

**THE ROLE OF CATHOLIC CHURCH IN ENVIRONMENTAL
CONSERVATION: A CASE STUDY OF MAKINDU
SUB-COUNTY, MAKUENI COUNTY- KENYA**

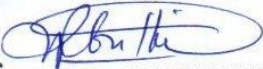
PETER MAITHYA MBUTHI

**A Thesis Submitted in Partial Fulfillment of the Requirements of the Degree of
Master of Arts in Religious Studies in the School of Humanities
and Social Sciences of Machakos University**

SEPTEMBER, 2024

DECLARATION

This thesis is my original work and has not been presented for award of a degree or any other award in any other University.

Signature.......... Date..... 17/09/2024

Peter M. Mbuthi

(REG. NO: C53/12780/2018)

SUPERVISORS

We confirm that the work reported in this thesis was carried out by the candidate and has been submitted with our approval as university supervisors.

Signature.......... Date..... 17/09/2024

Dr. Alex N. Kamwaria, PhD.
Department of Social Sciences
Machakos University

Signature.......... Date..... 17/09/2024

Dr. Julius W. Mbithi, PhD.
Department of Social Sciences
Machakos University

DEDICATION

This thesis is dedicated to my family members for their moral support and encouragement throughout my post graduate studies. To my deceased parents (Kimuyu Kyenze, Milka Kavithe, Mbuti Musomba) and David Mbuti for the gift of education. Glory be to the Lord.

ACKNOWLEDGEMENT

This work is a result of contribution from various people whom I have to acknowledge. I'm grateful to Machakos University for providing an opportunity to pursue my post-graduate studies. I also wish to express my sincere gratitude to my supervisors Dr. Alex N. Kamwaria and Dr. Julius W. Mbithi with whose guidance throughout the research period contributed enormously to my success. Always feel appreciated.

I also extend my sincere thanks to Mrs. Dorcus Mutisya for tirelessly typing my bulky research manuscript. It was not an easy task! And to all, "Climate change is real, let us Adapt or Perish."

ABBREVIATIONS AND ACRONYMS

ARC	Advocates for Religious Conservation
ASAL	Arid and Semi-Arid Lands
COP	Conference of Parties
KMD	Kenya Meteorological Department
KWS	Kenya Wildlife Service
NDMA	National Drought Management Authority
NEMA	National Environment Management Authority
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UN	United Nations
PAC	Population Animal Control
PPE	Personal Protective Equipment

OPERATIONAL DEFINITION OF TERMS

Arid Land: Land which over a time losses its ability to sustain human, plant and animal lives.

Conservation: All that is done in relation to land use with the intention of reducing land degradation.

Dominion: The selfish use of natural resources beyond what each ecosystem can provide.

Eco-theology: Christian teachings that focus on good use of the earth's resources.

Environment: All those surroundings us both living and non-living things.

Environmental Conservation: Human activities related to protection and care of environmental resources within a particular area.

Environmental Degradation: The progressive declining ability of land resources in a particular area to support lively hoods.

Stewardship: The collective efforts of a people in a specific area to co-exist with nature for a symbiotic benefit of all.

TABLE OF CONTENTS

DECLARATION.....	II
DEDICATION.....	III
ACKNOWLEDGEMENT.....	IV
ABBREVIATIONS AND ACRONYMS	V
OPERATIONAL DEFINITION OF TERMS	VI
LIST OF TABLES	XI
LIST OF FIGURES	XII
ABSTRACT.....	XIII
CHAPTER ONE.....	1
INTRODUCTION.....	1
1.1 Background to the Study	1
1.2 Statement of the Problem	5
1.3 Objectives of the Study	6
1.4 Research Questions	7
1.5 Significance of the Study	7
1.6 Scope and Limitations of the Study	8
CHAPTER TWO	10
LITERATURE REVIEW.....	10
2.1 Introduction	10
2.2 Theological Foundations of Environmental Stewardship	10
2.3 The Anthropogenic Causes of Environmental Degradation	12
2.4 The Role of the Catholic Church in Environmental Conservation	15
2.5 The Environmental Stewardship Projects Implemented by Catholic Church.....	18

2.6 Theoretical Framework	24
2.7 The Dominion Theory and Environmental Degradation.....	24
2.8 The Stewardship Theory and Christian Environmental Conservation.....	27
CHAPTER THREE	30
RESEARCH DESIGN AND METHODOLOGY	30
Introduction	30
3.1 The Study Area.....	30
3.2 Research Design	32
3.3 Target Population	33
3.4 Sampling Technique and Sample Size	33
3.5 Sample Size	33
3.6 Sampling Technique.....	33
3.7 Data Collection Procedures	36
3.7.1 The Questionnaires	36
3.7.2 Oral Interview	37
3.7.3 Observation Method	37
3.7.4 Secondary Data	37
3.8 Validity and Reliability of Research Instruments	37
3.8.1 Validity	37
3.8.2 Reliability.....	39
3.9 Data Analysis Procedures and Presentation	40
3.9.1 COVID-19 Mitigation and Adaptation Measures.....	41
3.9.2 Data Management and Ethical Considerations	41
CHAPTER FOUR	42
PRESENTATION AND INTERPRETATION OF THE RESEARCH FINDINGS	42
Introduction	42

4.1 Environmental Degradation in Makindu Sub County.....	42
4.1.1 Clearing of Indigenous Trees.....	43
4.1.2 Charcoal Burning and Anthropogenic Bush fires.....	45
4.1.3 Poor Land Management Practices	51
4.1.4 Overgrazing.....	55
4.1.5 Waste Management in Market Areas and Environs	58
4.1.6 Poverty and Environmental Degradation.....	62
4.1.7 Extractive Activities.....	63
4.2 The Doctrinal teachings of Catholic Church on environmental conservation	67
4.2.1 The Catholic Church and environmental doctrines sensitization forums	68
4.1.3 Percentage of environmental sensitization by the Catholic Church	69
4.2.2 The Catholic Church Climate Covenant.....	73
4.2.3 The Catholic Church and the Gospel of Creation.....	75
4.2.4 The Catholic Church Prayers on the Environment and Stewardship.....	77
4.3 The Environmental Stewardship Projects Implemented by Catholic Church in Makindu Sub County.....	78
CHAPTER FIVE.....	84
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	84
Introduction	84
5.1 Summary	85
5.2 Conclusion.....	87
5.3 Recommendations	87
5.4 Suggestions for further study	90
REFERENCES.....	91
APPENDICES	98
Appendix I: Preamble.....	98
Appendix II: Informed Consent Form for Data Collection.....	99
Appendix III: Questionnaire for Catholic Church Leaders and Farmers	100

Appendix IV: Questionnaire for Farmers, Government Officials and Business	
Community	103
Appendix V: Interview Schedule for Catholic Church Leaders	105
Appendix VI: A Schedule of Respondents	106
Appendix VII: Research Authorization from University.....	108
Appendix VIII: Research License	109
Appendix IX: Plagiarism Report.....	109
Appendix X: Christian Church Population in Makindu Sub County Per	
Denomination	111
Appendix XI: A Summary Distribution of Sample Population in Makindu , Sub	
County, Kenya	112
Appendix XII: A Physical Map of Makindu Sub County, Kenya	113

LIST OF TABLES

Table 3.1: Summary of Sample representation and Sample size distribution	3
Table 4.1: The table and the bar graph below gives a summary of the anthropogenic causes of environmental degradation in Makindu Sub County, Kenya.	5

LIST OF FIGURES

Figure 3.1 : A Physical Map of Makindu Sub County, Kenya	32
Figure 4.1 : Hay poaching.....	44
Figure 4.2 Shows indigenous trees cleared for Charcoal burning	47
Figure.4.3 Air pollution as a result of smoke emitted from a Charcoal burning site and a bush fire.	48
Figure 4.4 Air Pollution from road dust due to a moving vehicle along Sekeleni – Kalembe raha in Muuni Sub-location–Nguumo location	50
Figure.4.5 Displays storage of wood as a source of energy for domestic use common in many of the households of Makindu Sub County.	51
Figure 4.6 A rocky area cleared and planted with maize /beans in Kaunguni Sub location/ Kalakalya village.	54
Figure 4.7 Shows the main anthropogenic causes of environmental degradation in Makindu Sub County, Kenya	55
Figures 4.8 Shows the challenge of over stocking leading to overgrazing hence environmental degradation.	57
Figure 4.9 Aabove shows careless garbage disposal of plastic polythene bags	59
Figures 4.10 Demonstrate water pollution and air pollution	61
Figures 4.11 The extent of poverty and notice the use of grass, wooden materials to build residential houses.	62
Figures 4.12 Demonstration of extractive activities	65
Figure 4.14 Environmental conservation projects	80

ABSTRACT

The purpose of this study was to find out the role of Catholic Church in environmental conservation in Makindu Sub County, Kenya. The researcher adapted the dominion theory (1:27-28) and stewardship theory (Genesis 2:15) as a theoretical framework. The research was guided by questions that sought on how anthropogenic activities cause environmental degradation in Makindu Sub County, are there environmental doctrines of Catholic Church that teach about environmental conservation, has Catholic Church implemented any environmental stewardship projects in Makindu Sub County, Kenya and suggestions on how the environmental conservation in Makindu Sub County, Kenya could be enhanced. The study targeted Catholic Church from Makindu Sub County, Kenya. The sample included 10 Church leaders, 20 lay leaders, 10 development officers, 60 farmers 4 environmental officers, 6 agricultural officers, 40 business community members, from selected from different Catholic Church and Sub locations in Makindu Sub County, Kenya. The researcher applied both qualitative and quantitative research paradigms in collecting and analyzing data. The research instruments included questionnaires, oral interviews, observations and secondary sources (library, journals, newspapers, and E-books). Data was presented showing figure tables, pie charts and bar graphs using the Statistical Package for Social Sciences (SPSS) Microsoft 11.5 program. Non-quantifiable data was described in a narrative form. The major conclusions were that Makindu Sub County, Kenya has faced severe environmental degradation, acute food insecurity due to anthropogenic causes. The Catholic Church has responded to this environmental crisis by engaging in environmental teachings on its doctrines and initiating environmental stewardship projects. This has threatened the survival of many members of the Catholic Church who are also residents of Makindu Sub County, Kenya. The researcher recommended that Catholic Church members should adopt permaculture, use of green energy, eco-theological literacy, waste management skills, green revolution culture, identification and documentation of indigenous trees (*Acarcia tortillas* ponds, baobab tree), poverty eradication programs in order to enhance environmental conservation in Makindu Sub County, Kenya. In addition, since ASAL areas have unique geographical and climatic conditions the study suggested research be conducted in other ASAL areas. Secondly, studies also to be conducted to determine the challenges facing the implementation of environmental stewardship projects by Catholic Church in other ASAL areas. In addition, studies also to be conducted on the effects of environmental degradation on livelihoods in Arid and Semi- arid regions.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Environmental degradation is a vexing and spiral global phenomenon with negative social, economic and political consequences in both the developed nations and more severe in the third world countries. The 21st century is regarded as the century of the environment, the extent to which natural living conditions of the future generations on earth and their survival will be decided in the next decades. This is because of a rise in the speed of Climate change which is primarily regarded as the main looming humanitarian crisis due to environmental destruction. As result, this has prompted Catholic Church to be involved in addressing the world's most pressing existential challenge of Climate change due to wanton environmental destruction (Pope Francis, *Laudato, Si*, 2022).

All over the world, people have been engaging in plundering the environmental resources in search of food and for satisfaction of human needs (Shen, 2020). And more so, in the 21st century human beings are set on a path of unprecedented environmental degradation hence a profound moral and spiritual change is urgently needed according to Catholic Church environmental doctrines (Shen, 2020). In Genesis Chapter 2:15 the Lord took man and put him in the Garden of Eden to work on and take care of it. God gave man the stewardship role with the world to take care of the earth. For Catholics who account 80% of Kenyans not to be involved in this God given responsibility is a violation of the same divine mandate. Hence, the Catholic Church should teach her members to obey its doctrines which include environmental stewardship (Allen, 2019). Initially, the initiative of protecting the natural resources has been a preserve of many world governments assisted by Non-

profit making institutions. Besides these spirited environmental stewardship projects by various government agencies Catholic Churches all over the world appreciate the significance of environmental protection through Bible environmental teachings (Liederbach, 2022).

For example, according to the Catholic Church doctrines on environmental conservation emphasizes that after the creation of everything, The Lord God took man and put him in the Garden of Eden to till it and keep it as recorded in Genesis Chapter 2:15. Also, in Psalms Chapter 24 says keep the Lord's earth habitable, for the earth is Lord's and all that is in it. The Catholic Church environmental doctrines underlines the stewardship role of human beings and how man should relate responsibly well with the environment for his survival on earth. Therefore, human beings are entrusted with the divine mandate of taking care of God's creation in a transparent way (Igbo, 2021). This study, therefore, explained the role of the Catholic Church in environmental conservation.

The evidence of environmental degradation in the global South especially in Africa and more specifically in Kenya is endemic and phenomenal. Across the African continent negative impact of environmental degradation is manifested by a warming and drying Climate, cyclic droughts, declining water levels in the very known water masses, rivers and lakes like the drying of lake Chad in North Africa (Dike & Dike, 2018). Today, the more than a century old Catholic Church in Africa which is well spread and has numerically grown, expanding to almost every part of the continent is well positioned to deal with environmental atrocities, related to environmental degradation and its negative impact on livelihoods being committed to Mother nature. Hence, in Africa environmental conservation and promotion of awareness have

become matters of great concern because of its complex, widespread and long-term contribution to the survival of human beings (Amusan & Olutola, 2019).

Research conducted in Russia in regard to the contribution of mainstream churches towards environmental conservation demonstrated that the Catholic Church had impacted positively on a sustainable environmental conservation. An overall environmental conservation assessment report alluded that, Catholic Churches have progressively made official responses to the environmental crisis through environmental doctrinal teachings and community-based stewardship projects. As a result there has been implementation of various environmental stewardship projects by a majority of Catholic Church leaders (Duguma , L, 2020). In Kenya, the evidence of environmental degradation is visible and measurable. Temperatures have risen throughout the Country and extreme weather conditions are now a new norm in Kenya. The impact of Climate change in Kenya is accelerated by intense local environmental degradation (Government of Kenya, 2022). According to Drigo the environmental state in Kenya has not been sustainable in that, in the last twenty years or so, our forest cover has been reduced from 3% to 2% of total land cover. Deforestation is still at an alarming rate and we may end up having a land cover of less than 1% if the trend is not reversed with immediate effect (Drigo, 2019).

Today, only 17% of Kenya's land is arable land; the rest (83%) is arid and semi-arid lands (ASALs). The Country experiences a decline in soil productivity, prolonged drought and famine which have resulted to loss of plants, animals and human lives. Environmental degradation has also put pressure on water availability because rivers, lakes and wells have begun to dry up, (UNDP, 2022). Geographically, Kenya has twenty-three (23) ASAL counties which constitute about 88% of the Country's land

mass. Out of the twenty-three (23) counties, nine (9) are classified arid and fourteen (14) as semi-arid.

In the Semi-arid Counties like, Makueni County, Kenya environmental degradation is characterized by increasing drought, leading to declining water supplies making it a water scarce county. Declining indigenous forest and grazing lands as a result of poor land management practices causing soil erosion has led to loss of biodiversity accelerating arid conditions, food insecurity and poverty (Catholic Environmental Programs, 2019). Drought that for several months has ravaged large swathes of Kenya's arid and Semi-arid lands (ASALs) has so far killed over 50% of livestock there which is the economic mainstay of the pastoralist communities (Kogo, *et.al* 2021).

Makueni county classified as a Semi-arid zone with its different Sub counties like Makindu Sub County are experiencing negative effects of Climate change emergencies differently thus threatening the economic livelihoods of the residents (Kithuku, 2019). In order to reduce the negative impact of this phenomenon, the Catholic Church in Makindu Sub County, Kenya is engaged in environmental conservation activities.

In Makueni county Climate change and variability still remains a big challenge to the agricultural sector. For instance, in 2021-2022 rain season there was a 70 – 90% crop failure in the County with major crops registering an average of 60% decrease in productivity due to crop withering (Kogo, 2021). This has left about 60,000 people dependent on food assistance. Drought, heat stress, moisture stress, and increased surface temperatures are the most recurring problematic climatic hazards in the

County. Past climatic events have shown that drought is more likely to occur in Agro eco-zones which include Makindu Sub County, Kenya (Matter, et.al, 2021).

Makindu Sub County, Kenya was identified as a hot spot zone notorious for human-wildlife conflict resulting from the scramble for scarce water and pasture resources (Government of Kenya, 2018). The disastrous nature of severe drought makes the identification of impending Climate risks an urgent matter. The end result has been extreme poverty which has further made the people to exert more pressure on the remaining few natural resources leading to environmental degradation. And due to low agricultural productivity in the area as result of persistent drought and famine at alarming levels, has forced the residents occasionally rely on relief food from the government. This lack of adequate sources of food and reliable alternative sources of renewable energy against a surging human population have led to a forest depended communities in order to survive (Quandt, 2021).

To curb the rate of environmental degradation in Makindu Sub County a new environmental conservation culture needs to be nurtured by limiting the anthropogenic causes of environmental degradation and prioritizing the environmental stewardship projects implemented by the Catholic Church. The study, therefore explained the role of the Catholic Church in environmental conservation in Makindu Sub County, Kenya.

1.2 Statement of the Problem

Due to poor land management practices Makindu Sub County has continued to experience high levels of environmental degradation. There is extensive environmental destruction of indigenous trees, natural vegetation through Charcoal burning and bush fires respectively. This has consequently led to acute food insecurity

and water scarcity which are vital resources for human survival. In the yester years the area began experiencing low and unpredictable rainfall patterns hence poor agricultural productivity. Cycles of drought and extreme heat threaten natural habitats and farmers livelihoods. Environmental degradation is a common existential challenge in Makindu Sub County, Kenya. The Agro-pastoral communities living in these semi-arid regions of Makindu Sub County, Kenya are characterized by poverty, food insecurity, water scarcity, loss of biodiversity due to acute environmental degradation. This has triggered negative environmental conditions like cyclic drought, perennial water scarcity all accelerating the rate of environmental degradation and threatening the economic livelihoods of the people of Makindu Sub County, Kenya. Extreme drought in the semi-arid regions of Kenya like Makindu Sub County, Kenya has disrupted the livestock breeding cycle and caused animals deaths. Majority of the residents of Makindu Sub County, Kenya a semi-arid area occasionally face starvation due to acute food shortages caused by drought-fuelled crop failure. Long dry spells have also left hundreds of livestock emaciated and others dead in Makindu Sub County, Kenya. In order to reduce the rate of environmental degradation in Makindu Sub County, Kenya the role of Catholic Church in environmental conservation has been investigated. The study identified the anthropogenic causes of environmental degradation in Makindu Sub County, Kenya explained the environmental doctrines of Catholic Church on environmental conservation and finally established the environmental stewardship projects implemented by the Catholic Church in Makindu Sub County, Kenya.

1.3 Objectives of the Study

The purpose of this study was to explain the role of Catholic Church in environmental conservation in Makindu Sub County, Kenya.

More specifically, the study was guided by the following objectives:

1. To analyze the anthropogenic causes of environmental degradation in Makindu Sub County.
2. To explain the environmental doctrines of the Catholic Church on environmental conservation.
3. To establish the environmental stewardship projects implemented by the Catholic Church in Makindu Sub County.

1.4 Research Questions

1. What anthropogenic activities cause environmental degradation in Makindu Sub County?
2. Are there environmental doctrines of the Catholic Church that teach about environmental conservation?
3. Has the Catholic Church implemented any environmental stewardship projects in Makindu Sub County?

1.5 Significance of the Study

The study stressed that human activities were the major causes of environmental degradation in Makindu Sub County, Kenya a reversible trend hence the need to re-awaken Catholic Church to lead the way in the environmental restoration. The negative impact of the environmental degradation (food insecurity, water scarcity) is threatening the very existence of the majority people of Makindu Sub County, Kenya who are also Catholic Church members. The study findings emphasized that Catholic Church through environmental doctrinal teachings on environmental conservation is one of the key social pillars in the national sustainable environmental conservation

and a contributor to the big four agenda especially on food security in tandem with vision 2030 which is Climate sensitive.

For a long time, the focus was on mitigation of climate change focused on cutting emission of greenhouse gases into the atmosphere. Hence, when it comes to policy implementation, Catholic Church and other stakeholders will use the study findings to embark on a paradigm shift on environmental policy formulation by adopting a bottom-up approach/a three-P model. This down-up approach of policy operationalization has become a more realistic and cost-effective model of environmental conservation by targeting the local communities first.

The study revealed Catholic Church as one of the most resilient and ubiquitous social institutions in the semi-arid areas. As such Catholic Church is in a better place to continue playing a bigger role in Climate change adaptation and resiliency of its members by impacting on environmental doctrines and initiating sustainable environmental stewardship projects.

1.6 Scope and Limitations of the Study

The study was a case study, which focused on the role of the Catholic Church in environmental conservation in Makindu Sub County, Kenya. The research was guided by three specific objectives; to analyze the anthropogenic causes of environmental degradation in Makindu Sub County, to explain the environmental doctrinal teachings of the Catholic Church in environmental conservation and to establish the environmental stewardship projects implemented by the Catholic Church in Makindu Sub County, Kenya.

The study geographically confined its findings in Makindu Sub County, Kenya because of high rate of environmental degradation. Makindu Sub County is a home of

many Christian denominations but the study focused on Catholic Church in Makindu Sub County, Kenya.

The sample size population was one hundred respondents targeting seven groups of respondents i.e. 10 Church leaders, 20 lay leaders, 10 development officers, 4 environmental officers, 60 local farmers, 6 government officials and 40 business community. The study was guided by eco-theological perspectives where the nexus between the Catholic Church and environmental conservation is laced with theological overtones. A theological approach to the whole question of the role of the Catholic Church in environmental conservation poses a moral challenge which the research extraneously cannot avoid. However, the outcome of the study findings was guided by the role of Catholic Church in environmental conservation in Makindu Sub County, Kenya.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to review, synthesize and summarize literature related to the role of the Catholic Church in environmental conservation. The role of the Catholic Church in environmental conservation was done under the following sub-heading; theological foundations of environmental stewardship, the anthropogenic causes of environmental degradation; the environmental doctrinal teachings of Catholic Church in environmental conservation; the environmental stewardship projects implemented by the Catholic Church.

2.2 Theological Foundations of Environmental Stewardship

Theology of the environment tries to interlink two levels of relationships that are of human kind and its world in their relationship to the creator. God who is the creator of all the universe. who rules and reigns requires that every human being to worship and adore Him psalms 103;19-22. All what is seen on earth and with it, reflects his wisdom and goodness (Ps. 102 25-27; Heb, 1:3). Both men and women were created in His very own image, and they were commissioned to and mandated to live with other created creatures but with a special calling to be the overall steward as it is clearly depicted in Genesis 1:26-28 and Psalms 8:5. Fundamental to the Christian environmental ethic, then there is the doctrine of humankind being created in the image of God. Although there has been debates from some environmentalists who argue and insist that there are equal rights and value of all forms of life ,ideally it negates the biblical commissions of human beings, being bestowed with the special and unique assignment as a responsible steward which is seen to eliminate the very rationale for human beings present care for the entire creation .The image of the

almighty God is characterized in knowledge and righteousness of human character ,and express itself in the expected creative human stewardship and dominion over the earth .Human stewardship under the command of the almighty God therefore clearly implies that we have a moral obligation of being accountable to what he bestowed to us to do for the glory of the kingdom of God which depends on our actions from the freedom given to us for choosing.

Human beings are called upon to play their role of stewardship in a free way that is guided by the scriptures and the spirit of God .The calling to be stewards is not affected by the fact that man fell into sin which caused him to be judged and as a result being subjected to separation from the almighty God and even death as it is written in Genesis2:17. Indeed, Jesus Christ involves the sinful fallen human beings in the work of being good stewards of restoring the very Gods creation (Rom.8:21).Francis Bacon in his New Method of Science notes that the fall of man from his state of innocence and from his dominion over creation which makes it difficult for human beings to demonstrate Godly stewardship ,but through the work of Christ in ,on and through his people and creation makes it possible nonetheless .When the creation was taking place God prepared a very unique place in the name of the Garden of Eden ,and placed in it the first man ,Adam (Gen.2:8-15).God ,after placing Adam in the garden instructed him to cultivate and guard the garden (Gen 2:15) and to enjoy the fruitfulness that comes from it and both man and woman must multiply ,spread even beyond the Garden of Eden to fill and subdue the entire earth (Gen 1:26-28).They were given superiority and priority to exercise control over all the creatures that Gd had created. This clearly indicates that man was rightly and divinely placed in proper stewardship which he was supposed to ensure that there was harmony between him and the rest of the creation.

Human beings have a unique character that is not in any other creatures. They have both the rational and moral capacity to demonstrate real stewardship, by being accountable for the choices that they take and the responsibility for caring not only for being their own self but also for the sake of other creatures that they have been entrusted with. This summarizes that if human beings reject stewardship, then they reject the very divine calling of being accountable to the creator in terms of sustainable environmental conservation.

2.3 The Anthropogenic Causes of Environmental Degradation

All over the world and particularly in Kenya reveals the Country's rising surface temperatures, changing rainfall patterns affecting agriculture, rising sea levels, increase in extreme weather conditions, changing disease vectors, loss of biodiversity and ocean acidification. One of the visible impacts of Climate change in the Country has largely been persistent drought. The drought has led to huge losses of livestock, significant decline in crop production, as well as loss of lives through starvation and malnutrition (Collins, 2020).

While droughts are nothing unusual, the occurrences of droughts have become much more regular in recent times. For instance, chroniclers of drought frequency and changing climatic patterns demonstrate that in the 1960's, droughts would occur at intervals of twenty years, which later reduced to ten years in the 1990's and since 2000's to the present drought occurrence has been between one to three years (Richard, 2020). Agro- pastoralists and those who depend on rain fed agriculture have been the worst hit by this situation as it is a challenge to replenish their livestock or recover losses suffered (Pitman 2017). This report is relevant as it provided an updated information on the Climate regime that the Country is experiencing like

drought which is a ‘catalyst’ of environmental degradation. The study makes specific observations about the causes of environmental degradation in the ASAL areas like Makindu Sub County, Kenya.

Despite the generous beauty and abundant happiness that nature offers, human beings live in what has been called the age of anxiety. Human beings appear to be heading for disaster for the future has become a threatening encounter. There has been the view that human beings live in a new geological period, an anthropogenic era where human beings are becoming a force of nature, triggering immense changes in the ecosystem variations which could rebound, thus threatening our own livelihoods and lives of future generations (Anderson, 2018). This study related human activities as the main cause of environmental degradation and threatening lives of future generations which is linked with the objectives of this study in Makindu Sub County, Kenya.

The Catholic Church therefore is best suited to work with the marginalized groups by initiating many environmental conservation projects by generating home-grown sustainable solutions that are owned and driven by local communities in collaboration with government administration (Votrin, 2020). The Catholic Church in Ethiopia through her Development and Inter-Church Aid Commission has been long involved in assisting marginalized groups of people in identifying and dealing with the major factors that led to poverty, drought as well as human-wildlife conflict over resources by promoting stewardship programs through parish and diocesan centered approaches. Massive and extensive deforestation, especially through poor indigenous land management practices has resulted to scarcity of water which is a vital resource for human survival (Scheidel & Work, 2021). The study used this information as part of

Climate shocks precipitating negative human responses which have led to environmental degradation, a reversible trend under the current research in Makindu Sub County. It also highlighted one of the anthropogenic causes of environmental degradation elsewhere and which was also relevant in Makindu Sub County, Kenya.

Teahan, (2018) observed that human beings are polluting and destroying the environment, indeed wasting the limited resources of this planet at a phenomenal speed while at the same time witnessing a notorious human population explosions. Human beings depend on the environmental resources available for survival; he also notes that if human beings continue destroying the environment, we will destroy not only human beings but also the other life forms which depend on it. Waste management is also another environmental hazard due to the absence of modern facilities for proper waste disposal. Improper waste disposal has thus enhanced environmental degradation and lowered the quality of life (Teahan, 2018). This study seemed to blame demographic increase as a notorious cause of environmental degradation without showing how increase in human population can also be an opportunity to engage the people in reducing the intensity of environmental degradation through stewardship projects and as it was recommended in this study.

The study above also cited improper waste disposal as a great challenge in relation to environmental degradation which is also an opportunity to convert garbage disposal areas as material recovery sites by sorting waste material into bio-degradable waste and non-bio-degradable waste material/ a circular economic model (i.e. organic waste, plastic waste, paper waste) an informal form of employment to the majority jobless youth in the peri-urban markets of Makindu Sub County.

2.4 The Role of the Catholic Church in Environmental Conservation

According to Pope Francis (Laudato, Si, 2022) development and conservation is not a new thing in human history. And throughout history human beings have been both the object and agent of development. Development thus means nothing more than just man acting on his own environment to improve his condition (Tomislav, 2019). Indeed, from a theological perspective development is a human beings efforts to improve his living condition through use the world's resources in a sustainable way. This study is not specific and does not include the sustainability component of development a factor related to environmental conservation in which the Catholic Church ensured continued sustainable use of world's resources to improve human beings living conditions. The study demonstrated how the Catholic Church has contributed towards environmental conservation through sustainable stewardship projects it has implemented in Makindu Sub County.

Moreover, the Catholic Church and environmental conservation became a discursive t discourse especially in the mid 1970's and together with governments in both the developed world and the third world nations have overtime integrated sustainable environmental strategies into their national development plans (Anderson, 2018). The situation in developing world has shown differently that political administrative systems and structures alone cannot bring the idea of environmental conservation into fruition. The gaps identified can be filled if Catholic Churches continue to play an active role through systems which incorporates principles of sustainable environmental conservation. This study by Anderson is relevant as it admitted that political administrative systems alone without other stake holders like the Catholic Church the idea of environmental conservation had a missing link and therefore is not inclusive. The gap acknowledged was strategically bridged by the involvement of the

Catholic Church in environmental conservation through stewardship projects as recognized in the research findings.

The preoccupation of the Catholic Church as a religious organization since time immemorial has been associated with issues of justice but currently there has been a paradigm shift towards championing of issues related to environmental conservation which is 'married' to sustainability. Moreover, the related eco-theological literature available suggests that according to Catholic Church development has been measured in economic terms only, yet the term itself is a complex one with many facets which deliberately or otherwise ignored the spiritual dimension (Ives et. al, 2020). The spiritual dimension cannot be over looked as it is instrumental in shaping and re-shaping human attitude, values, hence influencing human behavior positively. The incorporation of the Catholic Church into the environmental agenda by many nations seems to offer potential initial advantages which serve as a road map to the attainment of a holistic environmental sustainability in many ways. The coming together of the Catholic Church leaders vitally offers possible opportunities for countries to share experiences on the implementation of environmental conservation programs (Ostheimer & Blanc, 2021). This study is silent on the spiritual dimension a prerequisite condition for sustainable environmental conservation an eco-theological doctrine domiciled in the Catholic Church social teachings and an approach widely employed in this study.

Morava, J, (2019) observed that the Catholic Church is often located in areas with a high concentration of vulnerable people, with most physical, psychological and spiritual needs. In speaking about the Catholic Church organizational capacity, in addition to its ability to gather peoples together for a common purpose and initiate

joint action, in many communities, the Catholic Church is one of the reliable social institutions there is. Furthermore, the Catholic Church leaders also enjoy high levels of trust and legitimacy just like civil society actors have also achieved. The Catholic Church leaders have received a divine call from God to address the spiritual as well the physical needs of the Church members. This set up is crucial as it is a strategic platform for an inclusive stake holder participation in all sustainable environmental stewardship projects. This study was relevant as it stressed the organizational ability and suitability of the Catholic Church to deal with the emerging issues periodically occasioned by environmental degradation though not specific. The Catholic Church is evenly distributed within the study area and the study demonstrated how practically it is being involved in environmental conservation.

The role of Catholic Church in environmental conservation has been given a lot of attention in many countries of Asia like Lebanon where Advocates for Religious Conservation, stressed more on environmental issues which progressively has evolved in to environmental conservation doctrinal teachings and sustainable implementation of environmental projects (Stowell, et.al, 2020). There is always a need for involving the civil society in environmental conservation of which the Catholic Church leaders can spearhead. Despite all its flaws and at time its perceived irrelevance, the Catholic Church is one of the most resilient and also the most ubiquitous social institutions there is (Morava, 2019). The study demonstrated the relevance of the Catholic Church in environmental conservation in Makindu Sub County, Kenya.

According to Broman and Robert (2019), the major question in environmental conservation discourse is whether the Catholic Church is going to act just as a guiding principle or whether it can generate practical workable environmental conservation

strategies. The concept of environmental conservation requires all stake holder active participation in both decision making at policy level and implementation matrix of environmental conservation ideas in communities which they live and work. The involvement of the Catholic Church at the two critical stages has stimulated Church members in providing insights in identifying and dealing with the emerging trends of Climate change as a result wanton environmental destruction and how it affects human beings and the earth in general and finding lasting local solutions to them. This has specifically placed the daunting responsibility on the Catholic Church to lead the way to restore the dilapidated environment. The study was relevant as it focused on the Catholic Church as one of the most suitable social institution to spearhead the environmental conservation agenda. However, practically the suitability of Catholic Church in environmental conservation and advocating for the weak like nature where man has turned to be the worst environmental ‘pest’ was highlighted in the study findings.

2.5 The Environmental Stewardship Projects Implemented by Catholic Church

Catholic Churches in the world today have pointed out the urgent need of dealing with the painful challenges brought about by environmental degradation as result of environmentally unhealthy lifestyles hence more emphasis on eco-friendly living styles. The Catholic Churches in Russia for the very first time declared the urge to actively participate in the process of environmental decision-making. In Russia, for instance the Catholic Church shrines/ forest churches/ monastery are indicators of religious sites to be chosen for afforestation programs in their specific localities and sources of indigenous knowledge on biodiversity that could serve as models of sustainable environmental conservation (Votrin, 2020). This study aptly identified destructive living patterns as the cause of Climate change but also preoccupies itself

with the glorification of the Catholic Church in the western world as the only leader in environmental concerns. To counter this pseudo narrative, the study focused on the role of the Catholic Church in the eastern as also proactive in environmental conservation targeting Kenya, specifically the Catholic Church in Makindu Sub County, Kenya.

In Africa, the Catholic Church leaders have been instrumental in influencing positive change especially in situations where political institutions are weak and sometimes, they are breaking down. A good example of where the role of the Catholic Church in environmental conservation has been magnificent is in Ethiopia. Aware of the Country's further decline of indigenous trees, Catholic Church in Ethiopia is engaged in environmental conservation programs (Bultz, 2019). Thus, the Catholic Church is playing a crucial role in environmental advocacy which is critical for raising awareness in environmental management. The Catholic Church in Ethiopia is conducting environmental sensitization forums to train its Church leaders and also guide the natives by inculcating the need to grow and protect the planted seedlings; highlighting the importance of protecting the existing trees, induce the desire to plant and look after newly planted trees and in particular taken care of the surviving indigenous trees and plants. In view of the above, human beings have a sole responsibility to give back to the creator regenerated environment (Votrin, 2020).

The Catholic Church in Russia as well as those in Ethiopia have been an excellent bridge heads for promoting sustainable environmental conservation (Votrin, 2020). The study was relevant as it provided a comparative analysis of the Catholic Church at the global, regional levels but 'silent' on the role of the Catholic Church in environmental conservation at the local level i.e. Eastern Africa like Kenya where the

case of the Catholic Church in Makindu Sub County, Kenya was the focus of this study.

It is clear that Catholic Church doctrines on environmental conservation do not go against Bible norms on the Christian idea that all creation belongs to God with human beings given the divine task to be responsible stewards over Gods creation. Catholic Church participation in environmental conservation conferences that have been held across the globe like the COP 27 in Egypt encompass many environmental teachings like care for environment, environmental management motifs and taking care of fellow human beings, fairness to all including eco-justice. For instance, Catholics are taught by their church leaders about stewardship behavior as ordered to human beings in the garden of Eden to work on it and to keep it (Liederbach, 2022). Psalms Chapter 24:1-2 says keep the Lord's earth habitable for the earth is Lord's and all that is in it. This is the core Catholic Church concept of sustainable environmental conservation (Holy Bible). This study was relevant as it stressed that environmental conservation should also employ eco-theological perspectives and be guided by biblical stewardship themes as it was used in this study.

Many Catholic Church's in Europe and also Asia are engaged in the formulation and actualization of their local environmental policies which they weave in their environmental teachings guiding their Christian service to human beings that seeks to transform the lives of the Catholic Church members and treat nature with reverence. As the Catholic Church is gradually struggling to meet the needs of the technology-oriented world characterized by mass exploitation of natural resources and selective consumption human beings should vicariously protect the environment by enacting

sustainable stewardship activities in their localities in conjunction with other stake holders (McNamara, 2020).

Another example of a successful use of the Catholic Church in environmental conservation in a Muslim dominated Country is in Lebanon where the Advocates for Religious Conservation (ARC) teamed up with local government to encourage the Catholic Church to protect their surrounding indigenous forests. The Catholic Church has succeeded in protecting the indigenous forests, as well as responsible for developing environmental conservation projects in over seventy surrounding villages and still plays a major role in environmental conservation in Lebanon (Allen, 2019). The study used this case to demonstrate the relevance of the Catholic Church elsewhere in Makindu Sub County, Kenya in environmental conservation efforts to mitigate and create resilient communities against the adverse effects of Climate change.

The Catholic Church's environmental agenda is to enlighten the people and also mold the behavior of its members by including ecological teachings and locally adaptable conservation models into various theological colleges and universities curriculum (Allen, 2019). The Catholic Church in many places is a positive influencer for behavior change as it is often well respected and listened to within communities. In Kenya, Watamu in Malindi Sub County is known globally as a hot spot for environmental conservation. It is here that A- Rocha Kenya, a Christian organization that deals with environmental care, community conservation and marine research has established itself using the church as a gateway to the community hence providing a classical way of working with communities to do conservation work.

A-Rocha Kenya is one of the twenty projects (20) around the world working in conservation for example, advocating the use of solar lighting systems and energy saving jikos which have reduced over reliance on wood. This has seen a clean environment where communities are actively engaged in tree planting to expand the Arabuko Sokoke forest which stretches from Somalia, through Kenya up to Mozambique (Habel, 2021). The Arabuko Sokoke forest has a wide range of biodiversity of wildlife and a home of rare species of birds facing extinction.

A-Rocha Kenya has also been involved in the establishment of seedbeds for indigenous trees and supply of seedlings to schools and the community towards forest restoration since June, 2021. In addition, it has also planted over 3714 indigenous trees through schools initiated environmental stewardship projects (Fungomeli, 2020). The study used this data as a case study of how faith-based organizations should benchmark the Arabuko Sokoke program to initiate stewardship programs in areas adversely affected by environmental degradation like Makindu Sub County, Kenya.

The ethical imperative of stewardship which must underlie all environmental policies and initiatives is echoed by D. Western, in his book *Conservation in the Twentieth Century* defines stewardship as the duty to look after our world prudently and conscientiously. The key to this activity of trusteeship, curatorship or tenancy is a conscious understanding and duty to care for our environment. As noted by Beltran, (2020) human beings have obligations to God and to the person and things over who we are stewards, not only to profit the land lord but also to benefit and do justice to the whole creation. Human beings are just but custodians of the earth (Beltran, 2020).

The words of John Ruslin as quoted by Beltran summarize it all that, the God has lent us the earth for our life, it is a great entail. It belongs as much to those who come after

us and whose names are already written in the book of creation, as to us; and we have no right by anything we do or neglect to do to involve them in unnecessary penalties, or deprive them of benefits which were in our power to bequeath.

The above sediment frequently resurfaces and a variant of it was attributed to Mrs. Thatcher in the United Kingdom government's white paper, *The Common inheritance* 1990 which was also quoted by Beltran (Beltran, 2020), We do not hold freehold on our world, but only a full repairing lease. We have a moral duty to look after our planet and hand it in good order to the future generation. This concept has gradually evolved into different sustainable environmental conservation models in the World. But none of the above proponents of stewardship have offered universally applicable ways of how man can be a good steward.

Moreover, these Eurocentric relativism views do not offer a way forward to the environmental degradation crisis facing Africa today. The study established a number of stewardship projects implemented by Catholic Church in Makindu Sub County, Kenya a practical approach towards mitigating environmental challenges facing many African countries Kenya included but glaringly missing from the above observations by Mrs. Thatcher and as reinforced by Beltran.

Broadbent, J, (2020) strongly asserts that the destruction of the environment must offer mankind a good opportunity to revolutionize his attitude towards nature. He observes that although movements for the conservation of the environment within the Catholic Church have been started and have already borne fruit. Likewise other religious scholars like Horrell, (2019) deeply explores how the Bible is rich with deep insights on environmental issues. He stresses the need for Catholics to be responsible and faithful stewards in looking after God's creation entrusted on them. The Catholic

Church in Kenya has become vocal in addressing environmental crisis the world is facing. However, Horrell does not focus on different Stakeholders like community, government agencies, the business community among others and how the Catholic Church can use its presence, resources and its closeness to the people in conserving the environment, a recommendation that was made in this study.

Bassey and Pimaro, (2022) alludes that conservation and protection of the environment is a prerequisite condition for a holistic development in any society. Alternatively, Bassey and Pimaro sees religious people and philosophers as custodians of faith who can help to rekindle the inherent feelings in human beings about their place in nature (Bassey & Pimaro, 2022). He however, does not show how the Catholic Church leaders who he calls custodians of faith can practically and in verifiable ways use their position/s to contribute towards environmental conservation in their areas of jurisdiction. The study is relevant as it stressed that Catholic Church leaders have a significant role to play in environmental conservation but does not approach environmental conservation as collaborative multi- sectoral efforts bringing on board other Stakeholders like farmers, government officials, business community who are also invaluable participants in environmental conservation.

2.6 Theoretical Framework

The study was guided by the dominion theory and environmental degradation, stewardship theory and the role of the Catholic Church in environmental conservation.

2.7 The Dominion Theory and Environmental Degradation

Genesis Chapter 1:27-28 has been quoted and continues to be quoted by many believers and non-believers who consider Christianity to be an unfriendly religion towards the environment and who want to legitimize their exploitative activities

towards nature (Igbo, 2021). This relevant portion of the scripture reads that God created man in His own image, in the image of God, He created him: male and female, He created them. And God blessed them and said unto them to be fruitful and increase, fill the earth and subdue it, have dominion over the fish of the sea and the birds of the sky and over every living thing that moves on the earth (Holy Bible). Indeed, generations of Christians have interpreted this Genesis command as almost mandating a senseless exploitation of natural resources and a totalitarian dualism.

The environmental degradation witnessed today can to some extent be attributed to Christianity. This is the biblical belief that nature, seen as inferior to human beings can be controlled by man and this has brought a lack of respect for the sacredness of nature. Lynn White summarizes this when he says: we are superior to nature contemptuous of it, willing to use it for our slighted when... We shall continue to have a worsening ecological crisis until we reject the Christian axiom that nature has no reason for existence (White, 1967).

Lynn White's conclusion was that, what people do about their environment depends on what they think about themselves in relation to things about them. Human ecology is deeply conditioned by beliefs about our nature and destiny; that is, by the religion. And in its western form, Christianity is the most anthropocentric religion the world has ever witnessed. Christianity, in absolute contrast to the ancient paganism and Asia's religions not only established a dualism in which human beings exploits but also dominates nature for his proper selfish end. The Genesis story in its insistence upon dominion and subjugation of nature encourages the most exploitative and destructive instincts in man, rather than those that are deferential and creative. The defensive response to this criticism is a misinterpretation of the biblical verses (White,

1967). The command to have dominion and subdue the earth as Beltran observes, was given by God to man in the context of being made in his own image. It was not a license for an unfettered exploitation, but an obligation to look after God's work responsibly on His behalf. The etymological meaning underlying the word dominion, implies unfettered control, unlike the Israelites concept of kingship of an accountable servant, but not an oriental despot (Beltran, 2020).

However, the Hebrew understanding was that of a ruler totally responsible for his subject's welfare-care, feeding, protection, etc. D. Western concurs Beltran's conception of 'dominion' by noting that: as a Lord of his realm, the king is responsible not only for the nation; He is also the one who bears and mediates blessings for the realm entrusted to him. Man would then fail in his royal office of dominion over the earth when he exploits the world's resources to the detriment of the land, plant life, animal, rivers, sea, negatively impacting on human beings as well. Human beings' misconception and selfish execution of the principle of dominion has resulted in to the current environmental crisis. Everyone is realizing that the earth is losing its ability to sustain both terrestrial and aquatic life. This is manifested in the extreme atmospheric changes, water scarcity, pollution, loss of biodiversity, decline in soil fertility and forest cover. Human beings are now asking the question: what then should be the way forward? Yi,C, (2020) a pioneer conservationist proposes that the first step must be plainly to reject and scrub out the complacent image of man as the conqueror of nature and of man as licensed by God to conduct himself as the worst earth's environmental pest.

2.8 The Stewardship Theory and Christian Environmental Conservation

Those who critique Christianity of promoting exploitative attitude towards nature are nevertheless in agreement that the necessary key to both the past and future environmental sustainability is in adopting the right attitude towards nature. Lynn White (1967) is explicit when he says that since the roots of our environmental crisis are so largely religious, the remedy must be essentially religious, whether we call it that or not. What we do about nature depends on our ideas of man-nature relationship. Far from being the roots of our environmental crisis Christianity offers not only a credible explanation for our environmental crisis but also the very solution for the same environmental crisis (White,1967). Thus, the view that Christianity should bear a huge burden of guilt for our current environmental crisis as argued by Lynn White and others should not hold back Christians in their fight for environmental conservation. Christianity offers deep insights towards environmental reconstruction, particularly the principle of environmental stewardship (Liederbach, 2022).

The environmental crisis better known as the Climate change facing the world today is no longer an imagined phenomenon. It is real and is threatening our very existence either we adapt or perish as human beings. Human beings are now facing the harsh reality after the wanton destruction of its own environment. This calls for prudential considerations for a speedy remedy. The environmental crisis should be sending a warning signal and alerting bells to human beings that the very basic religious principle has not only been forgotten but also totally overlooked – the principle of environmental stewardship (Liederbach, 2022).

DeWitt, (2019) notes that man has so far too long forgotten that the earth was given to him for fruitful use only, not consumption for profligate waste. Therefore, if

Christians still believe positively in the goodness and even the holiness of God's creation from the visible environment, they face an urgent task of defending that paradoxical doctrine very energetically (Beltran, 2020). In the Christian faith there is an irrefutable truth that God owns all. God owns everything in the world. This is evident from the Catholic Church environmental teachings, for instance; Psalms 24:1-2, Psalms 50:10-11, Psalms 89:11-13, Leviticus 25 e.t.c. These reaffirms that human beings only take care of the earth on behalf of the owner, the Creator-God. The 'big' attitude by human beings in the modern world, 'to own and use of earthly resources carelessly' has led to poor environmental stewardship.

To a large extent, the environmental crisis arises from our habitual and utopian assumption that the earth belongs to us, to human beings and to this generation in particular. However, by no conceivable title does this world belong to us. Christianity as a world living religion continues to influence human history in various aspects of human life. Likewise, Christianity and the Catholic Church in particular have a potential to positively contribute towards environmental stewardship. There is an urgent need for a more realistic idea of our own understanding, a habitual awareness that we live here on earth not as free holders but as tenants and stewards responsible always to someone else, God the giver of life (Dewitt , 2019).

The moment human beings will come to the habitual awareness that they hold their dominion over nature only as stewards then they should show concern and their total commitment to environmental conservation both in the present and future. This duty towards the environment does not merely include their fellow men, but all nature and all other forms of life. DeWitt, (2019) sees the Catholic Church as an efficient instrument to bring about healing on our environment through biblical insights and as

creation awareness center. Genesis Chapter 2:15, states that the Lord God took the man, placed him in the Garden of Eden as root theme of environmental stewardship. It is a fundamental Catholic Church doctrine on environmental conservation with which Catholic Church members cannot afford to fail to urgently and seriously embrace it. It cannot only be that the earth has been given to us for our enjoyment, but also that it has been entrusted to our care, protection hence we should not manage it as if God is an absentee land lord (Igbo, 2021).

This chapter highlighted the empirical review of theological foundations of environmental stewardship, anthropogenic causes of environmental degradation and their biblical roots, the biblical connection between the church and environmental degradation is tackled in dominion theory. The stewardship role of the church as a key social institution in environmental conservation is articulated in the stewardship theory. The empirical review specifically used these insights in making an analysis of the role of Catholic Church in environmental conservation in Makindu Sub County, Kenya.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

Introduction

This chapter addressed the research methodology, study area, target population, sample size and sampling technique, data collection instruments, validity and reliability of research instruments, data analysis and interpretation, and data management and ethical considerations.

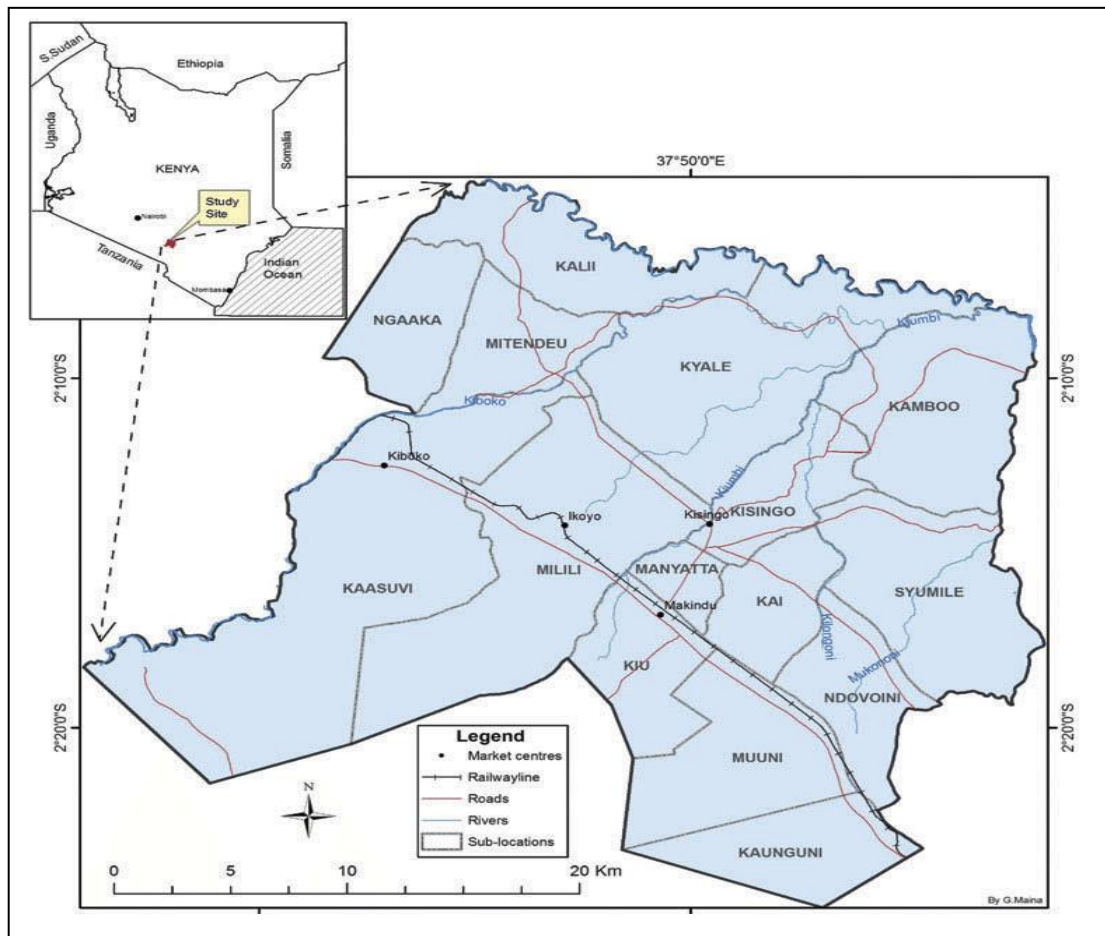
3.1 The Study Area

The study was carried in Makindu Sub County, Kenya. The reasons for choosing this area included one; the area is known for as a resource based human wildlife conflict zone and notorious for all forms of environmental degradation as a result of declining indigenous forests. It is located in south-west of Makueni County and bisected by the Mombasa highway almost in the middle. Makindu Sub County occupies an area 852.1 km² with a population of 84,946 and a population density of hundred people per square Km, and the number of households are 21,756, with an average household size of 3.8 as per population census 2019 (KNBS, 2019).

Geographically, Makindu Sub County is located in the most arid area of the County and it is extremely the driest part of Makueni county as it lies on the lower altitude. It borders Kibwezi and Mtito-Andei Sub County, Kajiado and Kitui County and Chyulu Hills National Park. Administratively, Makindu Sub County has four locations and fifteen Sub-locations based on the population census of 2019 (KNBS, 2019). In the past the Makindu Sub County served as a home to a large number of Agro-pastoralists but continued spells of drought, coupled with stringent supply of grazing lands, has forced the Agro-pastoral farmers to struggle to sustain their herds and supplement with crop growing due to dwindling grazing area and little rainfall.

After the gazettelement of Chyulu hills ecosystem as a National Park in 1983 majority of the displaced Agro-pastoralists are engaged destructive lifestyles causing massive environmental destruction. In order to survive, the internally displaced persons resorted to wanton environmental in destructive lifestyles including: tree poaching, Charcoal burning and anthropogenic bush fires, wood carving, cutting down and use of indigenous trees for construction purposes, firewood, sandal wood, debarking, grass harvesting, overgrazing, etc. (Muriuki,2019). These poor land management practices have led to over use of natural resources and therefore, the area is selected because of the visible destruction of indigenous forests characterized by severe cycles of drought that has led to acute food insecurity and water scarcity, a dual existential environmental challenge commonly being experienced in Makindu Sub County, Kenya.

Figure 3.1 : A Physical Map of Makindu Sub County, Kenya



A Physical Map of Makindu Sub County and its location in Kenya showing the study area. (Source: Makindu Sub County Development Stakeholders Forum 2018-2023).

3.2 Research Design

The study used descriptive research design. Descriptive survey involves a detailed account of the context, the activities, participants observations. The goal of the study was to explain the role of the Catholic Church in environmental conservation in Makindu Sub County, Kenya. The research design enabled the researcher to collect information from respondents on their opinions in relation to the participatory role of Catholic Church in environmental conservation in their area. The design enabled the researcher to gather both primary and secondary data. Primary data was obtained from field research using questionnaires, oral interviews, and participant observation.

Secondary data was generated from un/published research materials, journals and electronic books. The descriptive design generated both qualitative and quantitative. This method was thus preferred because it allowed for an in-depth study of the case.

3.3 Target Population

Makindu Sub County is a 'home' of numerous main line Christian denominations, including Catholic Church. The study focused on Catholic Church which is well established, has a long history in the community and is evenly distributed in all the fifteen sub locations of Makindu Sub County. The targeted Catholic faithful's in Makindu Sub County comprise 24,097 (28%) (The Secretariat, Makueni Association of Churches, 2022). The study focused on Catholic Church leadership: Priests, lay leaders, and Church members. Other Stakeholders considered in this study included farmers, development officers and business community.

3.4 Sampling Technique and Sample Size

3.5 Sample Size

The sample size of one hundred and fifty respondents was selected from the target population using simple random sampling and purposive sampling procedures i.e. 20 church leaders, 20 lay leaders, 10 development officers, 4 environmental officers, 60 farmers; 6 agricultural officers, 40 business community.

3.6 Sampling Technique

Two sampling techniques were used; simple random sampling and purposive sampling method. First, the researcher randomly selected one Catholic Church across the fifteen sub-locations of Makindu Sub-County, Kenya. The sample size was determined in accordance to Fisher et al., 1998 as applied by Braun and Clarke (2021).

$$n = \frac{z^2 pq}{e^2} = \frac{(1.96)^2 (0.31)(0.69)}{(0.05)^2} = 150$$

$$d^2 = \frac{z^2 p q}{n} \quad (0.05) (0.05)$$

where: n – the desired sample size is greater than 10,000, z – the standard normal deviation, set at 1.96, which corresponds to 95% confidence level p - The proportion in the target population estimated to have a particular characteristic (31% in this study are Catholics)

$$q = 1.0 - p = 0.07$$

d = the degree of accuracy desired, here set at 0.05 corresponding to the 1.96

to assign the example size to the strata, the proportionate stratification equation was used.

$n_h = \frac{N_h}{N} * n$; where n_h = sample size of catholic Christians for stratum h ; n_h = population size of Catholic for stratum h ; N = total population of Christians and n = total size of Catholic Christians.

In total, one hundred and fifty respondents were drawn. The first category comprised of government officials. Purposive sampling was used to select respondents for this category. This involved two officers; one Sub-County Agricultural officer and one NEMA officer. These officers interviewed provided detailed information on the causes of environmental degradation. The second category was drawn using purposive sampling from the selected Catholic Churches within Makindu Sub County, Kenya.

These included; Catholic Church leadership: 10 parish priests were picked from each of the selected Catholic Church's making ten respondents. Next were the 20 lay leaders. The two categories are the ones directly concerned with the implementation

of various stewardship projects hence provided a detailed information on the role of Catholic Church in regard to environmental conservation. The other Catholic Church group consisted of lay leaders and Catholic Church members. The researcher randomly selected 10 Catholic Church Development officers from each of the selected Catholic Churches, making ten respondents who provided data on the stewardship projects implemented by Catholic Church.

Through oral interviews, questionnaires and observation the farmers provided data on human activities related to environmental degradation, i.e. the poor land management practices, overgrazing, Charcoal burning and bush fires, clearing of indigenous trees etc. and their response to Climate shocks hence escalating poverty level in the study area.

The Government officials provided an updated data on the extent of environmental degradation in the study area and the policy intervention measures to the residents on how to diversify their farming practices and cushion the resident farmers from adverse effects of drought which substantially leads to food insecurity and water scarcity, the two observable negative effects of environmental degradation in the study area.

The business community provided data on anthropogenic causes of environmental degradation by identifying the sources of energy most commonly used and their contribution to waste disposal management, challenges and intervention measures. Simple random sampling was emphasized because it eliminated biasness and accorded the business community members an equal chance to participate in the final sample while purposive sampling helped the research to focus on particular characteristics of a population of interest, which best enabled to answer the research

questions (Denscombe, 2019). Overall, one hundred respondents were drawn to participate in the study. The sample was tabulated as indicated in Table 3.1.

Table 3.1: Summary of Sample representation and Sample size distribution

Study Area	Respondents Selected	Frequency
Church Leaders	- Clergy	10
	- Lay leaders	20
	- Development officers	10
Community Members	- Farmers	60
Government Officials	- Sub-County Environmental officers	4
	- Sub-County Agricultural Extension officers	6
Business Community	- Shopkeepers/ Hoteliers	40
Sample Size (Total)		150

Source: Researcher (2022)

3.7 Data Collection Procedures

The study used both primary and secondary methods of data collection as follows:

Oral interview, Questionnaire, Observation, Electronic books, Newspapers, Journals.

3.7.1 The Questionnaires

The questionnaire method was administered to the respondents who were able to read and write. They were hand delivered to the respondents. The questionnaire had both closed and open-ended questions which enabled the researcher to elicit a good qualitative data from the respondents. The questionnaire method was advantageous to the study because it enabled the researcher to cover a large geographical area of

Makindu Sub County, Kenya. It also gave a standardized response that was simpler to compare the different responses during data analysis.

3.7.2 Oral Interview

The personal interview was also conducted among the illiterate respondents. The researcher read the questionnaire questions, interpreting the questions and taking short notes from the oral responses of the respondents. The researcher compiled all the responses noting similar responses and their consistencies of mentioning noted. This method enabled the researcher to have face to face interaction with the respondents therefore minimizing the chances of misinterpretation of the questions or answers.

3.7.3 Observation Method

This was another key instrument of data collection tool which was guided by the objectives of the study. Observation method was employed to gather information on visible human activities that lead to environmental degradation in Makindu Sub County and the response of the Catholic Church towards environmental conservation through implemented stewardship projects.

3.7.4 Secondary Data

The library research formed the first method. Time and resources were spent consulting books either hard copies or electronic, magazines, journals, church publications and archival materials available either at Machakos University or elsewhere. These enabled the researcher to gain more information from other scholar's points of view in relation to this study.

3.8 Validity and Reliability of Research Instruments

3.8.1 Validity

Validity refers to the extent to which research instruments measure what is intended to be measured. How accurately the data is obtained in the study represents the

variables of the study (Mugenda & Mugenda, 1999). Content validity in non-statistical method used to validate the content employed in the questionnaire. This was done by research supervisors who read through the questionnaire and provided feedback. The recommended corrections were incorporated.

Pilot testing was also done at different sub locations of Makindu Sub County namely Kaunguni, Kiboko and Kalii Sub locations and it assisted the researcher to re-state the questions so that they could measure what they were supposed to measure (Kombo & Tromp, 2006). For example; Appendix iii (Questionnaire for Catholic Church leaders and farmers) Section A on background had b, (Gender) and (c) level of education missing, an omission that confused respondents on how to accurately respond and led to answers that were skewed towards one gender. This led to biasness, subjectivity and results being too general instead of being specific aligned with the research objectives. To rectify this anomaly, the gender and level of education component was included. Appendix iv: questionnaire for farmers, government officials and business community of the questionnaire had a question 1, 3, 4 and 6 wrongly framed. Instead question 1 had failed to answer the question how the environment had been conserved by the Catholic Church in Makindu Sub County, Question 3 instead of being specific on Catholic church simply mentioned the local church, question 4 mentioned a Christian instead of the Catholic church and question 6 measured effects of environmental degradation on livelihoods an objective not under the study. And Appendix v questionnaire interview schedule for Catholic Church leaders had question 2 not capturing the Catholic Church and spaces between questions too small not providing enough space for the respondents to write a detailed response. Therefore, the questions were corrected and aligned with the research title and specific research questions being investigated.

Validity of the instruments for qualitative data was ensured by triangulation; a similar question was put before respondents in each category and there was consistency in their responses, so that was the confirmation that the research instruments were valid. However, the research question with environmental doctrines of Catholic Church had to be explained to one category of respondents.

3.8.2 Reliability

Reliability is the measure of the degree to which a research instrument yields consistent results or data after repeated trials (Mugenda & Mugenda, 2003), reliability coefficient range from 0.00 for totally unreliable measure to 1.00 for perfectly reliable results. The reliability of the instruments (the questionnaire) in this research was determined through the SPSS data editor. The reliability analysis-scale (alpha) of items in the two questionnaires (Anthropogenic causes of environmental degradation and environmental doctrines of Catholic Church) ranged between 0.55 and 0.88 for example, the alpha of items in the two questionnaires (on anthropogenic causes of environmental degradation in Makindu Sub County and environmental doctrines of Catholic Church) ranged between 0.55 and 0.85. For example, the alpha of items on anthropogenic causes of environmental degradation in Makindu Sub County was 0.76 and for environmental doctrines of Catholic Church was 0.73. An analysis of all items at once in each research instrument also fetched results within the same range reliability apart from the environmental stewardship which read -27. This is acceptable range of reliability because according to Kothari (2004), reliability of 0.6 and above is satisfactory for any research concurring with Braun & Clarke (2015), who say that research instruments with a reliability of 0.5 can be used to collect data.

3.9 Data Analysis Procedures and Presentation

The study generated both quantitative and qualitative data for processing and analysis. The researcher coded the original data manually i.e labeling it and giving it numbers sequentially, cleaned it and organized it into categories according to research questions for quantitative and in to themes for qualitative data. The researcher then prepared four code books with their corresponding worksheets in the computer (SPSS for window 11.5 version) and entered the data. The researcher transcribed both interviews, looked for coded key words and phrases that were similar in meaning then entered data from Catholic Church leaders' questionnaires, Farmers, Government Officials and Business Community and Catholic Church leaders' interviews. Qualitative analysis was used to analyze the structured, open-ended questionnaires that were used for the study. The researcher applied content analysis methodology. This technique involved gathering of the common themes, grouping them according to their commonality and analyzing them in those groups. Finally, the researcher undertook a series of steps to detect data quality errors. The process involved detection of outliers, missing values, logical inconsistencies and coding errors, the researcher addressed first by detecting the source of the error and secondly, using statistical methods to clean data set.

Descriptive statistical analysis was applied for the analysis of quantitative data. The researcher analyzed data using descriptive statistics such as frequencies and percentages and compared responses from different categories of respondents. The analyzed data was presented using simple figure tables, pie charts and bar graphs using the Social Sciences (SPSS) Microsoft Office Professional Plus 11.5 program. Non-quantifiable data was described in the respondents' words and the researchers.

After the analysis and interpretation of data, a report of the findings was compiled and submitted.

3.9.1 COVID-19 Mitigation and Adaptation Measures

The data collection was carried in the context of COVID-19 health crisis. The methods of collecting data are overtly interactive, group sessions involving and including a large sample of hundred respondents scattered in different social settings of the entire Makindu Sub County. The researcher and the respondents were therefore of necessity required to adhere to the COVID-19 health protocols i.e. during the interview and focused group discussions washing hands, social distancing, face masking, sanitization was mandatory. As an additional cost the researcher bought and moved around with a hand sanitizer, packets of face masks distributing during individual/group interview sessions.

3.9.2 Data Management and Ethical Considerations

In this study, consent from a potential respondent was obtained. Permission was obtained from the research subjects in order to collect data from them. This was done in a non-coercive way worked out through the use of informed consent form for data collection. Anonymity where requested was ensured in order to protect the research subjects and the quality of data. The respondents were not compelled to reveal their identity at any time; this ensured their protection was guaranteed, to feel free to give honest responses. Except with the consent of the participants, confidentiality of their identity and data throughout the research was adhered to.

Where possible, potential participants were informed in advance of any features of the research that may reasonably be expected to influence their willingness to take part in the study. Openness and honesty about the research, its purpose and application was

put into consideration. An account of the purpose of the study as well as its procedures was provided by the researcher with a view to advance further research and advance scholarship.

CHAPTER FOUR

PRESENTATION AND INTERPRETATION OF THE RESEARCH

FINDINGS

Introduction

This chapter presents the findings of the study, the interpretation and analysis of the results. The chapter is organized in three sections. Namely;

- i. Environmental Degradation in Makindu Sub County.
- ii. The environmental doctrines of Catholic Church on environmental conservation.
- iii. The environmental stewardship projects implemented by Catholic Church in Makindu Sub County.

4.1 Environmental Degradation in Makindu Sub County

Displacement of people once settled in Chyulu Hills National Park has exerted more pressure on and has increased demand for natural resources like wood as a source of domestic energy hence tremendous decline in indigenous trees. And in order for the residents of Makindu Sub County, Kenya to meet their basic needs like food security has resulted in massive destruction of indigenous trees cover leading to severe and a wide spread environmental crisis. For example, increased environmental degradation has caused various forms of soil erosion due to overgrazing, Charcoal burning and bush fires, poor land management practices, extractive activities and poverty. This Chapter gives a detailed analysis of the anthropogenic causes of environmental degradation in Makindu Sub County, Kenya.

4.1.1 Clearing of Indigenous Trees

Clearing of indigenous trees to create space for farming activities and human settlement is still a very common practice of land mismanagement in ASAL areas for many years. Decline of indigenous trees in Kenya is both attributed to illegal human activities and by many other actors as well as government sanctioned forest excisions (NEMA, 2022). The Catholic Church members who responded to the question on the causes of environmental degradation gave varied reasons that were responsible for the declining indigenous trees cover in Makindu Sub County, Kenya. At least over 90% of the respondents attributed the causes of declining indigenous trees to Charcoal burning and anthropogenic bush fires, wood carvings, over grazing while 10% of the respondents mentioned human population pressure as a factor leading to the clearing of bushes for agricultural and human settlement purposes. Clearing of indigenous trees cover destroys natural habitats of many wild animals, important tree species which are a source of herbal medicine, wild fruits and affects the hydrological cycle.

Conservation areas like Chyulu Hills National Park are a 'home' of rare and endangered species like black rhino, a variety of rare indigenous tree species; acacias of different types, like the African olive tree, *Acacia Tortilis* (Muaa/Mulaa) which is threatened with extinction because of their use to make wood carvings and mostly Charcoal burning. The East African sandal wood (*Osyris Lanceolata*) commonly found in the Chyulu Hills National Park and its environs is unfortunately facing extinction due to tree poaching (Kamau, 2021). The wood is repackaged and exported to the Asian countries to manufacture cosmetics and perfumes. According to Mr. Nzioki a farmer of Kaunguni Sub location since 1966 had this to say about the environmental destruction, "this area used to have big 'whistling' trees and received reliable rainfall but due continued Charcoal burning rains have become un-reliable"

(Interview, 10.10.2022). The photographs below in Figures 2.0 and 2.1 displays one of the many cases of grass and tree poaching observed during the research at Kakuyuni and Kalakalya villages in Kaunguni Sub location.



Figure 4.1 : Hay poaching

In addition, another cause of declining of indigenous trees is due to poor farming methods and overstocking in small pasture areas (Collins, 2020). The study findings revealed that overstocking is one of the major causes of declining natural vegetation

cover in Makindu Sub County, Kenya. In one of the interview schedules administered to the village elders who are also farmers confirmed that the residents of Makindu Sub County engage not only in tree poaching but also continued to burn bushes as a way of preparing land for planting. The use of firewood as a major source of domestic energy in rural Kenya is wide spread; large quantities of firewood are consumed in the house holds as well as in the local markets, like hotels, butcheries on daily basis and in learning institutions.

Firewood like Charcoal is also for sale locally in the local markets as a way to earn a living and also as a Climate shock response strategy. The cutting down of indigenous trees is destroying the natural habitat of thousands of living forms (Ives, 2020). A resident of Kaunguni Sub location since 1969 (over 50 years), revealed that environmental degradation, “we used to burn and sell Charcoal to Charcoal dealers from Nairobi at Kshs.5 per 50 kg sack and other times in exchange of food stuffs and since then we have continued to receive little rainfall due cutting down of trees” (Interview, 13.10.2022).

4.1.2 Charcoal Burning and Anthropogenic Bush fires

According to Kamau P.N in his research paper titled “Anthropogenic fires and local livelihoods at Chyulu Hills Kenya,” says that there are different reasons why fires occur on lands surrounding their villages; people in this village light fires in the park as a sign of revenge against Kenya wildlife service (Kamau, 2021). Historically, when Chyulu Hills was officially declared a National Park, people living in the hills could not contemplate leaving their volcanic fertile woody lands to settle in the Semi-arid areas of Makindu Sub County, Kenya where means of livelihood were uncertain. The local residents of Makindu Sub County, Kenya have since then resulted to different

destructive adaptive Climate shock lifestyles the commonest one being Charcoal burning which is a major source of income for the Kamba in then Kibwezi district (Makindu Sub County today), and a major cause of bush fires reported in Kamba villages in and around Chyulu Hills National Park (Muriuki, 2019).

Bush fires from Charcoal production are anthropogenic, intentional and deliberate. According to one of the villagers interviewed reported that “we rely on Charcoal burning for income in this village. Most of us are not educated and therefore, we have no better paying alternative menial jobs, we rely on Charcoal burning. Sometimes, when an inexperienced Charcoal maker does not cover the Charcoal kiln with sufficient soil, fire flames might leak out and end up burning an unintended surrounding bush or spill over to neighboring farms and bushes. “Some of the fires you see here are deliberate”, to quote one of the anonymous respondents (Interview, 10.10.2022).

The research findings revealed that Charcoal business in Makindu Sub County, Kenya is accelerated by poor law enforcement where the residents obtain “oral permits” from local administrators in conjunction with the Nyumba Kumi appointees and rarely are this tree poaching activities reported as environmental crimes to the relevant authorities. Mrs. Regina a widow had this to say “I normally educate my children by selling firewood to schools and burning Charcoal with the full knowledge of local administration” (Interview, 14.10.2022). A good example is in Kalakalya village Kaunguni Sub location where Charcoal burning goes on unabated.

The photos 2.2 below demonstrates Charcoal burning sites and the collateral bush fires that are sometimes deliberate at a Charcoal burning site that are made to appear as accidental fires. Alongside the cutting down of indigenous trees in Makindu Sub

County it was observed during the research that collateral bush fires during Charcoal burning are a common phenomenon purposely to conceal evidence of the Charcoal burning and for the scene to appear as accidental fires.

Figure 4.2 Shows indigenous trees cleared for Charcoal burning



Figures (i)& (ii) captures the researcher Mr. Mbuthi at a Charcoal burning site Kalaka–Kaunguni Sub location near Chyulu Hills National Park. Photo taken on 12.10.2022

The bush fires spread widely and cause a lot of phenomenal environmental damage to the woodland natural vegetation and its biodiversity. Charcoal burning destroys the fragile volcanic lava shrubs, natural vegetation cover as they use traditional Charcoal kilns which are not energy saving. Fires from the traditional Charcoal kilns end up destroying the fauna and flora in the bushes surrounding the Charcoal burning sites. In addition, the smoke emitted from the Charcoal kilns causes intensive air pollution into the atmosphere, contributing a lot to Climate change (Bultz, 2019).



Figure.4.3 Air pollution as a result of smoke emitted from a Charcoal burning site and a bush fire. Photo taken on 12.10.2022

The third annual international Day of the Clean Air was celebrated on September 7th, as it was set aside by the U.N General Assembly's Resolution 74/212. The theme of

the Day was, "The Air We Share." According to the UN Environmental Programs (UNEP), air pollution was the greatest threat to public health, accounting for seven million premature deaths. UNEP also lists Kenya among the countries whose air is most heavily polluted. The UN says nine out of ten people regularly breathe polluted air. Air pollution disproportionately affects women, children, and older persons. However, little has been done to stop its negative effects to human health and the environment. With 99 % of the world exposed to polluted air, there is an increase in air related diseases such as lung cancer, acute respiratory infections, heart diseases and other complications (Bultz, 2019).

According to the National Environment Management Authority (NEMA), there are several causes of air pollution but the major ones for a third world Country like Kenya range from road dust, Charcoal burning, industrial effluents. In addition to the use of solid fuels, road side rubbish fires, careless disposal of litter, and exhaust fumes from public service vehicles. The research findings established that in the ASAL areas like Makindu Sub County, Kenya major air pollutants similarly included and were related to the African three stone fire place, local hotels where wood as a source of energy is consumed on a daily basis bellowing smoke in to the atmosphere. There is also careless disposal of litter where huge garbage heaps are visible in the markets even in many households that are without a strict garbage disposal culture. Charcoal burning and roadside litter from passengers commuting is another poor waste disposal acts. These also included roadside dust from the movement of large herds of livestock, daily fleets of motor cycles, tractors, lorries carrying ballast from areas of Kaunguni Sub location and sheet erosion observed in parts of Kalii Sub location during the dry season due to extreme environmental degradation as a result of uncontrolled

overgrazing. Roadside dust due to motor cars, motor cycles and strong winds blowing dust along most of the murram roads like Sekeleni – Kalembe raha road.



Figure 4.4 Air Pollution from road dust due to a moving vehicle along Sekeleni – Kalembe raha in Muuni Sub-location–Nguumo location . Photo taken on 16.10.2022

The photo 2.2 is a pile of wood stocked for use during the rainy season a culture in most of the households in Makindu Sub County, Kenya.



Figure.4.5 Displays storage of wood as a source of energy for domestic use common in many of the households of Makindu Sub County .Photo taken on16.10.2022

Woody plant resources are critical to the Kamba who extract them commercially for Charcoal burning and wood carving activities, a traditional economic lifestyle that is still practiced today. Wood serves as a vital source of domestic fuel and construction material. Forests play an important role in the maintenance of the ecosystem (Bultz, 2019). The study recommends that local residents need to be educated on the long-term benefits of environmental conservation. The Catholic Church in Makindu Sub County, Kenya has therefore devolved their environmental stewardship projects at the community level in order to reduce and reverse the rate of environmental degradation.

4.1.3 Poor Land Management Practices

Fire is an important environmental driver that influences the fruition of tropical ecosystem by directly modifying the structure and composition of vegetation. (Cochrane, Shenyang, Oba & Weladji, 2019). Fire also plays an important role on livelihood conditions of rural communities around the world (Cochrane, 2019). Indigenous communities in Africa also show a deep history of using fires in the dry season for many reasons including to stimulate sprouting for game and livestock grazing, create new areas for cultivation, kill disease causing vectors such as ticks and to keep away dangerous wild animals like snakes. Seasonal bush burning practices by indigenous communities can prevent late season fires, increase plant bio-diversity and improve productive capacity of tropical pastoral lands (Angassa & Oba, 2018). Moreover, this bush burning practices are detrimental to wildlife and leads to environmental degradation. The study revealed that this indigenous land management

practices are openly associated with diminished woodlands and accelerated soil erosion as they are part of poor land management practices which should be suppressed.

Indigenous agricultural practices are often associated with low levels of soil fertility, loss of the top fertile soil as evidenced by reduction of vegetation cover and other agricultural malpractices like overgrazing. Poor cultivation methods, particularly cultivation without cutting terraces on the sloppy areas have been associated with increased soil erosion greatly reducing the ability of the plants to vegetate and flourish well. Such poor farming methods have accelerated the rate of soil erosion and depletion (Singh, 2018). The research findings revealed that agricultural practices like mono cropping and lack of crop rotation over a long period of time have contributed to the declining soil fertility in many of the arable areas of Makindu Sub County, Kenya. One of the farmers observed that poor land management practices like abandoning farming areas to fallow seasonally and overgrazing for a long period of time have immensely contributed to declining soil fertility (Interview, 16.10.2022). And according to one of the farmers deliberately start fires in their farms after a harvest season as a traditional way of clearing weeds and as a preparation for the next planting rain season commonly practiced in Kaunguni Sub location. Local farmers set their farms on fire as a way of preparing to cultivate the new stony areas. The fires clear the weeds, opens up space and make it easier for the farmers to use broadcasting method of sowing seeds (Interview, 14.10.2022).

The study recommends to the farmers to employ environment friendly methods of farming like afforestation, crop rotation, use of drought resistant crops which are early yielding and suitable for arid areas, cut terraces to reduce the speed of running water hence minimizing soil erosion and restoring soil fertility. In addition, farmers should

keep a sizeable number of livestock in proportion to the available grazing areas or adopt zero grazing method of animal husbandry which is eco-compliant.

Majority of the respondents revealed that the need to feed the surging human population in Makindu Sub County, Kenya has forced many of the farmers in adopting Agro-pastoralism putting more stress on land and its diminishing environmental resources greatly accelerating the rate of aridity in the area. The researcher observed that gully erosion and sheet erosion were two very common environmental degradation hazards noted in parts of Nguu-Masumba Sub location specifically in Matutu and Kikumini villages as a result of wind which strongly blows away the top fertile soil during the dry season and running water during rainy season. Muema a farmer from Kalii Sub location since retirement 1980 reported that running water sweeps the top fertile soil away during the heavy rain seasons. In addition, over the years residents related this environment phenomena to the loss of grassy vegetative cover due to over grazing and cutting down of indigenous trees for construction and to meet Charcoal needs (Interview, 17.10.2022). When the indigenous trees are cleared, the exposed land becomes bare and more vulnerable to heat, soil erosion thus reducing the agricultural productivity of the land. Moreover, the loss of top fertile soil reduces fertility as the soil becomes denser, thinner hence less penetrable by growing roots (Maja, M, M. et.al, 2021).

Consequently, this reduces the soil's ability to hold water and makes not it available to plants hence withering of plants as a drought resistant adaptive mechanism. Likewise, vital soil nutrients are sieved away together with the top fertile soil. Figure 2:3 shows a rocky area cleared and planted with maize and beans in Kaunguni Sub location / Kalakalya village.



Figure 4.6 A rocky area cleared and planted with maize /beans in Kaunguni Sub location/ Kalakalya village. *Photo taken on 15.11.2022*

Table 4.1 The table and the bar graph below gives a summary of the anthropogenic causes of environmental degradation in Makindu Sub County, Kenya.

Variables	Human Population	Poor Land management practices	Poor Law enforcement	Ignorance	Unemployment	Charcoal burning and bush fires	Over-Grazing
Percentage of Respondents	90	75	25	80	40	97	85

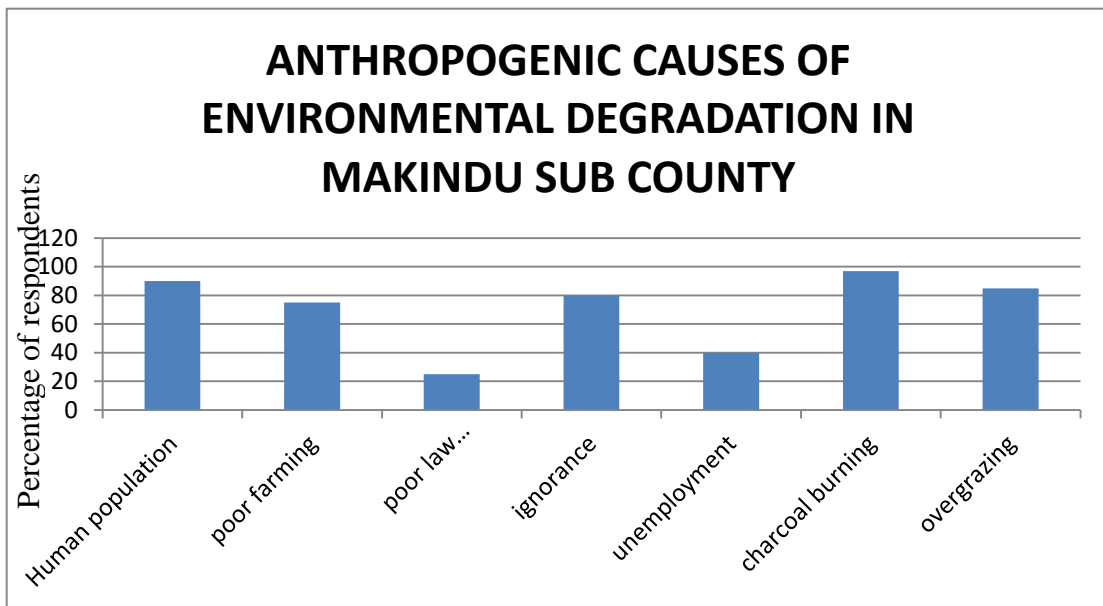


Figure 4.7 shows the main anthropogenic causes of environmental degradation in Makindu Sub County, Kenya

The respondents revealed the following were the anthropogenic causes of environmental degradation in Makindu Sub County, Kenya namely: human population growth 90%, poor land management 75%, poor law enforcement 25%, ignorance 80%, unemployment 40%, Charcoal burning and bush fires 97% and over grazing 85%. The study findings concluded that Charcoal burning and anthropogenic bush fires, human population growth were the major anthropogenic causes of environmental degradation in Makindu Sub County, Kenya.

4.1.4 Overgrazing

Pastoralism characterized by keeping of large herds of goats, sheep and traditional zebu cattle is a peculiar economic lifestyle of the people of Makindu Sub County, Kenya. Overgrazing has been the result of keeping and pasturing of large herds of goats, cattle and sheep in the very same areas for a long period of time. The quality and quantity of the livestock kept by individuals is commonly practiced regardless of

the quality and the monetary value of the animals (Bultz, 2019). Overgrazing has many destructive environmental consequences and observations made during the research revealed that over grazing is a serious environmental challenge in Makindu Sub County, Kenya. The study findings revealed that overgrazing has led to the degeneration of the natural vegetation cover by rendering fertile top soils bare and this has lowered the ability of many forms of vegetation life to thrive greatly reducing their survival rate. A local farmer stressed on an evaluation of the importance of the socio- economic value bestowed on large herds of livestock by the local community living in Makindu Sub County, Kenya as a major source of economic livelihood. These has encouraged over-stoking leading to over-grazing. In conclusion, she notes that overgrazing is also a major contributor to soil erosion in many ways including running water on sloppy areas and sheet erosion during the rainy seasons and due to strong blowing winds during dry seasons (Interview, 19.10.2022).

In addition, the researcher also observed that there is undue pressure on natural vegetation cover because of overgrazing livestock in both stony lava shrubs vegetation and arable areas of Nguu Masumba in Kalii Sub location of Makindu Sub County, Kenya. The researcher observed that in Soto and Kawelu villages of Kaunguni Sub location there were a higher number of households concentrated in the arable areas and sparsely populated in the stony lava buffer zone areas near Chyulu Hills National Park. These areas once reserved as a buffer zone and suitable for goat keeping and bee keeping is fast being phased out due to Charcoal burning and encroachments as a result of new human settlements.

Majority of the residents in the arable areas of Kawelu, Ndeini, Yala, Kalandaleni, Mombuni, Kakuyuni, Munathi villages secure grazing rights for their livestock on

“leased” pasturing grounds in wooded grassy volcanic areas bordering the Chyulu Hills National Park. Over stocking over a long period of time has over the years proven difficult to sustain livestock both during the rainy seasons and times of drought (Kelly, 2019). Figures 2.4 and 2.5 shows over grazing leading to increased arid conditions by wiping out vegetation cover thereby exposing the bare land to both sheet and gully erosion catalyzing arid conditions of the once arable land.



Figures 4.8 Shows the challenge of over stocking leading to overgrazing hence environmental degradation. Photo taken on 10.10.2022 at Kalii Sub location.

4.1.5 Waste Management in Market Areas and Environs

Cleaning markets off post-consumer plastic waste is an emerging environmental hazard in many of the urban as well as rural peri urban centres. The conversation around the disposal and the recycling of plastic straws and containers used for packaging of soda, beer, milk, water and juice is becoming critical. This is critical because although Kenyans interact with plastics daily a few dispose it properly after use (Quandt, 2021). A culture of littering is rampant and goes unpunished. There is lack of infrastructure for garbage sorting, collection and recycling as well as low awareness levels on the importance of recycling plastic remnants which is identified as a major concern encouraging this environmental hazard culture. The concept of extended producer/user responsibility in order to improve the way plastic waste is managed is critical in reducing the number of plastic remnants that goes to land fill our residential areas, market centres and also open spaces hence enhancing the green economy (UNDP, 2022).

The researcher has observed that, a large quantity of garbage is poorly dumped in market places and their environs leading to rotting and bad smelling heaps of garbage. According to a NEMA official garbage collection possess a serious challenge in Makindu Sub County, Kenya and its peri urban market centres due to poor waste management policies and lack of waste collection facilities (Interview, 16.09.2022). Moreover, observations made during the research revealed that poor dumping of plastic waste products is rampant across the village markets and the stop over markets along Nairobi Mombasa highway. Figure 2.6 shows poor plastic disposal and livestock feeding in one of the carelessly dumped litter in a local Market.



Figure 4.9 above shows careless garbage disposal of plastic polythene bags

Figure 4.9 above shows careless garbage disposal of plastic polythene bags, remnants of take away Alcohol bottles è.tc and livestock feeding in a garbage site in a local Market along Mombasa Road. The use of non-recyclable polythene bags has been banned by the government through NEMA but still in use a case of poor law enforcement on environmental protection.

In addition, the researcher observed that empty plastic bottles are collected and re-used by shopkeepers without considering the danger or the health implications they posed to the secondary users. The use of plastic bottles is accompanied by use of plastic straws which land fill over the open spaces. Despite the stench and buzz by blue flies which contribute to air pollution and, the vegetable vendors and other roadside hawkers go about their businesses in silence while exposed to this environmental hazard. However, the business community may not be aware that in its

Global Assessment Report on Disaster Risk Management 2022, the World Health Organization noted that at least eight hundred people die every hour as a result of dirty air they breathe and that globally, millions of people die every year due to air pollution (UNDP, 2022). One of the Market dwellers is concerned that besides the danger posed by waste disposal which includes plastic waste of broken bottles such haphazard dumping devastating impact has negative effect on the environment. We have complained about this waste that is normally dumped here by the sweepers employed by the County government of Makueni to keep the markets clean (Interview, 10.10.2022). The study suggests that the County government of Makueni in partnership with the business community should establish a well-managed dumpsite for safe disposal of waste and healthy living of the residents of Makindu Sub County, Kenya market dwellers.

The research revealed that in many of the retail business entities within Makindu Sub County, Kenya there is widespread circulation of the banned plastic polythene bags commonly being used as packaging material. This kind of plastic pollution is rampant today as observed in the open market spaces despite the government ban imposed on the use of plastic polythene bags in 2017 a case of environmental negligence hence poor law enforcement imposed on the selling of plastic straws was witnessed during the research which is a notorious environmental polluter.

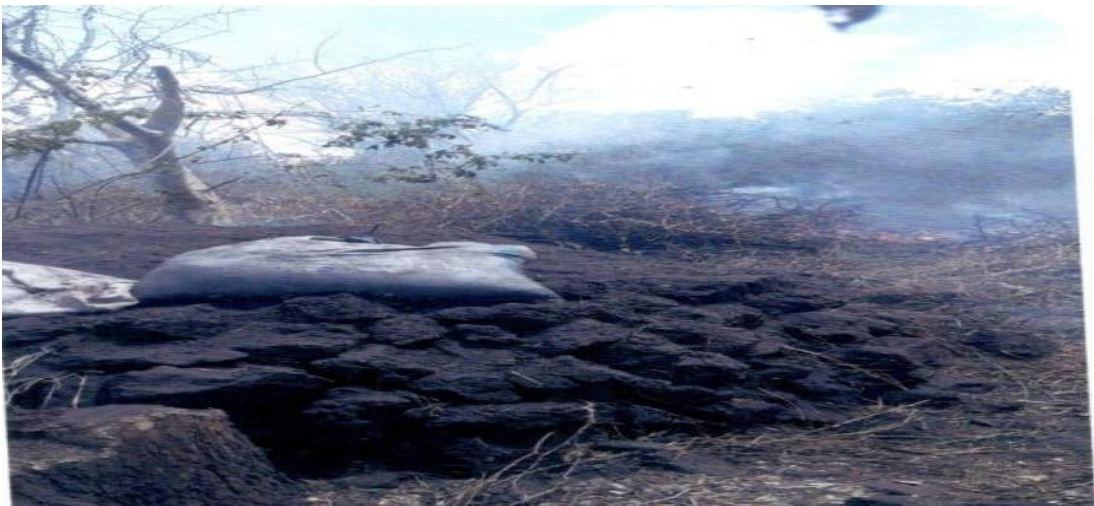
Observations made during the study also revealed that little or no recycling of plastic pollutants is done and the biggest quantity of plastic remnants ends up visible heaps of garbage. The Catholic Church can partner with the NEMA to turn garbage sites into material recovery sites. The youth in the Catholic Church should be trained on waste management skills of sorting, recycling as a form of an income to most of the

unemployed youth, in the urban centres through organized guidance and counseling environmental forums.

Figures 4.10 demonstrate water pollution and air pollution.



Children drawing water for domestic use inside Kwa Katundu Earth Dam.



Air pollution from a Charcoal burning site – Nguu Masumba. Photo taken on 03.09.2022

4.1.6 Poverty and Environmental Degradation

Poverty intensifies environmental degradation in many ways that are visible. The ASAL consists about 35% of Kenyans population (13million people) and over 60% of its inhabitants live below the poverty line, subsiding on loss of one US dollar per day (UNDP, Combating Desertification in Kenya, 2022). Extreme conditions of poverty and the need for the people to survive has forced majority of the residents of Makindu Sub County, Kenya to engage in wanton destruction of the environment. During the study it was observed that farmers who have no access to organic manure have continuously adopted fallowing, a poor land management practice of abandoning farming areas to regain fertility.

This shifting cultivation is wasteful and leads to poor agricultural production hence increasing food insecurity. Over a time, families have resulted to cutting down of trees to meet food and fuel needs, Charcoal burning business and the use of wood as construction materials. The increasing poverty index in Makindu Sub County, Kenya is aggravated by the growing human population of both the natives and new settlements, leading to encroachment of new areas leading to bush clearing, opening up new areas for cultivation.

Figures 4.11 The extent of poverty and notice the use of grass, wooden materials to build residential houses.



Figures (a & b) shows the misuse of grass to make a grain store and photo (ii) shows the appalling living conditions as a poverty indicator in the area. Photo taken on 12.09.2022

The poor persons with no access to monetized lifestyle are forced to depend entirely on the gifts of Mother Earth but in the process land, water, forests and other resources are phenomenally dilapidated. The poor are likely to destroy their immediate environment simply to survive (DeWitt, 2017). Hungry people cannot conserve the environment. Poverty as demonstrated by the semi-permanent housing and poor living conditions above (Figure 2.8) has worsened the already deteriorating environment in the area and forced majority of the residents of Makindu Sub County, Kenya to engage in clearing of indigenous trees, Charcoal burning, poor land management practices, high levels of illiteracy leading to ignorance and unemployment.

All these interlocking anthropogenic factors among the residents of the Makindu Sub County, Kenya are associated with the increasing environmental degradation in order to meet their daily food security needs. The researcher recommends to the Catholic Church to adopt measures related to improving food security and provision of water to the majority poor residents of the Makindu Sub County, Kenya.

4.1.7 Extractive Activities

ASAL areas are well endowed with stocks of natural capital e.g. a diverse range of flora and fauna, with a comparative advantage for livestock and wildlife production based on natural pastures. However, mining and quarrying activities that also take

place in the ASAL's are rapidly depleting natural and mineral resources (GOK, 2022) at any depth the scooping of ballast for construction purposes in fragile bush thickets and shrubs exposes the roots of shrubs to scorching sun and at other uprooting makes them to dry up. During the study the researcher observed that open ballast pits were left open, topographically defacing the land surface and leaving huge scars defacing the earth' robbing' the terrain its natural scenic beauty. Another form of extractive activity is clay brick making observed during the study. Clay brick making observed entails interrelated activities like the scooping of the top most fertile soil, involves the use animal manure and grass to accelerate the process of baking, defacing the land's terrain by leaving behind big pits which takes a longer time to land fill. Huge raw brick kilns require large quantities of firewood to bake. This amounts to a multiple variants of environmental degradation strands like, deforestation due to cutting down of indigenous trees as the only source of energy for raw brick baking, leaving the soil bare and vulnerable to wind and water erosion during both dry and rainy seasons respectively. Air pollution as a result of clay brick kilns emitting large volumes of smoke into the air contributes to greenhouse gas emissions into the atmosphere, thus accelerating Climate change.

Reliable and quality source of water is key to the well-being for both humans and domestic animals use in this Semi-arid region. This challenge of water scarcity prompts the farmers of Makindu Sub County, Kenya to engage in manual digging of water wells which defaces the land surface, including cutting of the indigenous trees. At some point an underground stone becomes really tough and to 'soften' it and allow the digging of the well to go beyond this tough layer down wards firewood is used. The use of hard wood to soften the hard layers of rock in shallow wells also accelerates environmental degradation in Makindu Sub County, Kenya. Depending on

the nature of the rocky soil sometimes well pits as deep as more than 25 meters, are sometimes left half way done while others are abandoned completely before one strikes water.

The researcher observed that the desire by the residents of Makindu Sub County, Kenya to have a reliable source of water using this laborious manual technique becomes not only a life-threatening activity but also a multilayered environmental destructive chain of inter connected activities as demonstrated in

Figures 4.12 Demonstration of extractive activities



Figure (i) An abandoned pit which was being dug as a shallow water well



Figure (ii) the use of wood to soften the hard rock



The researcher with an artisan at Mbuinzau handcraft workshop.



Figure (iv)) the effect of soil excavation for sale- Nthilani village Ndovoini sub location.



Figure (iii) Use of mango tree manure and grass on top of baking brick kiln as source of energy. Photographs taken on October-November.2022.

Figure (vi) Air pollution as smoke is emitted from the baking kiln.

These clay brick pits when left behind are dangerous to the people and livestock as they can accidentally fall into causing injuries and death. These extractive activities are a serious form of environmental degradation that not only interferes with the beauty of the land but also makes it ugly.

This Chapter confirms that environmental degradation in Makindu Sub County, Kenya is mainly due to destruction of indigenous trees, poor land management practices, ignorance, overgrazing, poverty and Charcoal burning and bush fires which are all anthropogenic activities.

4.2 The Doctrinal teachings of Catholic Church on environmental conservation

The Catholic Church has a divine obligation as a driver of behavioral change to instill societal values and attitudes which positively contribute to lifestyles that can ensure sustainable environmental conservation. The Church resources are people and through its message provides environmental guidance by influencing new attitudes and norms that gradually result to adoption of new lifestyles that can be translated into predictive environmental conservation stewardship behavior by the Catholic Church members.

This chapter provides an analysis of the doctrinal teachings of Catholic Church on environmental conservation in Makindu Sub County, Kenya. It provides a highlight

on how the Catholic Church has been engaged in creating awareness on its doctrine on environmental conservation through sensitization forums.

4.2.1 The Catholic Church and environmental doctrines sensitization forums

According to Catholic Church doctrines on environment Genesis Chapter 2:15, man has been commissioned by God to behave responsibly towards God's creation by protecting it. This divine role has elevated Catholic Christians to be responsible stewards of the environment. The Catholic Church members are good environmental stewards through the environmental teachings, organized environmental rallies, disseminating eco-theological doctrines on environmental conservation and the use of good waste management practices. The study confirmed that 60% of the respondents were aware of the doctrinal teachings about the environmental conservation, while 40% were not aware of the Catholic Church doctrinal teachings on environmental conservation.

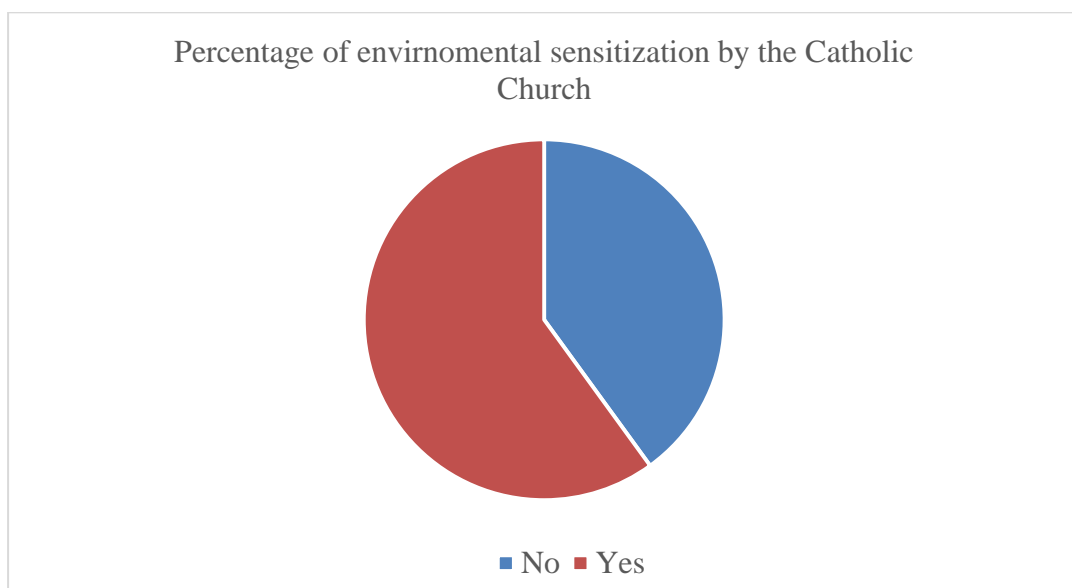
A catechist remarked that it is the duty of the Catholics as Christians to abide by the Church doctrines on the environmental conservation according to Genesis Chapter 2:15 (Interview, 04.09.2022). Human beings are inherently created as responsible and accountable stewards with a divine mandate to protect and conserve the environment in a sustainable manner. The interdependency between human beings and their entire survival is greatly influenced by their day-to-day healthy interaction with their environment. The environmental degradation which has led to diminishing natural resources is a pointer to the imminent destruction of human beings' life on earth (Schaeffer, 2018).

According to the Catholic Church traditions inherited from the early fathers like St. Augustine of Hippo the beauty of the earth, seas, skies and circulation of the air is a

testament of who created them, normally the beautiful one who permanently cannot change (Pope Francis, Letter from Christian Ecologists COP 27). St. Francis of Assisi, a revered Catholic Church monk treated all living things with respect. He taught his followers not to cut trees down completely, so that they could grow again, and not to harvest all the bees honey lest they starve. St. Francis Assisi invited all of creation, animals, plants, natural forces, even brother sun and sister moon to give honor and praise to the Lord (Jaromi, 2019).

The pie chart below indicates the percentage of environmental sensitization forums by respondents of Catholic Church in Makindu Sub County, Kenya.

4.1.3 Percentage of environmental sensitization by the Catholic Church



The research findings showed that Catholic Church in Makindu Sub County, Kenya is involved in environmental sensitization forums. Majority of the Catholic Church members who comprised 60% confirmed that Catholic Church engaged the residents of Makindu Sub County, Kenya on environmental conservation sensitization forums, while 40 % were not aware of any initiative by the Catholic Church to create awareness on matters of environmental conservation. The Catholic Church has a

responsibility to inculcate a green mindset, a paradigm shift in the people's lifestyles and an eco-culture which will eventually lead to better environmental conservation initiatives by the Church members in their households.

A Priest confirmed that he engages the Church members with sermons aimed at environmental conservation (Interview, 24.09.2022). The research revealed that during the annual Kent Lenten forums teaches Christians on many issues affecting the society including Climate change, coupled with environmental degradation and how they should respond to such emerging issues. Moreover, many of Catholic Church members are educated on how to keep the environment clean and safe for human habitation during earths wetland days and Catholic environment days. In addition, during this annual environmental event there is mass participation by Catholic Church members emanating from proper coordination by the Catholic Church and this has resulted to adequate sensitization, advocacy and commitment to accountable stewardship of the environment in Makindu Sub County, Kenya.

The Priest further revealed that Catholic Church engages environmental experts for instance the agricultural extension officers and NEMA officers from the Makindu Sub County office to educate the church members on how best to conserve the environment in their households. These officers engage the Church members on various topical issues related to the County government of Makueni environmental agenda and its current strategy intervention measures on environmental conservation (Kenya County Climate Risk Profile Series, 2022).

However, the study findings revealed that due to a few environmental experts in Makindu Sub County this has slowed down the pace of environmental sensitization across the vast Makindu Sub County, Kenya. High levels of illiteracy among a

majority of the church members have prevented efficient coordination of environmental sensitization by Catholic Church. The research established that there were collections of published documents on environmental conservation in parish offices like Catholic Church Environment Policy Strategic Document (2011-2019) with a wide circulation among the Church members.

Among the published literature on environmental conservation included books, magazines and environmental journals i.e. the caritas Kenya. These useful tools in disseminating knowledge in environmental conservation are available among the clergy. In addition, Catholic Church in Makindu Sub County at parish level is structurally organized into three different faith groups: Catholic Women Association, Catholic Men Association and Youth. This means that Catholic Church has human capital and existing useable networks for the formation of a 'green army' of Christians who capable of spear heading a 'green' revolution if well-coordinated. These groups are a valuable reservoir of Christians that Catholic Church should use in spreading the environmental awareness doctrines to the people of Makindu Sub County, Kenya.

Table 4.4 The table below gives an analysis of how Catholic Church engages in environmental conservation sensitization.

Variables	Environmental workshops	Environmental doctrines	Environmental policy sensitization	Waste management initiatives
Percentage of respondents	70	30	50	40

Table. 4.4 Compares the results of the relationship between Catholic Church environmental conservation initiatives and the respondents in Makindu Sub County, Kenya.

From the table above, the research findings revealed that majority of the respondents stressed that environmental guidance and counseling forums were more useful tools in behavior modification and molding the Church member's mindset towards a new paradigm shift by progressively adopting eco-friendly lifestyles. In addition, 50% of the respondents identified environmental policy sensitization by the clergy during Sunday sermons as a key reminder to Church members about environmental conservation.

The study recommends that some of the environmental materials in circulation should be translated in to the local dialect for a better understanding and effective communication of its contents towards environmental conservation. However, 70% of the respondents were aware of Catholic Church participation in environmental conservation while 30% of the respondents were aware of important environmental days and that Catholic Church actively participated in good waste management practices.

The study revealed that, most of Church members have dug waste disposal pits in their household's. The sorting of waste products into biodegradables and non - biodegradables at the household level is a challenge due to ignorance which has become an existential threat to both human and livestock mortality and morbidity (Interview, 06.10.2022). However, the study findings identified illiteracy due to poverty as one of the major challenges Catholic Church members faced in their efforts to contribute effectively to environmental conservation.

4.2.2 The Catholic Church Climate Covenant

The role of Catholic Church in environmental conservation is well articulated in Pope Francis encyclical letter, June, 2022, titled, *The Care of Our Common Home, Care for the Climate*, the Pope begins the encyclical letter by summarizing his presentation by citing earlier Catholic Popes specifically St. Francis of Assisi and other religious leaders who have shared their convictions about the environment. He says, sister earth, cries out to us because of the harm we have inflicted on her by our irresponsible use and abuse of the limited environmental resources with which God has endowed us with. The response to the question what to do to save Our Common Home, Pope Francis who is a staunch believer in the need to gather the facts in order to understand a problem argues that faith convictions can motivate Christians to care for the environment and the most vulnerable of their brothers and sisters (Igbo, 2021).

Pope Francis begins with the biblical account of creation and then meditates on the mystery of the universe, which he opines as a continuing revelation of the divine. Everything is related and we human beings are united as brothers and sisters on a wonderful life pilgrimage, woven by the love of God has for each of his creatures and which also unites us in the fond affection with brother sun, sister moon, brother river, and mother earth. The earth is essentially a shared treasure from our immediate departed ancestors whose fruits are meant to be enjoyed by everyone in the present inclusive of the generations yet to come (Pope Francis, 2022).

Although science and technology can produce important means of improving the quality of human life it has given those with the knowledge, and especially the environmental resources to use them in an impressive dominance over the whole of humanity and the entire world. Pope Francis says we are enthralled in a technocratic

paradigm which promises unlimited growth. But this paradigm which promises unlimited growth is based on the lies that there is an infinite supply of the earth's environmental products because the planet is being squeezed dry beyond every limit (Hodson, 2017).

This begs the question, what then is to be done to reduce the high rate of environmental degradation and restore Eden? The Catholic Church then through its established authority like office of the Pope in Vatican calls for a dialogue on and the review of environmental conservation policy in the international, regional, national and even within the local communities. The dialogue must include transparent decision making so that the politics of the day serve human environmental needs and not just economic interests per se (Kelly, 2019). The Catholic Church members in Makindu Sub County need to change and develop new convictions, attitudes, and forms of life including a new lifestyle which is environment compliant. In addition, this will involve individual conversion and also build community networks to solve the complex environmental degradation and its impact on livelihoods facing the residents of Makindu Sub County today.

The Catholic Church identified the pressing modern environmental challenges as follows: Pollution and Climate change, the issue of water scarcity, the loss of biodiversity, the decline in quality of human life, and the disintegration of social and political structures of the society. Commenting on the issues revolving around Climate change, Pope Francis emphasizes that the environment is a common good belonging to all, meant for all and recognizes that a number of scientific studies indicate that most of the global warming in recent decades is due to the great

concentration of greenhouse gases released in to the atmosphere mainly as a result of human activities (Liederbach, 2022).

Pope Francis stresses that Climate change is a global problem often with grave implications: on environmental, social, economic, political and for the distribution of goods and laments that the poor who are least responsible for causing the problem are disproportionately vulnerable to its harmful effects. Although those that face environmental degradation would blame human population growth instead of extreme and selective consumerism (Pope Francis, 2021).

4.2.3 The Catholic Church and the Gospel of Creation

According to Catholic Church, The Gospel of creation eludes that:

God created everything with intrinsic goodness, Humans are uniquely created and called to exercise responsible, stewardship over creation on behalf of the loving creation All creation is a mystery the diversity and unity of which both reflect and mediate the creator. The right to private property is not absolute or inviolable but subordinate(ed) to the universal destination of good. The destiny of all creation is bound up with the mystery of Christ (Ostheimer, 2021).

In his submissions about the cause of the environmental degradation, Pope Francis through the Catholic Church points out that human beings presume to take place of God and refuse to acknowledge our creaturely imitations a dynamic that causes us to mistake God's command for human beings to have dominion over creation as an exploitative license rather than a vocation to cultivate and care for the God's precious gift of creation (Richard, 2021).

Inspired by the Catholic Church traditions, Pope Francis addresses the human roots of our environmental crisis specifically criticizing anthropocentrism; the belief that human beings are radically separate from and above the non-human natural world. He points that anthropocentrism devalues creation and leads to practical relativism which values creation only to the extent that it is useful to human beings (Pope Francis, 2021). The study observed that while addressing the issue of environmental degradation in Makindu Sub County Catholic Church embraced its social teaching based on the principle of subsidiarity which stresses that environmental challenges should be dealt with at the lowest level of the society pyramid possible and highest necessary (Pope Francis, Climate change Covenant, 2022).

The study revealed Catholic Climate covenant groups existed in different Catholic Church's in Makindu Sub County, Kenya. The major task of these environmental sensitization groups endeavors to work in order to make a difference, create a more sustainable environment both at the Church level and Community at large. These environmental groups in addition advocate for a faith based informed environmental stewardship projects in their household's and the small prayer groups (Jumuias) to sow the seeds of green thinking in order to entrench the sub-culture of environmental conservation. However, the study findings revealed that the spirit of *Laudato, Si*, had been integrated in to the creation care stewardship projects and permeated all aspects of the parish, school and community life.

The study findings also revealed that Catholic Church members are grouped in a three-tier approach in their efforts to address the issue of environmental degradation based on a pledge to pray, act and advocate for issues related to Climate change. The study findings revealed that Catholic Church members of Makindu Sub County set a

side time to pray, advocate and act in the interest of Climate change either as a family or as a Church in a formal manner during mass on Sunday worship.

4.2.4 The Catholic Church Prayers on the Environment and Stewardship

The Catholic Church also encourages prayers on the environment as follows: Lord grant us the wisdom to care for the earth and till it, help us to act now for the good of the future generations, what you have created and all your creatures, help us to become instruments of a new creation, founded on the covenant of your love. (Climate Change, Prayer Booklet for the Catholic Church, 2022).

According to the Climate change prayer booklet, Catholic Church relief services has a prayer item for Catholic Church members; The prayer of stewardship, The Prayer of stewardship God of all creation, At the beginning of the earth, You placed a single mandate on human kind to be stewards of creation, To replenish and nurture through all generations, We kneel today amid that same, A world that creation is, in many ways, more splendid than ever. But, in too many ways, scarred beyond recognition, Turn us from thoughtlessness, Help our touch to be light, Help us renew the world that supports us. So, we may once more know creation, as it was in the beginning, Amen. (Catholic Church Climate change Prayer Booklet, 2022).

A Priest revealed that Climate change prayer booklets were in circulation and catechists guided the Church members on the Church doctrines after Sunday worship in environmental guidance and counseling forums (Interview, 14.09.2022). Hitherto, the study findings revealed that continued engagement of Catholic Church with environmental experts like agricultural extension officers and NEMA officers in Makindu Sub County regularly updates the Church members on the status of the current Climate change trends on a global perspective and how in their small ways the

locals can continue saving our mother earth and the human beings imminent extinction. Together with the annual Lenten campaigns Catholic Church is able to articulate the need for the residents of Makindu Sub County to progressively engage in environmental conservation. This is greatly credited to the support of Catholic Church personnel from the Development and Agriculture Department and reinforced by the Priests.

4.3 The Environmental Stewardship Projects Implemented by Catholic Church in Makindu Sub County

The Catholic Church in Makindu Sub County as a social institution has a dual mandate to care to the spiritual and the physical well-being of its members and the larger community. This is undeniably directly related to the degree of the sensitivity of the residents of Makindu Sub County towards environmental reconstruction living patterns by specifically responding through initiating sustainable eco-friendly stewardship projects. In 1979, Pope Paul II declared St. Francis of Assisi to be the patron saint of those who promote environmental conservation matters. St. Francis came to view all created things as his brothers and sisters, loved into existence by God our Father. He celebrated how we related with our sister mother earth, on whom we depend (Pope Francis, 2022).

In the Franciscan view of the world, every element in the universe is related and interdependent: humans, flowers, birds, insects, water, trees, fish, rocks, even the Climate. As brothers and sisters to each other, we have a responsibility to care for one another (Pope Francis, 24.05.2019). The research findings revealed that stewardship activities by the Catholic Church are clergy-initiated stewardship projects, policy guided as a fulfillment of the pastoral religious life of the priests within a parish or a convent. The environmental stewardship projects by the Catholic Church clergy are

consistent with their pastoral and lay apostolate responsibilities commissioned as a partial fulfillment of their sacramental life within a parish or a convent.

In addition, in most of the Catholic Church's and households visited, the compounds were eco-friendly. The researcher observed that in most of the Catholic Church's and households within the area of study had a number of stewardship projects implemented some inside the Church compound and within the Community like Bore holes to provide water for both domestic and animal use. These included the Catholic Church connecting the community, the educational institutions in the neighborhood with a sufficient supply of treated water through sunk boreholes and elaborate water harvesting systems like water tanks and water kiosks to sell water for empowerment. Environmental care and sustainability is also given in all pastoral projects being implemented by the Catholic Church in Kenya (Catholic Environmental Policy, 2022). This is done in fulfillment of the command of God given to Man" The Lord then took the man and settled him in the garden of Eden, to cultivate and care for it" (Genesis, 2:15).

In addition, observable in the Catholic Church compounds and even in the community many of the residents had nutritional gardens which demonstrated good farming practices i.e. mixed farming practices including zero grazing of exotic breeds, goat and poultry keeping, cabbage, tomatoes, onions, hay plots and stores, use of green energy like solar energy and electricity, use of energy saving jikos; gas and biogas are used. Communal outreach activities like organized cleanup campaigns and collection of waste materials is done by the youth who are also members of the Catholic Church and at near by market centers.

Figure 4.14 Environmental conservation projects in Catholic Church in Kaunguni Parish and figure (iii) Kwa Kasungwa-Kalakalya Community water project in Kaunguni location Makindu Sub County, Kenya.



The researcher at Kaunguni Parish, Notice the protected indigenous trees and below other stewardship projects in of the Churches demonstration fields.



Use of Green Energy/Solar panels, a demonstration nutritional garden of cassava plants, bananas & vegetables e.t.c

The research revealed that r the youth at times engaged in community cleanup activities outside the Church especially in the littoral local markets as a way of environmental advocacy. The Catholic Church has initiated a community water project within Kaunguni Sub location for domestic and animal use like Kwa Kasungwa – Kalakalya Community water project serving more than two hundred households.



Kwa Kasungwa-Kalakalya a Catholic Church funded community water project in Kaunguni Sub location. Photo taken on 27th. 01.2023

In conclusion, the study revealed that the Catholic Church had initiated several sustainable water projects within Makindu Sub County.

The research findings demonstrated that Catholic Church in Makindu Sub County was involved in educating Church members on the importance of planting and protecting indigenous trees. Over 70% of the church members who responded to the question on the initiatives undertaken by Catholic Church in conserving the environment cited the priests organizing them to plant trees. The Catholic priests have established a well managed nutritional kitchen gardens. These parish compounds act as demonstration fields, in which case Church members have adopted a Climate smart farming in their households.

The researcher observed that the residents of Makindu Sub County, Kenya are regularly advised to use clean energy saving jikos and gas cookers in order to reduce the quantity of firewood utilized at the household level. This is done by the government officials and the Catholic development office. The clean energy saving jikos a project undertaken by the Catholic Women Association is work in progress. (Interview, 05.09.2022).

The research findings revealed that Catholic Development and Agriculture Office advocates for selective breeding of livestock and keeping a sizeable number of upgraded breeds of goats which are browsers unlike cows which are grazers and environmentally unsuitable in the study area as this has precipitated environmental degradation. The study recommends to Catholic Development Office to continue encouraging the farmers to adopt permaculture an environment friendly farming practices which combines zero grazing, bee keeping, poultry, rabbits and goats,

growing of early yielding drought resistance crops guaranteeing the locals adequate food availability and access, enhancing environmental conservation.

The Catholic Church has planted trees and advocated for conservation of existing indigenous trees, by establishing their own seedbeds and planting them in their household and farms. The Catholic Church has initiated community clean up initiatives by encouraging the residents to properly dispose waste in their household pits as careless disposal of plastic materials and their subsequent consumption by livestock affects their healthy and increases their morbidity.

Kenya generates massive amounts of plastic and litter, from plastic micro fiber and synthetic hair to lost toys, Personal Protective Equipment (PPE) such as face masks, and lost fishing nets. Available data shows an estimated 22,000 tons of waste are generated in Kenya per day, of which about 20% of it is plastic. Furthermore, Kenya's daily plastic consumption is estimated to be 0.03 kg per person and which is also carelessly disposed in our local markets (Singh, 2018). The study has revealed that Catholic Church in Makindu Sub County participates in ensuring a clean environment which is marked on September 17th, every year to combat the global solid waste management problem. The Catholic Church in Makindu Sub County has demonstrated good will and commitment by helping to raise awareness of the global waste management problem at the local level hence subsequently contributing to environmental conservation.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter gives a summary of the study which was on the role of Catholic Church in environmental Conservation: A Case Study of Makindu Sub County, Makueni County, Kenya. It gives the conclusions that are logically derived from research findings, the recommendations which are coherently drawn from the conclusions and suggestions for further study derived from the recommendations. The study has critically analyzed the anthropogenic causes of environmental degradation in Makindu Sub County, explained the environmental doctrines of the Catholic Church on environmental conservation and established the stewardship projects implemented by the Catholic Church in Makindu Sub County, Kenya.

5.1 Summary

The study has revealed that there are various forms of massive environmental degradation due to the increasing human population, Charcoal burning and bush fires, declining indigenous forests cover, poor law enforcement, ignorance, overgrazing, poor land management practices, extractive activities and poverty. Increasing human population has put a lot of pressure on land use and influenced how well its resources were being used. The need to feed an increasing human population in semi-arid areas of low rainfall and alarming drought conditions has resulted to poor land management practices due to poverty.

Overgrazing has resulted to acute environmental degradation like soil erosion hence declining soil fertility in the stony woody volcanic areas near Chyulu Hills National Park and also Nguu-Masumba and Kalii Sub locations. Growing of crops in areas designated as Elephant migratory routes has escalated human-wildlife conflict from time to time. Although Population Animal Control (PAC) by KWS is minimal as a result of Chyulu elephant electric fence, astray elephants still raid farms and destroy crops further straining the relationship between the KWS and farmers of Makindu Sub County.

Declining of indigenous trees is attributed to illegal harvesting of wood as a source of construction materials, and Charcoal burning for domestic use and commercial purposes as observed during the research in many areas of the Makindu Sub County bordering Chyulu Hills National Park in Kaunguni Sub location.

Garbage disposal and environmental hygiene is poor in public places like Market centres. Heaps of empty plastic bottles, polythene bags are rampantly littered in open markets where there are no substantive garbage disposal and collection points. County

workers deployed to clean up markets are few and work in certain Market centres only for two days.

Extractive activities like clay brick making and baking involves removal of the fertile soil cover, burning of manure, defacing of the earth's surface, use of grass to cover the top most point of clay brick kilns and consumes a lot firewood. This has caused many negative environmental effects including air pollution due to smoke, depletion of soil fertility, scooping of top fertile soil in many cases diminishing the agricultural productivity of the land there by precipitating poverty and similarly robs the landscape of its beauty. Ignorance as a result of high illiteracy levels due to poverty is another cause of environmental degradation in Maindu Sub County, Kenya.

A surging human population growth with high levels of illiteracy leading to ignorance is a key ingredient for environmental degradation in Makindu Sub County, Kenya.

Poor law enforcement is another accelerating cause of environmental degradation. The study has revealed that environmental degradation as a result of uncoordinated efforts by different stakeholders coupled with institutional weaknesses like a few NEMA officers on the ground, logistical challenges of intelligence gathering, communication and tracking difficulties of perpetrators of different environmental crimes has made environmental degradation in the area of study to be an endemic culture.

Conspiracies and collusions complicates law enforcement opening up so many gaps in law enforcement that are easily exploited by corrupt law enforcers and habitual environmental poachers who benefit from the proceeds of environmental destructive activities and its accompanied monetary returns.

Despite Catholic Churches good intentions about environmental conservation much innovativeness is still required in order for the Church to effectively communicate its environmental doctrines through existing local media stations.

The study also identified financial challenges as an impediment to the Catholic Church funding of stewardship projects in Makindu Sub County. The environmental stewardship projects by the Catholic Church revolved advocacy, planting and protection of indigenous trees, agricultural demonstration fields, community water projects (drilling of bore holes) and provision of water storage and supply tanks, community clean up campaigns.

5.2 Conclusion

The research has revealed that Catholic Church has implemented stewardship projects through the established Church networks in a Triple-P bottom-up approach (People, Planet, Profits). The Catholic Church with leadership structures in existence, a trusted leadership with an organizational ability has mobilized and collaborated with the community in matters of environmental conservation in Makindu Sub County, Kenya. The study used the dominion theory which justifies why human beings destroy and have continued to destroy the environment and the stewardship theory which explains the need for environmental conservation by the Catholic Church. These two theories focused on human actions and attitudes towards environmental issues and identifying the anthropogenic causes for them. Catholic Church therefore has an opportunity to continue engaging its members in environmental conservation.

5.3 Recommendations

Use of alternative sources of clean energy: The research findings indicate that there is a phenomenal environmental destruction of indigenous trees, scarcity of water and

increased air pollution in Makindu Sub County, Kenya mainly due to anthropogenic activities. It was also observed that the causes of environmental degradation include: declining of indigenous trees cover which is attributed to illegal cutting down of trees and harvesting of wood products like Charcoal burning and bush fires leading to reduced vegetation cover. The research has revealed that increasing human population pressure has led to clearing of indigenous trees for agricultural and residential purposes. The residents of Makindu Sub County, Kenya should be encouraged to use alternative sources of clean energy like biogas fuel, solar energy, energy saving supa jikos which greatly reduces the amount of fire wood that is being consumed on a daily basis in many households of Makindu Sub County, Kenya.

Adoption of climate resilient agriculture: The study findings also has established that poor land management practices is one of the major causes of environmental degradation which involves clearing of the 'virgin' land for peasant farming activities. This calls for training and encouraging the resident farmers to be receptive to new ideas as a mindset change in the context of climate smart adaptation by embracing permaculture farming practices which allows indigenous forests to re-grow like; drought resistant indigenous crops, bee keeping, poultry keeping, rabbit keeping, zero-grazing as an alternative to agro-pastoralism.

Training on waste management skills: The research findings also revealed that poor waste management and disposal is another big environmental challenge. This poses a threat to a healthy living to most of the dwellers in the peri-urban markets. Big heaps of garbage lead to many respiratory diseases, at times premature deaths and also rob the scenic beauty of this markets, water pollution is noticeable in common community earth dams which pose a health hazard. The public health officers should engage the

public in environmental health campaigns on need to treat water and make it safe for human consumption. There is need for locally innovative ways of proper waste disposal and recycling. The responsible manufacturing companies should seek to educate the locals on the importance of sorting of the household waste into biodegradables and non-biodegradables as part of their corporate responsibility to contribute towards environmental conservation. In addition, the people of Makindu Sub County, Kenya should be trained on how to do brand audits in order to identify the companies responsible for the waste and the data be used to demand responsibility from key polluters.

Eco- theological awareness. The study revealed a gap in the environmental experts and knowledge within Catholic Church members in the field of eco-theology. The question of eco-theology is still a marginal concept and slowly gaining attention in Catholic Church on the theology of the environment. There is need to stress on eco-theology in the theological syllabus and training of the clergy / in-service for the practicing clergy in the seminary schools. This will be the beginning of a paradigm shift and building of an eco-theological mindset among the practicing/ trainee clergy as a transformational and futuristic Church leadership agenda.

Green revolution culture: The study findings showed poor sustainable environmental conservation culture in Makindu Sub County, Kenya. As a way of greening households and nurturing environmental conservation culture Catholic Church should encourage planting and protection of indigenous trees to mark important Christian rites of initiation like birthday occasions, baptism rituals, weddings periods, burial ceremonies e.tc by the Church members.

Identification and documentation of value of indigenous trees: Catholic Church should also educate its Church members on the value of protecting and taking care of the existing indigenous trees because of their nutritional as well as medicinal value i.e hunger wild fruits and herbal medicinal trees.

Gazettement of wet lands: The Government should gazette all wet lands within Makindu Sub County near Chyulu Hills eco-system like kiu, kiboko and others.

5.4 Suggestions for further study

The purpose of this study was to explain the role of Catholic Church in Environmental Conservation: A Case Study of Makindu Sub County, Makueni County, Kenya suggesting further research to be carried on other ASAL areas since environmental challenges are unique, fast emerging and spread throughout the Country.

And secondly, further research could be done to determine the challenges facing the implementation of stewardship projects by the Catholic Church in other ASAL areas.

Finally, the study also recommends research on the effects of the environmental degradation on livelihoods in the Arid and Semi-arid regions for purposes of a change in Policy formulation and decision making in a bottom-up approach.

REFERENCES

- Allen, T. (2019). Restoring Eden: The Role of Christianity on Environmental Conservation: A Case Study of Karatu District Northern Tanzania , pp. 1-6.
- Amusan, L. & Olutola , P . (2019). Paris agreement (PA), on Climate change and South Africa's Coal-Energy Complex Issues at Stake, pp .43-57.
- Angassa, A., & Oba, G, (2018). Herder Perception on Impacts of Range Enclosures, Farming, Fire burn and Bush Encroachment on the Range Lands of Borana, Southern Ethiopia. *Human Ecology*, pp.201-215.
- Anderson, K. (2019). Earth Observation in Service of the 2030 Agenda for Sustainable Development, pp. 77-96.
- Bassey, S., & Pimaro, T., M,. (2022). Enyimba's Notion of Madukaku and The Question of Anthropocentrism In African Environmental Ethics, pp. 129-136.
- Beltran, F., B., P. (2020). Earth Stewardship, Economic Justice, and World Mission: The Teachings of Laudato Si, *Missiology*, pp.39-56.
- Bengtson, M . (2018). Transforming Systems of Consumption and Production for Achieving the Sustainable Development Goals: Moving beyond Efficiency. pp. 1533-1547.
- Benjamin, L., & Wirth, D., A. (2021). From Marrakesh to Glasgow: Looking Backward to Move Forward on Emissions Trading, pp. 245-264.
- Berry, F., S, & Berry, W. D. (2018). Innovation and Diffusion Models in Policy Research. *Theories of the policy process*, pp. 253-297.
- Bett, K.,G, (2015). The Role of Catholic Church in Environmental Conservation:A Case Of Kericho County,Kenya. A Masters Thesis,Kenyatta University,Nairobi.
- Braun, V., & Clarke, V. (2021). To Saturate or not to Saturate? Questioning data saturation as a useful concept for thematic analysis and sample-size rationales, pp. 201-216.
- Broadbent, J. (2020). Conflicting Climate change Frames in a Global Field of Media Discourse, p.2.
- Broman, G, I., & Robèrt, K.-H. (2017). A Framework for Strategic Sustainable Development, *140*, pp. 17-31.
- Bultz , R., J. (2019). Traditional Fire Management: Historical Regimes and Land Use Change in Pastoral East Africa, pp. 442-450.
- Climate Change Prayer Booklet, 2022. (Catholic Church Relief Services) , pp. 1-20.

- Collins, Y, A. (2020). *REDD+ Unravalled: A Discursive Analysis of Neoliberal Forest Conservation Efforts in Guyana and Suriname* PhD Thesis, Department of Environmental Sciences and Policy, Central ...]
- Christine, F., H, (2022). Catholic social Teaching and Ecological Ethics
- De Chazournes, L., B. (2021). Is there Room for Coherence in Climate Financial Assistance? *Laws*, 4(3), pp. 541-558.
- Denscombe, M. (2021). *EBOOK: The Good Research Guide: For Small-Scale Social Research Projects*. McGraw-Hill Education (UK), p. 40.
- DeWitt, C., B., (2019). The Bible and Environmentalism. *The Oxford Handbook of the Bible in America*, p. 386.
- Dike, E., & Dike, N. (2018). Did Global Warming and Climate change Cause the Degradation of Lake Chad, Africa's Most Important 'Ecological Catastrophe'? pp. 15-41.
- Drigo, N. (2019). Assessing and Understanding Biomass Change related to Deforestation and Forest Degradation, p.34.
- Duguma, L. (2020). From Tree Planting to Tree Growing: Rethinking Ecosystem Restoration Through Trees, p.15.
- Ellis, F., (2019). Household Strategies and Rural Livelihood Diversification, pp.1-38.
- Fungomeli, M., Githitho, A., Frascaroli, F., Chidzinga, S., Cianciaruso, M., & Chiarucci, A. (2020). A New Vegetation-Plot Database for the Coastal Forests of Kenya, p. 103.
- Government of Kenya, The Constitution of Kenya (2010). <http://Kenya law .org//ex/activew>.
- Gottlieb, R., S. (Eds.) (2018). *This Sacred Earth :Religion, Nature and Environment*. New York : Routledge Publishers, p. 40.
- Grassce, A. (2021). The Impact of Anthropocentrism on Christian Environmentalism Dialogue and Nexus , p.18.
- Jaromi, S. (2019). The Idea of St. Francis Of Assisi Garden as an Example of Christian Concern for Biodiversity, pp. 83-94.
- Habel, J., C. (2021). East African Coastal Forest under Pressure. *Biodiversity and Conservation*, 26 (11), pp. 2751-2758.
- Hessel, D.,T, and Ruether, R. (Eds.) (2018). *Christianity and Ecology;* Massachusetts: Havard University Press, p.18.
- Hodson R, M., et al. (2021). *The Place of Environmental Theology : The Course guide for seminaries, colleges and universities*. Published in UK, and Prague: Whitely Trust and the International Baptist Theological Seminary, p.1.

- Hoffman, A, J., & Bazerman, M., H. (2017). Changing Practice on Sustainability: Understanding and Overcoming the Organizational and Psychological Barriers to Action. *Organizations and the Sustainability Mosaic: Crafting Long-term Ecological and Societal Solutions*, pp. 84-105.
- Holy Bible, (1971). Revised Standard Version Bible Societies Resources Limited, 2016 Edition.
- Horrell, D., G. (2019). *The Bible and the Environment: Towards a Critical Ecological Biblical Theology*. Routledge, pp.174-176.
- Igbo, P. (2021). Humans: Stewards Or Exploiters Of Nature? A Study Of Gen 1: 26-28 From The Ambience Of Environmental Ethic, p. 238.
- Ives, C., D., Freeth, R., & Fischer., J. (2020). Inside-out Sustainability: The Neglect of Inner Worlds. *Ambio*, 49 (1), pp. 208-217.
- Irwin K,W. (2018). *The Socialmentality of Creation and the Role of Creation in Liturgy and Sacraments*.
- Kinsley, D. (2020). *Christianity as Ecologically Harmful: Christianity as Ecologically Responsible*. New York : Routledge, pp. 300- 304.
- Kombo, K., D. & Trump, L., A., D. (2006). *Proposal and Thesis writing: An indroduction*. Nairobi Publications Africa.
- Mugenda & Mugenda A, G., (1999). *Research Methods Qualitative and Quantitative Analysis* Nairobi: Acts Press.
- Jesperperson, S. (2020). *Responding to Organised Crime through Sustainable Development: Tensions and Prospects*, Emerald Publishing Limited , pp. 1-4
- Schaeffer, F., A. (2019). *Pollution and the Death of Man*, Cambridge :Tyndale House, p.99.
- Sean , M., (2020). *The Greening of the Church*, London: Geoffrey Chapman, p. 202.
- The Secretariat, Makueni Asscations of Churches, 2022.p.18
- Kamau N., P. (2021). Anthropogenic Fires and Local Livelihoods at Chyulu Hills, Kenya Landscape and Urban Planning, Journal Department of Geography, Miami University, pp. 76-84.
- Kariuki, M., PhD. (July, 2020). *Promoting Community Based Approaches in Environmental and Natural resources Management in Kenya: A reality or Mere Formality ?*, p.2.
- Karuku, G.,N. (2019). *Soil and Water Conservation Measures and Challenges in Kenya; A review*. International Journal of Agronomy and Agricultural Research (IJAAR) 12 (6), pp.116-145

- Kenya County Climate Risk Profile Series, Climate Risk Profile Makueni County Resilience Report, 2022, pp. 1-24.
- Kenya Episcopal Conference Commission For Pastoral and Lay Apostolate Seven Year Strategic Plan 2019, pp.1-18.
- Kenya National Climate Change Strategy (2019): World Bank Report on Strategic Environmental Assessment of Kenya Act 2005, (No 40659-KE 2019), pp. 391-406.
- Kinsley, D. (2020). Christianity as Ecologically Harmful: Christianity as Ecologically Responsible. New York : Routledge, pp. 300- 304.
- Kithuku, R., M. (2019). Efficacy of Community Based Adaptation (CBA): A Case Study Of Kalro Projects In Makindu Sub-County, Makueni County, Kenya, pp.18-19.
- Kenya National Bureau of Statistics (2019): Kenya Population and Housing Census. Nairobi: Government Printer
- Kogo, B., K. & Koech., R.(2021). Climate Change and Variability in Kenya: A Review of Impacts on Agriculture and Food Security. *Environment, Development and Sustainability*, 23 (1), pp. 23-43.
- Kumar, R. (2020). The United Nations and Global Environmental Governance. *Strategic Analysis*, 44(5), pp. 479-489.
- Laudato, Si, Pope Francis. (2022), Climate change Covenant Prayer Booklet, pp.165-167.
- Liederbach, M., D. (2022). Christian Worship and Human Stewardship'. The nature of things: Rediscovering the Spiritual in God's creation, pp 200-205.
- Maja, M. M., & Ayano, S. F. (2021). The Impact of Population Growth on Natural Resources and Farmers' Capacity to Adapt to Climate change in Low-Income Countries. *Earth Systems and Environment*, 5(2), pp.271-283.
- Matter, S., et al . (2021). Buffer-Capacity-Based Livelihood Resilience to Stressors-an Early Warning Tool and its Application in Makueni County, Kenya. *Frontiers in Sustainable Food Systems*, p.213.
- McNamara, J., et al . (2020). COVID-19, Systemic Crisis, and Possible Implications for the Wild Meat Trade in Sub-Saharan Africa. *Environmental and Resource Economics*, 76(4), pp. 1045-1066.
- Muriuki G, W., (2019). Migrating, Staying, or Moving on : Migration Dynamics in the Chyulu Hills, Kenya. *Population, Space ,and Place* ,17, pp . 391-406.
- Mwathi, G.,E. (2016). Sustainable Development and Environment: An Investigation on the Role of the Roman Catholic Church and Inter-Aid Kenya in Kiambogo area, Nakuru District, A Masters Thesis University of Nairobi.

- Nature Conservancy, (2021).The Biggest Environmental Challenges of 2022, (Persepectives from our Global and Regional Leaders on the most pressing issues facing people and the planet) , nature.org/environment , p.7.
- National Drought Management Authority Report, 2022. p. 2.
- National Environmental Management Authority, 2022. p. 20.
- Nisbet, E., G. (2019). Living Eden: To Project and Manage the Earth. London: Cambridge University Press, p. 60.
- Nisbet,E.,G. (2020). Greening the Christian Millenium, Dublin:Dominican Publications, p.28.
- Ostheimer, J., & Blanc, J., (2021). Challenging the Levels: The Catholic Church as a Multi-Level Actor in the Transition to a Climate-Compatible Society. Sustainability, pp. 137- 377.
- Pittman, S., et al. (2019). Marine Parks for Coastal Cities: A Concept for Enhanced Community Well-being, Prosperity and Sustainable City Living. Marine Policy, 103, pp. 160-171.
- Pope Francis, (2022). Climate Change Covenant, pp .165- 167.
- Pope Francis, (2019). Letter from Christian Ecologists , COP 27 , pp.1.
- Quandt, A. (2021). Coping with Drought: Narratives from Small holder Farmers in Semi-arid Kenya. International Journal of Disaster Risk Reduction, 57, 102168.
- Richard, F. (2020). World Views, Religion and the Environment. A Global Anthology, Belmont, California: Wads. Worth/ Thompson Hearing, p.40.
- Salome, J., et.al. (2018). Household Livelihoods and Conflict With Wildlife in Community Based Conservation Across Northern Tanzania Oryx. L. pp.702-712.
- Schaeffer, F., A. (2019). Pollution and the Death of Man, Cambridge :Tyndale House, p.99.
- Sean , M. (2020). The Greening of the Church, London: Geoffrey Chapman, p. 202.
- Scheidel, A., & Work, C. (2021). Large-Scale Forest Plantations for Climate change Mitigation? New Frontiers of Deforestation and Land Grabbing in Cambodia. Global Governance/Politics, Climate Justice and Agrarian/Social Justice: Linkages and Challenges, p. 11.
- Shen, C. (2020). An Analysis of the Ecological Significance of Lifestyle Changes. Open Access Library Journal, 7 (08), p. 1.
- Sheuyange, A., et al. (2019). Effects of Anthropogenic Fire: History of Savannah vegetation, North Eastern Namibia, Journal of Environmental Management, vol.75. pp. 189-198.

- Singh, R., L. & Singh, P., K. (2018). Global Environmental Problems. In Principles and applications of environmental biotechnology for a sustainable future Springer, pp. 13-41.
- Stowell, E., et al. (2020). Investigating Opportunities for Crowd Sourcing in Church-Based Health Interventions: A Participatory Design Study, p.134.
- Teahen, P., R, Levers, L., L. & Tarvyda, V. (2018). Disaster and Climate change. The Urgency of Climate change: Pivotal Perspectives, p .133.
- Tomislav, K. (2019). The Concept of Sustainable Development: From its Beginning to the Contemporary Issues. Zagreb International Review of Economics & Business, 21(1), pp .67-94.
- United Nations Development Program, (2021): Combating Desertification in Kenya, (Emerging Lessons From Empowering Local Communities), p.23.
- Votrin, V. (2020). The Orthodoxy and Sustainable Development a Potential for Broader Involvement of the Orthodox Churches in Ethiopia and Russia. Environment, Development and Sustainability,7,pp.9-21.
- White, L. (1967). The Historical Roots Of Our Ecological Crisis, Science , p. 55.
- Yi, C. (2020). An Exploration of Richard Powers' Ecological Thoughts in His The Echo Maker. Journal of Literature and Art Studies, pp. 780- 789.

Daily Nation, 21st January, 2020, p.22
Sunday Nation, 19th January, 2020, p.26
Daily Nation, 21st January, 2020, p.19
Daily Nation, 8th January, 2020, p.12
Daily Nation, 17th February, 2020, Pp. 1-16
Sunday Nation, 10th May, 2020, p.25
Sunday Nation, 9th August, 2020, p.9
Sunday Nation, 8th November, 2020, p.28

APPENDICES

Appendix I: Preamble

My name is Peter Maithya Mbuti, a Master of Arts Religious Studies (Christianity) student at Machakos University currently conducting research entitled; “*The Role of Catholic Church in Environmental Conservation: A Case Study of Makindu Sub County, Makueni County, Kenya.*” The study explained what Catholic Church has done towards environmental conservation in Makindu Sub County. I am requesting you kindly to read and understand the contents of the consent form below before voluntarily participating in the data collection.

Appendix II: Informed Consent Form for Data Collection

Research topic: *The Role of Catholic Church in Environmental Conservation: A Case Study of Makindu Sub County, Makueni County, Kenya.*

Researcher: Peter Maithya Mbuti.

I am requesting you kindly to read and understand all the information expected in the questionnaire and ask questions for clarifications before voluntarily participating in this research. Therefore, I am requesting with your permission to agree to the following:

- i. To honestly fill in all parts of the questionnaire and give additional information in the blank spaces provided, where applicable.
- ii. Voluntarily to participate in oral / focused group discussion/interviews.
- iii. Allow on site observation and photos related to the study to be taken.
- iv. Quote my responses for the purpose of this study which is academic.
- v. And that anonymity of participants will be observed where applicable/requested.
- vi. To waive any claim for copying this material should the researcher ever publish it in a scholarly journal or in electronic format on-line.
- vii. I/We understand the information gathered during the research will be confidentially used for academic purposes of this study only.

Participants

Date.

Appendix III: Questionnaire for Catholic Church Leaders and Farmers

Section A: Demographic Information

- a. What is your name (*Optional*)
- b. What is your Gender? 1. Male 2. Female
- c. What is the highest level of your education? (tick where appropriate)
1. Primary 2 Secondary 3.Tertiary 4. University
- d. What is your occupation? _____
- e. What is the name your Catholic Church parish _____
- f. What is your age in years _____

Section B: Environmental Conservation

1. In your opinion has the environment been taken care in Makindu Sub County?
- _____
1. Yes 2. No
2. How would you classify the state of environment in Makindu Sub County? (tick one)
1. Very good 2. Good 3. Poor 4. Very Poor
3. What do you think are some of the ways in which the environment has been conserved in Makindu Sub County? (Tick appropriate answer/s; multiple responses allowed)
- a) Planting trees.
- b) Protecting water catchment areas.
- c) Good management of waste disposal.
- d) Good methods of farming.
- e) Others, specify. _____

4. According to you what are the anthropogenic causes of environmental degradation in Makindu Sub County?

- | | | | |
|---------------------------|--------------------------|----------------------------|--------------------------|
| i) Population growth | <input type="checkbox"/> | ii) Deforestation | <input type="checkbox"/> |
| iii) Ignorance | <input type="checkbox"/> | iv) Charcoal burning | <input type="checkbox"/> |
| v) Poverty | <input type="checkbox"/> | vi) Overgrazing | <input type="checkbox"/> |
| vii) Poor law enforcement | <input type="checkbox"/> | viii) Poor land management | <input type="checkbox"/> |
| ix) Unemployment | <input type="checkbox"/> | | |
| x) Others | _____ | | |

5. Do you think protecting and caring for the environment should be a concern for Catholic Church?

1. Yes 2. No.

Give reasons for your answer? _____

6. How active is your local Catholic Church on matters concerning conservation of the environment? (Tick one)

1. Very active 2. Active 3. Not active

7. Are there any existing Catholic Church projects which aim at conserving the environment? (tick one)

1. Yes 2. No

If yes, mention some of them;

8. How often do you participate in environmental stewardship projects in your Catholic Church?

1. More often 2. Often 3. Rarely 4. Not at all

9. Do you have environmental committees in your Catholic Church? (tick one)

1. Yes 2. No

10. Are you a member of the environmental committee of the Catholic Church? (tick one)

1. Yes 2. No

11. Mention some of the environmental stewardship projects that you implemented in your Church. _____

12. As a member of the Catholic Church are you aware of any effects on environmental degradation? (Tick one)

1. Yes 2. No

If yes, briefly state some _____

Appendix IV: Questionnaire for Farmers, Government Officials and Business

Community

1. In your opinion has the environment been taken care in Makindu Sub County?

Briefly explain your answer

2. How would you classify the state of environment in Makindu Sub County?

1. Very Good 2. Good 3. Poor 4. Very Poor

3. How active is your local church on matters concerning conservation of the environment? (Choose one)

1. Very active 2. Active 3. Not active

4. As a Christian do you participate in environmental stewardship projects in your church?

1. Yes 2. No

5. According to you what are the anthropogenic causes of environmental degradation in Makindu Sub County?

i. _____

ii. _____

iii. _____

iv. _____

v. _____

6. Are you aware how the environmental degradation has affected the livelihoods in your locality?

1. Yes 2. No

If yes state i. _____

ii. _____

iii. _____

iv. _____

7. Have you received any support from your Catholic Church to conserve the environment?

1. Yes 2. No

8. Is the business community participating in environmental conservation and waste management?

1. Yes 2. No

9. If yes the ways (tick the appropriate answer)

i). planting trees

ii). better land management practices

iii). Use of energy saving jikos

iv). Environment friendly household compounds.

10. Are you aware of any reported cases of environmental degradation activities in your area (village elders/chief/NEMA official).

1. Yes 2. No

If yes mention some of the causes of environmental degradation activities reported.

a) _____

b) _____

c) _____

d) _____

11. Mention some of the activities Catholic Church should do to reduce the current impact of environmental degradation in Makindu Sub County.

i). _____

ii). _____

iii). _____

Appendix V: Interview Schedule for Catholic Church Leaders

1. What do you think are some of causes of environmental degradation in your area?
2. Is your Catholic Church active on environmental stewardship projects?
3. Mention some of projects Catholic Church has implemented to reduce the current rate of environmental degradation in Makindu Sub County.
4. Are you aware of any effects of environmental degradation on the people?

If yes mention some

5. Mention some of the environmental stewardship projects Catholic Church has implemented in collaboration with the community.
6. Has the Catholic Church received any support from the government officials to enhance environmental conservation?
7. Propose the areas of assistance the government officials in the area should take to enhance effective environmental conservation.

Appendix VI: A Schedule of Respondents

S/No	Name	Date	Category	Place
1	Kanini Maingi	10.10.2022	Farmer (since 1968)	Kaunguni
1.	Nzioki	14.10.2022	Farmer (since 1966)	Kaunguni
2.	Dorcus	19.10.2022	Church Member	Mbuinzau
3.	Josephine Musyoki	17.10.2022	Village Elder- Kalakalya	Kaunguni
4.	Munyao	18.10.2022	Farmer (since 1976)	Kaunguni
5.	P. Matheka	04.10.2022	Church Member	Ndovoini
6.	Agnes	24.08.2022	Church Member	Munathi
7.	Kimuyu	03.08.2022	Church Member	Kasuuvi
8.	Mwololo	17.11.2022	Church Member	Munathi
9.	Munuve Dalmas	21.09.2022	Church Member	Kaunguni
10.	Joyce	16.09.2022	NEMA officer/ Church Member	Makindu
11.	Kisangi	15.10.2022	Village Elder	Kosovo
12.	Mueni	19.10.2022	Farmer	Kalii
13.	Urbanus M. Yambu	20.11.2022	Senior Catechist – since 1978	Muuni
14.	Fr. Charles	14.09.2022	Priest	Kaunguni
15.	Wilfred	04.11.2022	Church Member	Kasuuvi
16.	Jonathan	19.12.2022	Church Member	Kaunguni
17.	Kisangua	05.09.2022	Church Member	Kalii
18.	Muthiani	08.11.2022	Church Member	Kasuuvi
19.	Gerald	16.11.2022	Catechist-Ndeini	Kaunguni

20.	Mbai	07.10.2022	Catechist	Kaunguni
21.	Matheka	19.11.2022	Farmer	Kaunguni
22.	Nzisa	28.11.2022	Catechist	Kasuuvi
23.	Muema Kanuna	17.10.2022	Church Member	Kalii
24.	Mathew	03.09.2022	Church Member	Kalii
25.	Kinama	09.10.2022	Church Member	Kasuuvi
26.	Kiminza	10.11.2022	Church Member	Kasuuvi
27.	Sila	15.11.2022	Church Member	Kaunguni
28.	Sabina	19.10.2022	Church Member	Kaunguni
29.	Naomi	06.09.2022	Church Member	Kaunguni
30.	David	19.10.2022	Church Member	Kasuuvi
31.	Monica	16.10.2022	Church Member	Kaunguni
32.	Kimilu	19.10.2022	Church Member	Kaunguni
33.	Muindi	13.09.2022	Church Member	Kalii
34.	Nganda	11.08.2022	Church Member	Kaunguni
35.	Musyoki	01.09.2022	Church Member	Kalii

The list names of participants above indicated do not reflect the true identity of the respondents for data protection.

Appendix VII: Research Authorization from University



MACHAKOS UNIVERSITY OFFICE OF THE DEAN GRADUATE SCHOOL

Telephone: 254-(0)735247939, (0)723805929
Email: graduateschool@mksu.ac.ke
Website: www.machakosuniversity.ac.ke

P.O Box 136-90100
Machakos
KENYA

REF. MksU/GS/SS/011/VOL.1

7th September, 2022

The Director,
National Commission for Science, Technology and Innovation
P.O Box 30623,
NAIROBI

Dear Sir

RE: PETER MAITHYA MBUTHI (C50-12780-2018)

The above named is a Master's student in the second year of study and has cleared course work. The University has cleared him to conduct a research entitled: "The role of the Catholic Church in environmental conservation: A case study of Makindu sub-county, Makueni County"

Kindly assist him with a Research Permit in order to undertake the research.

Thank you


07 SEP 2022
PROF. KIMITI RICHARD PETER, PhD
DEAN GRADUATE SCHOOL

KRP/gm



ISO 9001:2008 CertifiedSoaring Heights in Transforming Industry and Economy

THE ROLE OF THE CATHOLIC CHURCH IN ENVIRONMENTAL CONSERVATION: A CASE STUDY OF MAKINDU SUB-COUNTY, MAKUENI COUNTY

ORIGINALITY REPORT



PRIMARY SOURCES

1	link.springer.com Internet Source	3%
2	www.suaire.sua.ac.tz Internet Source	2%

Exclude quotes On

Exclude matches < 2%

Exclude bibliography On

**Appendix X: Christian Church Population in Makindu Sub County Per
Denomination**

Church	Population	Percentage
Catholic	24,097	28.37
Protestant	39,580	46.59
Evangelical Churches	10,888	12.82
African Instituted Church	3,018	3.55
Orthodox Church	18	0.10
Other Christian Churches	1,075	1.27
<hr/>		
Total Catholic Churches	78,739	0.93
Total Christian Population	84,946	

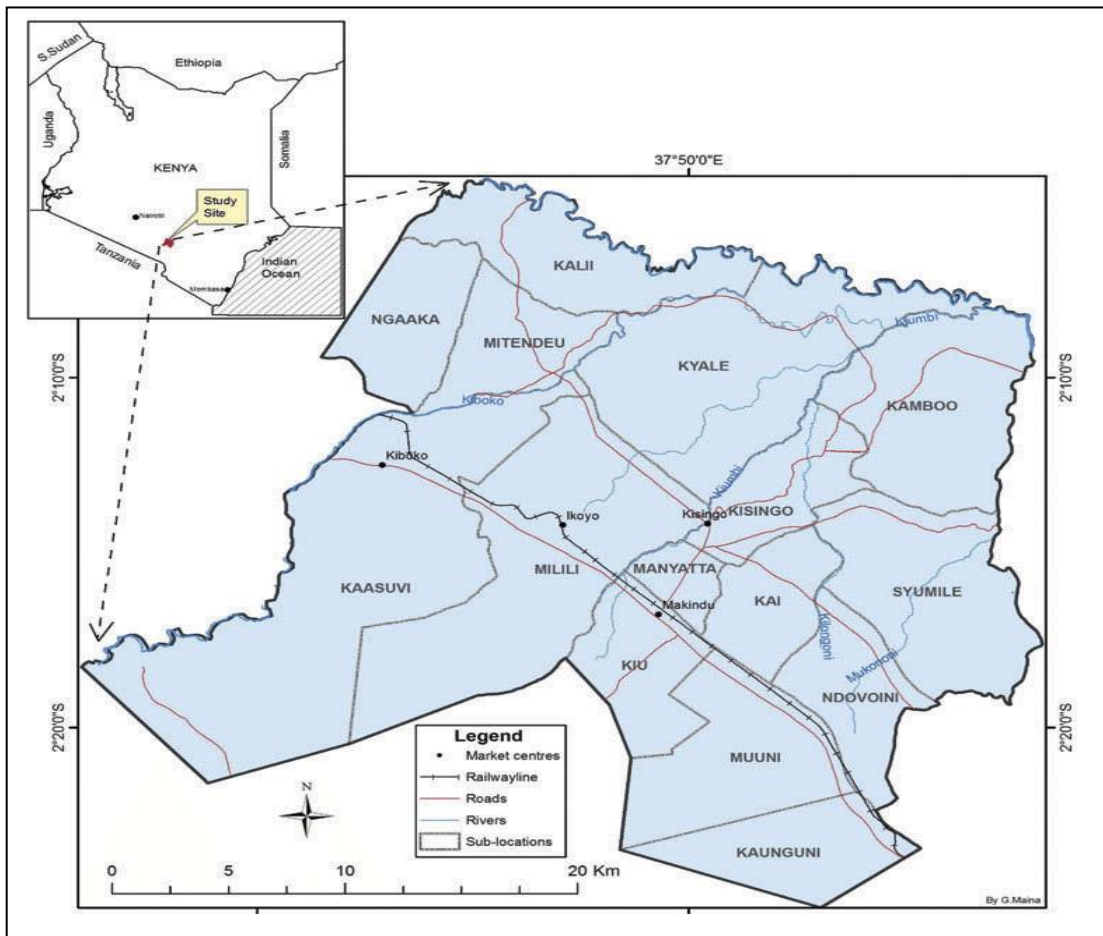
Source: The Secretariat, Makueni Association of Churches, (2022).

**Appendix XI: A Summary Distribution of Sample Population in Makindu , Sub
County, Kenya**

<u>Study Area</u>	<u>Respondents Selected</u>
Church Leaders	-Clergy -Lay leaders
Community Members	- Development officers -Farmers
Government Officials	- Sub-County Environmental Officers -Sub-County Agricultural Extension Officers
Business Community	-Shopkeeper/ Hoteliers

Source: Researcher, (2022)

Appendix XII: A Physical Map of Makindu Sub County, Kenya



A Physical Map of Makindu Sub County and its location in Kenya showing the study area. (Source: Makindu Sub County Development Stakeholders Forum 2018-2023).