



LODGES ALONG MBAGATHI RIVER, KAJIADO COUNTY

MUNALA KEVIN MUKOKO | B02/35002/2013

BACHELOR OF ARCHITECTURE THESIS

UNIVERSITY OF NAIROBI

COLLEGE OF ARCHITECTURE AND ENGINEERING

SCHOOL OF THE BUILT ENVIRONMENT

DEPARTMENT OF ARCHITECTURE AND BUILDING SCIENCE

FEBRUARY 2019

Dedication:

To Mum, Dad and my Brother;

Relatives, Friends and Mentors

“Think become, Keep becoming.”

Declaration

This research proposal is my original work and has not been presented for a degree in any other University. This thesis is submitted in partial fulfillment of the examination requirements for the award of the Bachelor of Architecture degree in the Department of Architecture and Building Science at the University of Nairobi.



.....

Author: **Munala Kevin Mukoko**

Registration Number: **B02/35002/2013**

.....

Chairman: **Arch. Musau Kimeu**

.....

Supervisor: **Dr. Yusuf Ebrahim**

.....

Year Master: **Arch. Norbert Musyoki**

Date:

Date:

Date:

Date:

This thesis like everything else I have created in my life, is the result of great support. I extend my deepest gratitude and thanks to God and:

Acknowledgments

Family

Benson Munala
Christine Munala
Ian Munala
Mr. Clement & Mrs. Teresa Matasyo
The late Mr. Stanley Mukoko &
late Mrs. Jescah Mukoko
Josphine Mukoko
Archie Makatiani
David Matasyo
Imelda Wiyema
Andrew Kagwa
Jane Matasyo
The Mukokos

Kenya Wildlife Service

Mr. Solomon Kyalo
Mr. Daniel Muteti
Mr. Wilson Korir

Emakoko Lodge

Anthony & Emma Childs
Jackson Ketter
David Parmisa

Yvonne Mwende

Maasai Lodge

The front desk at Maasai lodge

Osoita lodge

The front desk at Maasai lodge

Lecturers/Mentors

Dr. Yusuf Ebrahim
Arch. Adnan Mwakulomba
Arch. Etta Madete
Arch. Florence Nyole
Arch. Luke Carter
Arch. Kasera Carter
Arch. Musau Kimeu
Arch. Mutua Mutuku
Arch. Norbert Musyoki
Mr. Nick Kamere & Dr. Isabella Kamere
Dr. Julie Kamere
Mr. Nyakiongora Geoffrey
Mr. Ramazan Akkiliç

Friends and Classmates

Achilla Nick
Gifonga Prince
Irene Leperes
Junior Tollo
Kamere Peace
Kamithi Hillary
Kamithi Rose
Karuga Julius
Karugu George
Kasembeli Dan
Kemboi Brian
Kibaru Cate

Kingori Jesse

Kiragu David

Macharia Ian

Macharia Vivian

Macharia Isaac

Maina Emmanuel

Maito Sarah

Margiey Akinyi

Mark Kantai

Mativo Martin

Mbarak Siham

Meli David

Meli Dominique

Mwanda Gilbert

Mumo Joel

Muema Chuchu

Muriuki Christopher

Muthoni Sheila

Mwamachi Heinz

Mwambanga Mtalaki

Mwanda Gilbert

Mwariri Anne

Muitu Anne

Ndamu Nicolle

Nderitu Peter

Ndirangu Maureen

Njenga Gabriel

Nyabuti Brian

Okoth Edward

Perez Martin

Saitabau Kumary

Umara Audrey

Wageni Lance

Wambua Timothy

Wanga Stephanie

Wanjiku Joy

Waringa Waweru

Waweru Ted

and the entire 2019 Barch. Class

Carbngroup: Erregaffi: Voicebox:

Silhouettes: Itala Foundation

Metatron Africa Foundation

The Muthithi Family

Muthithi football team

Light Academy class of 2012

Contents

1: INTRODUCTION

1.1 Background of the study	2
1.2 Problem Statement	4
1.3 Research Questions	4
1.4 Research Objectives	5
1.5 Justification of the study	5
1.6 Significance of the study	6
1.7 Assumptions	6
1.8 Scope and limitations of the study	6
1.9 Terminologies	7
1.10 Organization of the study.....	9

2: REVIEW OF RELATED LITERATURE

2.1 Introduction	11
2.2 Perception of water in dry landscapes.....	11
2.3 Basic elements of concave landforms contributing to micro-climatic conditions.....	12

2.4 Character of river valleys	14
2.5 Principles of climate change action	15
2.6 Factors affecting thermal comfort of an individual	16
2.7 Sustainable design principles of lodges	17
2.8 The need for thermal comfort	19
2.9 Thermal comfort and a home	20
2.10 Definition of passive design	20
2.11 Passive design strategies	20
2.11.1 Passive Design Strategies according to Victor Olgay	21
2.11.2 Passive Design Strategies according to Cairns regional council	25
2.12 Case Study 1: Kintobo health centre Nyabihu, Rwanda	29
2.13 Case Study 2: Early Childhood care and development centre Bugesera, Rwanda	30
2.14 Case Study 3: Crosswaters ecolodge Nankunshan reserve, Guangdong, China	31
2.15 Case Study 4: Red pepper house Mombasa, Kenya	32
2.16 Savanna zone climate	33
2.17 List of passive design parameters identified in response to climate from review of related literature.	34
2.18 Operationalisation of variables	35

2.19 Conceptual Framework 36

2.20 Summary of literature review 37

3: RESEARCH METHODS

3.0 Introduction 39

3.1 Research Design 39

3.2 Data Sources 42

 3.2.1 Primary Data Sources 42

 3.2.2 Secondary Data Sources 43

3.3 Sampling Design 46

 3.3.1 Location of the study 46

 3.3.2 Unit of analysis 47

 3.3.3 Population 48

 3.3.4 Population fram 48

 3.3.5 Sample Size 49

 3.3.6 Sampling Technique

3.4 Data Collection tools and Techniques	50
3.4.1 Data collection tools	50
3.4.2 Data collection techniques	50
3.5 Data Analysis and Presentation	51
3.5.1 Data Presentation Techniques.....	53
3.5.2 Data Analysis Techniques.....	53
3.6 Time horizon	54
3.7 Summary of Research methods.....	54

4: RESULTS AND DISCUSSION OF FINDINGS

4.0 Introduction	56
4.1 Case Study 1: Osoita Lodge, Kajiado county	57
4.2 Case Study 2: Maasai Lodge, Kajiado county	68
4.3 Case Study 3: Emakoko Lodge, Kajiado county	76
4.4 Summary of results and discussion of findings	84

5: CONCLUSION

5.1 Introduction 94

5.2 Summary of chapters 94

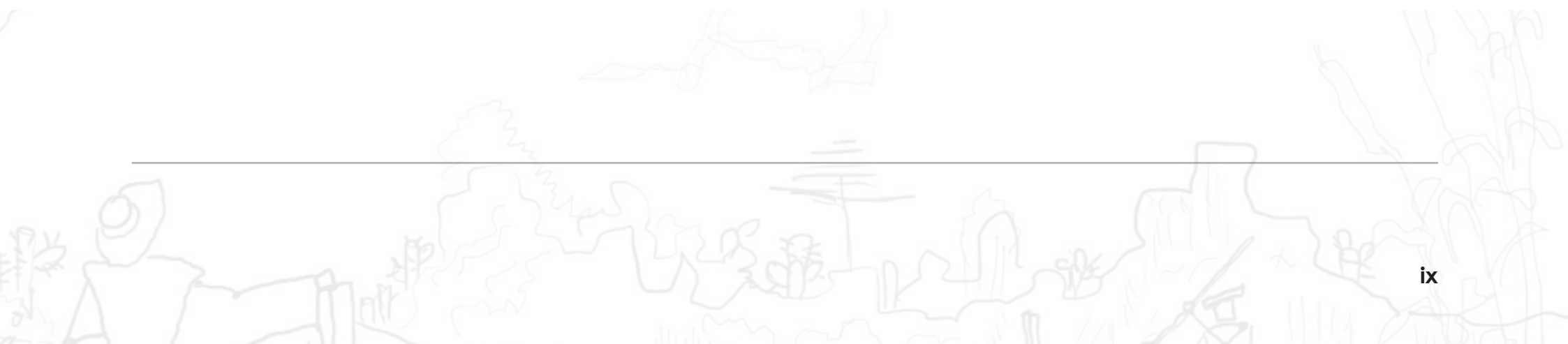
5.3 Lessons learnt on passive design strategies 96

5.4 Implications of the findings 100

5.5 Recommendations for further research 100

CITED REFERENCES xxii

APPENDIX



List of Figures

Figure 1.1
 Photo of industrial pollution increasing the rate of climate change 2

Figure 1.2
 Photo of a semi-arid zone with even higher temperature effects from climate change..... 2

Figure 1.5
 Climate change sensitivity map of Kenya 4

Figure 2.1
 Relationship between man and his environment 11

Figure 2.2
 Photo of Mbagathi river 11

Figure 2.3
 Relationship between man and his environment..... 12

Figure 2.4
 Varying degrees of exposure of a concave landform to wind and direct sun..... 13

Figure 2.5
 Photo of Chulyshman River 14

Figure 2.6
 Structurally-logical model of interaction between the architecture and landscape 14

Figure 2.7
 Built forms taking a linear organisation to reflect the directional quality of the river 15

Figure 2.8
 Drivers for achieving a low carbon footprint 15

Figure 2.9
 Crosswaters Ecolodge in China 16

Figure 2.10
 Thermal comfort for an individual 16

Figure 2.11
 The three rings of sustainability illustrate interdependence of the elements..... 17

Figure 2.12
 Sketch by Matt Lewis, Hitesh's colleague at EDSA showing a village home in the Wolong 17

Figure 2.13
 Principles of ecolodges 18

Figure 2.14	The parameters that effect thermal comfort.....	19
Figure 2.15	Heat gain and loss processes	19
Figure 2.16	Heat exchange between man and surroundings.	20
Figure 2.17	Passive Ventilation (cross-section)	20
Figure 2.18	Built forms on the lower portions of a slope	21
Figure 2.19	Alternative material to paving with landscaping on the edges.....	21
Figure 2.20	Closed building arrangement around green areas	22
Figure 2.21	Inward looking layout of SOS children's village in Djibouti with cool air effects from courtyards	22
Figure 2.22	Plan of LAAFI Nursery school with building elongated on an East-West Axis	23
Figure 2.23	Photo of Chipakata children's academy	23
Figure 2.24	Windows shielded from direct radiation	24
Figure 2.25	Photo of Red Pepper house with deep roofs shading the internal spaces and walls	24
Figure 2.26	Laafi Nursery School with an East West Orientation in response to the sun position for minimal heat gain	25
Figure 2.27	3D Section of Butaro Hospital illustrating openings aligned for maximum cross ventilation effectiveness.	25
Figure 2.28	Openings of Early Childhood Care & Development Center	26
Figure 2.29	Roof Cavity Ventilation	26
Figure 2.30	Photo 10 Ossmann Street house	27

Figure 2.31	
Photo of Falatow Jigiyaso Orphanage	27
Figure 2.32	
Thermal mass on the vertical plane	28
Figure 2.33	
Thermal mass on the horizontal plane	28
Figure 2.34	
Plan of Kintobo health centre	29
Figure 2.37	
Longitudinal section of the development	29
Figure 2.35	
Photo sun shading devices on the glazed openings	29
Figure 2.36	
Photo of the health centre	29
Figure 2.38	
Image showing the shaded outdoor space with a porous wall for free air movement	30
Figure 2.40	
Image showing the Early childhood centre	30
Figure 2.39	
Photo of the windows with high level vents	30
Figure 2.41	
Plan of Crosswaters ecolodge	31
Figure 2.42	
Images of Crosswaters ecolodge	31
Figure 2.43	
Plan of Red Pepper house	32
Figure 2.44	
Elevation of Red Pepper house	32
Figure 2.45	
Interior photo of Red Pepper house	32
Figure 2.47	
Aerial photo of Red pepper house	32
Figure 2.46	
Photo of Bathroom	32

Figure 2.48.	
Location of Kajiado in Kenya	33
Figure 2.49	
Kajiado temperature and precipitation averages	33
Figure 2.50	
Converting passive design strategies into measurable variables	35
Figure 2.51	
A model of a conceptual framework for the relationship between climate and passive design strategies	36
Figure 3.1	
The study used the case study approach to attain the research objectives defined	39
Figure 3.2	
The case study deals with processes that take place and their interrelationship	39
Figure 3.3	
Research strategy model	40
Figure 3.4	
Research Framework Table	41
Figure 3.5	
Observation as a way of watching and listening to an interaction or phenomenon as it takes place	42
Figure 3.6	
Handmade sketches	42
Figure 3.7	
Two-dimensional measured drawing of an Osoita lodge cottage	43
Figure 3.8	
Photo of some respondents interviewed at the Emakoko lodge, Kajiado county	43
Figure 3.9	
Map showing location of the lodges along Mbagathi River, Kajiado County	46
Figure 3.10	
Sample size	49
Figure 3.11	
A3 Artists' sketchpad	50
Figure 3.12	
Canon EOS DIGITAL REBEL XTi	50
Figure 3.13	
Bosch Laser Rangefinder	51

Figure 3.14	
Sony Xperia C5303	51
Figure 3.15	
Hp Envy m7 Notebook	51
Figure 4.1	
Map highlighting builtforms along River Mbagathi	56
Figure 4.2	
Plan of Osoita lodge	57
Figure 4.3	
Photo of main building from entrance	57
Figure 4.4	
Sketch massing of developement	57
Figure 4.5	
Photo of main building from entrance	57
Figure 4.6	
Sketch plan of the accommodation blocks organized around the pool area	
Figure 4.7	
Level 2 floor plan of accommodation block units	58
Figure 4.7	
Sliding windows on ground floor	59
Figure 4.10	
Sketch illustrating the porous makuti-bamboo screen	59
Figure 4.8	
Swinging windows on first floor	59
Figure 4.9	
Makuti screen on first floor corridor	59
Figure 4.11	
Sketch section illustrating the accommodation and cottages blocks organized around the pool area	60
Figure 4.12	
Sketch section of the two storey accommodation	60
Figure 4.13	
Sketch illustrating openings being shaded from the sun rays by nearby trees	61

Figure 4.14	Sketch illustrating openings being shaded by the external blinds shielding the space from sun rays.....	61
Figure 4.15	Sketch illustrating warm air escaping via the roof skylight	61
Figure 4.16	Photo of the external blinds	61
Figure 4.17	Section 1-1 of the level 2 unit in the accommodation block	62
Figure 4.18	Sketch elevation of the two storey accommodation block	63
Figure 4.20	Photo of the two storey accommodation block	63
Figure 4.19	Photo of the corridor access into the units at the rear	63
Figure 4.21	Rough pebble stone finish	64
Figure 4.22	Orange plastered and painted wall finish	64
Figure 4.23	Cobblestone finish	64
Figure 4.24	Vegetative layer	64
Figure 4.25	Makuti roof	65
Figure 4.26	Corrugated iron sheets roofing	65
Figure 4.27	Natural stone floor finish on pedestrian routes	65
Figure 4.28	300x300mm tiled floor finish on transition space.....	65
Figure 4.29	Gravel on vehicular circulation.....	65
Figure 4.30	Main lodge building Ceramic tile finish type 1	66

Figure 4.31	
Main lodge building Ceramic tile finish.type.2	66
Figure 4.32	
Natural stone on ground floor	66
Figure 4.33	
Ceramic tile floor finish on upper floor.....	66
Figure 4.34	
Main lodge building wall finish.....	66
Figure 4.35	
Accommodation units wall finish.....	66
Figure 4.36	
Main building exposed roof underside	66
Figure 4.37	
Ground floor unit ceiling	66
Figure 4.38	
Upper floor unit exposed roof underside.....	66
Figure 4.39	
Photo of landscaping fountain feature.....	67
Figure 4.40	
Photo of vegetation on edges of cottages.....	67
Figure 4.41	
Plan of Maasai lodge	68
Figure 4.42	
Photo of main building from pool area	68
Figure. 4.43	
Sketch massing of development	68
Figure. 4.44	
Photo of the cottages	68
Figure.4.45	
Sketch masterplan of the development.....	69
Figure 4.46	
Sketch plan of the blocks organized along the contours, receiving breeze from the river.....	69
Figure 4.47	
View of open lounge and dining in the main lodge building	70

Figure 4.48	Main lodge building stepped along the slope for natural ventilation, lighting and response to topography	70
Figure 4.49	Photo of conference room in main lodge building with high level timber vents	71
Figure 4.50	Glass louvered opening in double cottage	71
Figure 4.51	Opening to deck in the double cottage.....	71
Figure 4.52	3d model study of guest cottage	72
Figure 4.53	Photo of guest cottages.....	72
Figure 4.54	Glass louvered opening of double cottage	72
Figure 4.55	Brown plastered and painted wall finish	73
Figure 4.56	Orange plastered and painted wall finish	73
Figure 4.57	Natural stone	73
Figure 4.58	Natural stone	73
Figure 4.59	Natural stone	73
Figure 4.60	Main lodge building brick floor finish type 1	74
Figure 4.61	Main lodge building natural stone finish type 2	74
Figure 4.62	Main building painted arched ceiling	74
Figure 4.63	Main lodge building brick floor finish	74
Figure 4.66	Main lodge building wall finish	74

Figure 4.64	
Guest cottage natural stone finish.....	74
Figure 4.67	
Guest cottage plastered and painted wall finish.....	74
Figure 4.65	
Guest cottage ceiling.....	74
Figure 4.68	
Photo of landscaping around entrance building fountain feature.....	75
Figure 4.69	
Photo of pedestrian walkway with vegetation on the edges.....	75
Figure 4.70	
Photo of cottages and vegetation around it	75
Figure 4.71	
Plan of Maasai lodge	76
Figure 4.72	
Photo of lodge from the bottom of the slope.....	76
Figure. 4.73	
Sketch massing of development on the slope	76
Figure 4.74	
Photo of lodge building from entrance	76
Figure 4.75	
Photo of Emakoko lodge on a slope taken from the road to Mokoyeti picnic spot.....	77
Figure 4.76	
Photo of access bridge above River Mbagathi	77
Figure 4.77	
Photo of the elevated main lodge building	77
Figure 4.78	
Sketch masterplan of the Emakoko development.....	78
Figuren 4.79	
Sketch floor plan of a double cottage room in the Emakoko development.....	78
Figure 4.80	
Sketch elevation of the development and fig. 81 elevations	79
Figure 4.82	
Photo of roof breather caps.....	79

Figure 4.83	
Ceiling vent for roof breather caps	79
Figure 4.84	
Section of the access bridge leading to the main lodge development	80
Figure 4.85	
Sketch plan of the development	80
Figure 4.87	
Sketch section of the development sitting on a slope	81
Figure 4.88	
Interior photo of guest cottage viewing the bed and bathroom wall	81
Figure 4.89	
Interior photo of guest cottage viewing the bed, fireplace and entrance	81
Figure 4.90	
External wall finish on guest cottage	82
Figure 4.91	
Internal white plastered and painted wall finish in guest cottage	82
Figure 4.94	
Roof of guest cottages	82
Figure 4.92	
Internal brown plastered and painted wall finish in guest cottage	82
Figure 4.93	
Internal red plastered and painted wall finish in guest cottage	82
Figure 4.95	
Internal brown oxide floor finish in cottages	83
Figure 4.97	
Timber floor finish with rubber strips for grip	83
Figure 4.99	
Viewing deck floor finish with spacing	83
Figure 4.96	
Timber floor finish in main lodge building	83
Figure 4.98	
Natural stone floor finish	83
Figure 4.100	
Ceiling of guest cottage	83

Figure 4.101		
Photo of natural landscaping around the cottages		84
Figure 4.102		
Aerial photo of main building with vegetation around it		84
Figure 4.103		
Photo of walkway and vegetation around it		84

List of Tables

Table 1.1		
Table illustrating the organization of the study		9
Table 3.1		
Photo of natural landscaping around the cottages		44

Abstract

Even though Kajiado is recognized as a Savannah region, lodges within this context continue to develop in spite of the rising temperatures brought by climate change. Most lodges within this area are celebrated from the online reviews on Trip advisor and other sources however a few challenges on thermal comfort continue to arise as climate continues to change. Publications from Mwangi & Mutua (2015) reveal that a positive slope trend in average monthly minimum temperatures also affects this region as part of the effects of climate change. The study therefore aims to explore the passive design strategies employed in the design of the lodges along River Mbagathi, Kajiado county.

Three questions are asked and discerned with sustainable architecture as the theme. The first and second correspond to establishing the current status of the sampled lodges and appropriate passive design strategies respectively while the third corresponds to the contribution of Mbagathi river to architecture in terms of views and spatial qualities.

An examination of literature from various sources creates a foundation for the study. A brief synopsis of water in arid landscapes sets the scene to narrate the perspective of water in this context. Passive design strategies adopted in sustainable architecture around the world follow with topics relevant to the objectives expounded upon.

A case study method is employed in the research design as per Kothari and Garg (2014). The following parameters were used in undertaking the study: Planning and massing; building form; material and texture; openings and ventilation; and landscaping and ventilation . Recommendations are then proposed for designing within this area.

Keywords:

Passive design strategies, sustainable architecture, lodge, climate change, savannah climate

CHAPTER 1 | Introduction

This chapter explains the development of the effects of climate change and the influence it has had on the climate. A problem is identified in Kajiado county and the objectives are defined to guide the study.



Figure 1.1. Photo of industrial pollution increasing the rate of climate change. Source: google images.



Figure 1.2. Photo of a semi-arid zone with even higher temperature effects from climate change. Source: google images.

1.1 Background of the study

One of the greatest challenges facing human society in the 21st century is climate change. This refers to any significant change in measures of climate lasting for an extended period of time.¹

Through the ages, men have sought, in the building of shelter to fulfill two basic human needs - Protection from the elements and provision of an atmosphere favorable to spiritual endeavor. Olgay further states that British Columbia specifically the Hot arid zone made extreme demand on the constructors of tribal dwellings.²

Characterized by excessive heat and glaring sun, this area required that the shelter be designed to reduce heat impact and provide shade.³

In Kenya, the Arid and Semi-Arid Lands (ASAL) constitute about 80% (467,200 sq.km) of Kenya's total land mass hosting about 35% of Kenya's population. (13 million people).⁴

Every week we're seeing new and undeniable climate events, evidence that accelerated climate change is here right now. Droughts are intensifying. We are

¹ Oloutuah, 2013, p. 4.

² Olgay, 1962, p. 5.

³ Loc.cit. Olgay, 1962.

⁴ UNDP, 2013, p. 7.

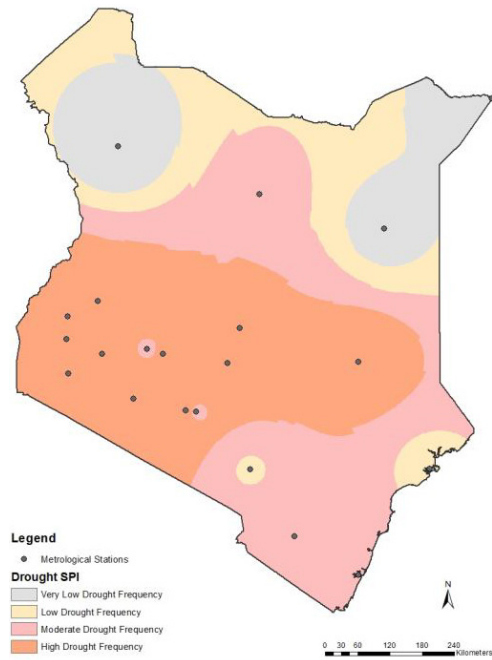


Figure 1.3. Minimum temperature trend in Kenya 1981-2011. Source: Mwangi & Mutua (2015).

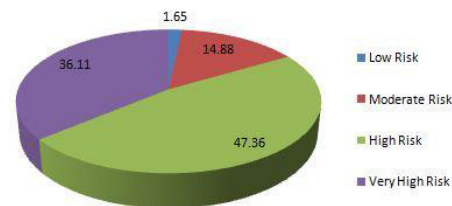


Figure 1.4. Percentage of land by area representing sensitivity to climate change in Kenya. Source: Mwangi & Mutua (2015).

seeing extreme weather events decades ahead of scientific projections.⁵

According to Mwangi and Mutua from the minimum temperature analysis in the years 1981 to 2011 all stations within their study reported a positive slope trend except four stations. This indicates an overall increase in the average monthly minimum temperature for the period under study as seen in Figure 2. From the minimum temperature analysis in the years 1981 to 2011 all stations reported a positive slope trend except four stations. This indicates an overall increase in the average monthly minimum temperature for the period under study. Majority of Kenya (47.36%) has been found to be high risk and 36.11% very high risk sensitivity to climate change. This means that these areas have a low threshold to the effects of climate change and would suffer most to the effects if no adaptation mechanisms are in place. Areas with lowest risk would have a higher threshold to withstand or cope with the effects of climate change and compose the smallest area of 1.65% in Kenya.⁶

Semi-arid landscapes are particularly vulnerable to degradation because of sparse vegetative cover and the distribution of annual rainfall. Climate change temperature rise has only aggravated this semi-arid situation.⁷

Kajiado county is home to vast tracts of undisturbed natural resource which are suitable for hospitality investment positions. It is as a tourist destination even with climate change.⁸

⁵ DiCaprio, 2016. Watch this documentary for a global elaboration of climate change effects and to his landmark speech at the United Nations climate summit

⁶ Mwangi & Mutua, 2015, p. 5.

⁷ El-Beltagy & Madkour, 2012.

⁸ County government of Kajiado, 2018.

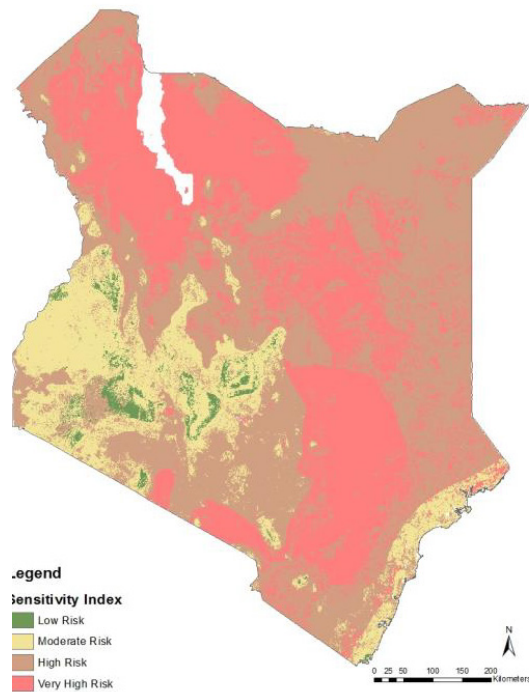


Figure 1.5. Climate change sensitivity map of Kenya Source: Mwangi & Mutua (2015).

1.2 Problem statement

According to the county government of Kajiado's trade tourism and industrialization department's vision statement, the county seeks to provide a globally competitive economy with **sustainable and equitable socio economic development**.⁹ However, multiple **online reviews** reveal that tourists using these spaces complain about **a lack of fans and air conditioning** during the day while others complain of **cold during the night**.¹⁰

While this problem is not common to all lodges in this context a need to seek for appropriate climate design strategies within this area arises. Therefore the study intends to give appropriate passive design strategies employed along Mbagathi river, Kajiado county that can help resolve this challenge in future buildings.

1.3 Research questions

The following questions are therefore asked to guide this research:

- i) What are the appropriate passive design strategies of built forms in response to tropical savanna climate?
- ii) What are the existing passive design strategies employed on the lodges along River Mbagathi, Kajiado county?
- iii) How has River Mbagathi, Kajiado county influenced the design of lodges along it?
- iv) What recommendations can be given to design of lodge architecture along Mbagathi river, Kajiado county?

⁹ Ibid.

¹⁰ Tripadvisor, 2018.

1.4 Key Objective

The purpose of this study is to give suitable passive design strategies in response to tropical savanna climate for lodges along Mbagathi river, Kajiado county.

1.4.1 Research objectives

From the main objective the sub-objectives of this study are:

- i) To understand appropriate passive design strategies of built forms in response to tropical savanna climate.
- ii) To establish the status of passive design strategies employed on lodge architecture along River Mbagathi, Kajiado county.
- iii) To give recommendations from the understanding and status of lodge architecture in response to the tropical savanna climate along Mbagathi river, Kajiado.

1.5 Justification of the study

The study is justified for the following reasons:

- i.) The results of this study will provide some insights and information on passive design strategies for lodges along rivers within the savanna climate.
- ii.) The findings of this study will establish existing passive design strategies of lodges along River Mbagathi, Kajiado county.
- iii.) The findings of this study will propose new or better passive design strategies for built forms along River Mbagathi, Kajiado county.

- iv.) The findings of this study will inform on the inspiration behind the forms.
- v.) The findings of this study will reveal the contribution of River Mbagathi on architectural design responses to this natural feature.

1.6 Significance of the study

The study is significant for the following reasons:

- i.) This study hopes to inform the professional consultants within the built environment on passive design strategies for the tropical savanna climate.
- ii.) This study hopes to contribute knowledge in the area of riverine, climate responsive and Maasai architecture.
- iii.) This study hopes to inform consultants on the importance of site selection.

1.7 Assumptions

- i.) No other study has been carried out within this area.
- ii.) There is insignificant difference in actual climatic conditions along the river.

1.8 Scope and limitations of the study

- i.) This study will be limited to Kajiado's county.
 - ii.) Only built forms along the river will be Osoita lodge, Ololo Safari Lodge, Maasai Lodge, Nyati Hills Cottages and Emakoko Lodge.
 - iii.) The study will be limited to passive design strategies employed on the lodges along River Mbagathi, Kajiado county.
-

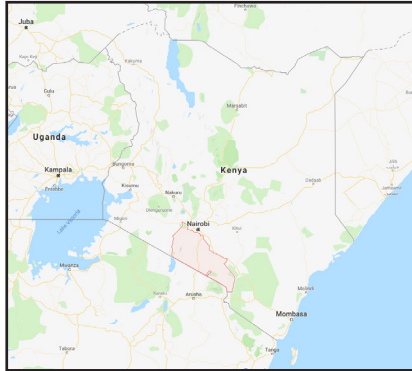


Figure 1.6. Map illustrating location of Kajiado county in Kenya. Source: Google.com.

1.9 Definition of terms

Lodge

A small house in a park, forest, or domain; a temporary habitation; a hut. Harris C.M.(2006)

Ecolodge

A nature dependent tourist lodge that meets the philosophy and principles of ecotourism.

Ecotourism

A nature dependent tourist lodge that meets the philosophy and principles of ecotourism.

Ecology

A nature dependent tourist lodge that meets the philosophy and principles of ecotourism.

Maasai

This is one of the nilotic pastoral communities found in Kenya and Tanzania. They form part of the forty two (42) tribes found in Kenya.

Manyatta

This is a habitation in form of a building lived in by people. In Kenya the manyatta is associated with the Maasai community in Kenya as most of their houses take the shape of a Manyatta. It is a dome-shaped semi-permanent structure build mainly using cow dung and mud (soil+ water mixture).

Thermal comfort

A sense of well-being with respect to temperature. It depends on achieving a balance between the heat being produced by the body and the loss of heat to the surroundings.

Thermal mass

Thermal mass refers to the ability of building materials to absorb, store and release heat. (Cairns regional council, 2011).

1.10 Organization of the study

Introduction	Abstract; Acknowledgements; Table of contents; List of tables and figures; Abstract
Chapter 1: Introduction	Introduction to central problem of a need for passive design strategies to deal with the rising temperatures brought by climate change.
Chapter 2: Review of related literature	Related literature on the development of the effects of climate change and the influence it has had on the climate leading to various passive design strategies employed around the world.
Chapter 3: Research methods	This chapter focuses on the research design and methods that were employed to carry out the study.
Chapter 4: Results	This chapter details what was found from the samples and what it means to the study.
Chapter 5: Discussion of findings	Significance of the results and their interpretation are presented based on the findings on site and the related literature studied.
Chapter 6: Conclusions	This chapter draws summary statement, conclusions, limitations, implications of the findings
Back matter	This consists of references, appendices and glossary.

Table 1.1 Table illustrating the organization of the study. *Source: Author*