

# EVICTION FOR FOREST CONSERVATION

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THE CASE OF WEST KILIMANJARO FOREST,  
SIHA, TANZANIA

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## **I. Abstract**

*In 2007 about 12,000 people were evicted from the forest of West Kilimanjaro, Tanzania. The government took such decision in response to various reports that quoted the decline of forest due to relentless pressure on forest resources arising from ever increasing demand for fuel wood, fodder, timber and demand of forestland for other uses. The people who lived in the forest for over half a century were said to be 'invaders' therefore evicted from the forest boundaries.*

*Eviction for conservation has been condemned to cause negative impacts to livelihoods therefore there has been a call for conservation policies that incorporates wellbeing of the people.*

*This study aimed to assess the impacts of eviction to livelihood and to evaluate how it affected the forest of West Kilimanjaro. It also aimed to assess how the costs and benefits of eviction were distributed among actors involved. The objective was to see if the current forest management conform to the goal of sustainable development as stated in their policy documents.*

*The results shows that, contrary to claims by state actors that people were invaders of the national forest, the people, were actually recruited by European settlers to work in the forest way back in 1950s and are the one that laboured to plant the very forest that is said to be destroyed by them.*

*Furthermore, using political ecology and historical framework to understand power relations between state actors and non-state actors in Tanzania revealed that, even the said relentless pressure to forest has its roots from the power struggle to control land and forest resources by state actors the process that led to alienating of indigenous people from their land turning them into labourers living near plantations to provide labor in settlers estates. It is further revealed that even after independence, power struggle for controlling land continued to map out of land the marginal communities leading to deterioration of their livelihood.*

*Assessment of impacts of eviction showed that since eviction there has been increase of forest cover but there has been deterioration of livelihoods of evicted people.*

*The study has also revealed that the costs and benefits of eviction were unequally distributed among actors whereby state actors accrue most of the benefits, while the evicted people born most of the costs.*

*The study has therefore concluded that, despite the call for incorporation of livelihood in conservation management strategies, and despite of having sustainable development as their management objective goals, the business ended in the rhetorics but not yet translated into action.*



## **II. Dedication;**

This work is dedicated to the grass root marginal communities of poor farmers, shifting cultivators, hunter and gatherers, and the like; who despite living in the site of environmental resource locations, they are disempowered from accessing such resources by the powerful actors who do not live in resource location sites but have placed constraints over such resources, but despite, all constraints placed against them by the powerful actors, they still thrive to make a livelihood.



### III. Acknowledgements

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## Table of Contents

I. Abstract.....	i
II. Dedication;.....	iii
III. Acknowledgements.....	v
IV. List of Acronyms .....	xi
V. List of Figures .....	xiii
VI. List of Tables .....	xv
CHAPTER ONE .....	1
1.1 INTRODUCTION .....	1
1.2 BACKGROUND .....	1
1.3 THE STUDY AREA .....	2
1.4 PROBLEM STATEMENT.....	6
1.5 OBJECTIVE OF THE STUDY .....	9
1.6 SIGNIFICANCE OF THE STUDY .....	9
1.7 JUSTIFICATION OF THE STUDY.....	9
1.8 LIMITATION OF THE STUDY .....	10
1.9 STRUCTURE OF THE THESIS .....	11
1.10 CHAPTER SUMMARY.....	11
CHAPTER TWO.....	13
2 THEORETICAL AND HISTORICAL FRAMEWORK.....	13
2.1 INTRODUCTION .....	13
2.2 POLITICAL ECOLOGY .....	13
2.3 POWER RELATIONS WITHIN HUMAN-ENVIRONMENT INTERACTION - IN TANZANIA CONTEXT.....	16
2.3.1 PRE-COLONIAL TIME.....	16
2.3.2 THE COLONIAL ERA .....	16
2.3.3 POST INDEPENDENCE .....	21



2.4	SUSTAINABLE LIVELIHOODS APPROACH .....	21
2.5	CHAPTER SUMMARY .....	24
CHAPTER THREE.....		27
3	METHODOLOGY, METHODS AND TECHNIQUES.....	27
3.1	INTRODUCTION .....	27
3.2	METHODS FOR ASSESSING NARRATIVES FOR SETTLEMENT.....	27
3.3	METHODOLOGY FOR ASSESSING FOREST COVER.....	27
3.3.1	GEOGRAPHICAL INFORMATION SYSTEM (GIS).....	27
3.3.2	ACQUIRING SATELLITE IMAGES.....	27
3.3.3	IMAGE PRE-PROCESSING .....	28
3.3.4	IMAGE PROCESSING .....	29
3.3.5	IMAGE CLASSIFICATION .....	29
3.3.6	IMAGE QUANTIFICATION .....	31
3.4	CREDIBILITY OF SATELLITE IMAGES.....	32
3.5	METHODOLOGY FOR LIVELIHOOD DATA.....	33
3.5.1	DATA COLLECTION TOOLS .....	33
3.5.1.1	QUESTIONNAIRE.....	33
3.5.1.2	INTERVIEW.....	35
3.5.2	SAMPLING .....	35
3.5.3	FIELD WORK PROCEDURES .....	37
3.5.4	THE ACTUAL FIELD WORK.....	39
3.5.5	INTERVIEWS .....	42
3.5.6	LIVELIHOOD DATA ANALYSIS .....	42
3.6	NATURE OF DATA VALIDITY AND RELIABILITY .....	43
3.6.1	CHALLENGES ENCOUNTERED.....	44
3.6.2	MY POSITION AS A RESEARCHER.....	44
3.7	CHAPTER SUMMARY .....	45

CHAPTER FOUR.....	47
4 NARRATIVES OF ESTABLISHMENT OF SETTLEMENT IN THE FOREST .....	47
4.1 INTRODUCTION .....	47
4.2 NATURE OF SETTLEMENT IN THE FOREST .....	47
4.3 WHAT CHANGED THAT SETTLEMENT COULD NO LONGER TOLERATED? 52	
4.4 CHAPTER SUMMARY .....	53
CHAPTER FIVE.....	55
5 IMPACTS OF EVICTION TO FOREST .....	55
5.1 INTRODUCTION .....	55
5.2 RESULTS OF ASSESSMENT OF FOREST STATUS .....	55
5.3 CHAPTER SUMMARY .....	63
CHAPTER SIX .....	65
6 IMPACT OF EVICTION ON LIVELIHOOD.....	65
6.1 INTRODUCTION .....	65
6.2 CHARACTERISTICS OF RESPONDENTS .....	65
6.3 RESULTS OF ASSESSMENT OF LIVELIHOOD.....	66
6.3.1 TRANSFORMING INSTITUTIONS, SOCIAL STRUCTURES AND PROCESSES.....	70
6.4 CHAPTER SUMMARY .....	76
CHAPTER SEVEN.....	77
7 DISTRIBUTION OF COSTS AND BENEFITS OF EVICTION AMONG ACTORS ..	77
7.1 INTRODUCTION .....	77
7.2 DISTRIBUTION OF COSTS AND BENEFITS AMONG ACTORS .....	77
7.3 CHAPTER SUMMARY .....	80
CHAPTER EIGHT.....	81
8 DISCUSSION AND CONCLUSION.....	81
9 REFERENCES.....	88

Appendix 1: Questionnaire.....	93
Appendix 2: t - test; Natural Capital .....	97
Appendix 3(a): t - test; Physical Capital (Part 1) .....	98
Appendix 3(b): t - test; Physical Capital (Part 2) .....	99
Appendix 4: t-test; Human Capital.....	100
Appendix 5: t-test; Social Capital .....	101
Appendix 6: t - test; Financial capital .....	102
Appendix 7: Natural Capital - Values for Asset Pentagon.....	103
Appendix 8: Physical Capital - Values for Asset Pentagon .....	104
Appendix 9: Human Capital - Values for Asset Pentagon.....	105
Appendix 11: Financial Capital - Values for Livelihood Asset Pentagon .....	107
Appendix 12 (a): Guiding questions for interviews with heads of households (evicted) .....	108
Appendix 12 (b): Guiding questions for interviews with heads of households (NOT evicted) .....	109
Appendix 13 Guiding questions for interviews with forest officials .....	110

#### **IV. List of Acronyms**

ETM — Enhanced Thematic Mapper

GIS — Geographical Information System

KINAPA — Kilimanjaro National Park

MDGs — The Millennium Development Goals

MNRT — Ministry of Natural Resources and Tourism

NAFCO — National Agriculture and Food and Cooperation

NBS — National Bureau of Statistics

NTNU — Norwegian University of Science and Technology

SLC — Scan Line Corrector

SLF — Sustainable Livelihood Framework

TANAPA — Tanzania National Park

TANESCO — Tanzania Electric Supply Company

TFS — Tanzania Forest Service

UNESCO — United Nations Educational, Scientific and Cultural Organization

URT — United Republic of Tanzania

USGS — United States Geological Survey

UTM — Universal Transverse Mercator

WGS — World Geodetic System

WKFP — West Kilimanjaro Forest Plantation



## V. List of Figures

Figure 1. The Study Area .....	2
Figure 2 Villages studied.....	3
Figure 3 Plantation forest, wheat plantations and part of Matadi Village.....	4
Figure 4. Sustainable livelihoods framework (DFID 1999).....	22
Figure 5. The forest studied.....	32
Figure 6. Miti Mirefu Village environment. ....	37
Figure 7 How one's position affects perception .....	44
Figure 8 House of a British settler. ....	50
Figure 9. Pyrethrum production in Northern Highlands* for the period of 20 years (1949-50 to 1969-1970) .....	51
Figure 10. Population of Tanzania mainland (in millions) from 1948 to 2012 .....	53
Figure 11 Status and changes in forest cover between years 2000 and 2006 .....	56
Figure 12 Status and Changes in forest cover between years 2006 and 2013.....	58
Figure 13 Forest cover status for the three years targeted by this research study.....	59
Figure 14. Proportion of forest and other land cover types.....	59
Figure 15. Afforested eviction site (a). ....	61
Figure 16. Afforested eviction site (b). ....	62
Figure 17 Afforested site (c) .....	62
Figure 18 A young tree of <i>pinus patula</i> destroyed by elephants.....	63
Figure 19 Age distribution of the surveyed households.....	66
Figure 20. Livelihood asset pentagon .....	69



## **VI. List of Tables**

Table 1. Satellite Images selected for the study .....	29
Table 2. Population of the Study Area by Sex, Average Household Size and Sex Ratio .....	36
Table 3 Distribution of administered questionnaires to villages.....	36
Table 4. Population of Tanzania mainland.....	53
Table 5 Forest cover change (in sq km) between the years 2000 and 2006.....	55
Table 6 Forest cover change (in sq km) between the years 2006 and 2013.....	57
Table 7. Data: Period 1 (before eviction).....	60
Table 8. Data: Period 2 (After eviction).....	60
Table 9. Household's major economic activity .....	70



# CHAPTER ONE

## 1.1 INTRODUCTION

This chapter presents background information about the eviction that occurred in West Kilimanjaro Forest Plantation in the year 2007 for forest conservation. It briefly presents general description of the forest of West Kilimanjaro, and then it explains the livelihood of rural Tanzania so as to broaden the view of the context where this conservation management option is applied. After description of the forest and livelihood, then it introduces the problem statement that this study aims at investigating. Thereafter the objective of the study is presented and its significance as well as limitations of the study. The chapter ends with description of the structure of the study and summary of the chapter.

## 1.2 BACKGROUND

In 2007 more than 12,000 people were evicted from West Kilimanjaro Forest in the North-eastern Tanzania (Chambi Chachage & Mbunda, 2009; Mariki, 2013 p.4; URT, 2007; 2007a p.7). In 2004, the people evicted were said to be 'invaders' of the national forest reserve (Hansards, 2004 p.11). This eviction was implemented by the government of Tanzania via the Ministry of Natural Resources and Tourism. The action came following several reports which warned about the decline of Kilimanjaro forest. The reports stated that the forest faced relentless pressure arising from the ever increasing demand for fuel wood, fodder, timber and demand for forest land for other uses (Lambrechts, Woodley, Hemp, & Nnyiti, 2002; Newmark, 1991; URT, 1998a).

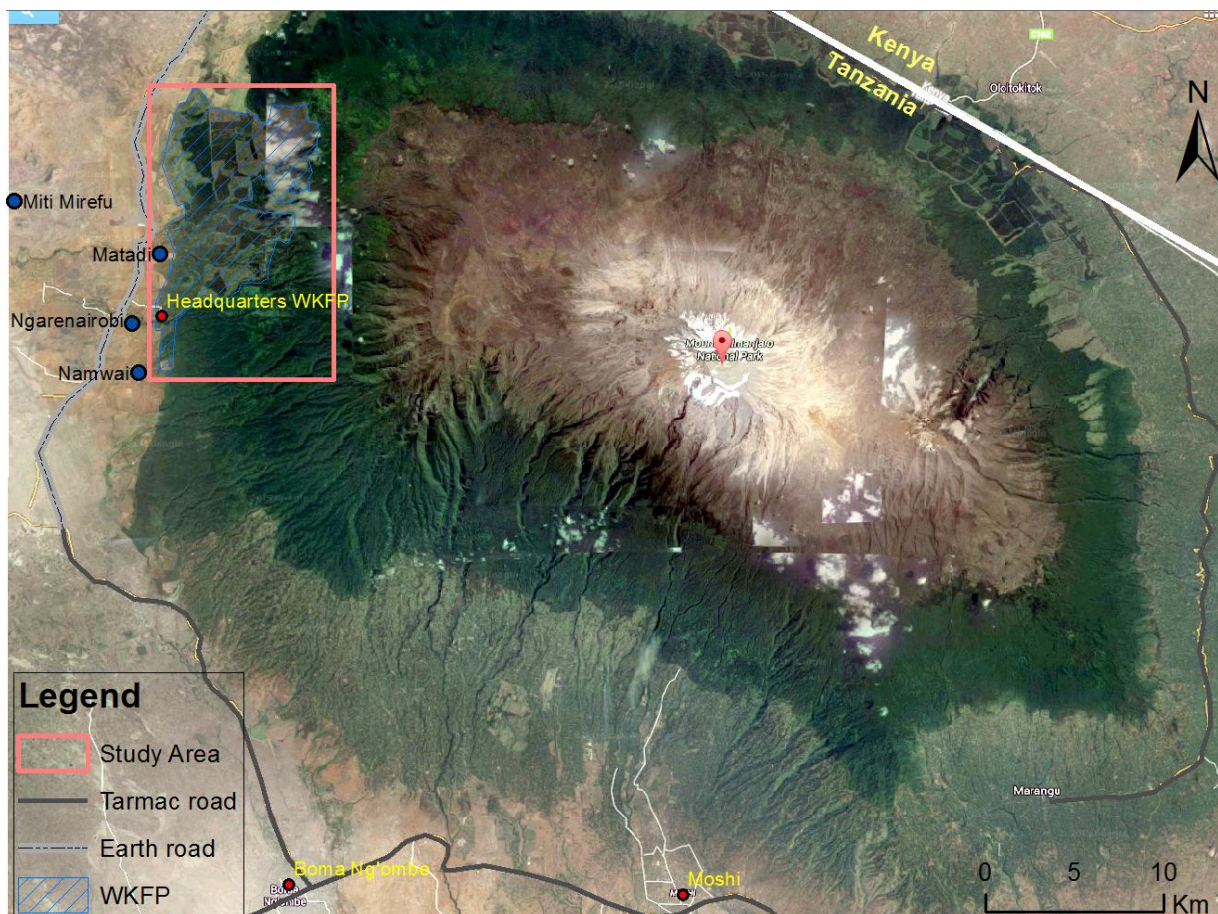
In 2002, the Forest Act of 2002 which is a legal instrument backing forest conservation management practices and actions was enacted. In section 26 (g) and (l), the Forest Act 2002, prohibits any occupation or residence in a national forest reserve. Five years after the act was introduced, evictions were carried out in the forest of west Kilimanjaro under the supervision of the forest officers backed up by the police force. The action resulted in evicting all forest residents, except the forest staff, from the forest. The estimated number of the evictees was about 12,000 people (URT, 2007 p.8) whose settlement was inside the forest and livelihood depended mainly on the land from which they were evicted.

After eviction, the people were allowed to enter for cultivation of 'forest plots' during day time only and go back home outside the forest since no any settlement were allowed in the forest anymore.

The people had to seek for settlement outside the forest boundary, and instead, commute to the forest in the day time for working in their forest plots and be back to their home in the evening.

### 1.3 THE STUDY AREA

The forest of West Kilimanjaro is located on the western slopes of Mount Kilimanjaro approximately 70 kilometres from Moshi town. It is on the north eastern part of Siha District of Kilimanjaro region, in North Eastern Tanzania.

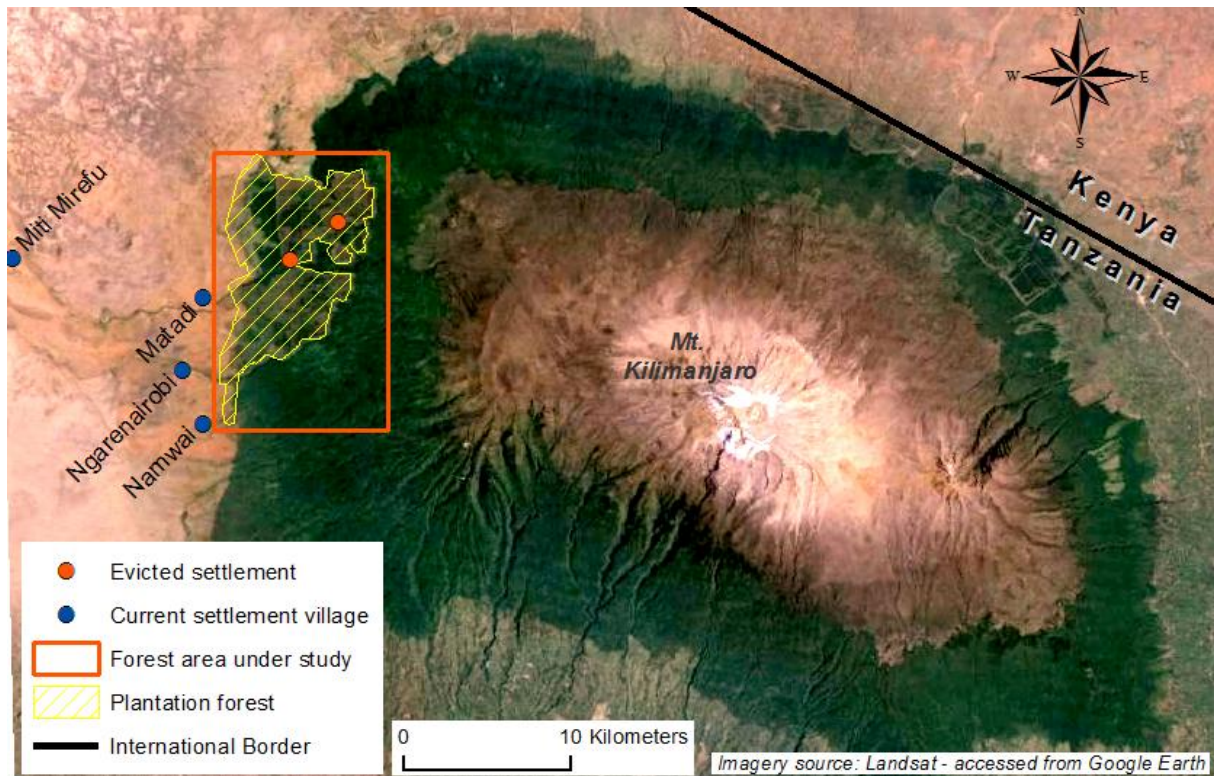


**Figure 1. The Study Area**  
*Map by Author*

*Imagery; Landsat accessed from Google map*

There is an earth road from the administrative centre of the plantation inside the forest boundary to Sanya Juu—the district capital— (about 22 km) then connects to a tarmac road to the Moshi-Arusha highway. The roads are passable throughout the year.

The forest borders the villages of Matadi, Ngarenairobi, Namwai and the nearby village of Miti Mirefu. The villages form the two wards of Ngarenairobi and Ndumeti.



**Figure 2 Villages studied**

Photo by Author

These villages become the most relevant for the study since it is where some of the people (probably most) evicted people moved to seek for shelter after eviction.

The area receives the mean annual rainfall of 750 mm and the monthly mean temperature maxima and minima are 27°C and 7°C respectively (Maro, Chamshama, Nsolomo, & Maliondo, 1991 p.466). Classified according to FAO - UNESCO, soils are red and grey-brown clay loams derived from volcanic ashes of Kilimanjaro Mountain (Samki, 1977; WKFP, 2012).

The population of the two wards of Ngarenairobi and Ndumeti, according to the Population and Housing Census of 2012, is 20,775 people, about 18 percent of the total population in the District of Siha, 116,313 (NBS, 2013).

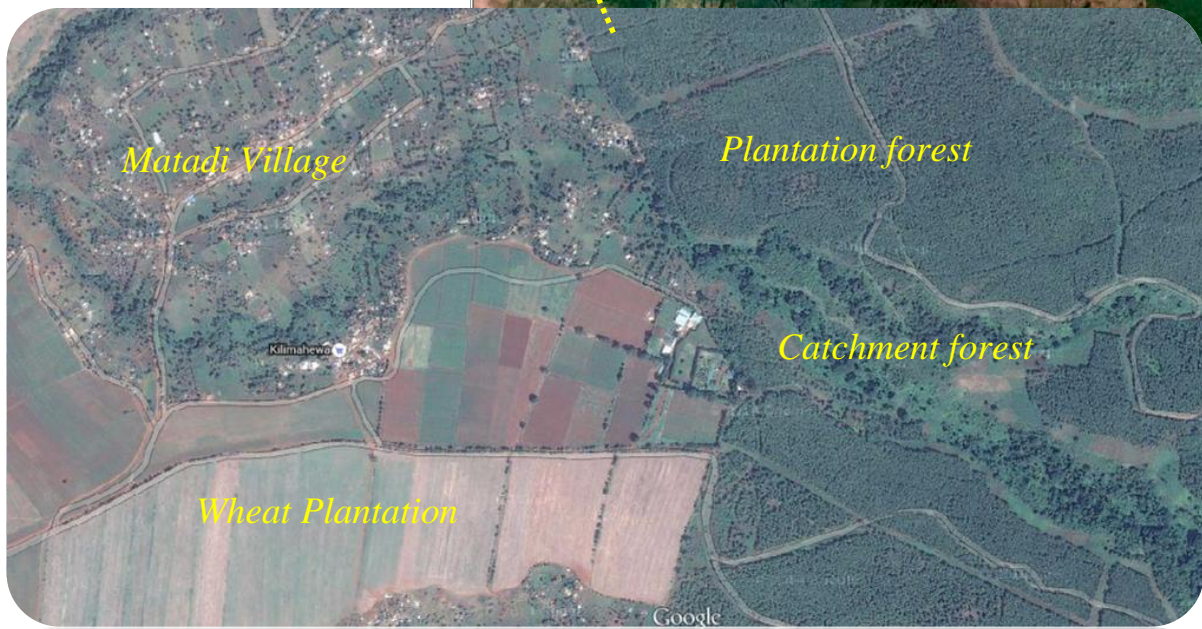
The main economic activity in the area is agriculture whereby several crops are grown including maize, beans, peas, Irish and sweet potatoes wheat, and vegetables such as; carrot, cabbage, tomatoes. Other economic activities also exist such livestock keeping, small-scale business, timber/log business, casual labor in plantations, few formal employment—mainly



for the teachers, government officials, forest management officials and the police officers. There also a few villagers assisting tourists as porters in climbing mount Kilimanjaro (Mariki, 2013 p.4).

The forest of West Kilimanjaro comprises of plantation forest, catchment forest and natural forest.

The plantation forest is located on the lower parts of the mountain bordering the wheat plantations



**Figure 3** Plantation forest, wheat plantations and part of Matadi Village

*Imagery source: Google map*

and the villages. It was established by clearing the natural forest and was also extended to afforesting the open glades of the then Kilimanjaro Territorial Forest Reserve, which was gazetted in 1921 and re-gazetted in 1940 under Government Notice No. 227 Cap. 132. The plantation has an area of 7,632.01 ha of which the productive area is 4,337.21 ha, and the rest 3,294.8 ha being steep slopes, valley bottoms, hilltops, roads, nurseries, primary school, FITI's station and natural forest which are left with indigenous vegetation as catchment areas (WKFP Management Plan 2012—2014).

The planting of trees was further expanded in 1956 in the pyrethrum licensed areas of Wasendo. The main species planted were *Pinus patula*, *Cupressus lusitanica* and *Pinus radiata*. Furthermore, expansion of planted forest took place in 1960's when survey for the wood consumption and timber utilization carried out in 1960/61 showed a shortage of wood supply in the neighbouring regions of Arusha and Kilimanjaro. This necessitated a need to increase the rate of tree planting through clearing of the natural forest areas. The plantation forest was established through Taungya system (licensed cultivators) (WKFP Management Plan 2012—2014).

The plantation now contains species like *Pinus patula*, *cupressuss lustranica*, *Eucalyptus saligna* and *Grevillea robusta*. The plantation has a high catchment value since several rivers flow through the forest plantation. The main rivers draining water from the plantation area are Simba river, Ngarenairobi, Gararagua, Leposa and Mana river in Sanya Juu. The flows are high during the rainy season (April and November), but rarely causing floods. The West Kilimanjaro forests form an important watershed for the Pangani river basin (WKFP Management Plan 2012—2014).

The forest is also comprised of the natural forest which is characterized by a high diversity of forest types because of the wide altitudinal range (from 1,300 m to 3,300 m). It comprises a very large number of plant species (around 2,500) and has a rich diversity of ecosystems (Lambrechts et al., 2002 p.7). There are 130 species of tree with the greatest diversity being between 1,800 and 2,000 meters above the mean sea level. There are also 170 species of shrub, 140 species of epiphyte, 100 lianas and 140 pteridophytes (UNESCO, 2015). The forest also buffers the world heritage site (The Kilimanjaro National Park—according to UNESCO), where the largest free standing volcanic mass in the world and the highest mountain in Africa—rising 4877m above surrounding plains to 5895m at its peak resides (UNESCO, 2015).

The forest of West Kilimanjaro fall under two management regimes within the Ministry of Natural Resources and Tourism. The plantation forest and catchment forest is managed by the Tanzania Forest Services (TFS). TFS is a semi-autonomous government executive agency established to develop and manage forest and bee resources sustainably in collaboration with stakeholders in order to deliver sufficient and quality goods and services to meet local and international socio-economic and environmental needs (TFS, 2012). It was established by the Government Notice No. 269 of 30<sup>th</sup> July 2010. Before 2010 the forest was under the Forestry

and Beekeeping Division of the same ministry. The administrative centre for the West Kilimanjaro Forest is situated at approximately 70 km from Moshi town.

The natural forest falls under the management of Kilimanjaro National Park (KINAPA) with their headquarters at Marangu.

#### 1.4 PROBLEM STATEMENT

Forest conservation is inevitably important because forest have the highest species diversity and endemism of any terrestrial ecosystem in the world (Sunderlin et al., 2005; Wachiye, Kuria, & Musiega, 2013). In Tanzania about 39.9% of the total land area was estimated to be forests and woodlands in 2010 (Ngaga, 2011). Meanwhile, according to the National Forest Policy of Tanzania of 1998, deforestation is taking place at an alarming rate. It is estimated that deforestation ranges from 130,000 to 500,000 ha per annum (URT, 1998a p.10). The main reasons outlined for deforestation being clearing for agriculture, overgrazing, wildfires, charcoal burning and over-exploitation of wood resources (Lambrechts et al., 2002; Newmark, 1991; URT, 1998g).

Section 2.1 of the Forest Policy of Tanzania, pointed out that deforestation through encroachment and over-utilization of forest has been taking place eventually in the forest reserves which are under the jurisdiction of the central or local governments. It states that, there has been relentless pressures on the forest resources arising from the ever increasing demand for fuel wood, fodder, timber and demand of forest land for other uses (URT, 1998g ). It is estimated that during the last 70 years, Kilimanjaro forest has lost nearly one-third of its forest cover due to fire and clearing for human activities (Hemp, 2009 p.3). Other report specifically pointed out that most of forest reduction has occurred in West Kilimanjaro (Newmark, 1991 p.11).

On the other hand, Tanzania is a home of 44,928,923 people according to the 2012 National Census (URT, 2014). The majority of people (70 percent) still live in rural areas leaving urban areas with only 30 percent of the total population. As it is in most developing countries, most rural livelihoods are reliant on the natural resource base (Scoones, 1998 p.6). In Tanzania about 80 per cent of the labour force is employed in agriculture (ILO, 2012) and agriculture sector is the foundation of the economy of Tanzania accounting for about half of the national income. Three quarters of merchandise exports comes from agriculture (URT, 2013). As a manifestation of the primary based economy, bio-energy is the main source of fuel for the rural population accounting for 92% of the total energy consumption in Tanzania (URT,

1998a p.9). Meanwhile, poverty is still striking problem in livelihoods of many Tanzanians. It is estimated that 39% of rural citizens are poor compared to 24% of urban citizens in 2000–01 (Ellis & Mdoe, 2003). It has been revealed that there is a direct connection between poverty and environmental degradation therefore any change on how environment is managed exposes the rural livelihood to a wide range of risks of impoverishment (Adams & Hutton, 2007 p.157).

Prior to 1980's most of conservation management policies and practices focused more on environment and paid little or no attention to local people thus highly criticized by anthropologists and other social scientists condemning the negative impacts of conservation to livelihood and inequitable distribution of costs and benefits for local communities (Adams & Hutton, 2007; Bennett, 2015; Brockington & Igoe, 2006a; West, Igoe, & Brockington, 2006).

By 1980's the whole paradigm of conservation changed from the traditional nature conservation mode of the ideal state of nature in which interference by people is considered harmful to biodiversity thus denied access—"fortress conservation" of 'fences and fines'—to recognition that nature conservation should be carried out for the benefit of people and in particular local communities (Adams & Hutton, 2007; Daugstad, Svarstad, & Vistad, 2006; Durrant & Durrant, 2008; Lein & Tagseth, 2009, p. p.207; URT, 1998g; Ylhäisi, 2003).

The need to incorporate conservation initiatives in development projects was also spearheaded by several international events; such as The World Parks Summit of 1982, The world commission on Environment and Development (The Brundtland Commission of 1987), The United Nations Conference on Environment and Development of 1992, The World Park Congress of 1992; that in common buttressed the need for bring together conservation and development strategies (Brundtland, 1987; Gissibl, Hohler, & Kupper, 2012; Redclift, 2005).

The need for conservation policies that aims at conserving environment while considering the livelihood is also reflected in policies and legal institutions guiding conservation in Tanzania. Both Forest Policy of 1998 and Forest Act of 2002 have sustainable development as one of their conservation objective goals. The Forest Policy of 1998, states that it aims;

*"to ensure sustainable and equitable use of resources for meeting the needs of the present and future generations without degrading the environment"(URT, 1998a p.3)*

The Forest Act (2002) section 3(a) states that it aims;

*"to promote, to enhance the contribution of the forest sector to the sustainable development of Tanzania and the conservation and management of natural resources for the benefit of present and future generations".*

The objective goal of these major instruments guiding forest management in Tanzania have a win-win face because they aim at conserving forest for the benefit of the present and future generations. These policy and legal instruments aims at striking the balance between conservation, livelihood and development. However, the eviction that was carried out in 2007, contradicts with the stated goal of sustainable development since the people, who lived there for more than 50 years were evicted without any relocation plan by the state.

Eviction cause harm to people (Brockington & Igoe, 2006a p.428; Cernea, 2000). The victims suffer repeated, multiple, mutually reinforcing, and sometimes simultaneous shocks to their families, their settlements and their livelihood (Blaikie, Cannon, Davis, & Wisner, 2004). The COP 7 of the Convention for Biodiversity, states the need for assessing the impacts arising from the establishment and maintenance of protected areas because they have a direct effect on livelihoods (CBD, 2004). Despite the importance of knowing the aftermath of eviction, there are only few studies, in Tanzania, which detail the effects of sudden land alienation on the people evicted (Brockington, 1999 p.76). Eight years has elapsed since eviction took place in 2007 making it relevant to evaluate the aftermath of eviction.



## 1.5 OBJECTIVE OF THE STUDY

This thesis aims to evaluate the impacts of eviction to livelihood and to forest of West Kilimanjaro and to assess how the impacts of eviction were distributed among the actors involved so as to see if the current forest management strategies aims at sustainable development as stated by the Forest Policy of 1998 and Forest Act of 2002.

To achieve this objective, the following questions have been formulated to guide the research:

- i. Why did the people settle in the forest in the first place?
- ii. Why that by 2007 the settlement could no longer allowed in the forest?
- iii. To what extent have evictions affected people's livelihood?
- iv. To what extent have evictions of people affected forest cover?
- v. How were the costs and benefits of eviction distributed among actors involved?
- vi. Does the outcome conform to the ultimate goal of sustainable development?

## 1.6 SIGNIFICANCE OF THE STUDY

Studying the impacts is important because first, it brings the feedback to conservation management and development policies in Tanzania. It provides inputs for policy and regulations reviews. Second, it becomes highly significant to evaluate the status of environment and livelihood as it brings the feedback to what has been achieved so far out of the eight millennium goals of United Nations (MDG). The year 2015 was the time frame for the accomplishment of the 8 MDG particularly goal number 1; Eradicate extreme poverty which is about the state of livelihood and, 5; Ensure environmental sustainability (Sachs et al., 2009). The empirical evidence from this study will show the state of forest as well as livelihood after eviction therefore brings important reflections of progress that has been made so far in striking a balance between environmental conservation and livelihood wellbeing.

## 1.7 JUSTIFICATION OF THE STUDY

As the requirement for a master program the student is required to conduct a research on a particular topic about natural resources management. Also, there are few studies conducted in Tanzania about the impacts of eviction (Brockington, 1999 p.76). Having born and brought up in West Kilimanjaro also inspired me to conduct a scientific piece of work from the community that I come from. The challenge faced by the forest management in Tanzania is on how to manage it in an integrated and sustainable basis to optimize their environmental, economic, social and cultural values.

The forest policy states that this remains as pressing as ever (URT, 1998a). For this case, the results of this study will bring valuable feedback to the forest management of Tanzania on various forest management policy actions for reflection and further improvement.

#### 1.8 LIMITATION OF THE STUDY

This study has been carried out in the forest and villages adjacent to forest and the forest of West Kilimanjaro in the western side of Kilimanjaro Mountain. It confines itself on that specific area due to limitations of resources such as time and finance. This is a master's thesis set out to be accomplished within 10 months whereby the field work is conducted for two months and the remaining time for data processing, analysis, presentation and report writing. Given such timeframe, it could be unrealistic to conduct a study of the whole forest of Kilimanjaro Mountain or assessing livelihood of all the evictees. These limitations, necessitated to restrict the study on the forest of western side of Mount Kilimanjaro as well as administer questionnaires to only the selected 200 households and interviews.

## 1.9 STRUCTURE OF THE THESIS

This thesis is organized into 8 chapters.

Chapter one introduces the study by giving background information about the incidence of eviction and the status of the forest of West Kilimanjaro. It proceeds on explaining the status of rural livelihood in Tanzania. The problem statement is then presented and the objectives that this study aims at achieving. After that, the significance of the study is presented followed by justification of the study. The chapter ends up by outlining limitations of the study.

Chapter two presents theoretical and historical framework. It introduces political ecology and historical narratives as a way of framing the human-environment interaction in a historical perspective to understand power relations between actors involved in eviction. Also, the chapter presents the Sustainable Livelihood Framework for understanding livelihoods.

Chapter three present methods and techniques applied in this study. The first section present the methods used to analyze the narratives for establishment of settlement in the forest. Then presents methods used to assess the status of forest cover. The chapter closes by presenting methodology used for assessment of livelihood.

Chapter four explores the narratives explaining the reasons for people to settle in the forest. It answers the question why did people settle in the forest in the first place.

Chapter five assesses the status of the forest cover of the study area before eviction and after eviction. The chapter ends with a summary of the findings.

Chapter six presents analysis of livelihood of the households after eviction. It takes a comparative approach to compare the livelihood assets of the households who were evicted and the households who were not evicted and presents the results.

Chapter seven discusses how the costs and benefits were distributed among actors involved.

Chapter eight presents discussion and conclusion.

## 1.10 CHAPTER SUMMARY

This chapter has introduced the case of eviction that took place in 2007 in the forest of West Kilimanjaro. It has also shown the growth of concern to incorporate livelihood in conservation programs thus framed the problem statement with the objective of understanding the aftermath of eviction. It further pointed the significance of this research project as a feedback to various management policy actions and strategies.

It also explains the limitations of the study in terms of time and finance. The chapter closes by giving out the structure of the thesis.

The following chapter presents theoretical and historical framework as a way of understanding forest conservation and livelihood in the context of Tanzania.

## CHAPTER TWO

### 2 THEORETICAL AND HISTORICAL FRAMEWORK

#### 2.1 INTRODUCTION

This chapter presents political ecology and historical narratives as a way of understanding the human-environment interaction in a historical perspective and the power relations involved. The chapter also presents the Sustainable Livelihood Framework for understanding the context from which livelihood stems.

#### 2.2 POLITICAL ECOLOGY

The stated decrease of forest cover of the forest of Kilimanjaro is environmental change that led to management response of eviction. Political ecology considers any environmental change as not a neutral process amenable only to technical solutions, such as eviction, but to have political sources, conditions and ramifications that are sustained by the existing social-economic inequalities and political processes. It recognizes that, environmental problems cannot be understood in isolation from the political environment from which they are created (Bryant & Bailey, 1997 p.28).

Political ecology evolved as a critique to the simplistic approaches—identified by Paul Robbins (2012) as apolitical ecology—that tends to dominate in global conversation surrounding the environment. The apolitical ecology approaches are identified as the most prominent apolitical approaches to human-environment interaction. They are; ecoscarcity and limits to growth, and modernization accounts that tend to dominate in global conversations surrounding human-environment interactions.

With ecoscarcity and limits to growth the approach draws inferences from Malthus's essay on Principle of Population which warned that human-environment interaction as influenced by population pressure thus, attributed environmental degradation to population growth (Bryant & Bailey, 1997 p.11). This approach was criticized, as a model for understanding interaction within human-environment, because it draws its conclusion from demographic variable to explain environmental change. Using population per se as a predictor for environmental change has been proved to be consistently weak predictor of environmental crisis and change (Newmark, 1991 p.6). This is because there are mitigating factors of affluence and technology which tend to inundate the force of crude numbers (Robbins, 2012 p.16).

Citing example from the United States and India, Paul Robbins shows how per capita consumption of resources and production of waste in the United States is larger than that of India while the population of India is three times larger than that of the United States.

This is a proof that crude number of population increase does not in itself explain the increase of resource consumption. Instead, other factors such as affluence which render consumption of majority of resources by a very few members of global community also contribute to differentiation in resource consumption.

The other dominant apolitical approach (as stated by Paul Robbins 2012) to environmental change is modernization. The major aspect in this way of thinking is commitment to economic efficiency. The approach argues that, ecological problems and crises are result of inadequate adoption and implementation of modern economic techniques of management, exploitation, and conservation (Robbins, 2012 p.18). This approach claims that "win-win" outcome can be achieved if there are efficient solutions, determined by optimal economic terms. The conceptual and empirical problem with such assertion is that, though modern technology can optimize production, it has also negative impacts on the environment. Such impacts include soil exhaustion, water contamination (Robbins, 2012 p.19) as it has been witnessed in the most outspoken areas where green revolution was applied such as Punjab, India (Shiva, 1991).

The shortcomings with the apolitical ecology approaches to environmental change necessitated the need for an approach that better explains the nexus within human-environment interaction. Political ecology therefore came as a critique to the apolitical explanation problems within human-environment interaction presenting Jekyll and Hyde Persona. As Jekyll it highlights the pitfalls of the apolitical approaches to human-environment interaction and as Hyde Persona it brings about the alternate approach to grow into new ecologies. It therefore offers both "hatchet" to dismantle flawed, dangerous and politically problematic accounts, and a seed to grow into new socio-ecologies (Robbins, 2012 p.20).

Political ecology therefore seeks to understand the environmental problems within the broader context of socio-economic and political spheres that structure the pattern of human-environment interaction. It considers environmental problems as having political sources, conditions and ramifications that impinge on existing socio-economic inequalities (Bryant & Bailey, 1997 p.28).

It considers human-environment as not politically inert but as being influenced by power relations. For that case, it approaches environmental problems with explicit consideration of power that underlie human-environmental interaction.

In political ecology power is the ability of an actor to control their own interaction with the environment and the interaction of other actors with their environment (Bryant & Bailey, 1997 p.39). Understanding power relations between actors within human-environment interaction is therefore a key factor in understanding pattern of human-environment interaction and associated environmental problems (Bryant & Bailey, 1997 p.38).

By focusing on power relations, political ecology considers any environmental or social change as never undifferentiated event but understood to have causes and consequences that are unevenly distributed between communities, people and groups (Robbins, 2011 p87). Political ecology grounds this claim from a common premise [within political ecology] that costs and benefits of any change in environmental or social systems are for the most part distributed among actors unequally which reinforces or reduces existing social and economic inequalities which holds implications in terms of the altered power of actors in relation to other actors (Bryant & Bailey, 1997 p.27—28; Robbins, 2012 p.20).

Adams and Hutton (2007 p.152) states that, in order to understand the wider socio-economic and political structure, that underlies human-environment relation, a historical context of colonial societies during extension of capitalism to the global periphery is of vital importance. It becomes important because the environments of developing countries bears the imprint of colonial history (Redclift, 1987 p.83). Also it was the invasion and colonization that altered how people interact with their environment.

To understand the pattern of human-environment that underlies the problem of decreasing forest, this study will begin by tracing the narratives that explains power relations between actors involved. This approach will help to understand the problem within the context that it originates therefore helps understanding of the root causes and consequences of environmental action as well as how the actors are affected.

The key actors of concern in this study are local people or place-based actors—in this case evicted households—and non-place-based actors (traditionally powerful actors)—the state. This sort of actors is based on categories identified by Bryant (1997 p.4).

Bryant and Bailey (1997) elaborate that the place based actors refers to grass root actors who live within the vicinity of a particular resource and depend mainly on that resource(s) for navigating their livelihoods, while non-place based actors refers to state actors. The analysis is undertaken to explore the interaction between these actors to see how they have evolved over time and see how they have influenced the pattern of human-environment that yield to environmental problem of decreasing forest cover.

### 2.3 POWER RELATIONS WITHIN HUMAN-ENVIRONMENT INTERACTION - IN TANZANIA CONTEXT

#### 2.3.1 PRE-COLONIAL TIME

Before colonial invasion, interaction within human-environment was determined mainly by the need and day to day activities of a particular society and to the limited needs of external trade. This is to say, to a large extent, the interaction between people and their environment served the interest of its own rather than to the external society. The units of economic production were relatively small and capital accumulation almost non-existed. Most of commodity production, if not all, was for use by a particular society and very little for exchange (Redclift, 1987 p.113 - 117, 151). The power over access to environmental resources such as land and forest was under the custodian of the herdsman, chiefs and elders of a particular community. This is to say that the people who used land and its resources had systems of power over access to it within their own societies. However, the forceful invasion and colonization marked the beginning of change in the pattern of human-environmental interaction.

#### 2.3.2 THE COLONIAL ERA

In the second half of 19th century the industrial revolutionized nations of Western Europe most notable; Britain, France, and Germany; forced by internal logic of their competitive system, sought opportunities to control raw material supplies, markets, and profitable fields of investment with little competition. The less developed countries therefore [presumably] were the only place that would offer little or no opposition to the penetration of foreign capitalism (Bryant & Bailey, 1997 p.7; CSL Chachage, 1998; Kimambo, 1991 p.2; Redclift, 1987 p.83; Rodney, 1974 p.103,136).

The capitalist nations therefore invaded the less developed parts of the world most notably Africa. Their advances in military technology such as inventions of machine guns and steam boat enhanced them to assert military control over the less developed countries (Bryant &



Bailey, 1997 p.53). The German in particular invaded and conquered the part of East African land that came to be known as Tanganyika and later Tanzania mainland.

After forceful conquer and assume political and military power, the German colonial state started to device institutions guiding control and access to environmental resources notably land and forest.

The efforts of colonial government to control these two resources lay the fundamental importance in the changing the pattern of human-environment interaction as explained in details below.

To start with forest, before 1890 there was no a centralized state forest regime in the land that we now call Tanzania (Hans G. Schabel, 1990). Instead, traditional systems regulated forest use. By that time, bureaucratic structures as they are today did not exist but institutionalized practices that evolve as people engage in day to day socio-economic activities. It was the daily routines that laid the basis for human-environment interaction. At that time there were no even advanced technologies and methods for monitoring and surveillance that could help to protect forest resources from destruction. But still in some places forest was intact and co-existed with the society. For instance, according to colonial official (Eick) the cedar forests near Kwai in Usambara was largely intact prior to 1896 (Hans G. Schabel, 1990 p.132). Almost all societies in pre-colonial time had different kinds of protected areas set for special role according to the need of their society but they were not recognised by Europeans (Ylhäisi 2003 p.280).

The arrival of Germans in 1890's marked the initial point for the establishment of the bureaucratized and centralized forest regimes in Tanzania (CSL Chachage, 1998; Neumann, 1997 p.47; Hans G Schabel, 2006) . In 1892, Eugen Kruger became the first 'professional' forester to set foot in the land that is now Tanzania. Though his assignment was general administration, Kruger with his supervisor, Dr. Franz Stuhlmann, provided the hallmark for the gradual but steady development of modern scientific forestry in the territory (Hans G. Schabel, 1990).

The German foresters and other officials arriving from Germany, preoccupied by the ideas of 'pristine' and 'untouched nature' of Africa, they were disappointed by the natural scarcity of high forests and the prevalence of savanna wood-lands and secondary forests in East Africa.

This was contrary to their imagination of untouched nature of Africa while the reality is that people and forest co-existed and live in harmony.

The reaction was that, the foresters and other officials from Germany commented on the situation as "*very sad*", "*almost completely devastated*", "*ruthless exploited*" (Hans G. Schabel, 1990 p.132). As a result, the colonial foresters trained in scientific forestry, instead of trying to understand the logic behind various land management practices by the indigenous, they rated them as "destructive" to forest thus devised various ways to counterfeit them.

The result was that various land management practices of the indigenous such as burning, grazing, cutting, of trees were considered as irrational practices through a number of ordinances, decrees, and edicts, in conjunction with severe penalties for violations (Neumann, 1997; Hans G. Schabel, 1990 p.132). The German foresters assumed that bureaucratic control of forest was instead the most economically efficient and socially equitable means of exploiting forest resources and protect land degradation (Neumann, 1997 p.45).

To effect the controlling of the forest against the 'irrational' land management practices by the local people the colonial power established the Department of Natural Resources and Surveying, which later became the Department of Agriculture (Hans G. Schabel, 1990) in Dar es Salaam, followed by subsequent opening of offices in other places. To effect the activities of the established forest regime, in 1904 the first Forest Conservation Ordinance was devised which led to conversion of almost three-quarter of a million hectares of crown land into forest reserves, where no settling, farming, grazing, or other unauthorized use was allowed (Ylhäisi, 2003 p.281). This declaration of forest reserves by the German colonial power in Tanganyika (now Tanzania) was a strategy employed by the powerful actor (the German colonial state) to control how it interact with the environment and at the same time to control how other actors (in this case weak actors or indigenous people) on how they interact with their environment.

This strategy appropriated the best forest land to the colonial state leaving the majority indigenous people with the less suitable land for agriculture or accessing forest resources. To protect these reserves, the colonial state created a corps of local forest wardens [Forstwirter]. Wardens were carefully selected and trained on the job. To strengthen the established forest regime the colonial state opened forest offices in Moshi/Arusha (the capitals for the north-eastern Tanzania) (Hans G. Schabel, 1990). By 1911 and 1912 three districts were created for forest ministration (Forstamter) (Hans G. Schabel, 1990).

The German colonial power continued with creation of regulations governing forest management in Tanganyika until after the World War One when Tanganyika became the protectorate under the British rule. After taking over of power by British, most of the German forest rules and regulations were closely followed (Mallinson, 1950; Neumann, 1997; Ylhäisi, 2003 p.281). It is stated in some records that the British forest officers who took over forest administration had a German bias.

*"...the British officers who took over the [forest] administration had a German bias, as they were largely German-trained and looked to that country as the fount of all sound forest practice" (Mallinson, 1950 p.16).*

In the continuation of the efforts by the powerful actors to control human-environment interaction, two years after taking over power from Germans, the British colonial state complemented the previous regulations created by the Germans by enacting the 1921 Forest Ordinance. The ordinance incorporated all the previous designated German Forest Reserves.

The other resource that was highly contested during colonial time was Land. In the efforts to control land, the German colonial state devised the Imperial Decree of the 26th November 1895 that declared all lands in Tanganyika, whether occupied or unoccupied, 'Crown Lands' vested in the empire (Rwegasira, 2012 p.53; URT, 1994 p.8; 1997a p.6). By this decree, the German colonial state aimed to exert control over access to land against the powerless actors—the natives—as a strategy to ensure that economic benefits associated with exploitation of that land accrues largely, if not exclusively, to the colonial state. The decree empowered the colonial state to alienate any land, from natives that was considered to be of interests to the colonial state. The process led to massive alienation of natives from their land to the extent that, by the end of World War I, in 1918, about 1,300,000 acres of the best lands in Northern and coastal areas of Tanganyika [later Tanzania Mainland] had been alienated to the European immigrants (CSL Chachage, 1998 p.255; URT, 1994 p.9). The natives were either squeezed to marginal lands or turned to proletariat living by working in the settlers plantations.

After the World War I, the colonial master changed from German to British. It is reported that, the British treated sensitive issues of land alienation and forced labor cautiously. However, the land alienated during the German period continued to remain alienated land.

This is to say, that unequal power relations within human-environment interaction, initiated by the German colonial government, was inherited and maintained by the British colonial state.

In addition, in 1923, the British passed their major land tenure legislation called the Land Ordinance. Section 2 of the Ordinance adopted the approach closely related to the German Imperial Decree of 1895.

The British ordinance declared all lands, whether occupied or unoccupied as 'public lands'. Section 3 vested all public lands under the control of and subject to the disposition of the Governor (URT, 1994 p.11). The decree therefore empowered the governor, in charge of the state, with the ultimate power over control of land. The governor had powers to annex any land that sought to be potential for the interest of the colonial state.

In the early 1940s the impacts of the World War II landed to the economies of the British government in Tanganyika. The war led to decrease of food import supplies and increasing demands for foodstuffs for the stationed conscripted troops and for market sale. In response to the problem, the British colonial government sought to increase food crop production within her territory [Tanganyika] rather than depending on imports from outside (Guyer, 1987 p.186). Being aware of the critical policy juncture, the white settlers used the situation as a justification for further land alienation from the natives (Guyer, 1987 p.179).

Therefore, the process of alienating the native people from their land, continued to the extent that by 1950s, about 40 percent of the cultivable land of Tanganyika was owned by the capitalists primarily Europeans and others such as Asians, Arabs and very few Africans (CSL Chachage, 1998 p.256). In particular to the study area, in 1950's much of the land on the slopes of Mount Kilimanjaro was transferred from the indigenous to either European colonialists or the central government for establishment of forest reserve and large coffee estates which restricted the local people from accessing land (Newmark, 1991 p.7).

Land alienation therefore was intensified to the extent that, between 1945 and 1955, the land holding by British settlers only, increased from 287,635 acres of land on lease to 1,300,654. This meant that about 101,302 acres of land were alienated annually from the native people to non-native settlers for the 10 consecutive years. This land alienation, by the British settlers was considered a greater scale of land alienated than ever before in the history of British colonialism in Tanganyika (CSL Chachage, 1998 p.256; Neumann, 1997).

It is estimated that, by 1954, only 8 Africans held some 2,482 acres in Tanganyika under long term right of occupancy which was later reduced to 2, holdings together only 136 acres (URT, 1994 p.13). The massive land alienation that occurred in between 1945 and 1955 formed the unprecedented change within the pattern of human-environment interaction by accumulating and concentration of land to the powerful actor (the colonial state) leading to marginalization of the majority indigenous people from the major means of production—land— turned them to proletariat. The only option left to them was to migrate to settlers' plantations to provide labor so as to earn a living.

### 2.3.3 POST INDEPENDENCE

Nevertheless, Tanganyika got her flag independence in 1961 followed by the union with Zanzibar Islands in 1964 and led to formation of the United Republic of Tanzania. The newly sovereign government took over power from the British therefore the white settlers had to surrender their estates to the sovereign government. However, as it will be discussed later in section 6.3.1 the land surrendered by the settlers never went back to the alienated people. So the alienated people continued to live in marginal lands and on plantations providing labor.

Up to this juncture, the analysis has revealed how power struggle for controlling environmental resources led to dispossession of the natives their major means of production—land, and led to concentration of that land into the hands of the powerful actor—the state. What the poor farmers and marginal communities were left with at their disposal was their labor power. To earn a living they had to travel to plantations to provide labor. They therefore lived in confined areas thus exert pressure to environment leading to environmental problems.

This historical approach has enabled understanding that certain environmental outcomes on human-environment interaction are the product of power struggle for control of environmental resources. This concept will enhance analysis of power relations and its impacts to the actors in later chapters.

## 2.4 SUSTAINABLE LIVELIHOODS APPROACH

This study involves measuring impacts of eviction to livelihoods and to forest. Therefore, in assessing the impacts on livelihood, the Sustainable Livelihood Framework is used to compare a portfolio of livelihood of the evicted households against the households who were not evicted. The aim is to see if there is any difference in livelihood of the two types of households.

## Sustainable livelihoods framework

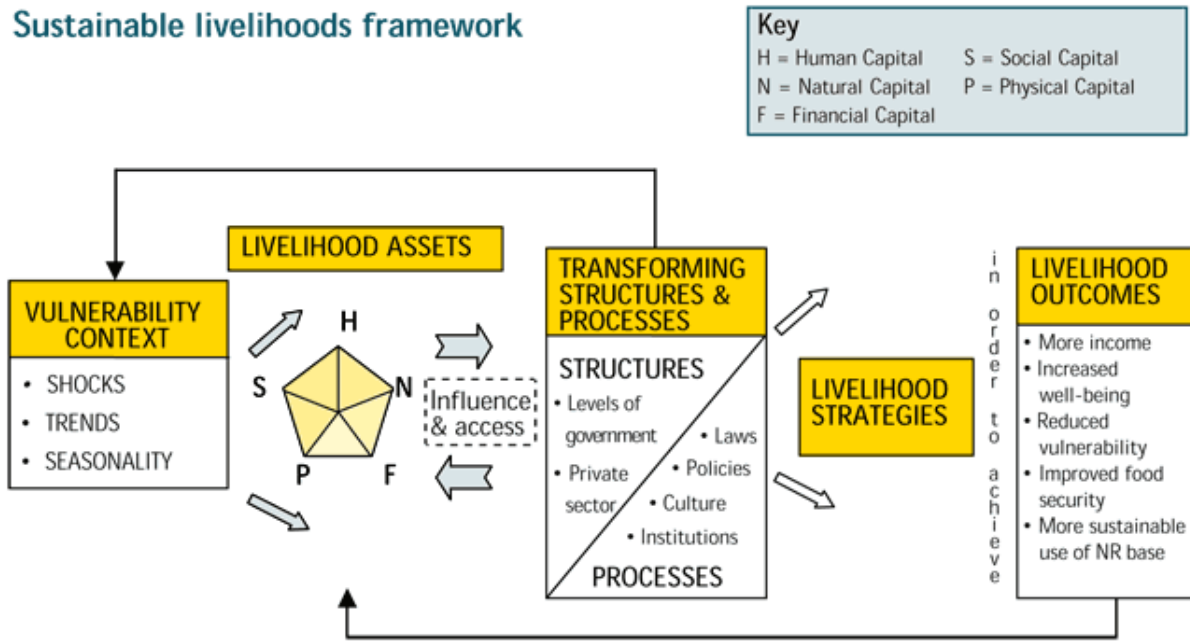


Figure 4. Sustainable livelihoods framework (DFID 1999)

Before proceed it is essential to define important terms involved in the concept of sustainable livelihood because they are the main variables connecting the whole concept of sustainable livelihood.

Firstly, livelihood refers to the "means of gaining a living including food, income and assets which interacts to enhance a living" (Chambers & Conway, 1992). Therefore livelihood can simply mean life support system which enhances survival of human being. A livelihood is sustainable if it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base (Chambers & Conway, 1992; DfID, 1999).

Because livelihood is attained through interaction of the means of gaining a living, understanding of these "means of gaining a living" as well as the way they interacts to enhance a living becomes a prerequisite for assessing sustainability of a particular livelihood. The sustainable livelihood Framework therefore serves this purpose. It is a framework that integrates a combination of livelihood resources with livelihood strategies in a particular context of institutional processes to determine the livelihood outcomes. The framework is based on the ideas of capability, equity and sustainability comprising of people, their capabilities, means of living—including food, income and assets—which in their totality enhance a living.

Therefore identifying what livelihood resources (or combinations of ‘capitals’) are required for different livelihood strategy combinations is a key step in the process of analysis (Scoones, 1998) because the ability to pursue different livelihood strategies is dependent on the basic material and social, tangible and intangible assets that people have in their possession (Scoones, 1998 p.7).

Livelihood resources or assets include natural, physical, financial, human and social capitals constituting the building blocks on which people develop their activities (Ashley, 2000). Scoones (1998) and May, Brown et al. (2009) provide set of definitions to these different types of capital that are amenable for empirical investigation and discusses them as follows:-

**Natural capital** - the natural resource stocks and environmental services from which resource flows and services useful for livelihoods are derived including land, water, air and ecosystem services.

**Human capital** - the skills, knowledge, ability to labor, good health and physical capability that is important for the successful pursuit of different strategies to achieve livelihood objectives.

**Social capital** refers to the social resources which people can draw on including informal relationships of trust, reciprocity and exchange with families, friends and neighbors as well as more formalized groupings (e.g. community and faith groups (May, Brown, Cooper, & Brill, 2009; Robbins, 2011 p.179; Scoones, 1998).

**Physical capital** - the tools and equipment that people need to be productive along with the basic infrastructure needed to function – e.g. affordable transport and energy, decent housing and access to information (May et al., 2009).

**Financial capital** - the capital base (including earned income in cash, credits/debts, savings, state [welfare] benefits, child maintenance, etc. and other economic assets) which are essential for the pursuit of any livelihood strategy (May et al., 2009; Scoones, 1998).

The Sustainable Livelihood Framework (SLF) therefore is used in this study as a framework for mapping livelihood assets of the evicted households against the assets the households who were not evicted to see if there are any significant differences between them. Assets are easier to assess and therefore the sustainability of a livelihood can be linked with its net asset in the sense that; the net asset position of a household may be a useable and useful indicator of vulnerability and security of that particular household (Chambers & Conway, 1992p.20).

In the light of the SLF therefore these assets will be measured and quantified to make a comparison between the two categories (evicted and not-evicted) of households.

However, mapping assets itself is not enough to understand livelihood but we have to also understand the social structures and processes through which sustainable livelihood is enhanced. Scoones states that;

*"Unless we understand the social structures and processes through which sustainable livelihood is enhanced a description of the relationships between variables and outcomes is somewhat limiting" (Scoones 1998 p.9).*

The social structures and processes through which sustainable livelihoods is contested, negotiated, include formal and informal institutions such as policies, tenure regimes, labor sharing systems, to market networks or credit arrangements which mediate access to livelihood resources and in turn affect the composition of livelihood portfolios (May et al., 2009; Scoones, 1998 p.12).

For the sake of this study land policy, market system and credit arrangements are analyzed in relation to livelihoods of the households. This is because eviction involved physical removal of people from a particular the land that they had depended for settlement. Moreover as it has been stated in the problem statement, more than 80 percent of people in Tanzania depend on agriculture therefore land becomes their major means of production.

## 2.5 CHAPTER SUMMARY

This chapter has presented theoretical and historical framework as a way of framing understanding of power relations within human-environment interaction. Description of political ecology focusing on power relations between actors has been explained and put into the historical context of Tanzania. The aim was to understand how power mediated human environment interaction from pre-colonial, colonial and post independent periods. This approach has clotted a mental picture of the power relations in human-environment interaction in Tanzania. It has shown how the state actors in their efforts to control environmental resources, led to marginalization of natives by squeezing them off the fertile land and valuable forest resources. This understanding is then used to assess the reasons for evictions and how costs and benefits were shared among actors.

The last part of the chapter has presented the framework for understanding sustainable livelihood. The framework brings together, the livelihood platform thus helps to understand how livelihood is enhanced.



The framework enhances visualization of how the major components of livelihood interact to enhance a living. The framework is applied in the assessment of impacts of eviction to livelihoods.

The following chapter presents methodologies used to make assessment of narratives, forest cover as well as in assessing impacts of eviction to livelihoods.



## **CHAPTER THREE**

### **3 METHODOLOGY, METHODS AND TECHNIQUES**

#### **3.1 INTRODUCTION**

This chapter presents methods and techniques applied to three tasks of analysis. The first section present the methods used to analyze the narratives for establishment of settlement in the forest. Then it presents methods used to assess the status of forest cover. The chapter closes by presenting methodology used for assessment of livelihood before closes by chapter summary.

#### **3.2 METHODS FOR ASSESSING NARRATIVES FOR SETTLEMENT**

In assessing the narratives for establishment of settlement in the forest, exploration was made on both primary and secondary data. For primary data, the 8 interviews conducted in the field work were used as a basis for further investigation in secondary data. In complementing primary data, various sources of information were consulted including historical records on books, scholarly articles and government reports including the hansards of the parliament of Tanzania. Together these sources of information led to understanding of the nature of settlement in the forest.

#### **3.3 METHODOLOGY FOR ASSESSING FOREST COVER**

##### **3.3.1 GEOGRAPHICAL INFORMATION SYSTEM (GIS)**

In assessing the status of forest, GIS was used to analyze the Landsat satellite images. GIS refers to the system that lets us visualize, question, analyze, and interpret spatial data and their attributes to understand relationships, patterns, and trends (ESRI, 2013). With the aid of remotely sensed data, GIS has demonstrated the utility in monitoring change in forest cover (Giriraj, Babar, & Reddy, 2008 p.78; Wachiye et al., 2013). The following section presents the process used for analyzing forest.

##### **3.3.2 ACQUIRING SATELLITE IMAGES**

To acquire satellite data for assessing of impact of eviction to forest, I started by contacting the United States Geological Survey (USGS) for acquisition of Landsat Satellite data for the study area. I did that online by register an account and give details of the purpose of using the satellite data. After complete the process, I managed to access the satellite images of the study area and select suitable images for my study then submit order to the USGS for a request to download. Unless the image requested is not yet processed, it usually took only some minutes

for the order to be delivered. But for the images that were not yet processed I had to wait for several days since I submitted the order until it was delivered to me. But for all the orders that I had to wait, it never happened that I waited for the order for more than a week. Therefore this process was relatively smooth with only some minor challenges, but at the end I had the images to use for my study.

The Landsat satellite images of the Landsat 7 (ETM+) were therefore acquired and used for this study. The Landsat Thematic Mapper images are the common remotely sensed data used for change detection (D Lu, Mausel, Brondizio, & Moran, 2004). The images have a spatial resolution of 30 meters for Bands 1 to 7, and 15 meters for Band 8 (panchromatic). These images were captured by the Enhanced Thematic Mapper+ sensor (ETM+) onboard Landsat 7 from path 168, Row 62. These images were captured in February months of the selected years—2000, 2006 and 2003. The scene size is 170 km north-south by 183 km east-west (USGS, 2014). A single scene therefore covers a total of 31,110 square kilometres. In this case only a single scene of a particular year was actually more than enough to cover the forest of my study area which is just 150 square kilometres. The images were accessed freely from the USGS website <<http://glovis.usgs.gov/>> upon registration and subscription to the online database of the United States Geological Survey (USGS) using the Global Visualization viewer.

### 3.3.3 IMAGE PRE-PROCESSING

Image processing is the process of preparing the image to be used for analysis of a particular purpose in GIS. Satellite images comes with scene-to-scene variation caused by the effects of external sources such as an angle, soil moisture, atmospheric condition and seasonal phenological differences (Hayes & Sader, 2001; D Lu et al., 2004) therefore important to consider this before analysis is performed. To reduce these variations in all the three images selected are from the same sensor Enhanced Thematic Mapper Plus (ETM+) with same radiometric resolution and spatial resolution (30meters) and from the same month (February). Selection of suitable images was made through a process of examining several images. The selection therefore involved considerable efforts to get the images without cloud cover in the area of my study and from the same month to avoid seasonal variation of vegetation. In the end, the three scenes of the three years (2000, 2006 and 2013) were found to be the best to be used for this study.

**Table 1. Satellite Images selected for the study**

<b>Landsat scene identifier</b>	<b>Acquisition date</b>	<b>Sensor</b>	<b>Quality</b>	<b>Cloud cover (%)</b>
LE71680622000052EDC00	21/02/2000	ETM+	9	0
LE71680622006036ASN00	05/02/2006	ETM+ (SLC-off)	9	0
LE71680622013055SG100	24/02/2013	ETM+ (SLC-off)	9	0

Source: <http://glovis.usgs.gov>

Theoretically, as the timing of this study is concerned, the satellite images for years 2001, 2007 and 2014 would be the ideal images since the study aims at comparison of forest cover before eviction which took place in 2007 and after eviction. However, in practice, these images did not qualify to be used in this study because they were of low quality due to excessive cloud cover over the targeted forest.

Cloud cover obstructs important information about reflectance values of electromagnetic spectrum from the forest. For instance, the scene with the ID "LE71680622001038SGS00" of February 2001 has cloud cover of 22%, while in February 2007 there is no available image and the image of February 2014 has cloud cover of 2% mostly over the targeted study area [the size of the study area is less than 1 percent of the single scene]. Therefore these images did not meet the criteria for my study. Instead, the images of the 'nearest neighbour' years (2000, 2006 and 2012) qualified to be used for the study therefore selected for the study.

#### 3.3.4 IMAGE PROCESSING

Processing of the images was done on ESRI ArcGIS 10.2 work environment with ARC/INFO licence. The images were registered by automatic registration method using *register raster* tool from Data Management tools of ArcGIS whereby the image of *Time 1* (2001) was used as a reference and the other images of *Time 2*, (2006) and *Time 3* (2013) were automatically registered to the reference image of *Time 1* (2000). The ArcGIS program was used to project the three images to UTM zone 37 S, with the spheroid and datum in WGS 84.

#### 3.3.5 IMAGE CLASSIFICATION

Image classification refers to the task of extracting information classes from a multiband raster image (Campbell, 2002 p.335; ESRI, 2012a). It is a multi-step workflow resulting in creation of thematic maps. The major steps of image classification may include determination of a suitable classification system, selection of training samples, feature extraction and post-classification processing (Dengsheng Lu & Weng, 2007).

Based on the interaction between the analyst and the computer during classification, image classification can be either supervised or unsupervised (Panchal, Singh, Kaur, & Kundra, 2009 p.270). Supervised classification is performed by enclosing the area or a class with a polygon through interaction of the analyst and the program. Therefore supervised classification can be applied when the analyst is familiar with the study area (Campbell, 2002 p.337). Unsupervised classification on the other hand is the automated classification performed without the analyst's intervention.

In my study, I used supervised classification to classify the image since I am familiar with the study area. The forest is adjacent to my home village (approximate 500 meters from home to the western boundary of the forest under this study). I also visited the area during my field work in the summer of 2014.

In classifying the information from the image the 'false colour' composite band combination of RGB—4,3,2 was used to detect classes within the Landsat images. This combination is usually used for vegetation mapping. When displayed in a computer screen, the deep red hues indicate broad leaf and/or healthier vegetation while lighter reds signify grasslands or sparsely vegetated areas. Vegetation in the NIR band (band 4) is highly reflective of the infrared band due to chlorophyll therefore a NIR composite vividly shows vegetation in various shades of red color. This band combination gives results similar to traditional color infrared aerial photography (ESRI, 2014).

In assigning classes from the composite band Landsat image, I chose the categories of: dense forest; sparse forest; scrub crops & grasses; and bare surface based on the physical display of the image in the computer screen. With a composite band combination of RGB—4,3,2 the Landsat image displays dense forest in dark red, sparse forest in light red (Giriraj et al., 2008), and the remaining features were classified as shrubs crops & grass displayed lighter red, and bare surface displayed in dark to light browns.

Based on the classes above, training samples representing classes were created in ArcGIS environment using Training Sample Manager Tool. Training samples are class representative of the existing feature classes in a particular surface cover (ESRI, 2012b). They are created to represent classes in a supervised classification. The created training samples were then used to extract features from the satellite image. Features that resemble to a particular class of training sample were assigned into their respective classes and assigned a class value. In this case, dense forest was assigned a value of 1, sparsely forest 2, Shrubs and grass 3, bare surface 4.

### 3.3.6 IMAGE QUANTIFICATION

After classes were created a comparison between images of different time periods were performed. At this stage pixel by pixel comparison was performed using the Raster Calculator from the ArcGIS Spatial Analyst Tools. The subtraction map algebra expression was used to define the task to be executed by the raster calculator. Map Algebra expression was defined as;

*["Classified\_image\_of\_2006" - "Classified\_image\_of\_2000"]*.

This expression returned a zero pixel value where there is no change since the same values (say 1 for image of the year 'A' and 1 for image of year 'B') are subtracted against each other. For the areas where there has been positive change (increase of forest or vegetation) the pixel values results in a positive number for instance 2. But for the areas where forest has decreased the pixel values results into a negative number such as -1. This is how change detection was done for the images of the selected years (2000, 2006 and 2013).

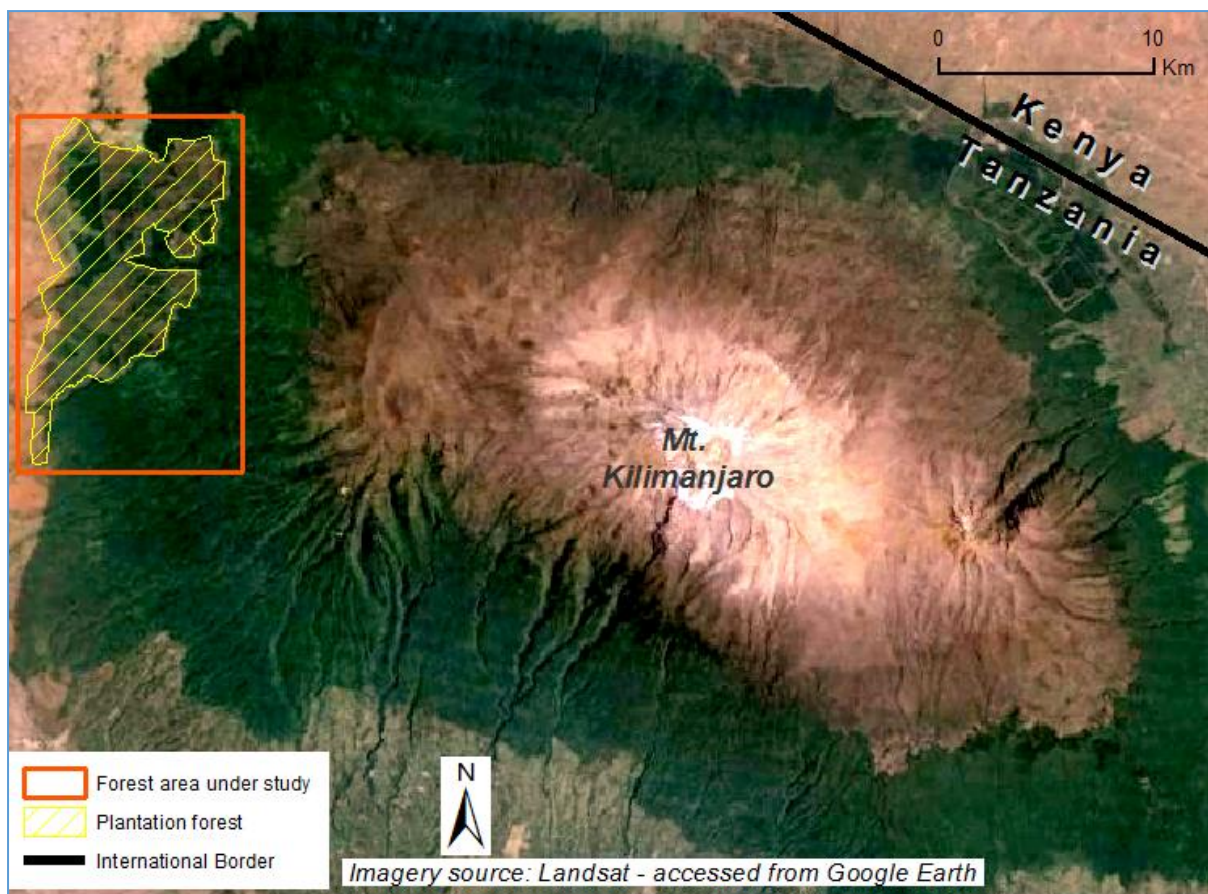
In addition to absolute change, I also wanted to find out the rate of change because it determines time taken for change to take place. Using the equation from Wachiye (2013); the mean annual rates of forest cover change (MARFCC) between different images dates were computed based on the time series classified images:

The equation is as follow;

$$MARFCC = \frac{\text{Forest Area at } t2 - \text{Forest Area at } t1}{\text{Forest Area at } t1 * (t2 - t1)} * 100$$

*Where:* t1 = the date when the older image was captured;  
t2 = the date when the second image was captured

After initial procedures of registration and projection, extracting of the targeted forest was done to reduce time used in creating training samples by working only on the area of target forest (about 150 sq. km). The area of forest that covers mostly the plantation forest was selected.



**Figure 5. The forest studied**

*Map by Author*

This area was arbitrarily selected because, based on the methodology applied herein, the visible changes on forest cover was depicted mostly on plantation forest than on native forest. Therefore I decided to focus my analysis on this area of plantation forest and the adjacent area of native forest since the study is all about changes.

### 3.4 CREDIBILITY OF SATELLITE IMAGES

The satellite data used for analysis of forest cover were obtained from the Landsat mission database of the United States Geological Survey (USGS). According to the USGS, the Landsat satellite carries the Enhanced Thematic Mapper Plus (ETM+) sensor which supports the Landsat project's mission to provide quality remote sensing data in support of research and applications activities (USGS, 2014).



### 3.5 METHODOLOGY FOR LIVELIHOOD DATA

#### 3.5.1 DATA COLLECTION TOOLS

In collecting data about livelihoods of households, several data collection tools were used. The tools include: interview, questionnaire, and digital camera. I also used the smartphone for recording some of the interviews. To maintain anonymity, all names mentioned here, except for the names of government officials, are pseudonyms.

##### 3.5.1.1 QUESTIONNAIRE

Questionnaire is the data collection method whereby a set of questions are pre-prepared by the researcher to be answered by the respondents. In this study a questionnaire was designed before research began. The format, structure, variables and questions of the questionnaire was developed with discussion between the author and the supervisor. At the end the final format of questionnaire was agreed upon and 200 copies of the questionnaire was produced (*See Appendix 1*). The 200 questionnaires were administered to the two categories of households; 100 to the evicted households and the other 100 the households who were not evicted.

The questionnaire collected data of the five main variables of livelihood assets as outlined in the sustainable livelihood framework. The aggregate of that make up these variables are explained below;

**Social capital** is aggregated by 9 questions regarding siblings living within the proximity of the household, social networks, neighbourhoods, membership in organisations as well as questions on satisfaction in living in the area. *See Appendices 5 and 10.*

**Human capital** is attributed by the skills of the head of household, years of experience for the main occupation and the status of household's health in terms of medical service insurance. *See Appendices 4 and 9.*

**Physical capital** is attributed by 9 variables ranging from the type of house the household lives in, ownership, average distance to water source, main access to the household's premise, average distance to the bus station, mobile phone and TV set ownership, and if the households has a private means of transport. *See Appendices 3 and 8.*

**Natural capital** is attributed by the land owned and land rented [*the land manager has only right to use at a particular time rent period*].

Measuring **financial capital** is based on the question of trend of household income rather than on the cash stock (*See question number 50 in Appendix 1*). I had to use the variable of trend instead of the absolute income figures because people became reluctant to respond to the question regarding the amount of money they have at their disposal. The possible reasons for the reluctance may be that people feel that their income is their privacy. Also the prevalence of non-monetized transactions makes it difficult for some to recall the income that they make for a particular period. In rural areas of Tanzania where the major economic activity is small scale agriculture, the major part of output is consumed by the household therefore its monetary value becomes invisible to monetary system.

A concern about the possibility of not getting responses from this question was already raised by my supervisor when structuring the questionnaire. I therefore I created a related question about financial asset but in a relative term rather than in real figures (*See question number 50 of the Questionnaire in Appendix 1*). Despite structuring the alternate question, I retained the question about the income earned by the household so as to test it in the field to see if it could bring any responses anyway.

In the field I therefore tested it. As it was predicted, respondents were reluctant to respond to the question. So after testing the question to some respondents at the start of survey without getting targeted results, I decided to skip it and retain the question about trend of household income for the past six years, instead of using the question that asked about the real figures of the income that the household has. This turned to be successful as it got responses from 98% of respondents (n = 195).

The answers of the variables of questionnaires were ranked on the scale ranging from 1 the poorest situation and 5 for the best situation, except for some questions—example questions number 38 and 39 in *Appendix 1*—which could not have five options therefore not fit for the scale of 1 to 5.

But, to stretch values to fit into the scale of 5 was not a problem at all for calculations of statistical tests since the program used for analysis, SPSS, allows transformation of variables as required by the analyst.

### 3.5.1.2 INTERVIEW

Interview is another method of collecting data by presentation of oral-verbal stimuli and reply in terms of oral-verbal responses between the interviewer and interviewee (Kothari, 2004 p.97). In this study 8 interviews were conducted with the researcher taking notes and sometimes voice recording for the respondents who consented with the recording. The interview involved four heads of household, and the other four interviews were conducted to the forest officials of WKFP headquarters, the Londorosi range office, Siha District Council and KINAPA. The interviews were conducted in Kiswahili—the main language used in Tanzania and in the study area as well. Recording of interviews was also done for the interviewees who consented to be recorded. In fact, only the heads of households accepted to be recorded but the forest officials declined to be recorded. For the forest officials I therefore took notes while asking questions. In my interviews with the heads of households, I recorded the interview with my smartphone [*the iphone*] which captured the conversation with a very good quality. The digital camera of the smartphone was also used in taking photos of my observations.

### 3.5.2 SAMPLING

As stated earlier the population of the two wards is 20,775 (NBS, 2013). Given the average household size computed from the 2012 census, the two wards comprises of about 5000 households. Due to limitation of time for a master project field work, surveying the entire population would prove unrealistic if not impossible. This necessitated selecting a sub-set of the population and studying that group instead of the entire population. In scientific terms this process is referred to as sampling. Sampling is a process of selecting a sub-set of the population to be studied (Kothari, 2004 p.55). It helps to serve resources such as time and money but at the same time aiming at producing possibly accurate results. In this study 200 questionnaires were administered to 200 head of house hold. The head of household referred here is either father or mother.

**Table 2. Population of the Study Area by Sex, Average Household Size and Sex Ratio**

Ward	Total	Male	Female	Average Household Size	Sex Ratio
Ndumeti	11,344	5,279	5,615	4.3	102
Ngarenairobi	9,431	4,679	4,752	3.9	98
<b>Total for the two wards</b>	<b>20,775</b>	<b>9,958</b>	<b>10,367</b>	<b>4.1</b>	<b>96</b>

Source: (NBS, 2013)

Half of the households are the evicted and the other half are the households who were not evicted. The reason for having two types of households is for the sake of comparison of the livelihood assets.

The sampling technique employed in this study is quasi-quota sampling. The study area was divided spatially based on the administrative units. Then households were selected randomly from these 'quota' of administrative areas for administering of questionnaire.

**Table 3** Distribution of administered questionnaires to villages.

WARD	VILLAGE	SUB-VILLAGE	EVICTED	NOT-EVICTED
Ndumeti	Matadi	Matadi A	8	9
		Matadi B	7	9
		Mji Mwema	18	0
		Roseline	11	11
	Miti Mirefu	Miti Mirefu	6	10
		Kalimaji	0	8
		Mabanzini	0	1
		Songambebe	0	2
		<b>Sub-total (I)</b>	<b>50</b>	<b>50</b>
Ngarenairobi	Ngarenairobi	Ngare Mjini	5	8
		Kiloriti	2	8
		CCM	4	9
		Kijiweni	13	1
	Namwai	Mwangaza	25	7
		Motomati	1	9
		Esimbosi	0	8
		<b>Sub-total (II)</b>	<b>50</b>	<b>50</b>
		<b>TOTAL</b>	<b>100</b>	<b>100</b>
		<b>GRAND TOTAL</b>	<b>200</b>	

It is a 'quasi-quota' because in some sub-village areas only few of the evicted households were found therefore the quota had to look for the evicted households in adjacent villages.

For instance the Miti Mirefu village had only few evicted households therefore I had to look for evicted households from adjacent village. The reason behind 'scarcity' of evicted households at Miti Mirefu village may be that the evictee might have refrained from migrating to the village because the major economic activity of the area is quite different from the economic activity of the eviction site. The major type of economic activity practiced in the area that is pastoralism while the evictees were mostly crop farmers. Other reasons might be the distance factor The Miti Mirefu village is located at approximate 20 kilometers from the previous settlement while the other villages of Matadi, Ngarenairobi and Namwai are located at approximately 10 kilometers from the previously settlement in the forest. Climatic condition may have also been one of the factors that discouraged the evictee from settling in that village.



**Figure 6. Miti Mirefu Village environment.**

All photos by Author on 04.07.2014

The climatic condition of the village is scarce rainfall manifested by semi-arid landscape features therefore suitable for pastoralism rather than crop farming per se.

### 3.5.3 FIELD WORK PROCEDURES

Preparation for field work started earlier by conducting literature review while at the university in Trondheim, Norway to familiarize myself with the study area. The department prepared information meeting for the students who were in preparation to go for field data collection. In the meeting we were informed of important issues to consider prior and during data collection process including the field work procedures as well as safety issues.

In the end of May 2014 I flew to Tanzania ready for starting my field survey. In the mid June I started the field work until late August.

The field work started by introducing myself to the local authorities at ward level in the area of my study and delivered the introduction letters to the respective authorities. The officials received the introduction letter and from there we started to discuss the subject matter of my research and they gave me various proposals on how they could assist to orient me to the respondents. It seems to be all smooth up to that point. However later another local government official at the village level advised me that the procedure is that I should start with the regional administration because is the one that has mandate to offer research permits. I felt that it was a bit illogical because one of the wards executive officer had already received the letter of introduction. However to be safe, since I had time, I decided to consider the advice and decided deliver the introduction letter to the Office of Kilimanjaro Regional Administration.

I therefore visited the Kilimanjaro Region office in Moshi town and deliver the introduction letter. I was told to come for collecting the permission letter after 5 days. This was a bit longer for me to wait since my time to begin research was already started. So instead of waiting for 5 days, I instead went back after four days as a "technique" to make sure that by the 5th day I get the permit letter. This is important to mention particularly for the young researchers with little experience in government procedures in Tanzania. Theoretically the letters should be available as promised, but practically this to me has proved to be problematic. When you are told to come after some days you go and come back and find that almost nothing has been done about your case. In most cases it is until you try to push the issue by convincing the responsible officials that your issue needs urgent response since it is time limited otherwise your case will be much delayed.

As it was in my case; I went back one day before the promise day that I was promised to collect the permission letter, there was almost nothing done to prepare the permission letter. I noticed this because after asking whether my research permit was already prepared; it was actually the time that a secretary was assigned to prepare it. The 4th day after making a request still nothing was done. What I had to do was make persuasion efforts to show the responsible officers how important it was to get the permission letter in time. I was therefore told to wait the permit as it was then been prepared for me. I had to wait at the office of the Regional Commissioner for some hours and luckily I got a permission letter with a copy to deliver to the Office of Siha District Commissioner. I therefore took the letters and went to the office of Siha District commissioner where I delivered a copy.

The anomalies in office procedures explained here is actually what happens in most cases, as for my experience at least, when it comes to government procedures in Tanzania. Therefore it is important for the researcher who want to do research in Tanzania to consider 'waiting time' when plan for anything connected to government issue that requires a response before one can proceed to the next step. I don't mention this as a "pro-waiting" but I mention it as important factor to consider in avoiding confusion with working schedule during field work. Of course would be really nice and perfect if the "waiting time" would be shorter and keeps the promise. I would really like if it would be that way but at the moment it is not yet there.

After finishing with the administrative procedures, the real field work begun.

#### 3.5.4 THE ACTUAL FIELD WORK

The field work involved administering questionnaires to the households and after finished with questionnaires I started interviews. I deliberately decided to start with questionnaires as a technique to identify the potential households for in-depth interview later. The field work started by visiting the Ward Executive Officers (WEO) who were the focal point to begin with the practical work of data collection. These were Mr. Elinisaa Lema of Ngarenairobi Ward and Mr. Simon Sereni of Ndumeti Ward. These WEOs connected me to the village authorities within the areas of their jurisdiction. I then contacted the village authorities who connected me to the sub-village chairpersons who I worked with. With the sub-village leader we planned on how best we could identify the targeted respondents based to their temporal and spatial distribution.

In administering questionnaires I was accompanied by local government officers. I was advised to do so since the officers know better the streets within their areas of jurisdiction. I welcomed the idea of having a gate opener and in fact, it really helped to identify the evicted households, as well as to introduce me to the respondents at their respective areas.

I was keen to ensure that the presence of the gate opener does not limit the freedom of respondents to answer the questions. In practice this was not a problem at all because in most cases the gate opener would just accompanied me to the household to introduce me in brief then gives me time to continue with administering questionnaire. After introduction the gate opener, went to find another household nearby therefore left me to continue administering questionnaire with the respondent at that particular time.

I then introduced myself and continue with the administering of questionnaires. After finishing the questionnaire the gate opener would come back to direct me to another household. The process went like this for most of the households I visited.

In addition, for some cases the gate opener positively influenced the willingness of some households to participate in the survey even when they seemed to be reluctant. For instance, in one of the cases that happened, when I was administering questionnaires at Motomati we met a lady who was hesitant to participate in the first place. She said that she was afraid to participate in the survey because she was afraid of her husband. She wasn't sure if her husband would like to see her participate in the survey if he came back [because the husband was not there at that time]. So the woman said that she became willing to participate because I was accompanied by the sub-village leader. She said;

*"If it was not that you came with this village leader that I know, I would have not answered your questions because I am afraid of my husband. ...I don't know what would happen if he comes and find me answering to these questions here" (comments from a respondent of Namwai Village on 03.07. 2014).*

In other occasions it happened that I passed in shopping places where people were gathered and the door opener would identify for me if there was the right candidate who lives in the area for my survey. If we found one, the gate opener would introduce me to them and I would continue with administering questionnaire upon their consent.

The survey usually started at 9am visiting homes and administer questionnaires to one of the heads of the households—either mother or father. The work went on until 1pm and we stop until the next day. But sometimes we just pause for lunch depending on availability of the respondents at home. But in some days we just pause from 1pm to 2pm and continue from 2pm to 4pm therefore it depended on the availability of respondents at home and their capacity for understanding the questions which either saved time or prolonged time taken to fill questionnaires.

In administering the questionnaires, I started by administering 50 questionnaires at Ngarenairobi Village by myself to gain experience of the field work. After gaining experience on interaction with respondents, I then decided to recruit a research assistant, Emanuel Mwalwayo, a high school student specializing in Chemistry, Biology and Geography combination of subjects (CBG).



At the time of my research he was on vacation therefore I got chance to work him. This guy lives in Matadi (one of the researched villages) and his parents work as small scale farmers.

I gave him a short training on how to administer questionnaires before we begun the task together. It was easy for him to understand most of the basics of administering questionnaires because he already had background knowledge of field research studied at secondary school. Also he had already conducted survey in the same area previously so I felt that he was the right person that I wanted to assist me.

I had to agree with him the payment however I put it very clear to him that numbers of questionnaires filled per day was not my priority but the most important is the quality of the data. Therefore I told him that I was not going to measure a day's work by number of questionnaires filled but through how correct and complete the questionnaires were filled. Of course I would not tolerate if he would just filled one questionnaire in the morning and take a rest under a tree shadow until evening and brings me only one questionnaire. No thank you, it would never work that way. But infact the guy worked diligently throughout the survey.

After setting of 'terms of reference' with my research assistant, we then began by working together in one sub-village of Kijiweni in Ngarenairobi Village. I started administering several questionnaires while my research assistant was observing. After sometime I then asked him to be in charge when we moved to another respondent. He began the work on administering questionnaires successfully with only minor issues that I had to remind him to focus his attention on. After two days of moving together, we then split so everyone was going to a different area for administering questionnaires.

The modality was that we met in the morning I gave him the questionnaires and connect him to the person in charge of the government office in the village that he would visit either through phone or physically. After this coordination task, I then go to another area for administering questionnaires. In the evening my research assistant would come to my home with the filled questionnaires where I passed through them to see if they were filled correctly. If there was any missing information we would take that questionnaire back to field in the next day. We therefore worked parallel until we successfully completed to administer the 200 questionnaires. The summary statistics for the spatial distribution of questionnaires administered is presented in *table 3* above.

### 3.5.5 INTERVIEWS

After finishing administering questionnaires I embarked on interviews. On interviews I did it myself since it was only 8 interviews and I wanted to have the feelings of the respondents while interviewing them which helped me to understand the nature of responses. In conducting interviews I started by the forest officials of the WKFP, then the Officer responsible for Natural Resources at Siha District. After that I continued with interview with the households. The interviews with the households focused on the 2 head of households who were not evicted followed by the 2 who were evicted. I finalized the interviews by the officials of Kilimanjaro National Park (KINAPA) in their headquarters at Marangu, Moshi.

### 3.5.6 LIVELIHOOD DATA ANALYSIS

In assessing impacts of eviction to livelihoods, data of livelihood assets based on livelihood resources of the sustainable livelihood framework were used.

The analysis was done using two methods; a computer programs SPSS version 21 and Microsoft Excel for analyzing quantitative data, and content analysis method for analyzing qualitative data of interviews.

Content analysis as a research method allows the researcher to test theoretical issues to enhance understanding of the data (Elo & Kyngäs, 2008). The interview notes were expanded to analyze the context and the recorded sound clips were transcribed to written scripts for further analysis of the content in relation to the objective of the research.

The information of land owned by the households obtained from questionnaire was further processed to get values for natural capital used for asset pentagon by using the following equation.

$$\text{Natural Capital} = \frac{\text{Household's Land per capita}}{\text{Arable Land per capita}} \times 5$$

Where;

- Household land per capita is the land (acres) owned per person within the household including the owned and rented land.
- Arable land per capita is the arable land (acres) per person in Tanzania as per World Bank figures for the year 2012 (World Bank, 2014).
- The coefficient 5 is the scale parameter for the asset pentagon.

Comparison of livelihood assets was done using independent-samples t-test. The t-test is a statistical test used to compare means of two unrelated samples to test the significance of differences (Bryman & Cramer, 1994). The significance is tested by the alpha or risk level. In most social research the "rule of thumb" is to set the alpha level at .05 (Bryman & Cramer, 1994; Kothari, 2004). The alpha level of .05 implies that, in every 100 observations there will be five times statistically significant differences between the means by chance. If the alpha level is above .05 then the differences between the groups are said to be attributed to fluctuations of sampling thus not statistically different. When the alpha level turns out to be .05 or lower the differences in two independent sample statistics is significant and not attributed to the fluctuations of sampling error (Kothari, 2004 p.170).

### 3.6 NATURE OF DATA VALIDITY AND RELIABILITY

The reliability of data to a great extent depends on the source and the means used to acquire and process data. I therefore find it useful to explain the context from which the data were obtained as it adds value to the data because the reader gets opportunity to understand the field experience encountered during data collection process.

During data collection, in most cases, people were willing to co-operate therefore I have the feeling that what they report is the actual situation to a large extent. However, exaggerations and omissions may have penetrated the data but at a very minimal scale. For instance some few respondents may have underreported the amount of land they have because they might think that my research aimed at allocating land for the people without land.

But the margin for this error is minimized by the fact that before I started administering questionnaires, I clearly explained to the respondent that my research was for academic purpose only and not connected to the government. This to some extent reduces their expectations of getting 'something' direct out of my research.

There were just few cases where respondents declined completely from participating in the survey. A typical example is Mariam from Kalimaji sub-village on the downstream of Simba River who declined from participating because she had grievances of her crops been raided by the elephant on the night before the day I visited the village. When I approached her and ask for her consent to participate in the survey she desperately responded to me that;

*"You [researchers, data collectors] always fill in papers but it doesn't help me anything".*

She went on lamenting that her crops had been raided by elephants almost every season without any help. She stated that she has already met people who come into the village, to ask for information from the villagers but in the end of the day [she said] nothing of a help to her comes after giving such information so she refused to participate completely. I tried; even to show her that I was a friendly person by buying a cup of tea from her since she was moving on farms with tea and porridge on thermoses to sell the products to the farmers at work, but still she remained reluctant. However, the cases like this happened only to this respondent therefore I would comment that its impacts have negligible effects on overall results of the study.

### 3.6.1 CHALLENGES ENCOUNTERED

Most of the respondents were expecting something of benefit to them so it was a challenge to convince them that my research was not connected to government. For instance, when introducing myself I used to tell the respondents that my research is for academic purpose only, but this didn't change expectations, because at the end of a questionnaire they wanted to know what they get out of all the questions they answered. Therefore we kept on put it clear to them that our research was for academic purpose only. The only thing we told to them was that after finalizing our research the copy of our findings will be submitted to the government as a requirement for our permit at least to show them that they were not spending their time in answering questions for nothing.

### 3.6.2 MY POSITION AS A RESEARCHER

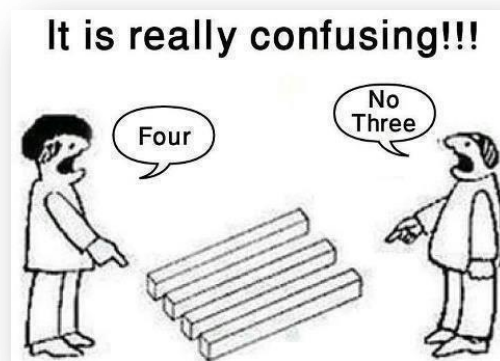


Figure 7 How one's position affects perception

Source : (Bits and Pieces, (2012)

The position of the researcher, in one way or another, may influence to some extent the research topic being investigated. It is therefore important to expose to the reader the 'filter' used by researcher in the process that led to a particular research report because it has been revealed that a researcher training and skills can influence both choice of topic and how the topic is investigated (Buchanan & Bryman, 2009 p.12). By knowing researcher's filter the reader's mind is stretched beyond the horizon of the researcher's possible biases.

In this research I see myself as an 'insider' in one hand as an 'outsider' in the other.

As an insider, I was born in one of the villages under study area but there was no eviction that took place in my village since the village (Matadi) is outside the forest boundary. Being the son of the land it helped me to reduce the time for introduction as it would be for an outsider and or stranger. But by being an insider I took extra care so that I do not take important things for granted therefore I was careful in maintaining my role as a researcher.

I also consider myself as an outsider since I have been living outside the village since 1996 after completion of primary education and move to Moshi towns for vocational training followed by secondary, and high school education and eventually higher education at the University of Dar es Salaam and Umeå University in Sweden. In addition, I have been in Norway for postgraduate studies since 2013 to 2014 when I moved to Tanzania for data collection.

This is to say that, about half of my life has been outside my home village therefore I have the feelings that to some extent the people, in my village, feel that I am the insider and to some extent as an outsider.

Having also the feelings of an outsider, I was aware of the possible drawbacks from the respondents' sensitive issues therefore during my time with them I tried to position myself to their level despite my relatively higher level of formal education. By harmonizing myself to the respondents' world enhanced my survey to be as part of normal conversation therefore creating a freedom to the respondent to freely express their thoughts and encounters of their livelihoods.

### 3.7 CHAPTER SUMMARY

This chapter has presented methodology used for assessing the narratives for establishment of settlement in the forest which involved mainly historical secondary and primary data.

The chapter has also presented methods used for assessment of forest cover which included; internet in acquiring satellite images, GIS for processing and presenting results of the forest data from satellite images. The chapter has also presented methodology used for collecting, processing and analysing livelihood data that included; questionnaires, interviews for collecting data and SPSS for analysing data. The chapter has also presented data validity and reliability showing that the nature of data acquisition was relatively trustworthy. The position of the researcher has also presented showing that he considers as having double role as insider in some aspects and outsider in the other aspects.

The following chapter presents the narratives for establishment of settlement in the forest.

## CHAPTER FOUR

### 4 NARRATIVES OF ESTABLISHMENT OF SETTLEMENT IN THE FOREST

#### 4.1 INTRODUCTION

This chapter explores the reasons for people to settle in the forest. It answers the question why did people settle in the forest in the first place.

#### 4.2 NATURE OF SETTLEMENT IN THE FOREST

Investigation of nature of settlement in the forest shows that the settlement in the forest has a direct connection with the world capitalist crisis particularly the impact of the World War II which greatly changed the pattern of economy of Tanganyika. Literatures show that, during the Second World War, export of timber boomed due to various martial purposes as well as for sleepers for the construction of railways in Iran (Voss, n.d p.22; Wood, 1964 p.112).

*"The 1939 war soon brought an alteration in the pattern. East Africa became the base for the considerable Allied Forces in the Middle East. Very large quantities of timber were exported and volume became of greater importance than quality" (Mallinson, 1950 p.16)*

*"The war, led to a tremendous demand for timber, mainly for sleepers, and production rose from 5,000 cubic feet in 1941 to 583,000 cubic feet in 1942" (Wood, 1964 p.112).*

As a result, large scale felling led to clearance of more than 3000 ha of indigenous forest in West Kilimanjaro (Lundgren & Lundgren, 1983; MGK, 2012; Newmark, 1991; Hans G Schabel, 2006b p.31; UNIDO, 2000 p.39; WKFP, 2012).

The areas cleared of natural forest were to be afforested the task that required labour.

Also, after the war, there was sharp increase of demand for pyrethrum (*Chrysanthemum cinerariaefolium* Vis) due to the impacts of the (World War II) that completely shut off supply of pyrethrum from Asia, and greatly encouraged the production of pyrethrum in Africa particularly; in Tanganyika, Kenya and the Belgian Congo. Pyrethrum is a botanical insecticide produced primarily in the flowers of *Tanacetum cinerariaefolium*, a species of the *chrysanthemum* plant family (MGK, 2012). It grows in areas of high altitudes and in volcanic soils. For this case, the slopes of mountains in East Africa became the target areas for growing pyrethrum (Casida, 2012 p.6-12; MGK, 2012; UNIDO, 2000 p.32-34). The British colonial government encouraged production of pyrethrum in Tanganyika. Because pyrethrum grows in highlands, the North Eastern Tanganyika highlands became ideal for production of pyrethrum. The government therefore parcelled the forest land of West Kilimanjaro to licensed

cultivators of pyrethrum to clear the natural forest so as to establish plantations for pyrethrum (Lundgren & Lundgren, 1983 p.48; Maro et al., 1991 p.466; Newmark, 1991). The licensed cultivators of pyrethrum in West Kilimanjaro were mainly European or Asian settlers (UNIDO, 2000 p.32-39). The cultivators had therefore to recruit labourers to clear the clear the indigenous forest for establishment of pyrethrum plantations. This task of clearing the natural forest and plant pyrethrum also demanded human labour.

Moreover, in its efforts to contain the war veterans, after the World War II, the British colonial government parcelled the large tracts of forest land of West Kilimanjaro and rewarded it to the war veterans.

*"In 1950 the Government parceled out the land of the former Northern Province Wheat Scheme to four settlers, and two years later, large thousand-acre farms in the forest land of West Kilimanjaro were awarded to eight British war veterans for wheat farming" (Guyer, 1987 p.181).*

Empirical data from field also support these facts. My interviewee, Mr. Malimusi, the man who migrated in the area in 1950s, confirms to these facts;

*"...I arrived here in 1950. I came here with the wazungu [Europeans] from Kilosa, Morogoro. They were rewarded these lands as gifts of the war... you know there was war [referring to the World War II]... they said that the government had given them to cultivate pyrethrum. Therefore they were allocated the Londorosi forest [the place where eviction took place]. ...during that time it was a thick natural forest" (Interview #7, August 2014).*

Also Mr. Mbonye who migrated into the area in the 1950s explains the clearance of natural forest for establishment of plantations for pyrethrum.

*"...all here in this area from Grewaal, Chaulale, up to Saladini...it was a natural forest. It was the wazungu [white people] who opened not the forest. He [the settler] name was an English man. They didn't clear the forest to cultivate trees, they cleared to grow pyrethrum. It was the year 53 [1953]" (Interview # 6, August 2014).*

Various historical records show that the process of clearing natural forest faced the challenge of availability of labor. They show that the shortage of labour to work in plantations particularly in forest was a chronic problem especially in areas of Kilimanjaro and Usambara Mountains throughout the colonial time (Neumann, 1997; Hans G. Schabel, 1990 p.131). The major reason for labor shortage to work in the forest was the competition for labor from other enterprises such as sisal, mining, and railroad construction projects which offered better pay



and were considered more prestigious, than did forest work which deemed to be tedious and unskilled (Hans G. Schabel, 1990 p.132).

Also the co-existence of both plantation and peasant agriculture particularly in Kilimanjaro led to retention of labor in the peasantry system of the natives. Contrary to the German colonial state that preferred settler plantation, the British colonial government encouraged both plantations and peasant agriculture (Guyer, 1987; Swai, 1979 p.119; URT, 1994 p.10). Consequently, the peasantry system had a negative impact on labour to work in plantations because the conditions which made plantations possible in the north-east (Kilimanjaro, Tanga and Arusha) also enabled the people of those areas to commercialize on their own agriculture therefore escaped from being converted into humiliated plantation labourers.

*"The encouragement of Chagga peasant agriculture meant that not much of this force was to be available from peasant households in Kilimanjaro. Peasants would rather work in their own plots of land than submit to the humiliation of being treated as Manamba by Europeans in their estates" (Swai, 1979 p.119).*

To deal with this challenge the white settlers in collaboration with the colonial government embarked on recruiting laborers from other regions such as Kigoma, Tabora, Shinyanga, Mbeya, by offering a bonus of twenty-five to thirty rupees, transportation, and rations (*posho*) (Hans G. Schabel, 1990 p.131-132).

Mr. Mbonye explained that he came from Kigoma at the age of 15. He was brought by his sisters. He explained that his parents who hailed from Kigoma were brought to Tanga to work in sisal plantations. Since then, his parents lived there [in Tanga] till their death.

He tells that after reaching Tanga he heard that a certain *mzungu* [a white man] was looking for labourers for picking pyrethrum flowers, he therefore decided to move to West Kilimanjaro looking for his fortunes. I asked him how the *mzungu* obtained workers to work in the plantations and he replied;

*"...he [the mzungu] was an English man... he went to bring people from Kigoma, Mbeya... I mean manamba [native people recruited from distant places to work for colonial projects]" (Interview # 6, August 2014).*

Because the labourers were recruited from distant places, the settlers therefore decided to build camps to accommodate them.

One of respondents explained about the starting point of establishment of settlement in the forest.

*"...in 1954 the wazungu [Europeans] said to me, because I was like a supervisor. They told me: you know? ...there are people who will be brought from Kigoma and Mbeya... They said that we should put more efforts to build houses so that when they come they find a place to stay. And it was just as they said because one day in a date of April, they came...some from Kigoma and some from Mbeya. It was in 1954" (Interview #7, August 2014).*

So he said that they embarked in building temporary houses for the laborers to stay. His explanation is also supported by Mr. Mbonye.

*"...he [mzungu] had built camps and houses if you have a woman you get a house, if you are 'mhuni' [the guy without a wife living in ghetto] you are allocated to a camp where you have to live with 4 to 5 people" (Interview # 6, August 2014).*

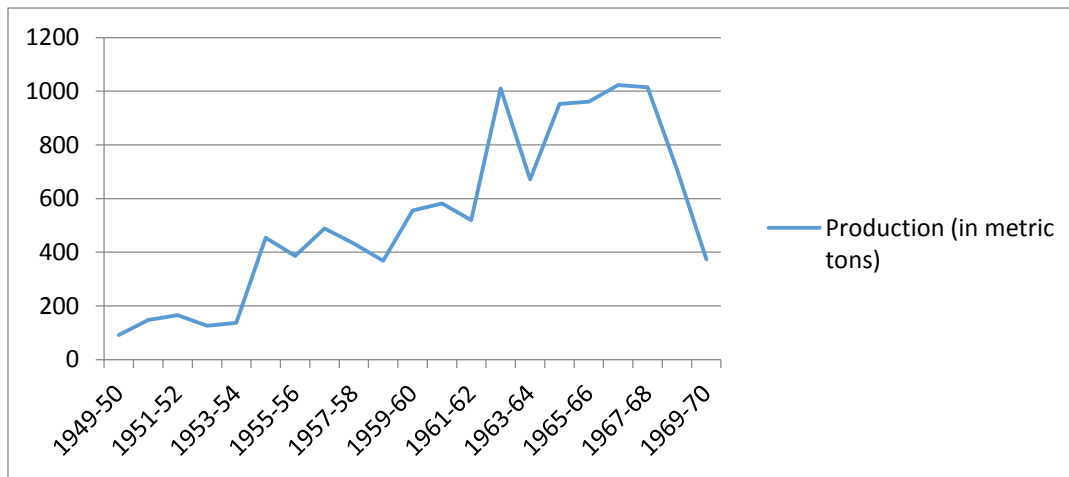
In my field observation with the forest rangers who accompanied me to the eviction site I observed a building and I was told that it was the house of one of the British settlers during establishment of plantations in the forest.



**Figure 8 House of a British settler.**

*Photo by Author 19.08.2014*

The settlements in the forest were therefore deliberately built by the British settlers so as to accommodate labourers who were recruited from distant places for the task of clearing the natural forest for planting of pyrethrum and exotic tree plantations the mission that became successful such that Tanzania and Kenya became prime growing regions of pyrethrum (MGK, 2012; UNIDO, 2000).



**Figure 9. Pyrethrum production in Northern Highlands\* for the period of 20 years (1949-50 to 1969-1970)**

\*Northern Highlands refers to Arusha and Kilimanjaro Regions

Data Source: (UNIDO, 2000 p.41)

In 1956 the colonial forest department started to afforest the areas where pyrethrum was cultivated. The trees planted were mainly *Pinus patula*, *Cupressus lusitanica* and *Pinus radiata* (WKFP, 2012).

However this did not prevent pyrethrum because the trees were planted while cultivation of pyrethrum continued under the so called *taungya* or *shamba* system. However, until 1960, cultivation of pyrethrum in northern Tanzania was grown only in large estates by the European and Asian Settlers (UNIDO, 2000 p.32-39). The small land holders of between 4 to 8 hectares of land started the pyrethrum cultivation from 1960s. Prior to 1960 the native people were just labourers to the plantations. Even if they were allocated some plots was only for cultivation of the food crops for subsistence.

In 1961, when Tanzania [Tanganyika by then] got her independence, the personnel for forest management changed from the British to indigenous. However, the labourers who use to work on plantations of the settlers were kept to continue with cultivation in the forest land under *taungya* system. The *taungya* system is like shifting cultivation practice but it intercroops forest and crops with some agreement with the forest management. The ruling philosophy of the *taungya* system aimed at establishing forest plantations at almost no labor cost by using the unemployed or landless labourers to perform forestry tasks and in return the labourers are allowed to cultivate the land between the rows of tree seedlings to grow agricultural produce (Lambrechts et al., 2002 p.23; Nair, 1993 p.4).

Under taungya system;

*"...the forester assigns pieces of natural forest land to a licensed cultivator normally 2-5 ha per family. The farmer clears the forest (after valuable trees have been extracted by the Forest Department), burns the slash and cultivates his crops, normally maize, beans, peas, potatoes (Irish) and pyrethrum (only annual crops are permitted) for 3-4 years. In the first or second year the Forest Department plants seedlings at regular intervals in the farm and these are thus intercropped with the farmer's crops for 2-3 years when the canopy closes and the farmer is allotted a new piece of forest. It is the farmer's responsibility to tend the young trees (weeding, protecting them from animals, etc.), while he cultivates the land in between. The benefit to the Forest Department is obvious-land clearing and obtained at no cost" (Lundgren & Lundgren, 1983 p.48).*

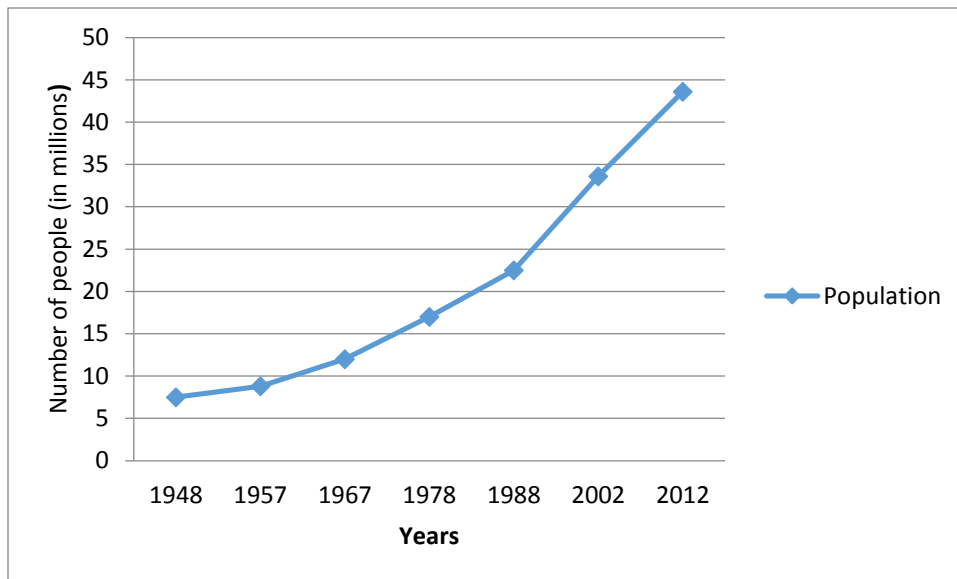
My respondents also explained how taungya system was operated by the forest department.

*"You were offered a plot to cultivate for three years, the fourth year trees were planted and you were allocated plots in the other areas. It was free of charge" (Interview #1, 16, July 2014).*

These findings completely reject the claim by the state authorities that the people were 'invaders' of the national forest.

#### 4.3 WHAT CHANGED THAT SETTLEMENT COULD NO LONGER TOLERATED?

The reason for *intoleration* of settlement can be explained from the demand-supply pattern of labor for forest works. As the analysis of settlement in the forest has shown that, the major reason for establishment of settlement in the forest was the issue of labor shortage. In 1950's the settlers had to recruit labor to work in the forest but now things have changed completely. Population has increased to the extent that the people are actually the one that struggle to get a plot in the forest as it will be discussed in details in chapter 7.



**Figure 10. Population of Tanzania mainland (in millions) from 1948 to 2012**

*Source: Taylor (1963 p.28), NBS (2012), NBS (2013)*

**Table 4. Population of Tanzania mainland**

Years	1948	1957	1967	1978	1988	2002	2012
Pop	7,468,155	8,788,466	11,958,654	17,036,499	22,455,193	33,584,607	43,625,354

*Source: Taylor (1963 p.28), NBS (2012) and NBS (2013).*

This demographic change may be the major reason that has absolutely changed the demand and supply pattern of labor to the forest management. The pattern has changed from labor scarcity and land abundance, to land scarcity and labor abundance which implies that, at the moment acquiring labor to work in the forest is no longer a problem to the forest management therefore the reason for intolerance of settlement in the forest.

#### 4.4 CHAPTER SUMMARY

This chapter has presented the findings of nature of settlement in the forest. The major reason the shortage of labor to work in the forest was that forest works were considered less prestigious and tiresome as compared to other jobs. The findings discovered that instead of being invaders, the people were actually recruited by the settlers to provide labor in the forest works.

The chapter has also presented the possible reason that explains why by 2007 the settlement could no longer be tolerated that the pattern of demand and supply for labor to work in the forest has completely changed. The following chapter present result of analysis of forest cover.



## CHAPTER FIVE

### 5 IMPACTS OF EVICTION TO FOREST

#### 5.1 INTRODUCTION

This chapter assesses the status of the forest cover of the study area before eviction and after eviction to see if there are any changes that might be associated with eviction. The periods analyzed are between years 2000 and 2006 (before eviction) and between the years 2006 and 2013 (after eviction). The results are presented in maps, tables and graphs. The chapter ends with a summary of the findings.

#### 5.2 RESULTS OF ASSESSMENT OF FOREST STATUS

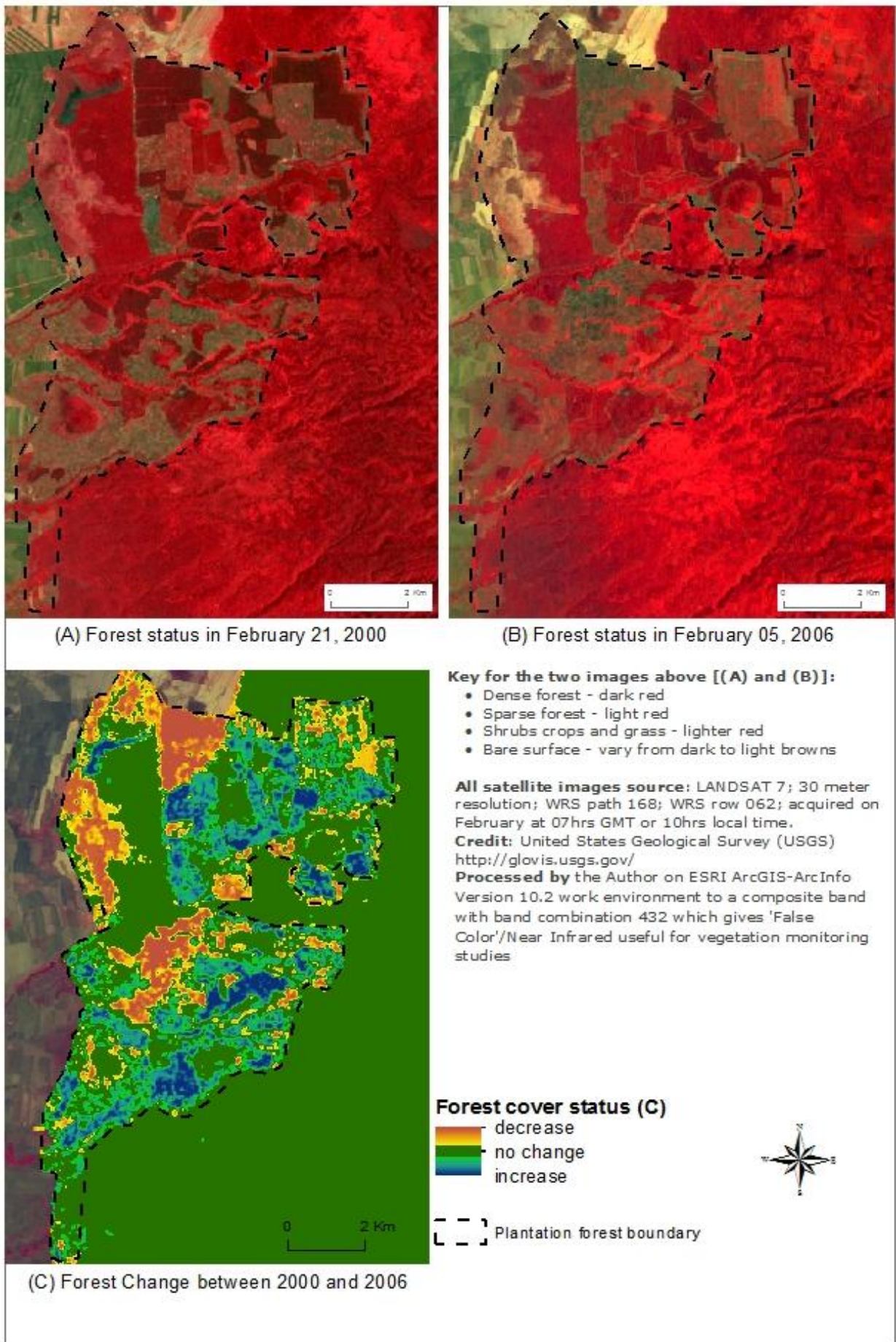
Results of assessment of forest cover shows that, before eviction, between the years 2000 to 2006, there was a small increase of forest for 2square kilometers and there was no increase of 'sparse forest' while the area of shrubs/grass and/or crops decreased. This means that at this period the forest cover increased but the process was slow.

**Table 5** Forest cover change (in sq km) between the years 2000 and 2006

	2000	2006	Change (sq km)
<b>Dense forest</b>	111	113	2
<b>Sparse forest</b>	16	16	0
<b>Shrubs/grass</b>	20	12	-8
<b>Bare surface</b>	3	8	5

Visually the changes can be traced from the satellite images below (*Figure 11*) where the figures were generated from. The images 'A' and 'B' are the actual satellite images displayed as composite bands with band combination of 423-RGB as detailed in methodology chapter above. The image 'C' is the results obtained through the process of image classification and comparison as detailed in methodology chapter.





**Figure 11** Status and changes in forest cover between years 2000 and 2006



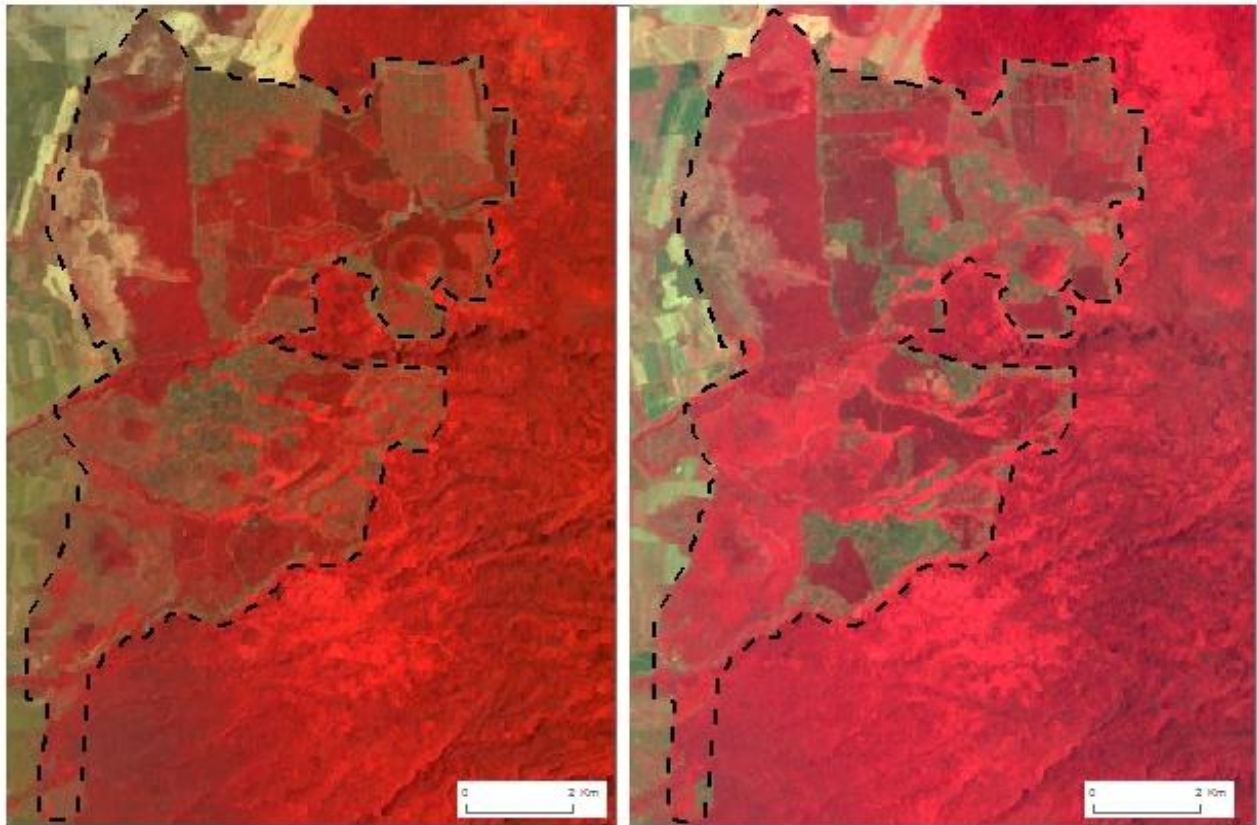
As can be seen from image 'C' the increase and decrease of forest seems to be almost equal from the visual display of the results. But in fact there was an increase of 2 square kilometers. A lot of red colors displaying decrease was not on the forest class but from the "shrubs and grass" class which lost to bare surface and to the forest as seen in table 5 above.

The analysis of forest change between the years 2006 and 2013 also shows a positive change in forest cover. The results show a substantial increase of forest cover under 'dense forest' and a high decrease of the other categories. The dense forest increased from 113 to 128 square kilometers—an increase of 15 square kilometer (13 percent). The 'decrease' in sparse forest from 16 to 8 square kilometer should not be considered as decrease of forest because some of it actually qualified towards 'dense forest' category as the satellite images bellow (*Figure 12*) shows. The period can be said to be a 'forest boom' period dominated by increase of dense forest and diminishing of all other classes.

**Table 6** Forest cover change (in sq km) between the years 2006 and 2013

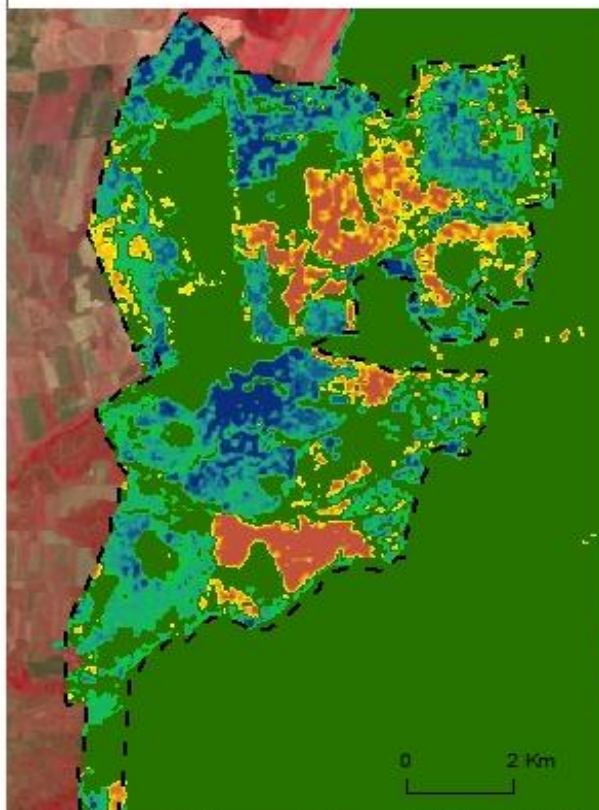
	<b>2006</b>	<b>2013</b>	<b>Change (sq km)</b>
Dense forest	113	128	15
Sparse forest	16	8	-8
Shrubs/grass	12	7	-5
Bare surface	8	7	-1

From the satellite images below, the increase of dense forest and diminishing of other categories can be observed. As explained above, the two images that begin are the actual satellite images displayed in composite bands combination. The image 'C' below the two images displays the results of assessment of forest for the period after eviction. The most discernible changes can be visualized at the center of the image. The image shows that in 2006 this area at the middle of the image was almost bare surface but by the year 2013 the area was already afforested. Including other areas to the period after eviction seem to be the period of forest increase at quite promising pace.



(A) Forest status in February 05, 2006

(B) Forest status in February 24, 2013



(C) Forest Change between 2006 and 2013

**Key for the two images above [(A) and (B)]:**

- Dense forest - dark red
- Sparse forest - light red
- Shrubs crops and grass - lighter red
- Bare surface - vary from dark to light browns

**All satellite images source:** LANDSAT 7; 30 meter resolution; WRS path 168; WRS row 062; acquired on February at 07hrs GMT or 10hrs local time.

**Credit:** United States Geological Survey (USGS) <http://glovis.usgs.gov/>

**Processed by the Author on** ESRI ArcGIS-ArcInfo Version 10.2 work environment to a composite band with band combination 432 which gives 'False Color'/Near Infrared useful for vegetation monitoring studies

**Forest cover status (C)**

- decrease
- no change
- increase

Plantation forest boundary



**Figure 12** Status and Changes in forest cover between years 2006 and 2013

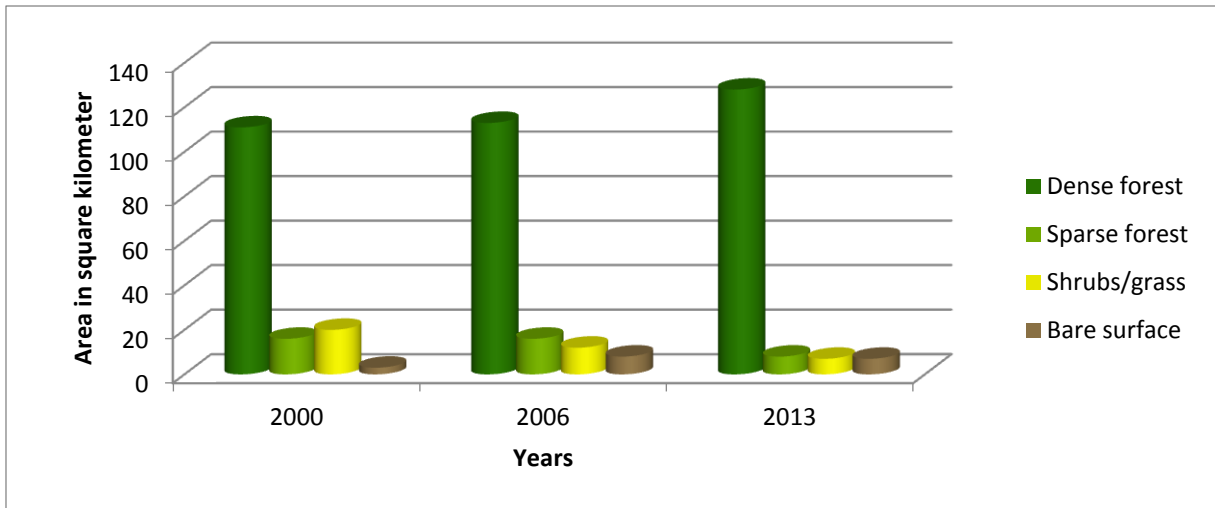


Figure 13 Forest cover status for the three years targeted by this research study

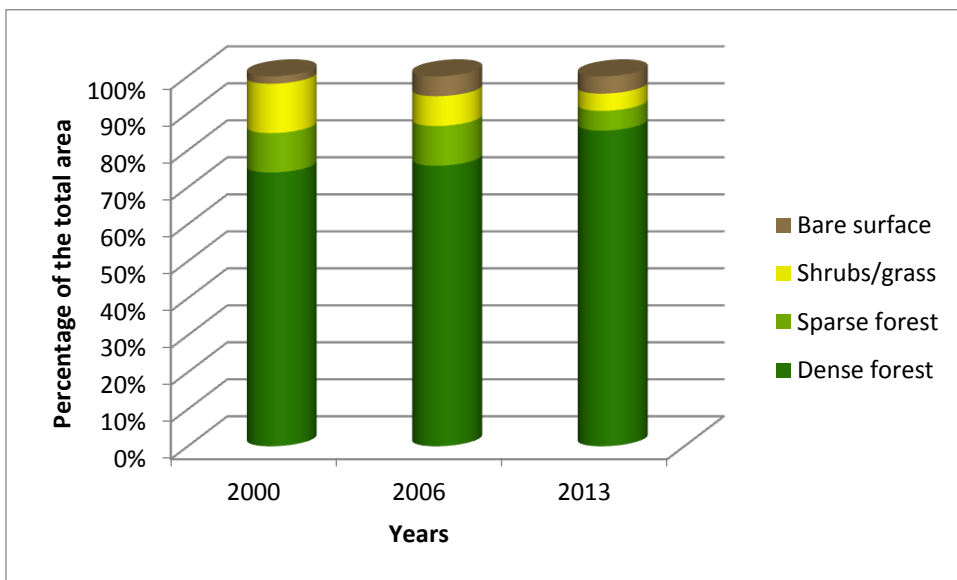


Figure 14. Proportion of forest and other land cover types.

Based on the context of analysis of this study the presence or absence of people in the forest of West Kilimanjaro had no influence over the *direction* of forest change since for both periods, the forest has been increasing. But it has influenced the extent of change as the computation of the mean annual rate of change shows below.

To calculate the rate of change to see how the pace of change was before and after eviction, I used the equation for the Mean Annual Rate of Forest Cover Change (MARFCC) from Wachiye (2013). The formula enables computation of the annual rate of change between two periods.

The equation;

$$MARFCC = \frac{\text{Forest Area at } t2 - \text{Forest Area at } t1}{\text{Forest Area at } t1 * (t2 - t1)} * 100$$

Where: t1 = the year in which the older image was captured  
t2 = the year in which the recent image was captured

**Table 7. Data: Period 1 (before eviction)**

	<b>2000</b>	2006
Dense forest	111	113
Sparse forest	16	16
<b>Total</b>	<b>127</b>	<b>129</b>

Computation of the mean annual rate of forest change;

$$\begin{aligned} MARFCC &= \frac{\text{Forest Area at 2006} - \text{Forest Area at 2000}}{\text{Forest Area at 2000} * (2006 - 2000)} * 100 \\ &= \frac{129 - 127}{127 * (2006 - 2000)} * 100 \\ &= \frac{2}{762} * 100 \end{aligned}$$

$$MARFCC = 0.3$$

Therefore the Mean Annual Rate of Forest Cover Change (MARFCC) between years 2000 and 2006 stood at 0.3.

**Table 8. Data: Period 2 (After eviction)**

	2006	2013
Dense forest	113	128
Sparse forest	16	8
<b>Total</b>	<b>129</b>	<b>136</b>

The rate of forest change;

$$MARFCC = \frac{\text{Forest Area at 2013} - \text{Forest Area at 2006}}{\text{Forest Area at 2006} * (2013 - 2006)} * 100$$

$$= \frac{136 - 129}{129 \times (2013 - 2006)} \times 100$$
$$= \frac{7}{903} \times 100$$

$$\text{MARFCC} = 0.8$$

Therefore the Mean Annual Rate of Forest Cover Change (MARFCC) between years 2006 and 2013 stood at 0.8. This implies that the rate of change after eviction was more than double after eviction. This means the forest increased faster than it did before eviction.

On the 19th of August 2014, accompanied by two forest rangers, I visited the eviction site for observation of the current status of the area. The observation shows that the area that was previously settlement for the evictees is now afforested with exotic species mainly *pinus patula* and *cupressuss lustanica*.



**Figure 15. Afforested eviction site (a).**

**Photo by** Author on 19.08.2014





**Figure 16. Afforested eviction site (b).**

**Photo by** Author on 19.08.2014



**Figure 17 Afforested site (c)**

**Photo by** Author on 19.08.2014

The areas that were once built up are now mostly covered by forest. This is among the reasons behind declining of "bare surface" class of land cover between years 2006 and 2013. The only negative impact that the forest rangers mentioned it to me was that since there is no longer people's settlement in the forest, there has been tree raiding by wild animals such as elephants which destroy the trees at their young age.



**Figure 18** A young tree of *pinus patula* destroyed by elephants

**Photo by Author:** 19.08.2014, at geographical coordinates; 37° 08' 03" E, -2° 57' 36" S, altitude 2234m AMSL.

### 5.3 CHAPTER SUMMARY

This chapter has presented results of analysis of forest cover for the two periods (before and after eviction). In general, assessment of forest cover shows that there was increasing of forest cover before as well as after eviction. The only difference between the two periods is the rate of change of forest increase. It shows that before eviction, the rate of change of forest was at 0.3 while after eviction the rate of change was 0.8. The negative impact that was observed in the forest was tree raiding by elephants.

The following chapter assesses the impacts of eviction to livelihood.





## **CHAPTER SIX**

### **6 IMPACT OF EVICTION ON LIVELIHOOD**

#### **6.1 INTRODUCTION**

This chapter presents analysis of livelihood of the households. It takes a comparative approach to compare the livelihood assets of the households who were evicted and the households who were not evicted and presents the results. The comparison is measured from the livelihood assets as presented in the sustainable livelihood framework in chapter 2 above.

The statistical measure, t-test, was applied to test if there is any significant difference between the livelihoods of the evicted households as compared to livelihood of the households who were not evicted. It also quantified the livelihood assets and presents the results on a livelihood pentagon for comparison. The qualitative analysis focuses on analyzing the transforming institutions structures and processes identified in the sustainable livelihood framework. The chapter continues by analyzing the existing institutions, structures and processes that enhance or limits livelihood strategies. The assessment of the process structures and transforming institutions focuses on land tenure since majority of the sample households depend mainly on land. The chapter closes by summarizing the major findings.

#### **6.2 CHARACTERISTICS OF RESPONDENTS**

The total number of households surveyed is 200 where questionnaires were administered to one of the key household member either father or mother. Out of the 200 questionnaires administered to the head of households, 112 (56 percent) were men and 88 (44 percent) were women. The earliest household to migrate into the area among the respondents migrated to the area in the year 1950 therefore has experience of over 64 years of living in the area thus having a long term experience of livelihood in the study area. The average size of surveyed households is 4.7 members slightly higher than the average size of household of 4.3 at district level (NBS, 2013 p.42). The largest household had 14 members and the minimum 1 member. The average age of respondents was 43 years.

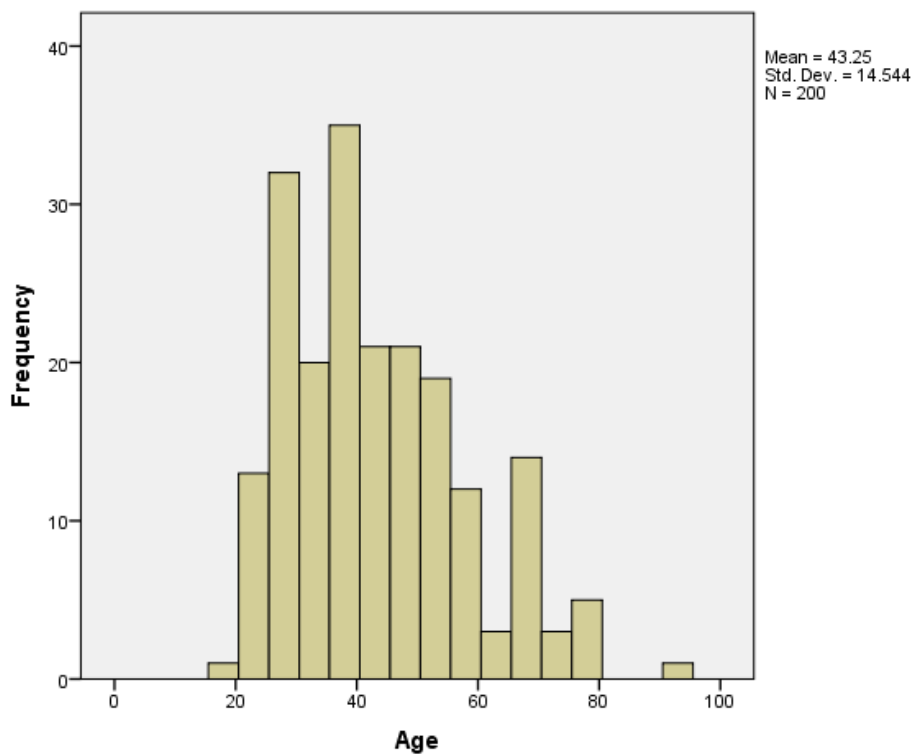


Figure 19 Age distribution of the surveyed households

### 6.3 RESULTS OF ASSESSMENT OF LIVELIHOOD

As stated in methodology chapter, assessment of the impact of eviction was done by comparison of livelihood assets of the two groups of households, the evicted and the households who were not evicted. To test whether there was any significant difference the t-test for independent samples was used. Under this statistical test the values reported are: mean (M) and standard deviation (SD) for each group and t value (t), degrees of freedom (in parentheses next to t), followed by significance level (p).

**Note:** only variables that are statistically significant are reported below for the statistically insignificant variables can be accessed from the main tables on *Appendices 2 to 6*.

#### **Natural capital:**

Analysis of natural capital involved assessment of land owned by the household as well as land rented and the associated distance to the farms. The variables that have significant differences are size of land owned and the distance from home to the rented land. I decided to put this variable of distance to the land since most of the evicted households who still cultivate in the forest plots, has to commute to their plots in the forest therefore distance factor implies costs for commuting which inevitably has implication to their income because

travelling to the farm requires paying of fare or buying fuel for those with motorcycles and for the very few with cars.

The t-test result shows that; for the owned land size (acre); the evicted households have an average of .38 land per capita (SD = .53) which is significant less than land owned by the households who were not evicted with the average of 1.53 land per capita (SD = 1.90). Conditions (t) 109 = 5.70 and p value < .05. This implies that the evicted households have significant less land than the households who were not evicted.

On the distance factor (km) to the major land (rented); the evicted households have to travel on average of 11.49 kilometres (SD = 5.62) to their farms while the households who were not evicted travel on average of 8.32 kilometres (SD = 5.95) to reach their farms. Conditions; t (140) =3.25, p < .05. These results suggest that the evicted households have to cover more distance to reach their farms that it is for the households who were not evicted. For detailed statistics see *Appendix 2*.

### **Physical capital:**

Measuring of main means of access to household's house (either road or footpath ranked at the scale of 1 - poorer to 5 - the best); the access to the evicted households scored the average of 1.52 (SD = .50) while the means of access to the households who were not evicted scored 1.76, (SD = .43). Conditions; t (193) = 3.63, p < 0.5. This means that the evicted households have significant poorer means of access to their houses than the households who were not evicted.

Ownership of private means of transport as a physical capital of the household was measured and ranked at the scale of 1 none, to 4 a car. Result shows that the evicted households scored higher value 2.08, (SD =1.00); while the households who were not evicted owns relatively poorer means of transport by scoring 1.72 out of four, (SD = .92). Conditions; t (197) = 2.64, p value < .05. These results suggest that the evicted households have a significant improved private means of transport than the households who were not evicted.

The possible explanation behind this kind of inverse proportion as compared to the general trend, that the households who were not evicted are in a relatively better position than their counterparts, is that the evicted households have to cover more distances when commuting to their farms than for the not-evicted households. This condition might have motivate the evicted households to have a relatively improved means of transport such as motorcycle and

few cars than not having a private means of transport or just having a bicycle as for the case of the households who were not evicted. For detailed statistics see *Appendix 3*.

**Human capital** variables were not statistically significant between the two samples which imply there is no significant difference in human capital between the evicted households and the households who were not evicted. Therefore the variables under this type of capital are not reported here but can be seen at *Appendix 4*.

**Social capital** assessment aimed at measuring the household's social resources of relationships of trust, reciprocity and exchange with families, friends and neighbours as well as more formalized groupings from which the household can rely upon in case of a shock or sudden disturbance in their livelihood. One of the variables under social capital asked that;

*"if you have an urgent issue that needs money (e.g. cash) to solve it and you don't have that amount at the moment, the first person you would consult lives in..." (See Appendix 1 variable 20).*

The responses were ranked from 1— I don't have any person to consult here, to 5— the person lives in this village. Results shows that the evicted households scored 4.69 out of 5, (SD = .81) while the households who were not evicted scored 4.89 out of 5, (SD = .57). Conditions;  $t(198) = 2.02$ ,  $p \text{ value} < .05$ . These results suggest that the evicted households have a significant less possibility to find a person to rely on in case of emergence within the proximity of their village than the households who were not evicted.

The other variable was about involvement in social organization. This variable aimed at measuring the extent to which the respondents have anchored themselves to various social groupings in the village they live currently. The question asked whether the respondent is or is not a member of any organization within the village they live (*See variable 22 in Appendix 1*). The answers were put on a scale of 1- NO, and 2 - YES.

The results show that evicted households scored 1.66 of 2, (SD = .48) which is significant higher than the scores of the households who were not evicted who scored 1.80 out of 2, (SD = .40). Conditions;  $t(193) = 2.25$ ,  $p \text{ value} < .05$ . These results suggest that the evicted households are significantly less engaged in social organization than it is for the households who were not evicted. For detailed statistics about t-test on Social Capital see *Appendix 5*.

### Financial Capital:

Financial capital was tested from the question that asked;

*"What best describe your household income for the past six years?"*

Responses were on three options; 1 declining income, 2 no change and 3 increasing income (See question number 50 in Appendix 1). A t-test result shows that the income of the evicted households scored 1.68, out of 3, (SD = .76) which is significantly less than the income of their counterpart—households who were not evicted—who scored 2.1 out of 3, (SD = .82). Conditions;  $t(193) = 3.47$ ,  $p$  value  $< .05$ . For detailed statistics on t-test on financial capital see Appendix 6. These results indicate that, the income of the evicted households have decreased significantly for the past six years as compared to the households who were not evicted.

After exploring differences in assets of the evicted and not-evicted households, I wanted to map these assets to get a visual impression of how they differ. I therefore plot the livelihood asset pentagon as illustrated in the sustainable livelihood framework in theoretical chapter. The Asset Pentagon visually represents 5 livelihood assets that constitute a livelihood portfolio. The asset pentagon is therefore used here to plot assets of households on a scale range from 0.1 the lowest to 5 the highest.

The values used to plot the pentagon were computed and standardized from a set of variables from questionnaires (See Appendix 1).

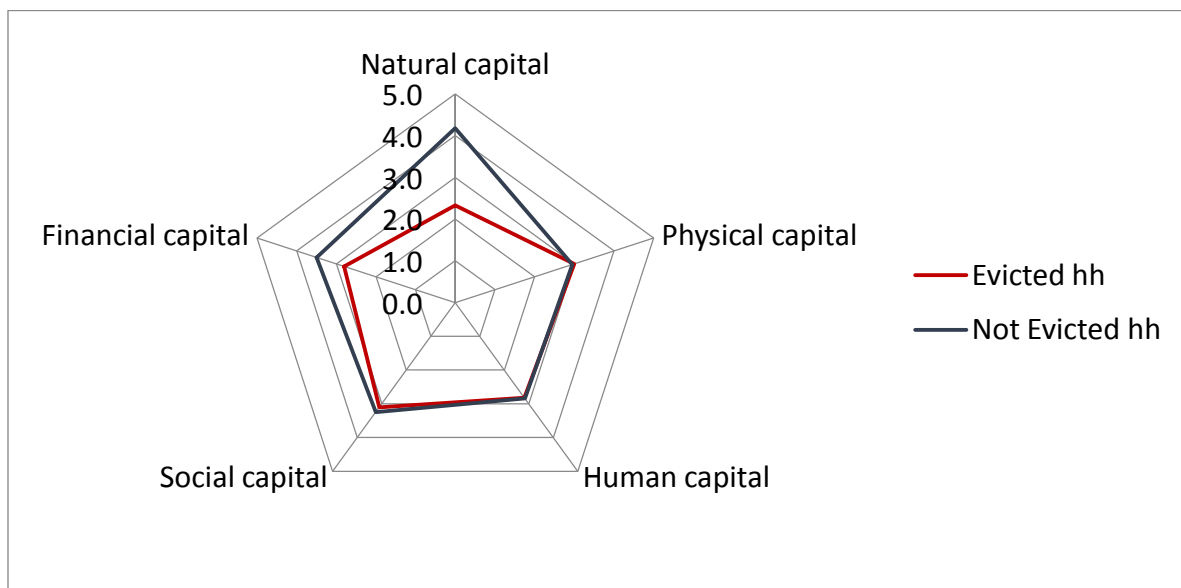


Figure 20. Livelihood asset pentagon

A detailed table on how the values were computed is provided in *Appendices 7, 8, 9, 10 and 11*.

The most notable difference between assets of the households is on natural capital computed from both owned and rented land size of the households. Land is crucial factor influencing livelihood of the people who lives in rural areas because that rural poverty is strongly associated with lack of land (Ellis & Mdoe, 2003). In Tanzania it is estimated that about 80 percent of the total labor force is in is employed in agriculture (ILO, 2012). The result of this study actually found that 96 percent of the 200 households studied claimed that the major economic activity they depend on is agriculture therefore access to land is a critical asset to their livelihood.

**Table 9. Household's major economic activity**

<b>Main economic activity</b>	<b>Frequency</b>	<b>Percent (%)</b>
Agriculture	192	96.0
Trade	5	2.5
Service	3	1.5
<b>Total</b>	<b>200</b>	<b>100.0</b>

*Data Source: Field study*

The possible reason behind the lack of land by the evicted households is that during eviction there was not land set aside for relocating the evictees and as it will be discussed later in chapter 7, though people are allowed to cultivate in the forest after eviction, acquiring a plot in the forest is now very difficult for the common farmer to afford.

The following section explores this part in details to see the extent to which transforming institutions, social structures and processes may have influence livelihoods of the evicted households.

**6.3.1 TRANSFORMING INSTITUTIONS, SOCIAL STRUCTURES AND PROCESSES**

Transforming institutions, social structures and processes include policies, tenure regimes, labour sharing systems, to market networks or credit arrangements which mediate access to livelihood resources and in turn affect livelihood outcome (May et al., 2009; Scoones, 1998 p.12).

In this study, the analysis of the existing institutions, social structures and processes that enhance or hinder livelihood of the evicted households, focus mainly on land tenure system. Other social structures and institutions such as labour sharing systems, market networks are also discussed but in brief. I chose land tenure system to be the main aspect that I focus on my analysis because eviction, to the evictees, was all about being denied to settle on the land that they had established their settlements for the past 50 years ago. In addition, results from this study also shows that 96 percent (n=200) of the surveyed respondents reported that, still their main economic activity is agriculture even after seven years of eviction. Therefore land is a prime factor of their livelihood portfolio. The following section presents the analysis of the land tenure system of Tanzania in relation to livelihood of the evicted.

On the 7th of February 2007, just three months before eviction took place, the Arumeru East Constituency Representative to the National Assembly Hon. Elisa D. Mollel asked a question in one of the session of the National Assembly of Tanzania Parliament, about the possibility to allot the farms that are nearby the forest of West Kilimanjaro to the expected evictees (eviction followed 3 months later) who were still living inside the forest by then.

The representative asked [a modest translation from Kiswahili]: -

*"Mr. Deputy Speaker ...because, there are State Farms that were under NAFCO, in West Kilimanjaro which have not been developed for long time now; and for there are many people around these estates who have shortage of land. Doesn't the government see that it is a wise decision to allot these farms to them under existing procedures?" (URT, 2007 p.7)*

The referred farms are a conglomerate of farms that were under private ownership during colonial time that were declared public lands by the Government after independence and handled over to the public corporation—NAFCO in 1969—to run them on behalf of the 'public'. However NAFCO existed only for two decades before it collapsed in 1996 but some of the farms that were under the corporation are not officially re-allocated to people or privatized (Chambi Chachage & Mbunda, 2009). In his reply, the Deputy Minister of Agriculture, Food and Cooperation Christopher Chiza replied rejected the proposal and instead, advised the people with land shortage to look for land 'elsewhere' in the country as the following quotation shows;

*"Mr. Deputy Speaker , ... about the proposal to distribute those estates to wananchi [people] it has been revealed that the exercise is not possible given that the number of people living in the forest of Kilimanjaro is estimated to be more than 12,000 therefore they cannot be covered with the available 5,935 acres, to enable their economic independence. Since there is an acute shortage of land in the area, redistributing the land into 'small-small pieces' (kidogo-kidogo) will not be a solution but it is wise for the people who do not have land in those areas to seek land in other parts of the country" (URT, 2007 p.8)*

The discussion above gives out the conditions that would face the evictees after eviction. The livelihood as described in the sustainable framework is enhanced by a combinations of assets, transforming processes and social structures and institutions that in their totality enhances a livelihood portfolio. Evicting people from areas they have been living for half a century without any compensation or setting areas for relocation by simply stating that they should 'seek land in other parts of the country' already cast a shed on the fate evictee's livelihood as I the following section discusses it in detail.

To seek land in 'other parts of the country' is highly dependent on existing land tenure system which guides how land ownership matters are handled. If it is structured in a way that is easy to acquire land by any one in need of it, then the statement by the deputy minister above would make sense to the evictees. But unfortunately in reality the situation of land tenure system of Tanzania is daunting as elaborated in details bellow.

As explained in details in chapter 3, the land tenure system of Tanzania is rooted from the Imperial Decree of the 26th November 1895 of the colonial regime of German which led to exclusion of the indigenous people outside the fertile land. The colonial land tenure is fundamental in the history of land tenure system in Tanzania because even after independence the system was inherited by the independent government virtually unmodified (Sundet, 2004 p.12; URT, 1994 p.9).

The inherited land tenure system was carried over by the independent government without any major changes until the end of the 1980s, when the need of consolidating the antiquated land legislation started to be acutely felt at Government level. Of particular concern was the growing incidence of land conflicts and disputes over allocation of land. In 1990, the land tenure problems grasped the full attention of the then minister of lands Mr. Komanya who was determined to bring it to the attention of the president. Mr. Komanya therefore recommended to the President that the presidential commission be set to investigate the land matters in the country (Sundet, 2004 p.84).



It shows that the minister was aware that the system was highly power laden therefore proposed the commission to have a presidential command.

*"The Minister was aware that there already was a committee within the Ministry drafting proposals for a new land policy, but he considered that "such a small committee" within the Ministry was not suited to undertake the country-wide investigation of land conflicts that he had in mind. Komanya... was mostly concerned with the political fall-out from escalating land conflicts and complaints of widespread land grabbing while the Ministerial Committee primarily dealt with development issues and the modernisation of an antiquated land tenure structure" (Sundet, 2004 p.84).*

The proposal of the minister attracted the President's attention whereby the then President Mwinyi consented to the Minister's request, and the Presidential Commission of Inquiry into Land Matters was established on 3rd of January, 1991. The Commissioners were given their commission on the 14th of January 1991 together with terms of reference. The Commission took about 22 months to accomplish the task. The comprehensive report was then submitted to the President of the United Republic of Tanzania on 11th of November 1992. In the preface of the report, the chairperson, Professor Issa Shivji, stated that

*"[the] report is the result of two years of hard labor by the Commissioners. More important, it is an authentic record of the grievances, complaints hopes, and fears of the sons and daughters of the soil. Never before has such a record been produced in the country" (URT, 1994 p. xii)*

The findings of the Commission are many to summarize here however in relation to this study, the Commission discovered a system of land allocation to be heavily bureaucratic in its structure with little direct participation of land users which hinders transparency (Sundet, 2004 p.84; URT, 1994 p.26). It revealed that there were allegations of pressures on land allocating organs from officers and leaders in executive or political authority. The evidences, according to the Commission, laid no doubt that the officers responsible for land allocation had made their decision of allocating land based on such pressure and not from merit basis.

*"In a couple of cases, the Commission was shown written notes from national level leaders instructing the officer concerned to allocate land to a named person or institution in breach of laid down procedures or known policy" (URT, 1994 p.27)*

The report pointed out many problems and malpractices that engulfed the land tenure system in Tanzania therefore came up with critical recommendations on what should be done.

In response to the Commission report, the government formulated the national land policy in 1995 with the Second Edition in 1997. However, critics point out that the National Land Policy of Tanzania rejected some of the fundamental recommendations by the Land Commission which was commissioned by the President to inquire the land matters in Tanzania (McAuslan, 2013 p.97; Rwegasira, 2012 p.90; Sundet, 2004 p.1-2).

In 1999, the government formulated the Land Act of 1999. However, these legislations have been criticized to have no significant reform of the land tenure system. The content of the Village Land Act of 1999-2000 for instance was criticized to be almost impossible to implement (Sundet, 2004 p.134).

This critic seems to hold water because, despite all the legislations and policies guiding land tenure in Tanzania, still the system is overwhelmed by anomalies manifested by the endless conflicts between the large scale farmers versus small scale peasants, and between farmers and pastoralists. All these make the context of acquiring arable land, by the poor household like the evictees, to be very difficult if not impossible as Rwegasira (2012) puts it this way;

*"The process of application and grant [of land] by the state... involves procedures and costs unfriendly to the common man. Again purchasing land in the highly competitive market is only open to the well-to-do leaving the majority poor as on-lookers. For the two main reasons above the majority of people appear to have no option rather than to keep their hand folded, waiting to inherit the land after the death of their beloved family members. However, inheritance is not an easy venture. Scarcity of the family or clan lands due to population growth, and the tenure of extended families may be marked as factors that have created a rough road to inheritance" (Rwegasira, 2012 p.117).*

In August 2014 when I was conducting interviews, one of the evictees, Mr. Malimusi, an old man of 80 years old, explained that since eviction until when I met him, he had not managed to acquire any piece of land for resettlement. He now lives in a house of his friend. He said, after eviction, he had no any piece of land anywhere else he could build a house and settle. His friend gave him a shelter in his house. He said that he has been trying to look for land for settlement without success. Even his efforts to get a plot in the forest for cultivation [since this right was not revoked by eviction] had not brought any success. Up to August 2014 when I met him he was still living in the house of a friend by 'grace' therefore his future prospect is unknown. He spoke to me in a statement that showed desperation and loss of hope;

*"The problem that faced me after eviction is that I don't have any land to settle. I also tried to apply for the plot [in the forest] after eviction for cultivation but they didn't give me any. So if I die today ...do you think I will be buried here? [Because the land doesn't belong to him] ...may be in the town council's cemetery [not considered positively as appropriate places to bury the dead according to some Tanzania tribes]. But if I had my plot I would be buried there" (Interview #7, August 2014).*

This man is not covered by any formal social security system. He has no wife or children who he could depend on, as it is for most Tanzanians, therefore he could not dare opt to look for settlement in distant places because travelling to distant places involves costs that he could not meet at the time of eviction.

The most recent incident which portrays the ongoing land tenure problems in the country is the revocation of right of occupancy of the Galapo Ufyomi Estate with the area of 1,220 acres at Babati in Manyara Region by the President of Tanzania, Jakaya Kikwete (Mwananchi Newspaper, 2015). The decision came out after a series of conflicts between local people and the private investor. The conflict reached the extent of wananchi [*people*] desperately taking action to destroy properties of the investor of the estate. The people condemned that the investor denies them their right of occupancy of the land. Under circumstances like this, it is very unlikely for the individual evictee to secure a suitable land for supporting their livelihood in due time to continue with their daily economic activities to enhance a living.

The other options that the evictees would opt include the off-farm activities such as small business and various entrepreneurships which require capital to start with. The direct source for capital that would be open for the evictees would be bank loans. However, the conditions for personal loans in most banks in Tanzania require either the guarantee of a possession of a real estate property by the borrower, or proof of a permanent employment or on renewable contract basis by reputable / stable organizations (Business Times, 2011; CRDB, 2009; NBC, 2015; NMB, 2015).

These conditions, locks out most of the evictees out of the game because first of all, their settlements had no title deed since they were considered as squatter settlement inside the state forest area, after raw their houses were already destroyed during eviction. The second condition which requires a borrower to have proof of employment on the basis of permanent or on renewable contract by 'reputable / stable organizations' also prevents the evictees, from

access to the service since they were not employed in any formal sector from which they could secure bank loans guarantee.

Further option that is currently recognized as a livelihood diversification strategy is migration (De Haas, 2010; King, 2012; Rigg, 2006; Thao, 2013) but according to result of this study migration seems to be not a preferred option for most of the evictees. The field data shows that only 15 of the evicted households surveyed (n=100) reported to have at least one of their member who migrated to other places for economic activity reasons. This means that migration as a livelihood strategy to diversify livelihood options is not the preferred option for the majority of the evictees. The discussion above gave mental picture of the context that faced the evictees after eviction.

#### 6.4 CHAPTER SUMMARY

This chapter has presented the results of assessment of impacts that faced the evictees after eviction. It has shown that some of the livelihood assets of the evicted households are significantly less than the assets of the households who were not evicted. Analysis of the transforming institutions structures and processes that the evictees had to navigate their livelihoods after eviction seems to be a 'stumbling' instead of stepping stone.

The following chapter, presents assessment of how costs and benefits of eviction has been distributed among state actors and the people evicted.

## CHAPTER SEVEN

### 7 DISTRIBUTION OF COSTS AND BENEFITS OF EVICTION AMONG ACTORS

#### 7.1 INTRODUCTION

This chapter seeks to assess on how the costs and benefits of eviction were distributed among actors involved. A discussion is presented with empirical evidences about the costs and benefits from the actors' point of view.

#### 7.2 DISTRIBUTION OF COSTS AND BENEFITS AMONG ACTORS

The main actors for the case of eviction are the local people who were evicted and the state actors responsible for forest management.

From the angle of the evictees or place-based actors, the most prominent impacts that faced their livelihood is mainly lack of land for settlement because there were no areas set for relocation plan.

Also, after evictions, the cost of maintaining labor has been completely shifted to the evictees. Before eviction, people who worked in the forest, stayed in the forest therefore most of their basic needs such as housing, firewood, water were all obtained from the premises of the '*land lord*' (the forest management). But after eviction, people have to maintain their labor at their own costs outside the forest zone and bring it only when needed by the forest managers.

It is also revealed that, for the evictees who have plots in the forest, have to commute up to 18 kilometers to tend their farms in the forest. This is an additional cost that the evictees have to finance on themselves while before eviction there was almost no costs for commuting since the people lived within the forest where the plots are.

The other cost born by evictees, is that the process of allocation of forest plots is now marred by malpractices that make it difficult if not impossible for the poor farmer to get a plot. Testimonies from the interviewed people both evicted and not-evicted admit that in the past plots were distributed free of charge. But now the situation is the opposite direction. They said now plots are '*sold*' at a price only affordable to the well-off people. It is further explained that, this selling of plots is "*unknown*" in official procedures. Mr. Rubambiza, a respondent from Matadi village said, in order to be allocated a plot, one has to '*do something*'.

By '*do something*' he meant that the forest plot seekers have to pay some amount of money to the responsible forest officers earlier before the plots are allocated for them to be considered.

This is something that did not exist in the past and is quite contrary to the taungya system that was meant to enhance growing of forest plantations at a very low cost by distributing forest plots to the people free of charge for them to clear and plant crops mostly short term crops. But the situation in the forest of West Kilimanjaro is quite different from taungya system. Mr. Rubambiza explains this;

*"In order to get a plot you have to give money. However, the money is 'unknown'. Means that the money is not recognized nationally. It is the money that the one who allocate you the plot puts it in their pockets and the one who takes the money does not take it directly because he/she knows that you may have come with the 'enemy' so that when you give the money the 'enemy' tells him hebu tuone hizo (kicheko) [let's see what you got (chuckle)]. So what they do instead, they tell you that; if you want a plot you give money to someone else [who you will be directed to] that third person will bring it to the responsible officer for plot allocation and he/she will show to the 'third' person the plot for you. ...but I do remember those days way back in 1970s, I just went and talk to the forestry officer he gave me a letter that I took to Londorosi [to the forest plantation office] then I got the plot" (Interview #2, 16.07.2014).*

The other interviewee also lamented about the corrupt practices engulfing the process of plot allocation in the forest. Because of its original echo, I find it useful to put it as it was stated by the interviewee in Kiswahili and provide a modest translation to it after.

*"...sasa hivi kazi iko hapo. ... funga mkanda mzee!,... kabisa mzee, hupewi shamba! ...hivi sasa, we baba!, jina tu, sauti inatoka...hewa. Mashamba yote ni ya watu wenye vifua vikubwa navyoona. Watu wenye mapesa".*

A modest translation to English;

*"..now! the task is there, ...tight your belt man. Indeed man! absolutely you don't get a plot! nowadays? man!, it's just the name, voice comes out empty!. All the farms are for the people with big chests as I see. ...people with big money" (Interview #1, 16.07.2014).*

The forest officials on their side denied the allegations by insisting that the plots are not sold but distributed free of charge to the people. But these allegations are also supported by the study conducted earlier by Mariki (2014) in the same area from 2009 to 2012 as explained by the original text in the box bellow.

**Box 1 Aspects of favoritism in the process of plot allocation in WKFP. From Mariki (2014 p.7)**

The interview responses revealed some aspects of favoritism in the process of plot allocation. First, the village leadership registered the names of villagers according to the set criteria, however the plots were allocated to other persons. Even though plantation management sometimes cross checked the process the problem remained in some villages, as one widow lamented:

I have been to plantation headquarters and in our village government office for more than 4 times applying for a plot. I was given a promise but during the plot allocation exercise, my name was not in the list . . . I am tired; I have lost hope. (Interview no. 42, 2012)

Second, some villagers reported that the management in the forest plantation favors relatives, friends, or influential people in the community during the allocation of plots; and some staffs engage in corruption by allocating plots to themselves where they later sell the user rights, rent out, or give to relatives or friends. The forest officials on their side denied the allegations and instead that the plots are not sold but distributed free of charge to the people.

For the state actors, the negative impact of eviction is that there are incidences of tree raiding by wild animals such as elephants. The explanation given by the forest rangers is that before eviction those incidences were rare since the wild animals are scared of people. So after eviction, the animals can roam around the forest plantation and destroy some trees particularly the younger ones.

The positive impacts of eviction to state actors include;

The cost for maintaining labor is completely shifted to the evictees. Before evictions people lived within the forest plantations therefore the cost of maintaining labor was shared with the forest management. But after eviction the people stays outside the forest boundaries and only enters into the forest for providing labor during day time and be off the forest in the evening therefore the entire cost of maintaining labor to work in the forest is transferred to the evictees.

Also, the increase of forest cover as shown in chapter 5, mainly accrue to state actors because; first, the bureaucrats employed in the forest sector may count this as credit for possibility of promotion to higher positions in the hierarchy within their respective organizations. Promotion to higher rank implies increased status and associated fringe benefits.

For the Ministry of Natural Resources and Tourism (MNRT) and its associated agencies, the increase of forest cover may have a promise for increased finance in the near future because of increased timber concessions. The forest planted in the area is mostly of exotic species of *Cupressus lusitanica* and *Pinus patula* (West Kilimanjaro Forest Plantation Management Plan 2012—2014) which produces poles after 10 years of planting and general purpose timber after 20 to 25 years (Louppe, 2008p.178). Once the trees reach the harvest time the state actors earn revenues via issuing harvesting licenses (URT, 1998a p.5).

Moreover, the state actors may use the increase of forest cover as an important achievement of their efforts to conserve 'nature' therefore reinforces their power and influence over managing of forest and nature in general. This might be used as a credit for their reputation for conserving forest thus reinforces their power over control of forest resources.

The costs and benefits outlined above fall to specific actors. Other benefits such as improved climatic condition and ecosystem service are accrued to both state and local actors.

By this analysis it is apparent that the impacts eviction led to costs and benefits that were unequally distributed among the actors. The negative impacts have in most part faced the evictees while positive impacts have been accrued in most part to the state actors.

### 7.3 CHAPTER SUMMARY

This chapter has assessed the way costs and fruits of eviction have been distributed among actors. It showed that most of the positive impacts are accrued by the state actors while most of the costs are born by the weaker actors.



## CHAPTER EIGHT

### 8 DISCUSSION AND CONCLUSION

This thesis aimed to evaluate the impacts of eviction to livelihood and how eviction has affected the forest of West Kilimanjaro, and to assess how the impacts were distributed among the actors involved, so as to know if the current forest management strategies aim at sustainable development as stated by the Forest Policy of 1998 and the Forest Act of 2002 of Tanzania.

In this discussion, I start by briefing how theoretical and historical framework presented in chapter two has provided guidance to my work then I move on explaining about the usefulness of the sustainable livelihood framework in analysing livelihood of households and then embark on discussion to evaluate if the current forest management conform to the objective goal of sustainable development.

Political ecology became useful in this study because of its three linked common assumptions which states that; costs and benefits of any environmental change are for the most part distributed among actors unequally which reduces or reinforces existing socio-economic inequality that holds political implication in terms of altered power of actors in relation to other actors (Bryant & Bailey, 1997 28-29). Since my study involved the incidence of eviction, these assumptions created curiosity to explore the aftermath of eviction to see how the actors involved were affected by the impacts of eviction.

In this case, political ecology showed a promise for guiding my way towards assessing the aftermath of eviction and to evaluate how the impacts of eviction were distributed among actors. But the only challenge that remained in my mind was on how to understand existing power relations within human-environment among actors in Tanzania perspective.

But through the way of framing actors as explained by Bryant and Bailey (1997 p.4), I grasped a starting point towards mapping the politicized environment of human-environment interaction. Bryant and Bailey categorized the actors into two major types; place-based actors, and non-place based actors. This way of framing of actors together with the approach of the same authors, that power manifests as an ability of an actor to control their own interaction with the environment and the interaction of others with their environment (Bryant & Bailey, 1997 p.39), proved to be very handful conceptual framework on how to trace power relation among actors within-human environment interaction in forest and livelihood in Tanzania.

Taking in mind this categorization of actors, and the concept of power as an ability of an actor to control their own environment and to control how others interact with their environment, I applied the concept to the historical perspective as suggested by Adams and Hutton (2007 p.152) and managed to trace power relations between state and local actors in Tanzania as detailed in section 2.2 in the theoretical chapter. In my analysis I discovered that state actors, in their efforts to control their own interaction with the environment as well as how local people interact with their environment, they led to marginalization of local and weaker actors by pushing them into marginal lands. As a result the local actors in their effort to utilize the resource left at their vicinity to make a living, led to environmental stress and resulted to environmental problems.

This understanding, of how power operates within the human-environment sphere and its consequences, laid a foundation from where I stood and understand the pattern of power relations between state actors and the evictees thus enabled me to first understand the root causes for forest degradation, as well as why the state actors took such decisions of eviction, and to understand how costs and benefits were distributed as the outcome of existing unequal power relations between state actors responsible for forest management and the people evicted. This conceptual framework enabled me to conduct assessment of impacts of eviction and to interpret the result without any difficulties. Therefore political ecology has been very useful in understanding the concept of power relation within human-environment. It actually opened the horizon that I could see how power manoeuvres to influence particular environmental outcomes.

As a way of understanding the basics of livelihoods I used the Sustainable Livelihood Framework (SLF). This also proved very useful in understanding how a livelihood is enhanced or hindered. The main components of livelihood presented in the framework enhanced me to identify the main livelihood assets that I could use as variables to measure and compare the livelihoods of the evicted households to the livelihood of households who were not evicted. It is from here that I picked the five household resources; natural, physical, human, social and financial capital and use them to quantify and test to see if there are any significant differences. Through the SLF, I also got a concept of how these livelihood assets through a particular livelihood strategy interact within a particular context of transforming policies, processes, structures and institutions, to achieve a particular livelihood outcome. From this concept, blended with the concept of political ecology that power manifests as ability of the actor to control interaction with environment, I managed to make a thorough

analysis of the situation that faced the evictee after eviction by tracing the land tenure and credit systems of Tanzania where I found that the weaker actor evicted from forest, faced very unfriendly circumstances to the extent that some have not yet managed to secure a place to settle to date but been sheltered by friends (refers to section 6.3.1 above). Therefore the two theoretical frameworks of political ecology and sustainable livelihood framework have enriched my way of understanding of the nexus within human-environment interaction.

In the following section, I present the main findings in relation to research questions that were stated in the introduction chapter.

When I introduced objectives of this study, I outlined several questions as a guide towards achieving the objective. The following questions were presented;

### **I. Why did the people settle in the forest in the first place?**

The analysis has revealed that the settlements in the forest were deliberately established by the British settlers to accommodate labourers who were recruited from distant places to work in the forest. These findings have proven that, the claim by state authorities that people were invaders of the national forest is flawed. The people who were *labelled* as 'invaders' were actually the ones who participated in planting the very forest that is considered to be threatened by them.

The possible reason for *labelling* the people as 'invaders' from political ecology point of view is that; this may be the manifestation of power struggle for resources. This implies that admitting that people were recruited to settle in the forest would mean that, eviction would have to be accompanied by relocation plan. When speaking of relocation it automatically refers to land, something that has been a central focus of power struggle between actors as detailed explained in the previous chapters. The historical assessment of power relations within human-environment interactions between state actors and local people has revealed this very clear. It is obvious that the option that touches the sensitive issue of power would not be a preference for those in power. The resolution was therefore to first *label* the forest dwellers as 'invaders', which makes the task of eviction a least cost option for those in power because the invaders deserve no compensation since they are just invaders.

This is where the utility of political ecology is manifested; to expose flaws in claims, favoured by state and other authorities and entities, showing them to be contingent outcomes of power.

It is where political ecology offers a "*hatchet*" to take apart flawed, dangerous, and politically problematic accounts to demonstrate the undesirable impacts of policies especially from the point of view of local people, marginal groups and vulnerable population (Robbins, 2012 p.99).

## **II. What changed that by 2007 that the settlement could no longer allowed in the forest?**

The reason for *intoleration* of settlement after been there for more than 50 years is that; the reasons that made establishment of settlement in the forest has completely changed to the other way round. As the narratives of establishment of settlement in the forest have shown, in 1950s there was scarcity of labour to work in the forest the problem that went throughout the all two periods of colonial occupation in Tanganyika (Neumann, 1997; Hans G. Schabel, 1990 p.131; Swai, 1979 p.119).

What has changed by 2007 that settlement could no longer be tolerated is that the demand and supply pattern of labour to work in the forest had completely changed. During establishment of settlement in 1950s the demand and supply pattern of labour to work in the forest was patterned as labour scarcity and land abundance, but up to the year 2007, the pattern had completely changed to land scarcity and labour abundance which implies that, at the moment acquiring labour to work in the forest is no longer a problem to the forest management.

The possible reason for eviction is that labour is no longer a problem for the forest managers, so why keeping the settlement in the forest? As it has been revealed in chapter 7, currently instead of forest managers to look for people to work in the forest plots, it is actually the people who have to struggle to *penetrate* the 'fort' of forest plot distribution.

## **III. To what extent have evictions affected people's livelihood?**

The impacts of eviction has manifest on livelihood assets. The evicted households, appears to be in a disadvantageous position in the four out of five livelihood assets that were put into comparison between the evicted households and the households who were not evicted. The attributes of the four livelihood assets, except human capital, showed to have differences that are statistically significant and the evicted households been at a disadvantageous position.

This is to say that, it is undeniable that eviction caused harm to livelihood of people.

#### **IV. To what extent have evictions of people affected forest cover?**

After eviction the rate of change of forest cover increased from 0.3 per annum in the period between the years 2000 to 2006, to the rate of 0.8 between the years 2006 and 2013. This implies that the eviction has had positive impacts to forest. The possible reason is that first of all the areas that were previously settled are now afforested as the settlement were completely demolished during eviction. The other reason may be that consumption of forest resources such as building poles, firewood might have been offset to other places since the people are now settling outside the forest and only allowed to enter for working in the forest plots in day time and go back to their homes in the evening. Though tree raiding by wild animals was observed as explained in chapter five, it seems that it has only a minor impact on the overall status of forest cover. In general, eviction has led to positive impacts to forest.

#### **V. How were the costs and benefits distributed among actors involved?**

The distribution of costs and benefits between state actors responsible for management of forest, and the evictees seem to be unequally distributed. The state actors appear to be on the side of benefits than to the side of costs. The local actors in turn bear most of the costs. The costs of maintaining forest labour, shortage of land, malpractices in the system of forest plot allocation, distance factor from home to the forest plots which has increased up to 18 kilometres from the current settlement to the forest plots (*see map in figure 2*), decreased income, and social disarticulation (*see results of assessment of social capital in appendix 5*) all these has been born by the evictees.

For the state actors; increased forest cover means possibility for increased timber concessions in the near future, no costs for maintaining forest labour, possibility for promotion of the bureaucrats to higher positions due to achievement made for increased forest cover, and overall reinforcing of their power over the environments by controlling what J Scott (1990) terms the 'public transcript' as quoted from (Bryant & Bailey, 1997 p.42) as;

*"...the 'socially accepted' versions of events presented in public documents, legal, political ideologies, popular music and theatres and so on".*

By controlling the public transcript the ministry reinforces its power as a forest “good guy” whose actions should be the role model therefore more power for controlling interaction of how it interact with environment and controlling how other actors interact with their

environment. The end result is likely to be further marginalization of the weaker local actors when it comes to any matter pertaining interaction with environment.

#### **VI. Does the outcome conform to the ultimate goal of sustainable development?**

Sustainable development in its basic sense as per Brundtland Commission report on our common future (Brundtland, 1987) implies achieving the wellbeing of the present generation in terms of changed material, social economic and political conditions from one stage to another, the latter being better than the previous while not undermining the base from which that progress stems from so as to ensure that the needs of the future generation is not compromised by the process.

The current forest management of Tanzania rhetorically seems to aim at sustainable development, as per Forest Policy of 1998, and Forest Act of 2002, but the case is different when it comes to practice. Despite 'referencing' to sustainable development, the forest management practices are still biased to forest at the expense of livelihood. The reason for claiming to aim at sustainable development while in practice is vice versa may be explained from the concept presented by Bryant and Bailey (1997) who identified the source of contradiction to sustainable development as caused by the double role played by the state as the facilitator for accumulation of resources by the capitalist system which is linked to the current environmental problems and yet the same state is also the key actor in finding solutions to those problems. As a result instead of finding solutions, the state has typically contributed to exacerbate those problems.

This approach can be used to explain the case of eviction in West Kilimanjaro where the state's [colonial state] role in facilitating the capitalist mission of acquiring sources of raw materials led to alienating people from their land and squeezing them to confined areas such as the West Kilimanjaro forest plantations. The people then continued to live there depending on forest plots for their livelihood. As land alienations were not enough to the people alienated, the same people are again accused of threatening the very forest that they laboured to plant it. But logically the root cause for pressure exert by people in the forest is not population increase but the land tenure policy initiated by the colonial states of German and British that alienated people from their land and confined them in the forest as labourers. What if the people were not alienated from their land? Would the pressure that is now sought as threat to the forest be there? The answer would be that the pressure would either not be there or not at that magnitude.

Therefore instead of evicting people and causing negative impacts to their livelihoods, the state agency responsible for management of forest would have to allocate land to these victims of the colonial land tenure so that they could manage to cope with the changed system for managing forest. But the state actors did not opt to this option which would be the logical solution to the problem of decreasing forest. But instead, the option of eviction was sought, which of course led to increase of forest but at the expense of livelihood.

As a result after eviction, forest plots are now “sold” at a high price and the money is “unknown” (referring to Interview #2, 16.07.2014). This case of eviction might be linked to the issue of green grabbing (Benjaminsen & Bryceson, 2012) where some powerful state actors and business claim to ‘conserve’ environment but with their hidden agenda of struggle for controlling land. After eviction, controlling of allocation of plots becomes easier since the people who are present in the forest are only those who managed to acquire plots, or who enters to the forest for casual labor. This reduces pressure on of public scrutiny on how plots are distributed therefore create more room for appropriation of the forest plots by some unethical forest officers and their counterpart local government officials responsible for land allocation as this study and study by Mariki (2014 p.7) has found.

Conservation cannot claim to aim at sustainable development if their strategies lead to impoverishment of poor and marginal people. In order to claim sustainability conservation should consider livelihood mostly of the poor and marginal people who depends largely in forest and forestland in meeting their aspirations (Redclift, 1987 p.35). If there is a will to achieve sustainable development, conservation and human welfare should not be contradictive but mutual supportive. As Agrawaal and Redford (2009) puts it this way

*"if conservation strategies distress human populations, especially those who are less powerful, politically marginalized, and poor, little that conservationists argue on behalf of biodiversity makes sense"*

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## Appendix 1: Questionnaire

### HOUSEHOLD SURVEY ON LIVELIHOOD ASSETS, COPPING STRATEGIES AND OUTCOME & PEOPLE'S ATTITUDE TOWARDS FOREST MANAGEMENT IN WEST KILIMANJARO

A. DEMOGRAPHIC DATA					
1	Gender (head of household)		2. Year of birth		Civil Status
	[1] Female		19 _ _		[1] Single
	[2] Male				[2] Married
					[3] Separated
				[4] Widow/widower	
4	Number of household members				
5	Adults (18 and above)				
6	Children (under 18)				
7	Is there any member(s) of this household who moved to live somewhere else than this Sub-location (KATA) for work and has stayed there for three months or more?				[1] NO
					[2] YES
8	If yes in 7, above, how many are they?				
9	If yes in 7, above, where did they migrated to?				
B. GEOGRAPHICAL DATA					
10	Kitongoji (sub-village)				
11	Kijiji (Village)				
12	Kata (Ward)				
13	Balozi (the lowest local gvt leader)				
C. MOTIVATION FOR SETTLING IN THIS VILLAGE					
14	Were you evicted from the forest in 2007?	1: NO [ ]	2: YES [ ]		
15	When did you move into this village? (year)				
16	What motivated you to settle in this village?				
D. SOCIAL CAPITAL (NETWORKS BETWEEN INDIVIDUALS, RELATIONSHIPS, MEMBERS OF GROUPS ETC )					
17	How many of you your siblings live within this same village ?				
	[1] none	[2] only one	[3] two	[4] three	[5] five and above
<b>To what extent do you agree or disagree with the following statements:</b>					
18	Most people in this village/neighborhood are honesty and can be trusted				
	[1] Strongly disagree	[2] Disagree	[3] Neither disagree nor agree	[4] Agree	[5] Strongly agree
19	I feel accepted member of this village/neighborhood.				
	[1] Strongly disagree	[2] Disagree	[3] neither disagree nor agree	[4] Agree	[5] Strongly agree
20	If I have an urgent issue that need money (cash) to solve it, the first person I would consult lives in...				
	[1] i don't have any person to consult	[2] another region	[3] another sub-location (KATA)	[4] another nearby village	[5] in this village

## Appendix 1: Questionnaire

21	If I drop my purse or wallet in the neighborhood and someone see it, would return it to me					
	[1] Strongly disagree	[2] Disagree	[3] Neither disagree nor agree	[4] Agree	[5] Strongly agree	
22	Are you a member of any social/political organisation in this village?					
	[1] no		[2] yes			
23	If yes in 22 above, to how many organization are you a member?					
		[1] ONE [ ]	[2] TWO [ ]	[3] THREE [ ]	[4] FOUR [ ] [5] FIVE [ ]	
24	If yes (in qn 22 above) what position do you hold in the most helpful organization(s) to you?					
	[1] Just a member	[2] member of organisation management	[3] Secretary	[4]CEO/Managing director	[5] Founder	
25	<i>To what extent are you satisfied living in this village?</i>					
	[1]Not satisfied at all	[2] Somehow satisfied	[3] neither satisfied nor dissatisfied	[4] somehow satisfied	[5] Very satisfied	
<b>E. HUMAN CAPITAL</b>						
26	<b>HH age structure</b>	0 - 5 years	6 - 14 years	15 - 17	18 - 60	61 and above
27	<b>Education</b>	[1] No formal education	[2] Primary education	[3] Secondary education	[4] College	[5] University
28	<b>Skills</b>	[1] Basic-traditional	[2] Basic-formal (primary)	[3] Intermediate (sec. tech)	[4] High (Tertiary College)	[5] Professional (University)
29	<b>Years of experience for the main occupation</b>	[1] Less than one year	[2] One to two years	[3] Three to five years	[4] Six to ten years	[5] More than ten yrs
30	<b>Health insurance</b>	[1] Not ensured	[2] Partly ensured	[3] Fully ensured		
31	<b>Ability to meet hh's health costs privately</b>	[1] Not at all	[2] Just pain killers	[3] consult. fee only	[4] Consult. fee and Medi	[5] Full costs
<b>F. PHYSICAL CAPITAL (ROADS AND TRANSPORT, BUILDINGS, COMMUNICATIONS ETC.)</b>						
32	<b>Type of house the household lives in</b>	[1] No house	[2] Mud/thatch wall and grass roof	[3] Mud/thatch wall and iron sheet roof	[4] Wooden walls and iron sheet roof	[5] Brick house with iron sheet roof
33	<b>House ownership</b>	[1] live free of charge	[2]Given in exchange for services	[3] Owned with a mortgage	[4] Owned and completely paid for	
34	<b>Where do you fetch water from?</b>	[1] river	[2] spring	[3] Public water kiosk	[4] Standing water tap within the hh's premise	[5] Plumbed house
35	<b>Average Distance to hh's water source</b>	[1] > 1 to 2 km	[2] > 500m - 1km	[3] > 250m-500m	[4] <= 250m	

## Appendix 1: Questionnaire

36	<b>Main means of access to the hh premise</b>	[1] footpath	[2] Bare soil surface road	[3] gravel road	[4] tarmac road	
37	<b>Average Distance to the bust station</b>	[1] >3 km	[2] 3km	[3] 1km	[4] 500m	[5] <=100m
38	<b>Mobile phone ownership</b>	[1] No cellphone	[2] basic cellphone	[3] basic cellphone with access to internet	[4] smart phone	
39	<b>Do you own a TV Set?</b>	[0] No	[5] Yes			
40	<b>Private means of transport</b>	[1] none	[2] Bicycle	[3] Motorbike	[4] Car	

<b>G. NATURAL CAPITAL</b>						
41	<b>Owned land size (acres)</b>					
42	<b>Rented land size (acres)</b>					
43	<b>Average distance to the major land (owned) in km</b>					
44	<b>Average distance to the major land (rented) in km</b>					
45	<b>Rivers/water for irrigation</b>	[1] none	[2] 1km and above	[3] within 500m	[4] within 100m	

<b>H. FINANCIAL CAPITAL (SAVINGS IN THE FORM OF CASH)</b>						
46	<b>What is your main source of income?</b>					
47	<b>Do you have any other sources of income?</b>		[1] No		[2] Yes	
48	<b>If yes in 47, mention other sources of income</b>					
	i)					
	ii)					
	iii)					
49	<b>Average annual income (mill TZS)</b>	[1] No income	[2] Up to half	[3] One	[4] Two to three	[5] Four and above
50	<b>What best describe your household's income for the past six years:-</b>					
	[1] my income is declining	[2] my income is neither declining nor increasing	[3] my income is increasing			

<b>H. LIVELIHOOD OUTCOME</b>						
51	<b>Number of active Labour in the household</b>					
52	<b>Occurrence of hospitalized hh member(s) for the past 12 months</b>	[1] Four +	[2] three	[3] two	[4] one	[5] None
53	<b>Which of these statements best describes the food availability situation in your hh for the last 12 months</b>					
	[1] often we don't have enough to eat [ ]					
	[2] sometimes we don't have enough to eat [ ]					
	[3] we have enough to eat but not always the kinds of food we want [ ]					
	[4] we always have enough to eat and the kinds of food we want [ ]					
54	<b>What type energy do you use for cooking</b>	[1] Firewood	[2] Charcoal	[3] Kerosene	[4] Gas	[5] Electricity
55	<b>Type of energy used for lightning</b>	[1] kerosene	[2] Gas	[3] Electricity (generator)	[4] Solar power	[5] Both -Solar & Electr (gen)

<b>I. PERCEPTION ON THE CURRENT FOREST MANAGEMENT SYSTEM</b>						
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## Appendix 1: Questionnaire

56	To what extent are you satisfied with the current forest management system of West Kilimanjaro forest?			
	[1] very dissatisfied [ ]	[2] dissatisfied [ ]	[3] neither satisfied nor dissatisfied [ ]	[4] satisfied [ ] [5] very satisfied [ ]
57	What do you think best describe scenario about the impact of relocation of people from forest in 2007			
	[1] I don't know [ ]	[2] forest loose-people loose [ ]	[3] forest lose-people win [ ]	
		[4] forest win-people loose [ ]	[5] forest win-people win [ ]	
58	If you were the forest manager responsible for West Kilimanjaro forest mention any three very important things to consider to make the forest in west Kilimanjaro grow while at the same time benefit the people in the village			
	[1]			
	[2]			
	[3]			
59	In case of forest fire in the midnight while you are asleep, and suddenly you hear kengele for wananchi to go to help extinguish the forest fire. To what extent will you consider to volunteer to wake-up and rush to put the fire off?			
	[1] not at all [ ]	[2] very unlikely [ ]	[3] likely [ ]	[4] very likely [ ]
60	If it happens that you are inside the protected forest area and suddenly see a little fire just on the start, to what extent would you consider to stop everything you are doing and put off this fire?			
	[1] not at all [ ]	[2] very unlikely [ ]	[3] likely [ ]	[4] very likely [ ]
61	To what extent do you consider yourself a stakeholder of this forest of West Kilimanjaro			
	[1] not at all [ ]	[2] very unlikely [ ]	[3] likely [ ]	[4] very likely [ ]
62	Do you have any other opinion(s) that you think are helpful for improving livelihood and/or forest here?			



## Appendix 2: t - test; Natural Capital

Group statistics					
	14. Were you evicted from the forest in 2007?	n	Mean	Std. Deviation	Std. Error Mean
41. Owned land size	No	96	1.53	1.897	.194
	Yes	99	.382	.528	.053
42. Rented land size	No	96	1.971	4.111	.420
	Yes	100	1.586	1.759	.176
43. Average distance to the major land (owned) in km	No	73	2.842	12.453	1.458
	Yes	71	.627	2.517	.299
44. Average distance to the major land (rented) in km	No	61	8.320	5.952	.762
	Yes	81	11.494	5.622	.625
41(b) Land per capita owned	No	73	.576	.791	.093
	Yes	71	.171	.253	.030
42(b) Land per capita rented	No	63	.663	1.040	.131
	Yes	83	.520	.611	.067

### Independent Samples Test

Variable		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
41. Owned land size	Equal variances assumed	54.997	.000	5.774	193	.000	1.14	.20	.75	1.53
	Equal variances not assumed			5.698	109.187	.000	1.14	.20	.75	1.54
42. Rented land size	Equal variances assumed	3.090	.080	.859	194	.391	.39	.45	-.50	1.27
	Equal variances not assumed			.847	127.559	.398	.39	.45	-.51	1.29
43. Average distance to the major land (owned) in km	Equal variances assumed	7.097	.009	1.470	142	.144	2.22	1.51	-.76	5.19
	Equal variances not assumed			1.489	78.032	.140	2.22	1.49	-.75	5.18
44. Average distance to the major land (rented) in km	Equal variances assumed	.794	.374	-3.248	140	.001	3.17	.98	5.11	-1.24
	Equal variances not assumed			-3.221	125.289	.002	3.17	.99	5.12	-1.22
41. (b) Land per capita (owned)	Equal variances assumed	18.032	.000	4.120	142	.000	.41	.10	.21	.60
	Equal variances not assumed			4.167	86.973	.000	.41	.10	.21	.60
42.(b) Land per capita rented	Equal variances assumed	1.867	.174	1.043	144	.299	.14	.14	-.13	.42
	Equal variances not assumed			.975	93.902	.332	.14	.15	-.15	.44

### Appendix 3(a): t - test; Physical Capital (Part 1)

#### Group Statistics (Part 1)

	14. Were you evicted from the forest in 2007?	n	Mean	Std. Deviation	Std. Error Mean
32. Type of house the household lives in	No	100	3.940	.789	.079
	Yes	100	4.060	.343	.034
33. House ownership	No	100	3.860	.377	.038
	Yes	100	3.800	.471	.047
34. Where do you fetch water from?	No	100	3.010	.628	.063
	Yes	100	2.910	.805	.081
35(b) Average Distance to hh water source (flip) both	No	100	4.813	.572	.057
	Yes	100	4.900	.384	.038

#### Independent Samples Test (Part 1)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
32. Type of house the household lives in	Equal variances assumed	22.562	.000	-1.395	198.000	.165	.120	.086	-.290	.050
	Equal variances not assumed			-1.395	135.103	.165	.120	.086	-.290	.050
33. House ownership	Equal variances assumed	3.645	.058	.994	198.000	.321	.060	.060	-.059	.179
	Equal variances not assumed			.994	188.790	.321	.060	.060	-.059	.179
34. Where do you fetch water from?	Equal variances assumed	3.043	.083	.980	198.000	.329	.100	.102	-.101	.301
	Equal variances not assumed			.980	186.854	.329	.100	.102	-.101	.301
35(b) Average Distance to hh water source (flip) both	Equal variances assumed	6.278	.013	-1.269	198.000	.206	.088	.069	-.223	.048
	Equal variances not assumed			-1.269	173.214	.206	.088	.069	-.224	.049

### Appendix 3(b): t - test; Physical Capital (Part 2)

Group Statistics (Part 2)					
	14. Were you evicted from the forest in 2007?	n	Mean	Std. Deviation	Std. Error Mean
36. Main means of access to the hh premise	No	100	1.760	.429	.043
	Yes	100	1.520	.502	.050
37(b) Average Distance to the bust station (flip)	No	100	2.640	1.630	.163
	Yes	100	2.750	1.731	.173
38. Mobile phone ownership	No	100	1.890	.314	.031
	Yes	100	1.830	.428	.043
39(b)_adj.Do you own a TV Set?	No	100	.650	1.690	.169
	Yes	100	.800	1.842	.184
40. Private means of transport	No	100	1.720	.922	.092
	Yes	100	2.080	1.002	.100

### Independent Samples Test (Part 2)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
36. Main means of access to the hh premise	Equal variances assumed	35.967	.000	3.633	198.000	.000	.240	.066	.110	.370
	Equal variances not assumed			3.633	193.322	.000	.240	.066	.110	.370
37(b) Average Distance to the bust station (flip)	Equal variances assumed	2.416	.122	-.463	198.000	.644	-.110	.238	-.579	.359
	Equal variances not assumed			-.463	197.285	.644	-.110	.238	-.579	.359
38. Mobile phone ownership	Equal variances assumed	10.030	.002	1.130	198.000	.260	.060	.053	-.045	.165
	Equal variances not assumed			1.130	181.830	.260	.060	.053	-.045	.165
39. Do you own a TV Set?	Equal variances assumed	1.448	.230	-.600	198.000	.549	-.150	.250	-.643	.343
	Equal variances not assumed			-.600	196.544	.549	-.150	.250	-.643	.343
40. Private means of transport	Equal variances assumed	3.876	.050	-2.644	198.000	.009	-.360	.136	-.628	-.092
	Equal variances not assumed			-2.644	196.651	.009	-.360	.136	-.629	-.091

## Appendix 4: t-test; Human Capital

Group Statistics					
	14. Were you evicted from the forest in 2007?	n	Mean	Std. Deviation	Std. Error Mean
28. HH Skills	No	100	1.14	.620	.062
	Yes	100	1.12	.537	.054
29. Years of experience for the main occupation	No	100	4.60	.899	.090
	Yes	100	4.68	.709	.071
30. Health insurance	No	100	1.29	.686	.069
	Yes	100	1.16	.526	.053
31. Ability to meet hh's health costs privately	No	100	3.48	1.105	.111
	Yes	100	3.55	1.388	.139

## Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
28. HH Skills	Equal variances assumed	.256	.613	.244	198	.808	.020	.082	-.142	.182
	Equal variances not assumed			.244	194.068	.808	.020	.082	-.142	.182
29. Years of experience for the main occupation	Equal variances assumed	3.227	.074	-.699	198	.486	-.080	.114	-.306	.146
	Equal variances not assumed			-.699	187.801	.486	-.080	.114	-.306	.146
30. Health insurance	Equal variances assumed	9.096	.003	1.503	198	.134	.130	.086	-.041	.301
	Equal variances not assumed			1.503	185.582	.134	.130	.086	-.041	.301
31. Ability to meet hh's health costs privately	Equal variances assumed	7.535	.007	-.394	198	.694	-.070	.177	-.420	.280
	Equal variances not assumed			-.394	188.548	.694	-.070	.177	-.420	.280

## Appendix 5: t-test; Social Capital

### Group Statistics (Part 1)

	14. Were you evicted from the forest in 2007?	n	Mean	Std. Deviation	Std. Error Mean
17. How many of you your siblings live within this same village ?	No	100	2.23	1.550	.155
	Yes	100	2.14	1.470	.147
18. Most people in this village are honest and can be trusted	No	100	3.85	1.123	.112
	Yes	100	3.82	1.274	.127
19. I feel accepted as a member of this village/neighborhood	No	100	4.44	.729	.073
	Yes	100	4.58	.589	.059
20. If I have an urgent issue that need money (cash) to solve it, the first person I would consult lives in...	No	100	4.89	.567	.057
	Yes	100	4.69	.813	.081

### Independent Samples Test (Part 1)

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
17. How many of you your siblings live within this same village ?	Equal variances assumed	1.520	.219	.421	198	.674	.090	.214	-.331	.511
	Equal variances not assumed			.421	197.45	.674	.090	.214	-.331	.511
18. Most people in this village are honest and can be trusted	Equal variances assumed	3.574	.060	.177	198	.860	.030	.170	-.305	.365
	Equal variances not assumed			.177	194.90	.860	.030	.170	-.305	.365
19. I feel accepted as a member of this village/neighborhood	Equal variances assumed	2.998	.085	1.493	198	.137	.140	.094	-.325	.045
	Equal variances not assumed			1.493	189.62	.137	.140	.094	-.325	.045
20. If I have an urgent issue that need money (cash) to solve it, the first person I would consult lives in...	Equal variances assumed	14.466	.000	2.019	198	.045	.200	.099	.005	.395
	Equal variances not assumed			2.019	176.85	.045	.200	.099	.004	.396

## Appendix 6: t - test; Financial capital

### Group Statistics

	14. Were you evicted from forest in 2007?	n	Mean	Std. Deviation	Std. Error Mean
50. What best describe your household's income for the past six years	No	98	2.071	.815	.082
	Yes	97	1.680	.758	.077

### Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
50. What best describe your household's income for the past six years	Equal variances assumed	.024	.876	3.468	193.000	.001	.391	.113	.169	.613
	Equal variances not assumed			3.470	192.232	.001	.391	.113	.169	.613

## Appendix 7: Natural Capital - Values for Asset Pentagon

### A. EVICTED HOUSEHOLDS - DESCRIPTIVES

Variable	n	Minimum	Maximum	Mean	Std. Deviation	Land per capita - (National)	Hh land percapita/Nat. Land percapita*5	Percent to the national average
Land owned per capita (Computed from VAR# 41 & VAR# 4).	71	.03	1.50	.17	.25	.74	1.15	23%
Valid N (listwise)	71							
Land rented per capita (Computed from VAR# 42 & VAR# 4).	83	.03	3.33	.52	.61	.74	3.51	70%
Valid N (listwise)	83							
<b>Hh land per capita Index: 0 no land to 5 national land per capita</b>				<b>0.35</b>		.74	<b>2.33</b>	<b>47%</b>
<b>B. Not EVICTED HOUSEHOLDS - DESCRIPTIVES</b>								
Variable	n	Minimum	Maximum	Mean	Std. Deviation	Land per capita - (National)	Hh land percapita/Nat. Land percapita*5	Percent to the national average
Land owned per capita (Computed from VAR# 41 & VAR# 4).	73	.03	5.50	.58	.79	.74	3.89	78%
Valid N (listwise)	73							
Land rented per capita (Computed from VAR# 42 & VAR# 4).	63	.04	6.67	.66	1.04	.74	4.47	89%
Valid N (listwise)	63							
<b>Hh land per capita Index: 0 no land, 5 national land per capita</b>				<b>0.62</b>		.74	<b>4.18</b>	<b>84%</b>

## Appendix 8: Physical Capital - Values for Asset Pentagon

### EVICTED HOUSEHOLDS - DESCRIPTIVES

<i>Var #</i>	<i>Variable</i>	<i>n</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. Deviation</i>
32	Type of house the household lives in	100	2.0	5.0	4.1	0.3
33	House ownership	100	1.3	5.0	4.8	0.6
34	Where do you fetch water from?	100	1.0	5.0	2.9	0.8
35	Average Distance to hh water source	100	2.5	5.0	4.9	0.4
36	Access to hh premise	100	1.3	2.5	1.9	0.6
37	Average distance to bus station	100	1.0	5.0	2.8	1.7
38	Mobile phone ownership	100	1.3	3.8	2.3	0.5
39	Do you have a TV set?	100	0.0	5.0	0.8	1.8
40	Do you have a private means of transport?	100	1.3	5.0	2.6	1.3
<b>Physical capital Index (0 - poor, 5 - better)</b>					<b>3.0</b>	

### NOT- EVICTED HOUSEHOLDS - DESCRIPTIVES

<i>Var #</i>	<i>Variable</i>	<i>n</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>Std. Deviation</i>
32	Type of house the household lives in	100	2.0	5.0	3.9	0.8
33	House ownership	100	2.5	5.0	4.8	0.5
34	Where do you fetch water from?	100	1.0	5.0	3.0	0.6
35	Average Distance to hh water source	100	1.3	5.0	4.8	0.6
36	Access to hh premise	100	1.3	2.5	2.2	0.5
37	Average distance to bus station	100	1.0	5.0	2.6	1.6
38	Mobile phone ownership	100	1.3	2.5	2.4	0.4
39	Do you have a TV set?	100	0.0	5.0	0.7	1.7
40	Do you have a private means of transport?	100	1.3	5.0	2.2	1.2
<b>Physical capital Index (0 - poor, 5 - better)</b>					<b>3.0</b>	



## Appendix 9: Human Capital - Values for Asset Pentagon

### EVICTED HOUSEHOLDS - DESCRIPTIVES

<b>VAR #</b>	<b>Variable</b>	<b>n</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
28	Household Skills	100	1.0	4.0	1.12	0.54
29	Years of experience for the main occupation	100	2.0	5.0	4.68	0.71
30	Health insurance	100	1.7	5.0	1.93	0.88
31	Ability to meet hh's health costs privately	100	1.0	5.0	3.55	1.39
	Valid N (listwise)	100				
	<b>Human capital Index (1 = poor, 5 = Highest)</b>				<b>2.82</b>	
<b>Not - EVICTED HOUSEHOLDS - DESCRIPTIVES</b>						
<b>VAR #</b>	<b>Variable</b>	<b>n</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
28	Household Skills	100	1.0	5.0	1.14	0.62
29	Years of experience for the main occupation	100	1.0	5.0	4.60	0.90
30	Health insurance	100	1.7	5.0	2.15	1.14
31	Ability to meet hh's health costs privately	100	1.0	5.0	3.48	1.11
	Valid N (listwise)	100				
	<b>Human capital Index (1 = poor, 5 = Highest)</b>				<b>2.84</b>	

## Appendix 10: Social Capital - Values for Asset Pentagon

EVICTED HOUSEHOLDS - DESCRIPTIVES						
VAR #	Variable	n	Minimum	Maximum	Mean	Std. Deviation
17	How many of you your siblings live within this same village?	100	1	5	2.1	1.5
18	Most people in this village are honest and can be trusted	100	1	5	3.8	1.3
19	I feel accepted as a member of this village/neighborhood	100	2	5	4.6	0.6
20	If I have an urgent issue that need money (cash) to solve it, the first person I would consult lives near/not near this village	100	1	5	4.7	0.8
21	If I drop my purse or wallet in the neighborhood and someone see it, would return it to me	100	1	5	3.1	1.3
22	Social organization membership	95	0	5	3.5	2.3
23	If yes in 29 above, to how many organization are you a member?	70	0	1	1.0	0.2
24	If YES (in qn 29 above) what position do you hold in the most helpful organization(s) to you?	67	1	3	1.4	0.7
25	To what extent are you satisfied living in this village?	100	1	5	3.7	1.2
	Valid N (listwise)	67				
<b>Social capital Index (1 - weak, 5 - Stronger)</b>					<b>3.1</b>	
NOT-EVICTED HOUSEHOLDS - DESCRIPTIVES						
VAR#	Variable	n	Minimum	Maximum	Mean	Std. Deviation
17	How many of you your siblings live within this same village?	100	1.0	5.0	2.2	1.6
18	Most people in this village are honest and can be trusted	100	1.0	5.0	3.9	1.1
19	I feel accepted as a member of this village/neighborhood	100	1.0	5.0	4.4	0.7
20	If I have an urgent issue that need money (cash) to solve it, the first person I would consult lives near/not near this village	100	1.0	5.0	4.9	0.6
21	If I drop my purse or wallet in the neighborhood and someone see it, would return it to me	100	1.0	5.0	3.3	1.4
22	Social organization membership	96	0.0	5.0	4.2	1.9
23	If yes in 29 above, to how many organization are you a member?	85	0.0	2.0	1.0	0.3
24	If YES (in qn 29 above) what position do you hold in the most helpful organization(s) to you?	80	1.0	3.0	1.5	0.7
25	To what extent are you satisfied living in this village?	100	1.0	5.0	4.0	0.9
	Valid N (listwise)	80				
<b>Social capital Index (1 - weak, 5 - Stronger)</b>					<b>3.25</b>	

## Appendix 11: Financial Capital - Values for Livelihood Asset Pentagon

EVICTED HOUSEHOLDS - DESCRIPTIVES						
VAR #	Variable	n	Minimum	Maximum	Mean	Std. Deviation
50	What best describe your household's income for the past six years?	97	1.7	5.0	2.8	1.3
	Valid N (listwise)	97				
	<i>Household income trend Index: 0 to 1.7 indicates declining income while &gt; 1.7 and &lt; 3.4 indicates no change. The high values above 3.4 to 5 indicates the income is increasing</i>				2.8	
NOT-EVICTED HOUSEHOLDS - DESCRIPTIVES						
VAR #	Variable	n	Minimum	Maximum	Mean	Std. Deviation
50	What best describe your household's income for the past six years?	98	1.7	5.0	3.5	1.4
	Valid N (listwise)	98				
	<i>Household income trend Index: 0 to 1.7 indicates declining income while &gt; 1.7 and &lt; 3.4 indicates no change. The high values above 3.4 to 5 indicates the income is increasing</i>				3.5	

## **Appendix 12 (a): Guiding questions for interviews with heads of households (evicted)**

1. What is your year of birth?
2. What is the highest level of your education?
3. When did you migrate to the forest of West Kilimanjaro?
4. Where did you come from when migrated to the forest?
5. Why did you migrate to the forest?
6. Did you find settlement when you came?
7. Where did you stay in your first arrival to the forest?
8. Who provided a place to stay for you?
9. How the forest looked like when you first came?
10. Was it a natural forest or plantation forest?
11. What activities were you doing in the forest?
12. What were the procedures for being allocated a forest plot?
13. Why were you evicted in 2007?
14. Were you assigned any piece of land to relocate after eviction?
15. What challenges have you encountered after eviction?
16. Do you still have a forest plot?
17. Is it still easy to get a plot after eviction?
18. Do you own any piece of land outside the forest?
19. Do you own any means of transport? (bike, motorcycle, car)
20. Who are the people who you depend on for support in case of emergence?
21. Do these people you depend on, live in this village too?
22. Do you think people are honest in this neighborhood?
23. For the past six years do you think the household's income is increasing or decreasing for the past six years
24. How would you describe food availability situation in your household for the last 12 months
25. What type energy do you use for cooking
26. Are you satisfied with the current forest management system of West Kilimanjaro forest?
27. What about livelihood after relocation, do you think life has improved or worsened?
28. Do you have any other opinion that you think are helpful for improving livelihood and/or forest here?

## **Appendix 12 (b): Guiding questions for interviews with heads of households (NOT evicted)**

1. What is your year of birth?
2. What is the highest level of your education?
3. When did people migrate to the forest of West Kilimanjaro?
4. How did settlement in the forest started?
5. Who provided settlement to the people?
6. How the forest looked like in the 1950s?
7. Was it a natural forest or plantation forest?
8. What activities were going on in the forest?
9. What were the procedures for being allocated a forest plot?
10. Do you have a forest plot?
11. Is it still easy to get a plot after eviction?
12. Do you own land?
13. If yes what is the size?
14. If no, what is the source of your income?
15. Do you own any means of transport? (bike, motorcycle, car)
16. Who are the people who you depend on for support in case of emergence?
17. Do these people you depend on, live in this village too?
18. Do you think people are honest in this neighborhood?
19. For the past six years do you think the household's income is increasing or decreasing for the past six years
20. How would you describe food availability situation in your household for the last 12 months
21. What type energy do you use for cooking
22. Are you satisfied with the current forest management system of West Kilimanjaro forest?
23. Do you have any other opinion that you think are helpful for improving livelihood and/or forest here?

### **Appendix 13 Guiding questions for interviews with forest officials**

1. Why were the people displaced from the forest?
2. Was it relocation or eviction?
3. Why did the people settle in the forest in the first place?
4. When and how did these settlements started in the forest?
5. What is the status of the forest after eviction?
6. How was the forest status before eviction?
7. What are the major causes for deforestation or/and forest degradation in the forest?
8. Forest conservation is very important, at the same time people's livelihood depends on forest for their daily needs. Therefore eviction of people from forest might have impacts to forest as well as on people's livelihood.
  - a. Do you think there have been any impacts of eviction to forest?
  - b. What do you think of the livelihood of the people evicted? are they coping?
9. Do you think the impacts are positive or negative to forest and livelihood?
10. Do you think that eviction has changed the public relation between forest management and the public?
11. According to your experience on working in the forest, what do you think could be a better and sustainable solution for reducing forest destruction while ensuring livelihood of the people is not compromised?