

**ASSESSMENT OF THE IMPACT OF DEFORESTATION OF MPANGA FOREST
RESERVE ON THE COMMUNITY IN MPIGI DISTRICT**

**BY
ABDULAH FARA ADAN
2019-08-09742**

**A RESEARCH DISSERTATION SUBMITTED TO SCHOOL OF NATURAL AND
APPLIED SCIENCES IN PARTIAL FULFILMENT OF THE REQUIREMENTS
FOR THE AWARD OF MASTER'S DEGREE OF ENVIRONMENTAL
MANAGEMENT OF KAMPALA
INTERNATIONAL
UNIVERSITY**

OCTOBER, 2021

DECLARATION

I ABDULAHI FARAH ADAN, declare that the research entitled “assessing the impact of deforestation on community livelihood in Mpanga forest reserve in Mpigi district” is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

.....

Signature

ABDULAHI FARAH ADAN

2019-08-09742

.....

Date

APPROVAL

This research has been under my supervision and is now submitted for examination with my approval.

Signed.....

Date.....

PROF. MARTIN ONUORAH

University supervisor

Signed.....

Date.....

PROF. CHUKUEMEKA J. DIJI

University supervisor

DEDICATION

I dedicate this report to my parents who have supported me in every way during my research. I also dedicate this dissertation to my mother Jawahir Mohamed Abdi and my father Farah Adan and my brothers, sisters and all the well-wishers. May Allah Bless you.

ACKNOWLEDGMENT

I extend my thanks to the Almighty God for taking through the academic journey. I would not have made it to this stage if it were not for you. I wish to express my sincere gratitude to supervisors who has tirelessly guided me through the research.

I'm deeply grateful to my supervisor for his guidance, patience and support I consider myself very fortunate for being able to work with a very keen, considerate and encouraging person like him. Without his offering to accomplish this research, I would not be able to finish my study at Kampala International University.

More regards go to my colleagues who encouraged me to undertake this course. I am greatly indebted to my colleagues. I am also thankful for the great joy and happiness brought by my parents and brothers.

My heartfelt appreciation and thanks to my parents for their support. Last but not least thanks to my friends for all the support they have given to me at the time when I needed it most, God Bless You.

Finally, I thank whoever accorded me support throughout my stay at campus but have not been mentioned. Please, be reminded that you have not been forgotten

TABLE OF CONTENTS

DECLARATION	i
APPROVAL	ii
DEDICATION	iii
ACKNOWLEDGMENT	iv
CHAPTER ONE	1
INTRODUCTION	1
1.0 Introduction	Error! Bookmark not defined.
1.1 Background of the study	1
1.1.1 Historical Perspective	1
1.1.2 Theoretical Perspective	2
1.1.3 Conceptual Perspective	3
1.1.4 Contextual perspective	4
1.2 Statement of the Problem	6
1.3 Purpose of the study	7
1.4 Objectives of the study	7
1.4.1 General Objective	7
1.4.2 Specific Objectives	7
1.5 Research Questions	7
1.6 Scope of the study	7
1.6.1 Geographical Scope	7
1.6.2 Subject Scope	8
1.6.3 Time Scope	8
1.7.0 Significance of the study	8
CHAPTER TWO	9
LITERATURE REVIEW	9
2.0 Introduction	Error! Bookmark not defined.
2.1 Theoretical Review	9
2.2 Conceptual frame work	10
2.3. Factors that contribute to deforestation	13
2.4 Effect of deforestation on community livelihood	19

2.5 Possible mechanisms for a addressing deforestation	23
2.6 Research Gaps	29
CHAPTER THREE.....	30
METHODOLOGY	30
3.0 Introduction	Error! Bookmark not defined.
3.1 Study area.....	30
3.1.2 Location.....	30
3.1.3 Size	31
3.3.1 Climate	31
3.3.2 Vegetation	31
3.3.4 Soils.....	32
3.3.5 Land.....	32
3.3.6 Wetlands.....	32
3.4 Research Design.....	33
3.5.2 Sample Size	33
3.5.3 Sampling Technique.....	34
3.6 Data Collection Instruments.....	34
3.6.1 Questionnaire	35
3.6.2 Key Informant Guide	35
3.7 Validity and Reliability	35
3.7.1 Validity of the study	35
3.7.2 Reliability of the study	35
3.8 Data Analysis	36
3.8.2 Qualitative analysis	36
3.9 Ethical Considerations.....	36
3.10 Anticipated Limitations and Solutions.....	37
4.0 Introduction	Error! Bookmark not defined.
4.1.1 Gender of respondents.....	38
4.1.2 Age of respondents.....	38
4.1.3 Time of stay in Mpigi district.....	39
4.1.4 Marital status of respondents.....	39

4.1.5 Education of respondents	40
4.2 Factors that contributes to deforestation in Mpanga Central forest reserve, Mpigi district.	41
4.2.1 Whether there is high degree of deforestation in and around Mpanga Central forest reserve.	41
4.2.2 Economic factors that contribute to deforestation in Mpanga forest reserve.....	42
4.2.3 Institutional factors that cause deforestation MFR	44
4.2.4 Policy factors are responsible for deforestation in Mpanga central forest reserve	45
4.2.5 Environmental factors that is responsible for deforestation in Mpanga forest reserve	46
4.2.6 Social cultural factors responsible for deforestation in Mpanga forest.....	47
4.3 Effect of deforestation on community livelihood in Mpanga Central forest reserve, Mpigi district.....	48
4.1.1 Does deforestation affect your communities around Mpanga forest reserve.....	48
4.3.2 How does deforestation affect the communities around Mpanga forest reserve.	49
4.3.3 Effect of deforestation on food security in Mpigi district.....	49
4.3.4 Effect of deforestation on health in Mpigi district	50
4.3.4 How does deforestation affect poverty alleviation in Mpigi district.....	51
4.4 Possible mechanisms for addressing deforestation in Mpanga Central forest reserve, Mpigi district.....	52
4.1.1 Are there mechanisms in place for addressing the deforestation in Mpanga Central forest reserve, Mpigi district.	52
4.4.2 Avenues developed by community in addressing the deforestation challenge in MFR, Mpigi district.	53
4.4.3 Whether Mpigi district local government provide guidance to local on the deforestation.	54
4.4.4 Mpigi district local government done in guidance to local on the deforestation in Mpanga forest reserve	54
CHAPTER FIVE	57
DISCUSSION, CONCLUSION AND RECOMMENDATIONS.....	57
5.0 Introduction	Error! Bookmark not defined.
5.1 Discussion of findings.....	57
5.1.1 Factors that contributes to deforestation in Mpanga Central forest reserve, Mpigi district.	57

5.1.2 Effect of deforestation on community livelihood in Mpanga Central forest reserve, Mpigi district.....	58
5.13 Mechanisms for addressing deforestation in Mpanga Central forest reserve, Mpigi district.....	59
Conclusion.....	60
5.3 Recommendations	61
5.4 areas for further research.....	62
REFERENCES	63
RESEARCH QUESTIONARIE	68

LIST OF TABLES

Table 3.1: Population and Sample Size of the study	34
Table 4.1: Gender of respondents	38
Table 4.2: Age of respondents	38
Table 4.3: Time of stay in Mpigi district	39
Table 4.4: Marital status of respondents	39
Table 4.5: Education of respondents.....	40
Table 4.6: Whether there is high degree of deforestation in and around Mpanga Central forest reserve.	41
Table 4.7: Economic factors that contribute to deforestation in Mpanga forest reserve	42
Table 4.8: institutional factors that cause deforestation MFR	44
4.10: How does deforestation affect the communities around Mpanga forest reserve.	49
Table 4.11: Effect of deforestation on food security in Mpigi district	49
Table 4.12: How does deforestation affect poverty alleviation in Mpigi district	51
Table 4.13: Avenues developed by community in addressing the deforestation challenge in MFR, Mpigi district.....	53
Table 4.14: Whether Mpigi district local government provide guidance to local on the deforestation.....	54
Table 4.15 What Mpigi district local government done in guidance to local on the deforestation in Mpanga forest reserve.....	54

LIST OF FIGURES

Figure 3.1: Map of Mpigi district	30
Figure 4.1: Economic factors that contribute to deforestation in Mpanga forest reserve.	42
Figure 4.2: Policy factors are responsible for deforestation in Mpanga central forest reserve. ...	45
Figure 4.3: Social cultural factors responsible for deforestation in Mpanga forest reserve.	47
Figure 4.4: Does deforestation affect your communities around Mpanga forest reserve	48
Figure 4.5: Effect of deforestation on health in MPigi district	50
Figure 4.6: Are there mechanisms in place for addressing the deforestation in Mpanga Central forest reserve, Mpigi district.	53

ABSTRACT

The study set to assess the impact of deforestation on community livelihood in Mpanga central forest reserve, Mpigi district. The objectives were to examine the factors that contribute to deforestation in Mpanga Central forest reserve, assess the effect of deforestation on community livelihood and to establish the possible mechanisms for addressing deforestation in Mpanga Central forest reserve, Mpigi district.

The data was collected from 321 respondents using the questionnaires and 12 respondents who provided data qualitatively, these were based on a descriptive research design based on both qualitative and quantitative research design.

The study results established that economically deforestation with charcoal burning, farming, institutional factors that cause deforestation were majorly limited institutional capacity to monitor forests, with poor policy management in environmentally, the occurrence of drought is responsible for deforestation. Secondly deforestation affect community livelihood in Mpanga Central forest reserve, Mpigi district majorly through affecting the food security that negatively, it provides incomes and construction materials although environmentalists. Thirdly, the community has designed few mechanisms for addressing the deforestation challenge in MFR, Mpigi district, the majority through arresting people in deforestation, reporting tree cutting with and improving trees conditions.

The study concludes that deforestation causes were majorly economic with sale of the products inducing it, though poor policy and institutional mechanisms and social beliefs increased the occurrence of deforestation in and around Mpanga forest reserve. Secondly deforestation was perceived by the locals as a positive venture towards the community livelihood. Thirdly the study conclude that the community and Mpigi district have developed few mechanisms to avert deforestation arresting people in deforestation and reporting tree cutting plus sensitization against deforestation and enhancing the development of skills for proper forest usage.

The study recommend that there is need for promoting activities that reduce the pressure off the forest like sericulture, butterfly farming, improved bee- keeping, development of fodder banks, bio-intensive agriculture and farm forestry. Secondly there is need for increasing income and improved literacy levels because with improved standards of living. There is need to increase the capacity of a government to design, implement and enforce policies and people should be encouraged to plant trees at home.

CHAPTER ONE

INTRODUCTION

This chapter presents and describes the background of the study, problem of the research, purpose and objectives of this study, research question, and scope of the study and significance of the study

1.1 Background of the study

The background of the study is presented on four perspectives namely historical, theoretical, conceptual and contextual perspective.

1.1.1 Historical Perspective

Deforestation means reduction or loss of the biological and economic productivity of forests and woodlands resulting from land use or a combination of processes arising from human activities. Forests are important habitats for biodiversity and provide crucial eco-system services in terms of soil and watershed protection and the economic value of the numerous products and services they provide (Rhett, 2016). Worldwide, 1.6 billion people depend on forests to some extent while over 60 million indigenous people depend directly on forests for their survival. However, forests are under pressure due to deforestation. Annually, the rate of global deforestation is around 13 million hectares, most of which occurs in the developing world. Deforestation is the result of a number of economic activities: legal and illicit logging, clearing trees to increase arable land, fuel wood extraction and mining. These causes are differentiated across the various forest zones in the country, however: in the south, timber exploitation, mining and agriculture expansion have been identified as predominant causes (Boafo, 2012), while in the north, unsustainable charcoal and firewood production, forest fires and agriculture expansion (again) are the major causes. The World Bank estimates that forest resources directly contribute to the livelihoods of some 90% of the 1.2 billion people living in extreme poverty.

Forest loss in Africa is particularly troubling, however: two-thirds of the continent's population depends on forest resources for income and food supplementation, and 90 percent of Africans use fuel wood and charcoal as sources of energy. Despite, or perhaps because of this reliance on forest resources and no timber forest products (NTFPs), deforestation in Africa is estimated at around 3.4 million hectares/year (FAO, 2010). Disappearing forest cover is a particular problem

in Ghana, where NTFPs provide sustenance and income for 2.5 million people living in or near forest communities (Acheampong and Marfo, 2011). Many of those living in these remaining forested areas have livelihoods predicated on the availability, access and utilization of forest products (Appiah, 2009). Forest communities use their surroundings for a variety of activities: the collection and production of fuel wood, hunting for game, collection of snails and mushrooms, gathering of medicinal herbs and chewing sticks, and both legal and illicit logging. The products obtained from these activities are recognized as resources that contribute directly to communities' well-being, especially during the agricultural lean seasons (Ahenkan and Boon, 2008).

Uganda's forest cover has halved during the past century, and currently is shrinking at a rate of 55,000 hectares per year (FAO, 2014). The loss of forested areas upsets soil-water relations, contributes to global warming, brings erosion, and lowers water quantity and quality which affects human health. People gather medicinal plants, fuel wood and derive food from the forests to support their livelihoods hence the loss of these habitats leads to a lower quality of life. Despite these effects, no factual information is readily available about the effects deforestation on the livelihoods of the local communities, in this case in Mpigi (Obua, Agea and Ogwal, 2010). This study set out to determine the impact of deforestation on the livelihoods of local communities in the sub-county. It focused on the causes of deforestation and its effects, challenges of combating deforestation and possible mitigation measures. The study found out that forests are a source of products such as firewood for domestic use and sale, poles for construction, charcoal mainly for sale, food (fruits, honey and mushrooms), medicinal plants, game meat and hand craft materials. More still, forests provide employment and protect soil from erosion, increase soil fertility and are important for water catchment and tourism, cultural values and climatic amelioration (Otieno and Buyinza, 2015).

1.1.2 Theoretical Perspective

This study will be guided by the empowerment theory adopted by Perkins & Zimmerman (1995) presents a theoretical model for understanding the process and consequences of efforts to exert control and influence over decisions that affect one's life, organizational functioning, and the quality of community life. Empowerment theory provides principles and a framework for organizing our knowledge. The development of empowerment theory also helps advance the

construct beyond a passing the provided information. The assessment of the state of deforestation is fundamental for enhancing or delimiting the community livelihood. The theory provides that the values that underlie an empowerment approach to social change and empowerment theory is necessary. The theory provides that livelihood of community can be improved through empowerment in the society and deforestation reduce the development of mechanism and avenues necessary by the different stakeholders in attaining and bridging development of the community.

1.1.3 Conceptual Perspective

Deforestation is the conversion of forested areas to non-forest land use such as arable land, urban use, logged area or wasteland. According to FAO (2014) deforestation is the conversion of forest to another land use or the long-term reduction of tree canopy cover below the 10% threshold. Deforestation can result from deliberate removal of forest cover for agriculture or urban development, or it can be an unintentional consequence of uncontrolled grazing (which can prevent the natural regeneration of young trees). The combined effect of grazing and fires can be a major cause of deforestation in dry areas.

Bustic, Baumann, Shortland, Walker, Kuemmerle (2015) defined deforestation to include not only conversion to non-forest, but also degradation that reduces forest quality - the density and structure of the trees, the ecological services supplied, the biomass of plants and animals, the species diversity and the genetic diversity. Narrow definition of deforestation is: the removal of forest cover to an extent that allows for alternative land use. The United Nations Research Institute for Social Development (UNRISD) uses a broad definition of deforestation, while the Food and Agriculture Organization of the UN (FAO) uses a much narrower definition.

Livelihood is defined as a set of activities performed to live for a given life span, involving securing water, food, fodder, medicine, shelter, clothing and the capacity to acquire above necessities working either individually or as a group by using endowments (both human and material) for meeting the requirements of the self and his/her household on a sustainable basis with dignity (Ellis, 2009). Community livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its

capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term (Bebbington, 2009).

1.1.4 Contextual perspective

In Uganda, increased population growth is one of the primary causes of deforestation. For instance, Ugandan population is growing almost every day due to immigration which puts the country at risk of ongoing deforestation. The causes of deforestation and degradation include a combination of direct and indirect economic, institutional, political, natural or social factors: for example, demand for agriculture or infrastructure development, or government failure to protect these valuable assets. Socio-economic development at the expense of natural forest by deforesting is a conservation concern globally (Vijay, Pimm, Jenkins & Smith, 2016). Logging, land conservation to agriculture, wildfires, cutting down trees for firewood, conflict over land rights caused by increased population growth, a need for more land mostly for agricultural production, as well as slash and burn as an agricultural technique that involves the cutting and burning of forests to create fields is mostly the causes of deforestation

Clark (2012) contends that forests start to degenerate as the domestic demand of food and natural resources increases because of economic growth and high population growth. The result is that forests are often lost or degraded even when it is not in the countries' long-term interests. The current as well as long term consequences of human activities like logging, bush burning, land clearance for construction, and wood collection are some of the most contributing factors to deforestation which are detrimental to jeopardize our lives on earth and fertile agricultural land (Aliyu, Modibbo, Medugu and Ayo, 2014). In Uganda, mass felling of trees put the country under threats of desertification.

Deforestation plays a role in both global warming and cooling as it results in reduction of biodiversity, disturbed water regulation, and the destruction of the resource base and livelihoods for many of the world's poorest (Wynveen, Kyle & Sutton, 2014). The continued deforestation in Uganda provides consequences such as temporary increase in agricultural production, land erosion, river contamination, emission of carbon dioxide and extinction of endangered species

(Clark 2012). For years, sustainable management of forest resources became a primary concern due to its detrimental impact on biodiversity as well as the maintenance of global ecological functions.

Uganda's first forestry policy was written in 1929. Forestry policy has undergone a series of changes since then, alternating between stricter conservation on the one hand and more liberal economic use of forest resources on the other hand. The last policy review was in 1988, but this contained limited guidance on principles and strategies for implementation, on forestry outside the gazetted reserves, and on the balance between production and conservation. It was also silent on the roles of government, the private sector and rural communities in forestry, and the linkages with other sectors and land uses.

National Forestry Authority: in the report on Restructuring Government Ministries/Departments (1998), and the report on the Post-Constitutional Restructuring of the Ministry of Lands, Water and Environment (1998), the government has expressed its commitment to public sector reform. In particular the decision has been made to create a semi-autonomous National Forestry Authority to succeed the Forestry Department as the lead agency in forest management.

In 1993, the Government of Uganda initiated a process of devolving forest management authority of central forest reserves to district governments. The high rate of deforestation and the global paradigm shift on forest management following the Rio Declaration, which Uganda ratified, were cited as the major reasons for these governance reforms in the forest sector (Byakagaba, Eilu, Okullo, Tumwebaze and Mwavu, 2011). To implement the new framework of managing forests, a new forest policy was formulated in 2001 to develop an integrated forest sector that could achieve sustainable increases in the economic, social and environmental benefits from forests and trees for all the people of Uganda, especially the poor and vulnerable. It recognized conservation, sustainable development and institutional reforms, such as collaborative forest management, as critical in forest management.

In 2003, the amended Forestry Act of 1964 was finally replaced by the National Forestry and Tree Planting Act of 2003 (GoU 2003). Under this Act, all forests in Uganda were reclassified as follows central forest reserves (about 15% of total forested land), forests under national parks

(about 15% of total forested land), local forest reserves (less than 0.5% of total forested land), community forests (less than 0.5% of total forested land) and private forests (70% of total forested land). Local forest reserves are governed by district governments and community forests are managed by registered community-based organizations, which are monitored by the district forest officer. These changes to the forestry policy and Forestry Acts were accompanied by similar changes in the Land Act (1998) and Land (Amendment) Act (2010), which had significant impacts on land-tenure security and incentives structuring behavior in relation to forest cover (Banana et al, 2014).

Communities emerging through forest conservations necessary in ensuring the development of mechanisms for developing the community embedment to the development of the forests. Deforestation in the communities is taken in the communities as deforestation occurrence is limiting the scope of the forests environments even when the forest policy prohibits the occurrence of the deforestation (Basu, Blodgett, Müller and Soezer, 2013).

1.2 Statement of the Problem

The status of urbanizing areas has seen deforestation and clearing of forests cover in form of swamps, trees, natural and manmade forests in a bid to create urban centers (Otieno and Buyinza, 2015). Deforestation coupled with cutting of forests for agricultural expansion, firewood extraction for domestic and industrial uses, sawing for timber, and cutting of trees for poles and charcoal are the leading causes of deforestation (Turyahabwe, Tumusiime, Byakagaba and Tumwebaze, 2016). Others are poor extension services, corruption and population increase, lack of alternatives to wood resources, over harvesting due to poor planning, poverty, indirect nature of conservation benefits, weak regulation and enforcement of existing laws and policies, urbanization and industrial growth, and inappropriate processing technologies (Wynveen, Kyle and Sutton, 2014). Deforestation occurrence in Mpanga forest reserve has a negative effect on the livelihood of communities around through decreased availability of forest products, increased erosion, gullies and bare lands, decreased agricultural production, decrease in water quality and quantity, increased landslides and floods, loss of biodiversity, decline in revenues, increased incidences of diseases, increase in prices of the forest products (Josephat, 2018). It's based on this that the researcher set to assess the impact of deforestation on community livelihood in Mpanga central forest reserve, Mpigi district.

1.3 Purpose of the study

The purpose of the study was to assess the impact of deforestation on community livelihood in Mpanga central forest reserve, Mpigi district.

1.4 Objectives of the study

1.4.1 General Objective

To assess the impact of deforestation on community livelihood in Mpanga central forest reserve, Mpigi district.

1.4.2 Specific Objectives

- 1) To examine the factors that contributes to deforestation in Mpanga Central forest reserve, Mpigi district.
- 2) To examine the effect of deforestation on community livelihood in Mpanga Central forest reserve, Mpigi district.
- 3) To establish the possible mechanisms for addressing deforestation in Mpanga Central forest reserve, Mpigi district.

1.5 Research Questions

- 1) What are the factors that contribute to deforestation in Mpanga Central forest reserve, Mpigi district?
- 2) What is the effect of deforestation on community livelihood in Mpanga Central forest reserve, Mpigi district?
- 3) What are the possible mechanisms for a addressing deforestation in Mpanga Central forest reserve, Mpigi district?

1.6 Scope of the study

1.6.1 Geographical Scope

The study was conducted in Mpanga Central forest reserve, Mpigi district. The focus of the study was based in Mpigi district. The area chosen is approximately 30 Kilometers from Kampala central district. The chosen area is because of the community livelihood constraints in the area and the fact that the area has attracted high degrees of deforestation in the area.

1.6.2 Subject Scope

The subject scope assessed the impact of deforestation on community livelihood. The focus was to identify the factors that contribute to deforestation, to examine the effect of deforestation on community livelihood, to establish the possible mechanisms for addressing deforestation.

1.6.3 Time Scope

The study considered an analysis of the environmental situation of Mpigi for a period of 10 years from 2009 to 2018. The study has a time scope of 6 months which run from January to August 2020. The time chosen is sufficient to enable the researcher collect reliable information for the study.

1.7.0 Significance of the study

The World Bank has also recognized that focusing exclusively on protection misses opportunities for poverty reduction and improved management and conservation of productive forests. This study seeks to add weight to academic literature that ‘the focus of development should not only be on the forests for the trees but only as far as it serve the needs of people.

This research work will justify the reasoning for this whiles collecting evidence to the fact that the local forest resource is an important source of rural economic livelihood, which when managed sustainably, can contribute to wealth creation.

The study will support the policy makers in understanding the deforestation and its impact on community livelihood and help them making better policies for informed purposes.

The study results will support the future studies in enabling the increase in supporting the context of deforestation in supporting the attainment of community livelihood.

The study contributes to provision of information concerning the state of community livelihood that has been limited through deforestation

CHAPTER TWO

LITERATURE REVIEW

In this chapter, the researcher critically analyzes works of other people related to variables under study. The theoretical review constitutes the theory underlying the relationship between the two variables, conceptual framework, related literature and related studies.

2.1 Theoretical Review

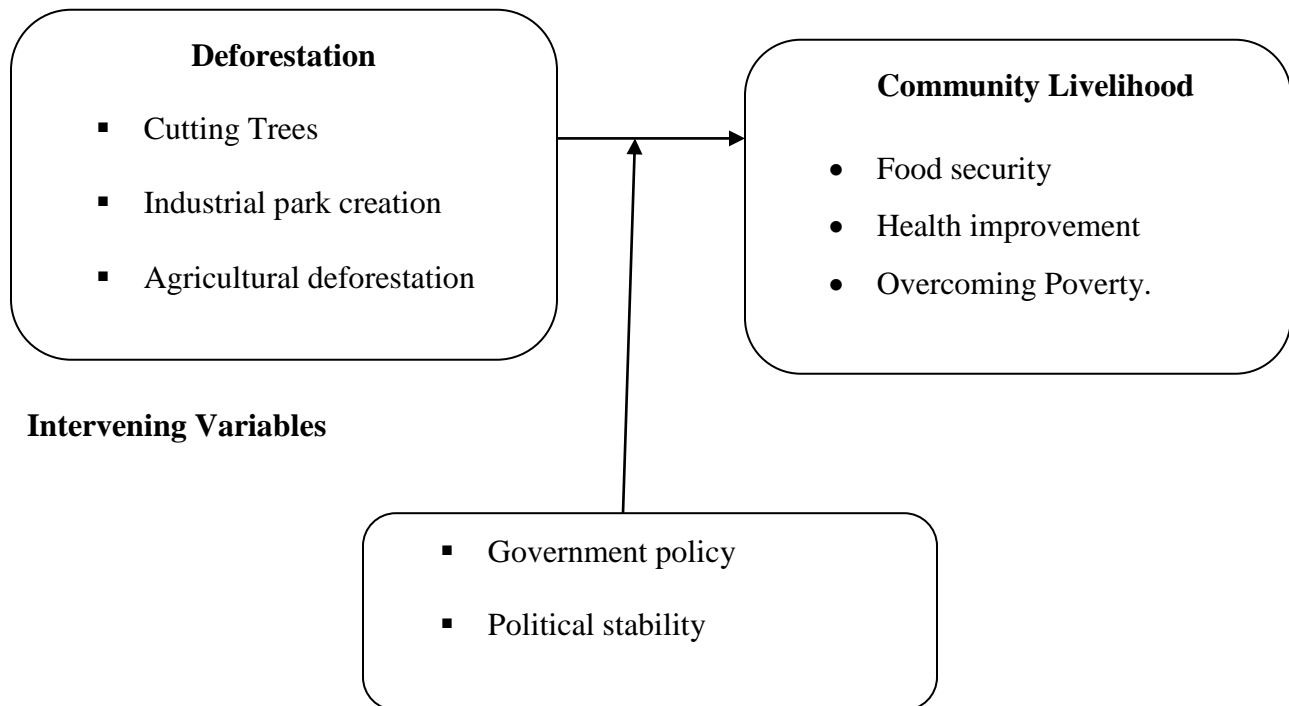
This study will be guided by the empowerment theory adopted by Perkins & Zimmerman (1995) presents a theoretical model for understanding the process and consequences of efforts to exert control and influence over decisions that affect one's life, organizational functioning, and the quality of community life. Empowerment theory provides principles and a framework for organizing our knowledge. The development of empowerment theory also helps advance the construct beyond a passing the provided information. The assessment of the state of deforestation is fundamental for enhancing or delimiting the community livelihood. The theory provides that the values that underlie an empowerment approach to social change and empowerment theory is necessary. The theory provides that livelihood of community can be improved through empowerment in the society and deforestation reduce the development of mechanism and avenues necessary by the different stakeholders in attaining and bridging development of the community.

Empowerment is both a value orientation for working in the community and a theoretical model for understanding the process and consequences of efforts to exert control and influence over decisions that affect one's life, organizational functioning, and the quality of community life (Perkins & Zimmerman, 1995). A distinction between the values that underlie an empowerment approach to social change and empowerment theory is necessary. The value orientation of empowerment suggests goals, aims, and strategies for implementing change. Empowerment theory provides principles and a framework for organizing our knowledge. The development of empowerment theory also helps advance the construct beyond a passing fad and political manipulation (Zimmerman & Warschausky, 1998).

2.2 Conceptual frame work

Independent Variable

Dependent Variable



Source: **Researcher made, 2019**

Explanation of the framework

The framework shows the linkage between deforestation and community livelihood. The deforestation is measured through cutting Trees, industrial park creation and agricultural deforestation while community livelihood is measured through food security, health improvement and overcoming Poverty. The status of the environment is affected through deforestation were livelihood is highly affected.

2.2.2 Review of Literature (Uganda, central Uganda and Mpigi district).

Uganda has carried out several Policies, Legal and institutional reforms aimed at promoting the conservation and sustainable use of the country's forest resources. Among the key reforms include: Putting in place of the National Forestry Policy 2001, enactment of the national forestry and tree planting Act 2003, new institutional arrangements including the forest sector support department, the national forestry authority. District forestry services being made- to address the question of enforcement in the forestry and other environment sub-sectors, Government also established the Environmental Protection Police Unit (NEMA, 2016).

Despite these interventions, the country continues to lose forest cover at a very alarming rate. While for many years it was reported that Uganda was losing approximately 90,000 hectares between 1990 and 2010 of forest cover annually. However, the recent studies conducted by Africa Natural Resources Institute indicate that forest cover loss has now increased to an estimated 200,000 hectares annually (Kayanja&Byarugaba, 2017).The situation is being blamed partly on Uganda's booming population, which is growing at a rate of about 3.6% per annum. At that growth rate, by 2025 the population will almost be approximately to 63 million, close to that of Britain, which has a similar land mass where in 1950 UK had a population of approximately 50 million with an increment of 10 million in the year 2018 (Josephat, 2018).Population growth and migration has increased demand for agricultural land and firewood energy, and rural poverty restricts the ability to invest in sustainable land use practices. The population growth rate of 3.6% per annum leads to exerted high pressure on the forest resources in order to derive people's livelihoods, higher population makes land for settlement and agriculture inadequate and consequently resort to the forest land.

Kyambadde(2012) established that central Uganda has registered high deforestation that is more intense in areas with high population densities. In districts such as Mukono, Mpigi and Luwero, major tracts of land have been cleared in the last decade. Much of this vegetation has secondary woody higher poverty levels over 46% of the people in Uganda live below the poverty line poor people are driven by the higher demand to sustain their livelihoods from the forest resources because they lack alternative sources of income as a consequence depletion of the forests become inevitable (Otieno and Buyinza, 2015). Following the trends, Uganda may not have any forests

left in the next 83 years due to high population growth unless serious interventions are executed not only by Ugandan Government but also International Community (UNEP- United Nations Environment Program to assist Uganda in implementing environmentally sound policies and best practices, and other relevant agencies.

Central Uganda is at risk of losing all its forests if deforestation in Uganda continues at its present rate there would be no forests left in 40 years Other reasons of deforestation include: poor rural electrification and costly electricity which makes 89% of Ugandans to use, firewood and charcoal as the main sources of fuel to cook (Otieno and Buyinza, 2015). Large amounts of forests are also spent as trees are cut for timber and wood because the construction industry still greatly uses timber rather than steel and other substitutes. The people in the rural areas are among the first hit by the environmental negative effect of deforestation which include climate change, soil degradation reduced biodiversity and loss of recreation (NEMA, 2016). Degradation of water- shed areas is leading to deterioration of the quality of life and reduction of the options for development, Farmers are already struggling to adapt to the rapidly changing and increasingly erratic weather patterns since rain is not falling when it is supposed to and drought has left many farmers struggling to find enough food to feed their families.

In many districts of Uganda in Mpigi district with the Mpanga central forest reserve has a declining forest cover has resulted in a fuel wood deficit hence rising costs and increased burdens on women and children who collect firewood (Josephat, 2018). Therefore, if the situation is not reversed the knock on effect will be catastrophic and contributing to exacerbating soil degradation, decline food security, disease and conflict. In the late 1980s, Approx. 75,000 km² (31.7%) out of 236,040 km² of total land in Uganda consisted of forest and woodland. Today, forests and woodlands cover is about 15.2% of Uganda's land surface meaning that Uganda has lost 16.5% of forests and woodland cover. Over the last three decades, growth in human population and corresponding increase in demand for forest products for domestic and industrial use, expansion of agricultural land, illegal settlements and weak forest management capacity have adversely affected the status of natural forests in Uganda, particularly the biodiversity (Josephat, 2018).

Mpanga Central forest reserve, Mpigi district central forest reserves risks losing all its forests if deforestation in Uganda continues at its present rate there would be no forests left in 40 years. Other reasons of deforestation include: poor rural electrification and costly electricity which makes 89% of Ugandans to use firewood and charcoal as the main sources of fuel to cook (Werikhe, 2014). Large amounts of forests are also spent as trees are cut for timber and wood because the construction industry still greatly uses timber rather than steel and other substitutes (NFA, 2015). Today, forests and woodlands cover is about 15.2% of Uganda's land surface meaning that Uganda has lost 16.5% of forests and woodland cover.

2.3. Factors that contribute to deforestation

Understanding drivers of deforestation and degradation is fundamental for the development of relevant policies and measures (Hosonuma et al., 2012) that aim to alter current trends in forest activities toward a more climate and biodiversity friendly outcome. A number of factors have been identified as major causes of the reduction in forest cover over the. In Uganda, deforestation can be linked to both direct and indirect drivers and underlying causes. Direct drivers of deforestation include; conversion of forest land to agriculture, grazing land and forest resource degradation due to firewood collection, pitsawing and charcoal burning. Deforestation is rampant on the 70% of forests on private land which is not regulated and managed. On the central forest reserves conversion into agriculture, is due to weak monitoring mechanisms.

2.3.1 Poor Planning

Poor planning, weak regulation and inappropriate processing technology have resulted in the unsustainable harvesting of forest products, and the degradation of the resource base (Kayanja& Byarugaba, 2011). The problem of overharvesting manifests itself when the annual harvesting rate exceeds the carrying capacity. These problems are attributed to limited institutional capacity and limited resource in both central and local government to improve planning and regulation, and little incentive for the private sector to improve its performance in the absence of firm regulation and the enforcement of professional standards.

2.3.2 Urbanization

In addition, Urbanization and industrial growth are putting pressure on the forest estate. Many urban and peri-urban reserves are under threat of being degazetted. The increasing demand for industrial land has led to the degazetting of nearly 10,000 ha, which will result in a permanent net reduction of the forest estate unless alternative non-forested areas are identified and developed. The most affected forest reserves are those close to the urban and industrial centers, for example Mpigiforest near the capital, Kampala (Chakravarty, Ghosh & Suresh, 2011).. Underlying factors; a number of factors that underlies the decline in the forest resource base and these includes; Policy deficiencies relating to the private sector and local communities over land tenure, access rights and responsibilities for resource management For instance, much of the deforestation occurring in the districts of Buganda is on mailo land. There are no clear mechanisms which allow the Uganda Forest Department to regulate the private forests on these lands.

2.3.3 Poor regulations and weak institutions

There is poor regulation by weakened institutions, which lack funding, and capacity the institutions mandated to manage forest reserves are inadequately funded and they lack enough human resources to implement the government policies of protecting forests however even these institution are being affected by corruption which takes several form that relates to granting concessions, embezzlement of institution funds among others. Population growth and migration has increased demand for agricultural land and firewood(Chakravarty et al., 2011) energy, and rural poverty restricts the ability to invest in sustainable land use practices. The population growth rate of 3.4% per anum leads to exerted high pressure on the forest resources in order to derive people's livelihoods, higher population makes land for settlement and agriculture inadequate and consequently resort to the forest land. Therefore, Deforestation has been reported to be more in- tense in areas with high population densities. In districts such as Mpigi, Mpigi and Luwero, major tracts of land have been cleared in the last decade. Much of this vegetation has secondary woody biomass. Higher poverty levels over 46% of the people in Uganda live below the poverty line poor people are driven by the higher demand to sustain their livelihoods from the forest resources because they lack alternative sources of income(Mwavu, 2007) as a consequence depletion of the forests become inevitable. Shifting agriculture also called slash and burn

agriculture is the clearing of forested land for raising or growing the crops until the soil is exhausted of nutrients and/or the site is overtaken by weeds and then moving on to clear more forest. It is been often reported as the main agent of deforestation. Smallholder production in deforestation and the growing number of such producers notably shifting cultivators were the main cause of deforestation mostly all reports indicate shifting agriculture as responsible for about one half of tropical deforestation and some put it up to two-thirds. Shifting agriculture was greatest in Asia (about 30 per cent) but only about 15 per cent over the whole tropical world. It appears that the proportion of direct conversion of forest to agriculture is increasing and the proportion of shifting agriculture is decreasing with time.

2.3.4 Logging and fuel wood

Logging and fuel wood: Logging does not necessarily cause deforestation. However, logging can seriously degrade forests. Logging in Southeast Asia is more intensive and can be quite destructive. However, logging provides access roads to follow-on settlers and log scales can help finance the cost of clearing remaining trees and preparing land for planting of crops or pasture. Logging thus catalyzes deforestation (Chomitz, Buys, Luca, Thomas and Wertz-Kanounnikoff, 2012). Fuel wood gathering is often concentrated in tropical dry forests and degraded forest areas. Fuelwood is not usually the major cause of deforestation in the humid tropics although it can be in some populated regions with reduced forest area such as in the Philippines, Thailand and parts of Central America. Fuelwood gathering was considered to be the main cause of deforestation and forest degradation in El Salvador. In the drier areas of tropics, Fuel wood gathering can be a major cause of deforestation and degradation.

2.3.5 Overgrazing

Overgrazing is more common in drier areas of the tropics where pastures degraded by overgrazing are subject to soil erosion. Stripping trees to provide fodder for grazing animals can also be a problem in some dry areas of the tropics but is probably not a major cause of deforestation. Clear cutting and overgrazing have turned large areas of Qinghai province in China into a desert. Overgrazing are causing large areas of grasslands north of Beijing and in Inner Mongolia and Qinghai province to turn into a desert. One man who lived in a village on the

eastern edge of the Qinghai-Tibet plateau that was being swallowed up by sand told the New York Times, "The pasture here used to be so greensand rich. But now the grass is disappearing and the sand is coming." Huge flocks of sheep and goats strip the land of vegetation. In Xillinggol Prefecture in Inner Mongolia, for example, the livestock population increased from 2 million in 1977 to 18 million in 2000, turning one third of the grassland area to desert. Unless something is done the entire prefecture could be uninhabitable by 2020. Overgrazing is exacerbated by sociological phenomena called "the tragedy of the common." People share land but raises animals for themselves and try to enrich them by rising as many as they can. This leads to more animals than the land can support. Grassland in Qinghai that can support 3.7 million sheep had 5.5 million sheep in 1997. Animals remove the vegetation and winds finished the job by blowing away the top soil, transforming grasslands into desert. When a herder was asked why he was grazing goats next to a sign that said "Protect vegetation, no grazing," he said The lands are too infertile to grow crops herding is the only way forus to survive (Hays, 2008 web page).

2.3.6 Fires

Fires are a major tool used in clearing the forest for shifting and permanent agriculture and for developing pastures. Fire is a good servant but has a poor master. Fire used responsibly can be a valuable tool in agricultural and forest management but if abused it can be a significant cause of deforestation. Based on the data available from 118 countries representing 65 per cent of the global forest area, an average of 19.8 million hectares or one per cent of all forests were reported to be significantly affected each year by forest fires (Anon., 2010). Deforestation due to road pavements in Brazil had also lead to higher incidences of forest fires.

2.3.7 Urbanization/industrialization and infra-structure

Expanding cities and towns require land to establish the infrastructures necessary to support growing population which is done by clearing the forests (Sands, 2015). Tropical forests are a major target of infra-structure developments for oil exploitation, logging concessions or hydropower dam construction which inevitably conveys the expansion of the road network and the construction of roads in pristine areas (Kaimowitz and Angelsen, 2008). The construction of roads, railways, bridges, and airports opens up the land to development and brings increasing numbers of people to forest frontier. Whether supported or not by the governmental programs,

these settlers have usually colonized the forest by using logging trails or new roads to access the forest for subsistence land.(Amor and Pfaff, 2008). The development of these infrastructure projects are of worldwide concern, since tropical forest clearing accounts for roughly 20 per cent of anthropogenic carbon emissions destroying globally significant carbon sinks and around 21 per cent of tropical forests have been lost worldwide since 1980.

2.3.8 Air pollution

Air pollution is associated with degradation of some European and North American forests. The syndrome is called “Waldsterben” or forest death. In 1982, eight per cent of all West German trees exhibited damage that rose to about 52 per cent by 1987 and half of the trees reported dying of Waldsterben in the Alps. High elevation forests show the earliest damage including forests in the north-east and central United States. It is well established that military operations caused deforestation during the Vietnam War and elsewhere (Sands, 2015). More recently, linkages have been documented between the civil war in Myanmar and the timber trade between Myanmar and Thailand. Myanmar regime sells timber to the Thais to finance its civil war against the Karen hill tribe. Forest destruction in El Salvador has resulted from war. Apart from military involvements in wars, the role of military in deforestation has been documented in Southeast Asia and South America (Sands, 2015). The authors also observed that role of powerful military in Brazilian politics are a major cause of Amazonian forest destruction.

2.3.9 Exploitation by industrialized countries

Wealthy countries or the erstwhile colonial powers having deficit of their own natural resources are mainly sustaining on the resources of the financially poorer countries those are generally natural resource rich. Twenty per cent of the world’s population is using 80 per cent of the world’s resources (Amor and Pfaff, 2008). Unfortunately also the governments of these poor resource rich countries had generally adopted the same growth-syndrome as their western neighbors or their erstwhile colonial master giving emphasis on maximizing exports, revenues and exploiting their rich natural resources unsustainably for short-term gains. Moreover, corruption in government, the military and economic powers is well known. The problem is further worsened by the low price of the most Third World exports being realized in the international market.

2.3.10 Overpopulation and poverty

The role of population in deforestation is a contentious issue (Sands, 2015). The impact of population density on deforestation has been a subject of controversy. Poverty and overpopulation are believed to be the main causes of forest loss according to the international agencies such as FAO and intergovernmental bodies. It is generally believed by these organizations that they can solve the problem by encouraging development and trying to reduce population growth. Conversely, the World Rainforest Movement and many other NGOs hold unrestrained development and the excessive consumption habits of rich industrialized countries directly responsible for most forest loss. However there is good evidence that rapid population growth is a major indirect and over-arching cause of deforestation. More people require more food and space which requires more land for agriculture and habitation. This in turn results in more clearing of forests. Arguably increasing population is the biggest challenge of all to achieve sustainable management of human life support systems and controlling population growth is perhaps the best single thing that can be done to promote sustainability. Overpopulation is not a problem exclusive to Third World countries. An individual in an industrialized country is likely to consume in the order of sixty times as much of the world's resources as a person in a poor country. The growing populations in rich industrialized nations are therefore responsible for much of the exploitation of the earth and there is a clear link between the overconsumption in rich countries and deforestation in the tropics.

Acheampong and Marfo (2011) provided that poverty and overpopulation are inextricably linked. Poverty, while undeniably responsible for much of the damage to rainforests, has to a large extent been brought about by the greed of the rich industrialized nations and the Third World elites who seek to emulate them. Development is often regarded as the solution to world poverty, seldom helps those whose need is greatest. Thus, it is often the cause rather than the cure for poverty. The claim that overpopulation is the cause of deforestation is used by many governments and aid agencies as an excuse for inaction. In tropical countries, pressure from human settlement comes about more from inequitable land distribution than from population pressure. Generally, most of the land is owned by small but powerful elite which displaces poor farmers into rainforest areas. So long as these elites maintain their grip on power, lasting land

reform will be difficult to achieve and deforestation continues unabated. Therefore poverty is well considered to be an important underlying cause of forest conversion by small-scale farmers and naturally forest-dense areas are frequently associated with high levels of poverty. The population also often lacks the finance necessary for investments to maintain the quality of soil or increase yields on the existing cleared land (Purnamasari, 2010). Deforestation is affected mainly by the uneven distribution of wealth. Shifting cultivators at the forest frontier are among the poorest and most marginalized sections of the population.

Corruption and political cause The FAO identified forest crime and corruption as one of the main causes of deforestation in its 2001 report and warned that immediate attention has to be given to illegal activities and corruption in the world's forests in many countries. Illegal forest practices may include the approval of illegal contracts with private enterprises by forestry officers, illegal sale of harvesting permits, under-declaring volumes cut in public forest, under pricing of wood in concessions, harvesting of protected trees by commercial corporations, smuggling of forest products across borders and allowing illegal logging, processing for straw materials without a license (Contreras-Hermosilla, 2011).

2.4 Effect of deforestation on community livelihood

The impacts of deforestation in exacerbating rural poverty are complex and widespread. Not only does forest loss reduce forest communities' contributions to national economic growth, but more critically, it threatens the livelihoods and traditions of rural and forest dwelling people across the country (Acheampong and Marfo, 2011). With the availability of NTFPs reducing alongside the trees that support them, forest communities often have to travel further distances into the forest to access products that sustain their food security and socioeconomic well-being. Across Ghana, logging operations have also had negative impacts on the collection of NTFPs at the local community level. Forest dwelling or depending communities rarely benefit from timber harvesting as concessions are reserved exclusively for corporate use (despite pervasive illegal tree cutting), while social responsibility agreements do not make adequate compensation provisions when forest dwellers' farming activities are harmed in the process of doing so (TBI, 2010).

2.4.1 Climate change

It is essential to distinguish between microclimates, regional climate and global climate while assessing the effects of forest on climate especially the effect of tropical deforestation on climate (Dickinson, 1981). Deforestation can change the global change of energy not only through the micrometeorological processes but also by increasing the concentration of carbon dioxide in the atmosphere (Pinker, 1980) because carbon dioxide absorbs thermal infrared radiation in the atmosphere. Moreover deforestation can lead to increase in the albedo of the land surface and hence affects the radiation budget of the region. Deforestation affects wind flows, water vapour flows and absorption of solar energy thus clearly influencing local and global climate (Chomitz *et al.*, 2007). Deforestation on lowland plains moves cloud formation and rainfall to higher elevations (Lawton *et al.*, 2001). Deforestation disrupts normal weather patterns creating hotter and drier weather thus increasing drought and desertification, crop failures, melting of the polar ice caps, coastal flooding and displacement of major vegetation regimes. In the dry forest zones, land degradation has become an increasingly serious problem resulting in extreme cases in desertification. Desertification is the consequence of extremes in climatic variation and unsustainable land use practices including overcutting of forest cover.

Global warming or global change includes anthropogenic ally produced climatic and ecological problems such as recent apparent climatic temperature shifts and precipitation regimes in some areas, sea level rise, stratospheric ozone depletion, atmospheric pollution and forest decline. Tropical forests are shrinking at a rate of about five per cent per decades forests are logged and cleared to supply local, regional, national and global markets firewood products, cattle, agricultural produce and biofuels (Anon, 2010). One of the most important ramifications of deforestation is its effect on the global atmosphere. Deforestation contributes to global warming which occurs from increased atmospheric concentrations of greenhouse gases (GHG) leading to net increase in the global mean temperature as the forests are primary terrestrial sink of carbon. Thus deforestation disrupts the global carbon cycle increasing the concentration of atmospheric carbon dioxide. Tropical deforestation is responsible for the emission of roughly two billion tonnes of carbon (as CO₂) to the atmosphere per year. Release of the carbon dioxide due to global deforestation is equivalent to an estimated 25 per cent of emissions from combustion of fossil fuels.

2.4.2 Water and soil resources loss and flooding

Deforestation also disrupts the global water cycle (Bruijnzeel, 2014). With removal of part of the forest, the area cannot hold as much water creating a drier climate. Water resources affected by deforestation include drinking water, fisheries and aquatic habitats, flood/drought control, waterways and dams affected by siltation, less appealing water related recreation, and damage to crops and irrigation systems from erosion and turbidity. Urban water protection is potentially one of the most important services that forest provides. Filtering and treating water inexpensive. Forests can reduce the costs of doing so either actively by filtering runoff or passively by substituting for housing or farms that generate runoff (Dudley and Stolton, 2013). Deforestation can also result into watersheds that are no longer able to sustain and regulate water flows from rivers and streams. Once they are gone, too much water can result into downstream flooding, many of which have caused disasters in many parts of the world. This downstream flow causes soil erosion thus also silting of water courses, lakes and dams. Deforestation increases flooding mainly for two reasons. First, with a smaller 'tree fountain' effect, soils are more likely to be fully saturated with water. The 'sponge' fills up earlier in wet season, causing additional precipitation to run off and increasing flood risk. Second, deforestation often results in soil compaction unable to absorb rain. Locally, this causes a faster response of stream flows to rainfall and thus potential flash flooding. Moreover deforestation also decrease dry season flows.

The long term effect of deforestation on the soil resource can be severe. Clearing the vegetative cover for slash and burn farming exposes the soil to the intensity of the tropical sun and torrential rains. Forest floors with their leaf litter and porous soils easily accommodate intense rainfall. The effects of deforestation on water availability, flash floods and dry season flows depend on what happens to these countervailing influences of infiltration and evapotranspiration- the sponge versus the fountain (Bruijnzeel, 2014). Deforestation and other land use changes have increased the proportion of the basin subject to erosion and so over the long run have contributed to siltation. Heavy siltation has raised the river bed increasing the risk of flooding especially in Yangtze river basin in China, the major river basins of humid tropics in East Asia and the Amazonian basin

2.4.3 Decreased biodiversity

Decreased biodiversity, habitat loss and conflicts; Forests especially those in the tropics serve as storehouses of biodiversity and consequently deforestation, fragmentation and degradation destroys the biodiversity as a whole and habitat for migratory species including the endangered ones, some of which have still to be catalogued. Tropical forests support about two thirds of all known species and contain 65 per cent of the world's 10, 000 endangered species (Myers and Mittermeier, 2010). Retaining the biodiversity of the forested areas is like retaining a form of capital, until more research can establish the relative importance of various plants and animal species (Mangave, 2014). According to the World Health Organization, about 80 per cent of the world's population relies for primary health care at least partially on traditional medicine. The biodiversity loss and associated large changes in forest cover could trigger abrupt, irreversible and harmful changes. These include regional climate change including feedback effects that could theoretically shift rainforests to savannas and the emergence of new pathogens as the growing trade in bush meat increases contact between humans and animals (Anon., 2012).

Economic losses: The tropical forests destroyed each year amounts to a loss in forest capital valued at US \$ 45billion (Hansen, 1997). By destroying the forests, all potential future revenues and future employment that could be derived from their sustainable management for timber and no timber products disappear.

2.4.4 Social Consequences

Social consequences: Deforestation, in other words, is an expression of social injustice. The social consequences of deforestation are many, often with devastating long-term impacts. For indigenous communities, the arrival of civilization usually means the destruction/change of their traditional life-style and the breakdown of their social institutions mostly with their displacement from their ancestral area. The intrusion of outsiders destroys traditional life styles, customs and religious beliefs which intensifies with infra-structure development like construction of roads which results into frontier expansion often with social and land conflicts. The most immediate social impact of deforestation occurs at the local level with the loss of ecological services provided by the forests. Forests afford humans valuable services such as erosion prevention,

flood control, water treatment, fisheries protection and pollination functions that are particularly important to the world's poorest people who rely on natural resources for their everyday survival. By destroying the forests we risk our own quality of life, gamble with the stability of climate and local weather, threaten the existence of other species and undermine the valuable services provided by biological diversity.

2.5 Possible mechanisms for addressing deforestation

As part of efforts to ensure effective management of Uganda's environment and natural resources, several policies and institutions have been put in place. Dissemination of information and decentralization of environmental management as proposed in these policies is still lacking. Wide spread corruption, high level of impunity, inequitable sharing of forest resources coupled with limited government funding makes the policies remain superficial and never implemented. And therefore, the country's natural resources continue to be degraded, and this jeopardizes both individual livelihoods and the country's economic development. Below, are some of the interventions that should be done to address the loopholes in the forestry policy and Uganda national environmental management policy (Werikhe, 2014).

2.5.1 Conserving biodiversity

Conserving biodiversity basing on protected areas alone is not sufficient, other conservation efforts outside protected areas can also be mitigative such as valuing biodiversity on private land where we have the highest rate of biodiversity loss. These acts as an incentive to protect the biodiversity resources in the forests and such initiatives also help solve the underlying causes of deforestation like high poverty rates. This action can be implemented by setting aside a biodiversity fund through government agencies such as NFA and NEMA. In addition expansion of protected to include more areas with forests is a better option.

Comprehensive implementation of the international conventions relevant to biodiversity protection and forest resource conservation, proper implementation needs adequate monitoring and measuring of performance of the expectation and therefore in any convention there need a commissions within the relevant departments of ministry of water lands and environment responsible to follow up the appropriate implementation of these conventions (Rhett, 2016).

2.5.2 Formation of one body to govern all biodiversity conservation

Formation of one body to govern all biodiversity conservation issues in the country. This would help to check on the deforestation rate since it will eliminate unrealistic competition amongst sectors and uniform goals will be set. It also unites the existing sectors concerning biodiversity conservation. Promoting activities that reduce the pressure off the forest like sericulture, butterfly farming, improved bee-keeping, development of fodder banks, bio-intensive agriculture and farm forestry. And should be extremely active and vigorous around the forests resources.

Increase per capita income and check on the population growth: This is central tenet in reducing deforestation in Uganda. This is only possible if there is increased income and improved literacy levels because with improved standards of living, over dependence on forest products for example as a source of energy is checked and land use change due to literacy. Environmental goods and service trading: Many developed countries and organizations have developed programs to curb deforestation. This is mainly through Clean Development Mechanisms and Reducing Emissions from Deforestation and Forest Degradation. Private land owners with natural forest cover on their land should be given direct monetary or other incentives to encourage them to limit deforestation (Obua, Agea & Ogwal, 2010).

2.5.3 Forest product and service valuation

Forest product and service valuation: monetary digits are more easily understood by the public. Forest goods and services should be explored and a value attached to them so that a lay-man can understand. This can be done through imposing realistic prices on forest products and services, forest rent and forest productivity by the government this is quite difficult but environmental valuation methods like comparing alternative artificial cost of filtering water can be easily done to get the actual value of forest services.

Increase the area and standard of management of protected areas: The protected areas are crucial in addressing biodiversity conservation. Protected areas alone, however, are not sufficient to conserve biodiversity. They should be considered alongside, and as part of, a wider strategy to conserve biodiversity. Support, reforms and advocacy: Campaigns opposing deforestation and to

reform agencies which fund such schemes should be supported. Local campaigns against specific mining, dams, industrial and tourist developments should be supported. Further reform of the World Bank and other such organizations is largely the demand of time (Rhett, 2016).

Investment in research, education and extension services: Educating stakeholders helps them understand how to prevent and reduce adverse environmental effects associated with deforestation. Extension services are also crucial because certain class of people have the information, however passing it on to the stakeholders is another challenge that can be addressed through extension

2.5.4 Place a regulatory framework

The government in addition is required to put in place a regulatory framework, which will create a positive investment climate to encourage private sector investment in commercial forest plantations. The government is required, amongst other tasks, to set out priority areas for the development of carbon storage plantations in different areas of Uganda (Obua, Agea&Ogwal, 2010). Commercial forest plantation can reduce pressure exerted on the natural forest which is threatening biodiversity. Imposing harsh punishments and penalties on those destroying the forest: for instance all those caught in any act of destroying the forest should be forced to replant or carry out enrichment planting under the supervision of NFA or NEMA at the same time meet the costs involved In the process failure to do should face the court and be succumbed to heavy imprisonment sentences

Uganda lacks proper certification and audit guidelines therefore national initiative institute should be developed to define the international standards in relation to the national standards. These should be in line with the local situation of Uganda and in doing so all stake holders must be involved in the process of developing these guidelines (Aliyu, Modibbo, Medugu, Ayo, 2014). Revision of the EIA process and procedure from the current system of allowing project owners pay for the EIA process which compromises or biases the outcomes to establishing and Independent body that should carry out EIA processes, auditing and certification, these body (ies) should be contracted to carry out the assessment process without the payment from the

project owners in order to avoid bias in the EIA process. The body should be paid by the government of Uganda under the Ministry of Lands, Water and Environment

2.5.5 Bureaucracy involved

The bureaucracy involved in the initial stages of applying for the EIA, audit and certification should be checked. This helps in the shortening of the lengthy process which will attract many people to apply for EIA and in so doing they help to control environmental degradation and deforestation. Decentralization of forest rights and powers: Collaborative forest management can only be a success if powers from the central governance are decentralized to the local communities. This promotes a sense of belonging amongst the local communities and tends to care for the forest resource instead of exploiting it unsustainably.

2.5.6 Perception Quality and Awareness

Perception quality and awareness: the best weapon to fighting everything is the human brain, if the people of Uganda are informed of their roles and the role of forests in their lives, deforestation will be reduced. This can be done through improving literacy levels. Develop updated the information system on land tenure systems and land use and land use changes is to avoid inadequate knowledge of the changes in these parameters. Inadequate. Knowledge of how much land, where it is and what it is composed of seems to be straightforward but surprisingly this most basic information is not always available. It is not possible to properly manage a forest ecosystem without first understanding where it exists (Obua, Agea & Ogwal, 2010).

Support, reforms and advocacy: Campaigns opposing land use changes (deforestation) and reform agencies which fund such schemes should be supported. Local campaigns against specific mining, dams, industrial and tourist developments should be supported. Policy and regulatory measures-enforcement and compliance: Many policies and regulatory measures have been established but need to be effectively enforced (Vijay, Pimm, Jenkins, Smith, 2016). These policies should be such that they encourage local and institutional participation in forest conservation. Formal and informal enforcement and compliance measures can be used which involve negotiation, warnings, cancelling work orders, notices of violation, fines, arrests and court actions.

2.5.7 Sensitization

Sensitization of land owners and users about benefits of conservation and dangers which may be brought about by misuse of such forest resources for example food production is important but effects of climate change may be long term, soil erosion due to deforestation can drastically lead to decline in food production. The government should consider strengthening land tenure rights through helping tenants by occupants secure land titles, and the people evicted need their land rights secured where they are resettled.

In addition on focusing on commercial tree planting, the government through NFA should also provide incentives to enable the poor to invest in forest conservation and meet their short term needs such incentives may take the form of forestry based enterprises and saving scheme that meet their short term needs to provide a secure place for the poor to save and borrow in modest amounts. However for these small scale enterprises too lead to conservation and avoid deforestation, they must be commercially viable, done on a large scale and capable of delivering significant benefits to the community. The development of local forest bases enterprises represents an opportunity for strengthening the livelihoods of the poor, forest dependent people at the same time providing economic incentives to conserve forests (Hamilton, 2010).

2.5.8 Strengthen anti-corruption efforts to protect the forests since implementation

Strengthen anti-corruption efforts to protect the forests since implementation of the government policies is marred by corruption tendencies with the institutions responsible for policy implementation, in addition training environmental police with some basic form of environment and natural resource protection is equally important. The human resources within the environmental institutions such as NFA, NEMA, and UWA among others should also be stepped up and at the same time they should be supported financially. Wage increment does not only motivate them, but also can help curb down corruption in these institutions. The policy that relates to deforestation is also affected by other policies such as the land policy, population policy among others and it is also affected by other sectors hence there needs to be streamlining of environmental issues such as deforestation in all national policy and institutional frameworks so as to pull down the rate of deforestation is an environment problem in Uganda Food Agricultural Organization, 2010).

2.5.9 Promote Sustainable Management

Promote sustainable management: In order to promote sustainable forest management, it must be sustainable ecologically, economically and socially. Achieving ecological sustainability means that the ecological values of the forest must not be degraded and if possible they should be improved. This means that silviculture and management should not reduce biodiversity, soil erosion should be controlled, soil fertility should not be lost, water quality on and off site should be maintained and that forest health and vitality should be safeguarded. However, management for environmental services alone is not economically and socially sustainable. It will not happen until or unless the developing nations have reached a stage of development and affluence that they can accommodate the costs of doing so. Alternatively, the developed world must be prepared to meet all the costs (Anon, 2011). There are vast areas of unused land as discussed earlier some of which is degraded and of low fertility. Technological advances are being made to bring this land back into production. This should be a major priority since a significant proportion of cleared tropical forest will eventually end up as degraded land of low fertility.

Encouraging substitutes: For all purposes where tropical or other timber is used, other woods or materials could be substituted. We can stop using timber and urge others to do the same. As long there is a market for wood products, trees will continue to be cut down. Labeling schemes, aimed at helping consumers to choose environmental friendly timbers are currently being discussed in many countries.

2.5.10 Strengthen government and non-government institutions and policies

Strengthen government and non-government institutions and policies: Strong and stable government is essential to slow down the rate of deforestation. FAO(2010) considered that half of the current tropical deforestation could be stopped if the governments of deforesting countries were determined to do so (Anon., 2010). Environmental NGO's contribution towards conservation management has been enormous. They have the advantage over government organizations and large international organizations because they are not constrained by government to government bureaucracy and inertia. They are better equipped to bypass corruption and they are very effective at getting to the people at the frontier who are in most need.

2.6 Research Gaps

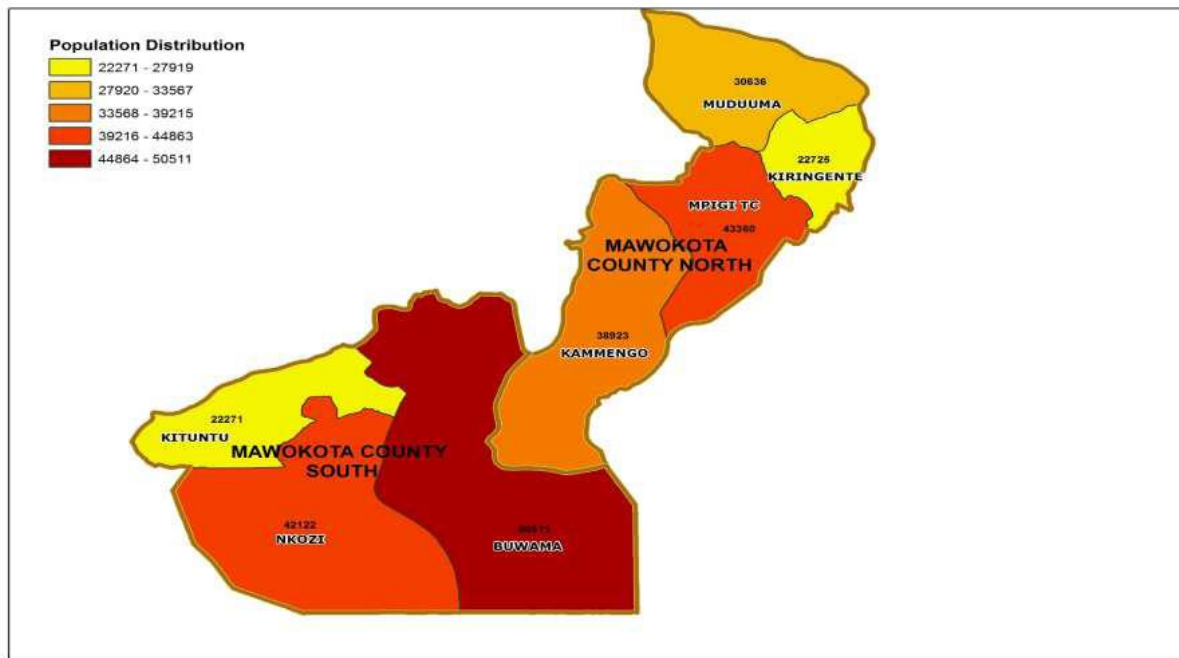
A few studies were conducted on the study topic Deforestation and community livelihood in Uganda. Kayanja & Byarugaba (2017) contend that while for many years it was reported that Uganda was losing approximately 90,000 hectares between 1990 and 2010 of forest cover annually. However, the recent studies conducted by Africa Natural Resources Institute indicate that forest cover loss has now increased to an estimated 200,000 hectares annually. Even Kyambadde (2012) established that central Uganda has registered high deforestation that is more intense in areas with high population densities. In districts such as Mukono, Mpigi and Luwero, major tracts of land have been cleared in the last decade. Apart from the few focus, no comprehensive study has been conducted on the study area, hence this study sets to identify the factors that contribute to deforestation in Mpanga Central forest reserve, Mpigi district, examine the effect of deforestation on community livelihood in Mpanga Central forest reserve, Mpigi district and finally to establish the possible mechanisms for addressing deforestation in Mpanga Central forest reserve, Mpigi district. The study will be done to fill the geographical, time and knowledge gaps that this study did not address.

CHAPTER THREE

METHODOLOGY

This chapter outlines the study area, study design to be used in the research, the area of study, the population to sample from, the sample size, sampling procedure, sources of data, data collection tools, validity and reliability of study, ethical issues and data analysis.

3.1 Study area



Source: UBOS, 2018 Demographic Survey

Figure 3.1: Map of Mpigi district

3.1.2 Location

Mpigi district borders with the district of Wakiso in the North East and East, Mityana in the North, Butambala in West and North West, Kalangala and Lake Victoria in the South and Kalungu is to the south West. The District lies on the shores of Lake Victoria, the largest fresh water lake on the Continent of Africa. The Equator, a natural spectacular phenomena traverses the district at Nabusanke in Nkozi sub-county and River Katonga One of Uganda's longest rivers that Joins Lake Victoria to Lake George traverses the district in Nkozi Sub County.

3.1.3 Size

Mpigi District covers an area of 1,041.13 square kms which is about 0.07% of the country size. Mpigi District Headquarters are situated 2 kms on Mpigi–Butambala Road off Kampala -Masaka Highway and it is 35 kms from Kampala the Capital City of Uganda.

3.3.1 Climate

The District experiences a bi-modal rainfall pattern with first rains occurring between March and May and second rains coming between September and November with an average rainfall amount of 1320 mm though in many areas around the Lake zone it is between 1750mm and 2000mm. Mpigi District has an average annual maximum temperatures ranging between 22.5⁰C and 27⁰C. Average relative humidity ranges between 80% and 95% especially in forest areas. The average monthly days of rainfall are 11. The minimum temperature in the district is 11⁰ C while the maximum recorded is 33.3⁰C. The bi-modal type of rainfall is conducive for rain fed agricultural production throughout the year and crops mainly grown include bananas, tobacco, coffee, maize, beans and tea. Up-land rice and cocoa are increasingly gaining importance in the District.

3.3.2 Vegetation

The District is characterized by evergreen vegetation with many seasonal wetlands and few areas with savanna type of vegetation. The savannah vegetation is typical for human activities. The thick forests especially those on private land are being used for timber harvesting although this poses a threat of environmental degradation since reforestation and afforestation are very limited.

3.3.3 Topography

The district lies in the central plateau of Uganda comprising of flat topped –undulating hills with deeply incised valleys. Hills summits range between 1100m-1400 meters above sea level. These hills form part of the catchment for both seasonal and permanent wetlands that drain most low lying areas. The topography and geology provides abundant gravel and rocks resources used in construction. The underlying geology comprises mainly of rocks of Precambrian age that are highly weathered. The district has a variety of iron deposits, stone debris, Murrum and clay soils. The most dominant rocks being of the Buganda-Tooro system.

The district relief is generally made of plateau and small undulating hills characterizing the Buganda surface and lying between 1,182 and 1,341 meters above sea level. Much of the low

lying areas are drained by seasonal streams. The district has a variety of iron deposits, stone debris, Murrum and clay soils

3.3.4 Soils

The Land tenure system in Mpigi District is characterized by owner occupied contributing 77%, 20.7% staying on rented premises while only 2.3% of the Population live on subsidized type of tenure system.

3.3.5 Land

The Land tenure system in Mpanga Central forest reserve, Mpigi district is characterized by owner occupied contributing 77%, 20.7% staying on rented premises while only 2.3% of the Population live on subsidized type of tenure system

3.3.6 Wetlands

The total area of Mpanga Central forest reserve, Mpigi district is 1,541.13 square kms of which 16% is covered by wetland. 273 km², or 54% of the wetland area is permanent wetland, while 280 km² is seasonal. Most permanent wetlands lie on the fringe of Lake Victoria. The wetlands lie at altitudes varying from 1,106 - 1,181 m (3,650 - 3,900 ft) above sea level. The watershed to these wetlands has flat-topped hills of the Buganda landscape.

Wetlands in Mpigi district lie in two drainage systems, namely Lake Victoria and Kafu. The wetlands of the Lake Victoria drainage system form a very extensive periphery to the north western shore of Lake Victoria. Each is independent of the other. Examples include Katonga, Nakyetema, Nawandigi, Kibukuta and Kasemulamba. The rivers draining these wetlands have indefinite water courses and are embedded in deeply incised valleys. The wetlands have a close relationship with the lake in terms of hydrology and soil. The Kafu drainage system consists of the permanent wetlands of Mayanja and Lugogo that drain into the Kafu river. Within Mpigi district, the main wetlands in this system are the Mayanja Kato and Wasswa, which have several other smaller ones draining into them. Some of these tributary wetlands include Namaya-Mwerango, Muyobozi, Danze, Munyika-Mondo, Tugavune, Katabana and Nasirye (Nastri).

3.4 Research Design

This study adopted a descriptive research design based on both qualitative and quantitative research design. The design is chosen in order to provide an elaborate assessment of the state of deforestation and community livelihoods. It employed the quantitative approach in that it was partly based on variables with numbers and analyzed with statistical procedures. It also employed a qualitative approach because it was aimed at obtaining data expressed in non-numerical terms. In particular, it was a descriptive design because it sought to gather data from a sample of a population at a particular time and in so doing, pertinent data was collected from all respondents once and for all to reduce on time and costs involved.

3.5 Study Population

The study was conducted on the locality of Mpigi district focusing on Mpanga Central forest reserve. According to the Demographia 2018, Mpigi district has a population of 100,000 adults. The study target the local population, municipality staff, environment staff and NGOs located in Mpigi district. The study hence targets the population for the study in the area of the study.

3.5.2 Sample Size

The sample in this study was restricted to the information required and for the purpose of this study; a sample size was determined using Slovene's Formula to come up with appropriate sample size to be used in the study. Slovene's Formula states that, given a population, the minimum Sample size is given by:

$$n = \frac{N}{1 + N\alpha^2}$$

Where; n = the sample size

N = total population of respondents, that is 100,000.

α = the level of significance, that is 0.05

$$n = \frac{N}{1 + N\alpha^2}$$

$$n = \frac{100,000}{1 + 100,000(0.05)}$$

$$n = \frac{100,000}{1 + 100,000 * 0.0025}$$

$$n = 399.5$$

A sample size of 400 respondents was selected to participate in the study.

3.5.3 Sampling Technique

Sampling is the process of selecting elements from a population in such a way that the sample elements selected represents the population. Because of resource constraints, a small sample was selected and handled using a simple random sampling procedure, purposive sampling and convenience sampling. Purposive sampling was used in the selection of the civil servants of Mpigi district, environment staff and NGO staff this is because these are perceived to have more suitable information so purposive sampling enabled the attaining those officials with key knowledge on the study. The convenience sampling was used in selection of local population sampling will be used because it enabled the selection of respondents.

Table 3.1: Population and Sample Size of the study

Categories of respondents	Sample size	Methods Used
Environmentalists(Mpigi district and NRA)	10	Purposive Sampling
Mpigi district	40	Purposive Sampling
NGOs (1 NGOs) (Eco Trust)	8	Purposive Sampling
Local population	342	Convenience sampling
Total	400	

Source: Researcher, devised.

3.6 Data Collection Instruments

This study comprised of two research techniques to collect data i.e. data collection was done using two methods, in-depth interviews and questionnaires was administered to some respondents who can read and interpret the question.

3.6.1 Questionnaire

This is a technique in which the researcher listed of short questions to the respondents requesting them to fill and collect data later. Open and Closed ended questions were designed to suit the objectives used to effectively attain data for the study. The questionnaires were used to collect data from all respondents concerning deforestation and community livelihood. The data was attained using questionnaires from local population around the Mpanga forest reserve and district employees using questionnaires.

3.6.2 Key Informant Guide

In this technique, the researcher personally went ahead to the respondents and asks them questions directly related to the topic of study. It involved individual interviews. The interviews were conducted with the NGOs and environmentalists.

3.7 Validity and Reliability

3.7.1 Validity of the study

The validity is measured by using content validity where all questions answered by the respondents will make sure that they truly measured the variables being researched upon (Amin, 2005). To ensure the validity of the questionnaires two experts in research involved in instrumentation of the research instruments. In this regard, after formulating the questionnaires were submitted to the two experts to ensure their validity through their duties' basis. This was based on the estimated alpha coefficient value of 0.7 and more. Thus, after the experts' judgment, the compilation of the resonances from raters will be computed to determine the content validity index.

3.7.2 Reliability of the study

To ensure that the data is reliable and valid, standard tests were done. The reliability test involved a "test and retest" exercise. This means the instrument was subjected to the representative sample. Whether each time the question asked and the respondent answered a question similar or consistent, then the instrument was considered reliable. Reliability refers to the degree to which the instrument is consistent with whatever it is measuring Amin, (2005). A research instrument is said to be valid if it actually measures what is supposed to be measured Amin, (2005). Since validity is a measure of how the question asked makes sense to the respondent. A few selected respondents advised whether the question makes sense by ranking it

on a scale of very clear, not clear, and very unclear. Alpha was used to measure instrument reliability and the minimum reliability of 0.7.

3.8 Data Analysis

3.8.1 Quantitative Analysis

The quantitative data involved information from the questionnaires only. Data from the field from the raw data for proper interpretation. The coded data was entered into the computer, checked and statistically analyzed using the Statistical Package for Social Scientists (SPSS) software package to generate descriptive and inferential statistics descriptive analysis that was applied to the primary variable and associated indicator items related to the study objectives. The coded data was entered into the Computer, checked and statistically analyzed using the Statistical Package for Social Scientists (SPSS) software package to generate descriptive statistics. Descriptive analysis was applied to describe the primary variable and associated indicator items related to the study objectives. The results for the study presented in form of tables then discussed in relation to existing literature. The presentations were done using frequency and percentages and then personal analysis according to the questionnaire presentations.

3.8.2 Qualitative analysis

The researcher used manual coding on the transcripts to identify the significant statements across individual interviews. Subsequent readings of the significant statement helped in identifying sub-themes emerging within the patterns. For presentation of thematic findings, both textual and structural descriptions were used in the results section. Textual descriptions are significant statements used to write what the participants experience. Structural descriptions are the interpretation of the context or setting that influenced participants' experiences. For textual descriptions, the quotes of participants were given in italics with the respondent to whom that quote belongs marked with type. The structural descriptions as interpreted by the researcher provided in plain text.

3.9 Ethical Considerations

It is important during the process of research for the researcher to make respondents to understand that participation is voluntary and that participants are free to refuse to answer any question and to withdraw from participation any time they are chosen.

Another important consideration involved getting the informed consent of those going to be met during the research process, which involved interviews and observations on issues that may be delicate to some respondents. The researcher undertook to bear this seriously in mind.

Accuracy and honesty during the research process is very important for academic research to proceed. A researcher treated a research project with utmost care, in that there had no temptation to cheat and generate research results, since it jeopardizes the conception of the research.

3.10 Limitations and Solutions

Lack of co-operation by some respondents was a constraint to this study. In Uganda it is common that researchers are viewed in a negative way, usually staff thinks that it is a problem of finding exercise that rendered most of the jobless at the end of the exercise. This study assured the respondents that the study is purely for academic purposes.

Time, the researcher anticipate that there was a problem of insufficient time. However, this was solved by making sure that the researcher is given enough/ sufficient time and maximum concentration.

The cost of the research was very high in regard to the already incurred cost of accessing relevant stationary, printing and the yet to be incurred cost of photocopying, binding, transport, and telephone charges. The financial constraints were solved by asking my friends and family to raise some money for my research work.

CHAPTER FOUR

PRESENTATION INTERPRETATION AND ANALYSIS OF RESULTS

The data was collected from respondents who were majorly communities and authorities of local government and Uganda forestry authority in and around Mpanga forest reserve located in Mpigi district. The data was collected from 321 respondents through the use of questionnaires out of the 382 questionnaires that were supplied to the respondents. The study results was attained using interviews that were administered with NGO officials and Environmentalists on the topic assessing the impact of deforestation on community livelihood in Mpanga central forest reserve, Mpigi district. The objectives was to examine the factors that contributes to deforestation in Mpanga Central forest reserve, Mpigi district, to assess the effect of deforestation on community livelihood and examine the possible mechanisms for addressing deforestation in Mpanga Central forest reserve, Mpigi district. The results are presented on frequency and percentages and then thematic analysis based on the results presented in results below.

4.1.1 Gender of respondents

Table 4.1: Gender of respondents

Responses	Frequency	Percent
Male	203	63.2
Female	118	36.8
Total	321	100.0

Source: Field Data, 2021

The study results show that majority of the respondents of the study were male with 203 representing 63.2% of the respondents, female were 118 representing 36.8% of the respondents. The study results indicate that the majority respondents of the study show that information was attained from both respondents of the study, the findings can be relied upon for decision making.

4.1.2 Age of respondents

Table 4.2: Age of respondents

Responses	Frequency	Percent
20-25	15	4.7
25-30	67	20.9
31-40	121	37.7
41 above	118	36.8
Total	321	100.0

Source: Field Data, 2021

Table 4.2 indicate that the majority of the respondents of the study were in the age of respondents of 41 years and above with 118(36.8%) respondents followed by 121(37.7%) were in 31-40, those of 25-30 were in 67(20.9%) finally those of 20-25 were 15(4.7%). The study results indicate that the majority of the respondents for the study were in the age of understanding, mature, information attained is relied upon for decision making.

4.1.3 Time of stay in Mpigi district

Table 4.3: Time of stay in Mpigi district

Responses	Frequency	Percent
Less than 1	5	1.6
1-5 Years	6	1.9
6- 10 years	40	12.5
11 Years above	270	84.1
Total	321	100.0

Source: Field Data, 2021

Results in table 4.3 on the Time of stay in Mpigi district reveal that the majority of the respondents had been in the district for over 10 years who were 84.1% respondents while who stayed for 6-10 years were 12.5%, those who stayed for 1-5 years were 6(1.9%) and finally those who stayed in Mpigi for less than 1 year were 5(1.6%). The study results indicate that data attained indicate that results were attained from understanding respondents in terms of time since they have been in the study area for more than 11 years.

4.1.4 Marital status of respondents

Table 4.4: Marital status of respondents

Responses	Frequency	Percent
Single	78	24.3
Married	227	70.7
Separated/ Divorced	16	5.0
Total	321	100.0

Source: Field Data, 2021

Results in table 4.4 show that the marital status of respondents were majorly 227 represented by 70.7% respondents were married while single were 24.3% while those who separated were 5% of the respondents. The study results indicate that the status of the results indicate that the marital status of the respondents were majorly married a sign of responsibility showing that the results were attained from reasonable respondents.

4.1.5 Education of respondents

Table 4.5: Education of respondents

Responses	Frequency	Percent
Secondary	166	51.7
Certificate & Diploma	80	24.9
Degree	40	12.5
Post graduate	35	10.9
Total	321	100.0

Source: Field Data, 2021

Results indicate that the majority of the respondents were secondary school levers who were 166 representing 51.7%, certificate and diploma were 80(24.9%) with degree of 40(12.5%) and finally post graduate were 35(10.9%) indicating that the status of the education of the respondents were majorly having an understanding level, information attained can be relied upon for decision making.

4.2 Factors that contributes to deforestation in Mpanga Central forest reserve, Mpigi district.

The first objective of the study was to examine the factors that contribute to deforestation in Mpanga Central forest reserve, Mpigi district. The data needed for the study is attained from the responses for the study; the results are presented in frequency and percentages below.

4.2.1 Whether there is high degree of deforestation in and around Mpanga Central forest reserve.

Table 4.6: Whether there is high degree of deforestation in and around Mpanga Central forest reserve.

Responses	Frequency	Percent
Yes	237	73.8
No	84	26.2
Total	321	100.0

Source: Field Data, 2021

Results in table 4.6 on whether there is high degree of deforestation in and around Mpanga Central forest reserve indicate that the state of majority respondents agreed 73.8% while 26.2% disagreed. The study results indicate that there is existence of deforestation in and around Mpanga central forest reserve. The respondents agree that deforestation is in high existence in the forest reserve.

4.2.2 Economic factors that contribute to deforestation in Mpanga forest reserve

Table 4.7: Economic factors that contribute to deforestation in Mpanga forest reserve

Responses	Frequency	Percent
Farming	80	24.9
Charcoal burning	96	29.9
Sale of firewood	33	10.3
Livestock	75	23.4
Construction	37	11.5
Total	321	100.0

Source: Field Data, 2021

The results are further presented in figure 1 below, on economic factors that contribute to deforestation in Mpanga forest reserve.

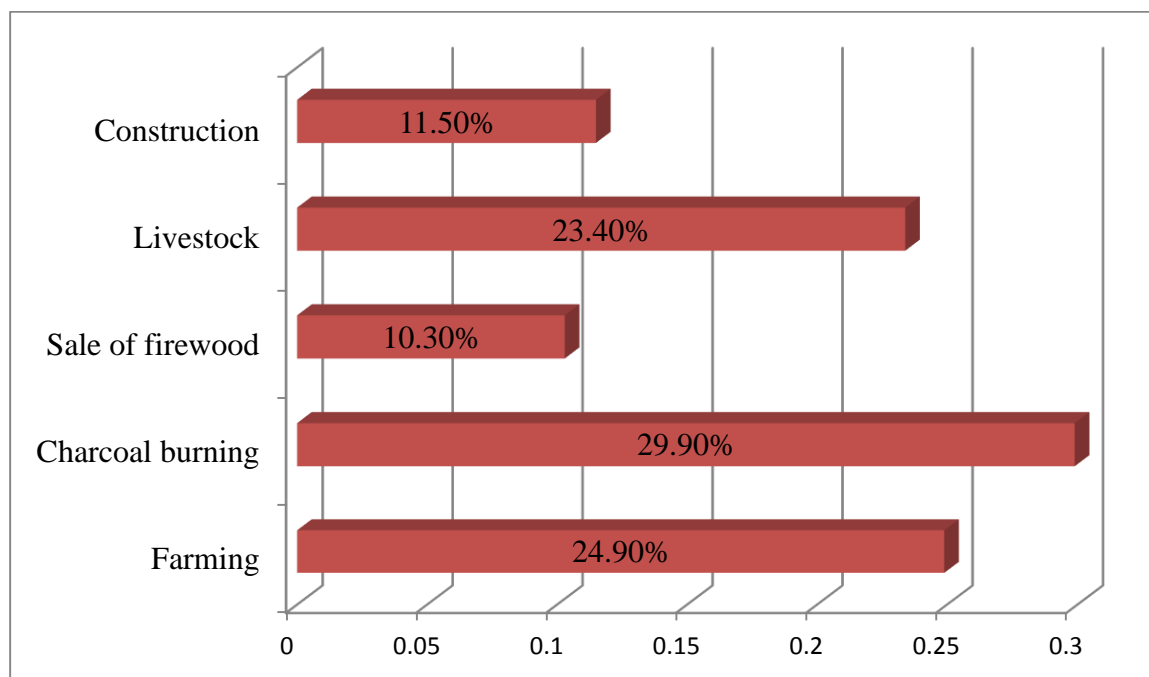


Figure 1: Economic factors that contribute to deforestation in Mpanga forest reserve.

Source: Field Data, 2021

Results in the study show that the major economic factors that contribute to deforestation in Mpanga forest reserve was charcoal burning with 29.9% respondents, farming had a 24.9% response, while livestock had 23.4% respondents, and construction had an 11.5% and finally sale

of firewood with 10.3% of the respondents. The study results indicate that majority respondents are in agreement with the presence of deforestation is an economically driven issue among the people in Mpanga forest.

Attained from the field using the interviews, the study results reveal agriculture through family leads to deforestation.

Agricultural activities that result in the clearing and conversion of forestland include the establishment of permanent cropland, shifting cultivation and cattle ranching. The expansion of the agricultural frontier is usually the clearly dominant contributor to deforestation.

KII with administrator Eco-trust, Mpigi district.

Furthermore, Wood extraction is the principal intra-sectoral cause of forest degradation, and can also lead to deforestation, either directly or indirectly. Wood is extracted from forests for timber, pulpwood, fuel wood and charcoal. While logging practices usually degrade forests, selective logging need not trigger severe degradation or deforestation.

KII with Environmental officer, Mpigi district.

It was found that the need for establishment and extension of infrastructure is the major reason for deforestation. Forests can also be cleared to construct roads, settlements, public services, pipelines, open-pit mines, hydro-electric dams, and other infrastructure.

KII with administrator Eco-trust, Mpigi district.

The results from the interviews and that of questionnaires are in agreement, majority respondents are in agreement that agriculture and wood extractions are responsible for deforestation in and around Mpanga forest reserve.

4.2.3 Institutional factors that cause deforestation Mpanga Forest Reserve (MFR)

Table 4.8: institutional factors that cause deforestation MFR

Responses	Frequency	Percent
Low effectiveness in monitoring by NEMA	73	22.7
Limited institutional capacity to monitor forests	93	29.0
Limited institutional development for forests	70	21.8
corruption in regulating institutions	85	26.5
Total	321	100.0

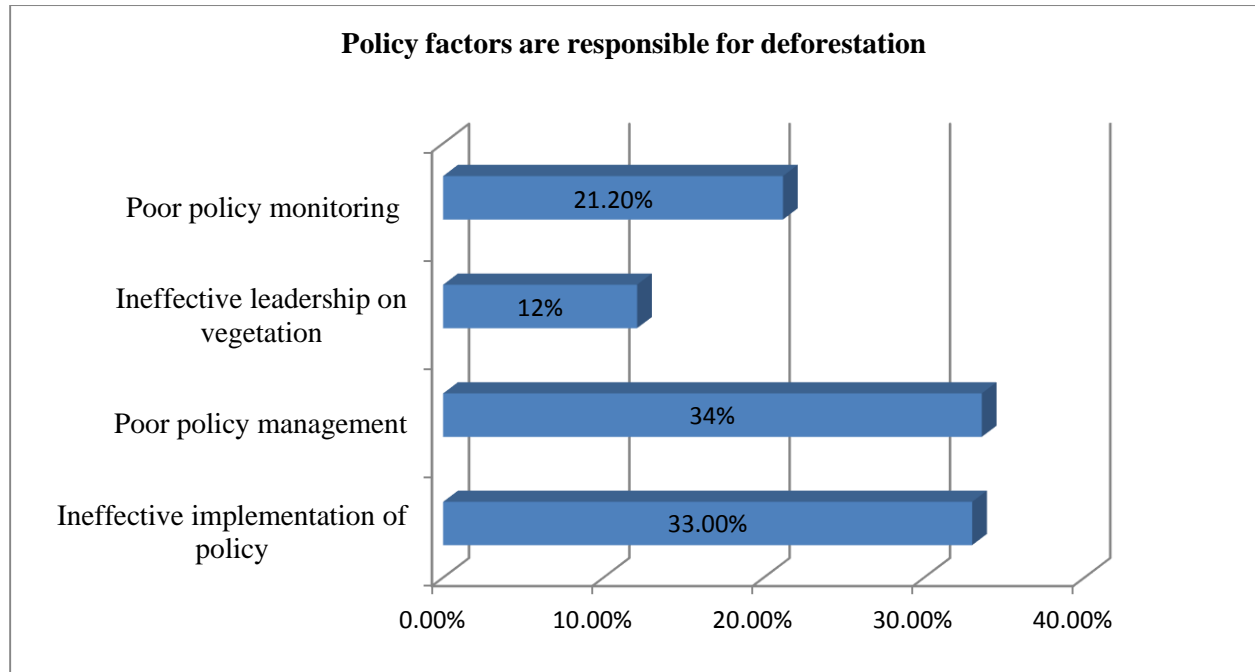
Source: Field Data, 2021

The study results show that the occurrence of deforestation in Mpanga forest reserve is due to institutional factors that cause deforestation, the major factor is limited institutional capacity to monitor forests with 29% of the respondents, corruption in regulating institutions with 26.5%, Low effectiveness in monitoring by NEMA had 22.7% respondents and finally limited institutional development for forests had 21.8% respondents. The study results reveal that it's true that institutional factors have led to the occurrence of deforestation in Mpanga forest reserve.

The study results based on the data attained from the interview reveal that there is institutional weakness that account for deforestation.

Non-transparent decision making regarding the allocation or conversion of state forest resources, and associated rent seeking behavior, is a second significant factor that drives deforestation and degradation. Newly empowered local officials, seeking additional revenue, legitimized what were previously illegal activities by issuing permits for small, poorly regulated timber concessions.

4.2.4 Policy factors are responsible for deforestation in Mpanga central forest reserve



Source: Field Data, 2021

Figure 2: Policy factors are responsible for deforestation in Mpanga central forest reserve.

Results in table 4.2.4 show that the major policy factors are responsible for deforestation in Mpanga central forest reserve was poor policy management with 34% respondents, followed by ineffective implementation of policy with 33%, then poor policy monitoring had 21.2% and ineffective leadership on vegetation had 12% respondents. The study results show that the occurrence of ineffective policies on forests account for the occurrence of deforestation in forest reserves. The results indicate that the state of the policy occurrence is limited in scope and operations efficiency.

4.2.5 Environmental factors that is responsible for deforestation in Mpanga forest reserve

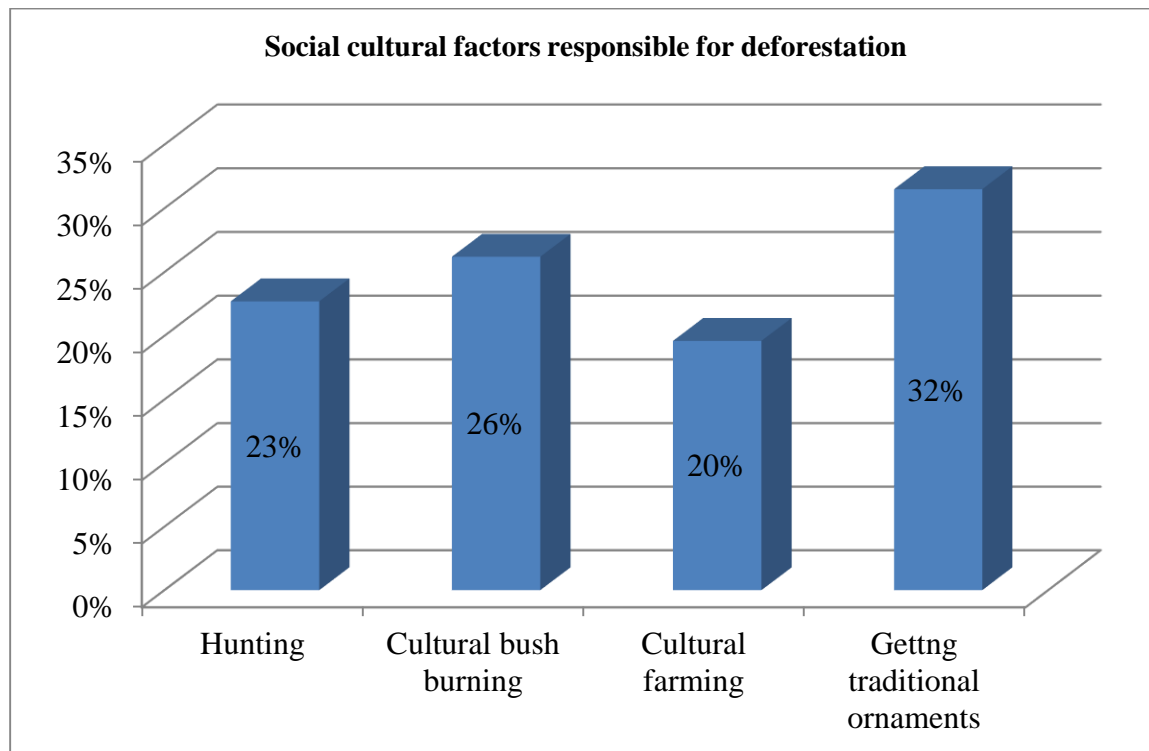
Table 4.9: Environmental factors that is responsible for deforestation in Mpanga forest reserve.

Responses	Frequency	Percent
Drought	147	45.8
Heavy rainfall	76	23.7
Biological factors	32	10.0
Chemical application	66	20.6
Total	321	100.0

Source: Field Data, 2021

Results in table 4.9 shows that the environmental factors that are responsible for deforestation in Mpanga forest reserve occurrences are drought occurrence with 45.8% respondents, 23.7% respondents argued that environmentally heavy rainfall account for 23.7% respondents then chemical applications had 20.6% and biological factors had 10% respondents. The study results show that the status of environmental factors is responsible for deforestation in Mpanga forest reserve.

4.2.6 Social cultural factors responsible for deforestation in Mpanga forest.



Source: Field Data, 2021

Figure 3: Social cultural factors responsible for deforestation in Mpanga forest reserve.

Results on the social cultural factors responsible for deforestation in Mpanga forest were majorly getting traditional ornaments with 31.5% respondents, 26% were provided for cultural bush burning, 23% were recorded for hunting and finally cultural farming had 20% respondents. The results indicate that the majority respondent affiliate socio-cultural issues to deforestation in Mpanga forest reserve.

Local culture can directly affect the use given to land. For instance, sacred forest areas are often protected from land conversion and degradation. However, other cultural factors can exert pressure on forests. The social cultural factors responsible for the occurrence of deforestation in Mpanga forest reserve, the status of the results indicate that the state of the deforestation is quite sufficient in enabling the occurrence of deforestation.

KII with Environmental Officer, NFA,

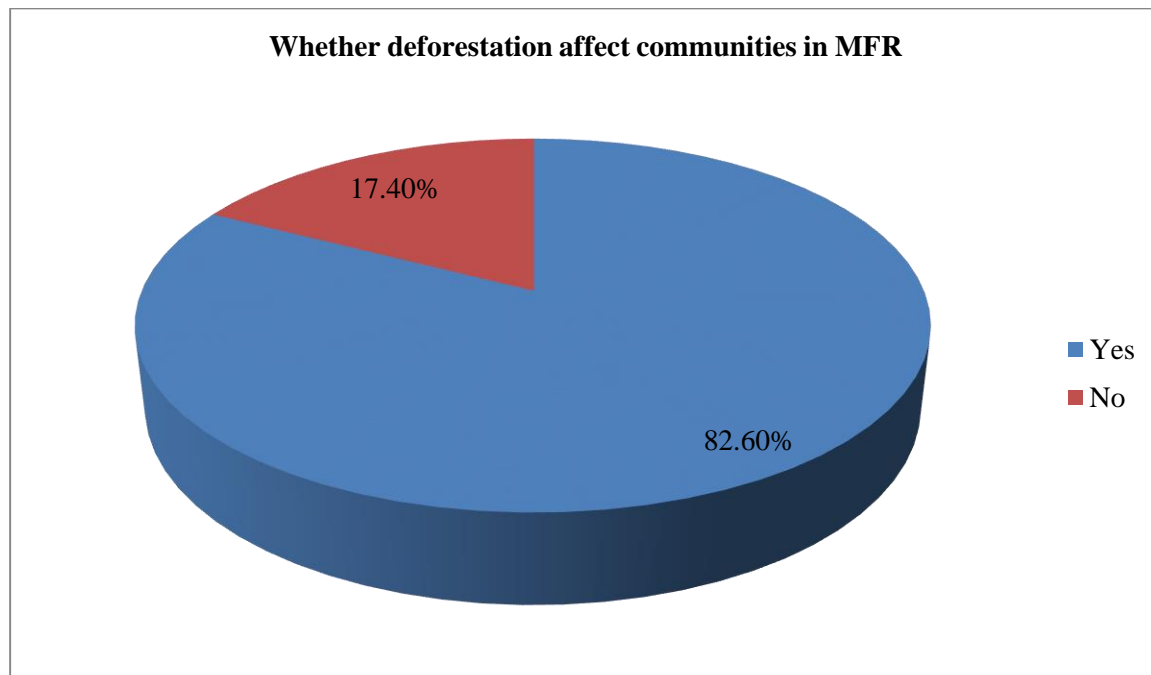
The study results reveal that the raise in demand for food and other land-demanding commodities, thus requiring more land to produce them. As population growth is often viewed as the main cause of deforestation, it is important to nuance this with the observation that most deforestation is from the conversion of forest to agricultural land and much of this is from industrialized rather than smallholder agriculture.

KII with Eco-Trust, Mpigi

4.3 Effect of deforestation on community livelihood in Mpanga Central forest reserve, Mpigi district.

The second objective of the study was to assess the effect of deforestation on community livelihood in Mpanga Central forest reserve, Mpigi district. The results attained from the study based on the information needed are provided in the assessments provided below.

4.1.1 Does deforestation affect your communities around Mpanga forest reserve



Source: Field Data, 2021

Figure 4: Does deforestation affect your communities around Mpanga forest reserve

Results in figure 4 show that 82.6% respondents argued that deforestation affect your communities around Mpanga forest reserve with 17.4% respondents disagreed implying that the status of the deforestation has a high effect on the communities in and around Mpanga forest reserve.

4.3.2 How does deforestation affect the communities around Mpanga forest reserve.

4.10: How does deforestation affect the communities around Mpanga forest reserve.

Responses	Frequency	Percent
Positively	182	56.7
Negatively	139	43.3
Total	321	100.0

Source: Field Data, 2021

Results in table 4.10 reveal that deforestation affect the communities around Mpanga forest reserve mostly positively with a minority response of 56.7% respondents and finally 43.3% respondents provided that the effect was negative. The study results indicate that there has been an overall effect both negative and positive in and around Mpanga forest reserve.

4.3.3 Effect of deforestation on food security in Mpigi district

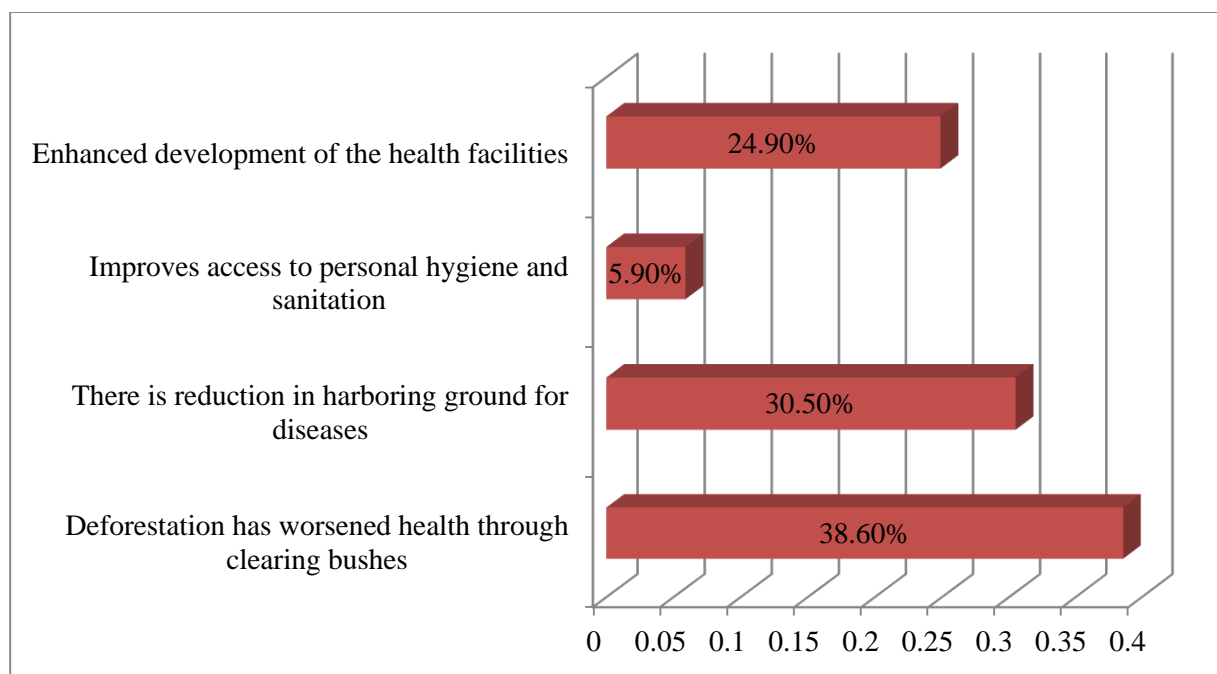
Table 4.11: Effect of deforestation on food security in Mpigi district

Respondents	Frequency	Percent
There is attainment of farm land for agriculture	68	21.2
There is loss of weather supporting food production	33	10.3
Deforestation lead to loss of food by animals	47	14.6
Deforestation affect food value chain	173	53.9
Total	321	100.0

Source: Field Data, 2021

Results in table 4.11 on the effect of deforestation on food security in Mpigi district reveal that Deforestation affect food value chain with 53.9% respondents, there is attainment of farm land for agriculture with 21.2% respondents, Deforestation lead to loss of food by animals with 10.3% respondents and there is loss of weather supporting food production with 10.3% respondents. The study results indicate that deforestation has negatively affected the food security of communities and the results show that the status for the means of responses was quite moderate.

4.3.4 Effect of deforestation on health in Mpigi district



Source: Field Data, 2021

Figure 5: Effect of deforestation on health in MPigi district

The study results in figure 5 on the effect of deforestation on health in MPigi district. The study results indicate that deforestation has worsened health through clearing bushes with 38.6% respondents, there is reduction in harboring ground for diseases 30.5%, enhanced development of the health facilities 24.9% and finally Improves access to personal hygiene and sanitation 5.9% respondents. The study findings show that the status of deforestation is having an effect on the health of the communities and it's presenting negative health issues.

4.3.4 How does deforestation affect poverty alleviation in Mpigi district

Table 4.12: How does deforestation affect poverty alleviation in Mpigi district

Responses	Frequency	Percent
Agriculture for livelihood is supported	73	22.7
Support for income generations such as charcoal burning	68	21.2
Deforestation has supported constructions	70	21.8
There is revenue to local government through tourists	110	34.3
Total	321	100.0

Source: Field Data, 2021

The study results in table 4.12 on whether deforestation affect poverty alleviation in Mpigi district. The study results indicate that the there is revenue to local government through tourists with 34.3% respondents, Deforestation has supported constructions with 21.2% respondents, Support for income generations such as charcoal burning with 21.2% and Agriculture for livelihood is supported with 22.7% of the respondents. The study findings show that the status of the people in communities are established and living in the affecting poverty, the people perceive that deforestation induces the poverty alleviations due to economic values.

These results were reverted and challenged by the environmentalists who contend that forest reduction is a danger to the communities where the people live. It's a danger both in the long term and short term avenues for management of forests.

KII with Environmental Officer Mpigi district.

The impacts of deforestation in exacerbating rural poverty are complex and widespread. Not only does forest loss reduce forest communities' contributions to national economic growth, but more critically, it threatens the livelihoods and traditions of rural and forest dwelling people across the country.

KII with Environmental Officer Mpigi district.

With the availability of non timber forest products in reducing alongside the trees that support them, forest communities often have to travel further distances into the forest to access products that sustain their food security and socioeconomic well-being it's hence key to argue that deforestation will hinder the socio-economic status of communities.

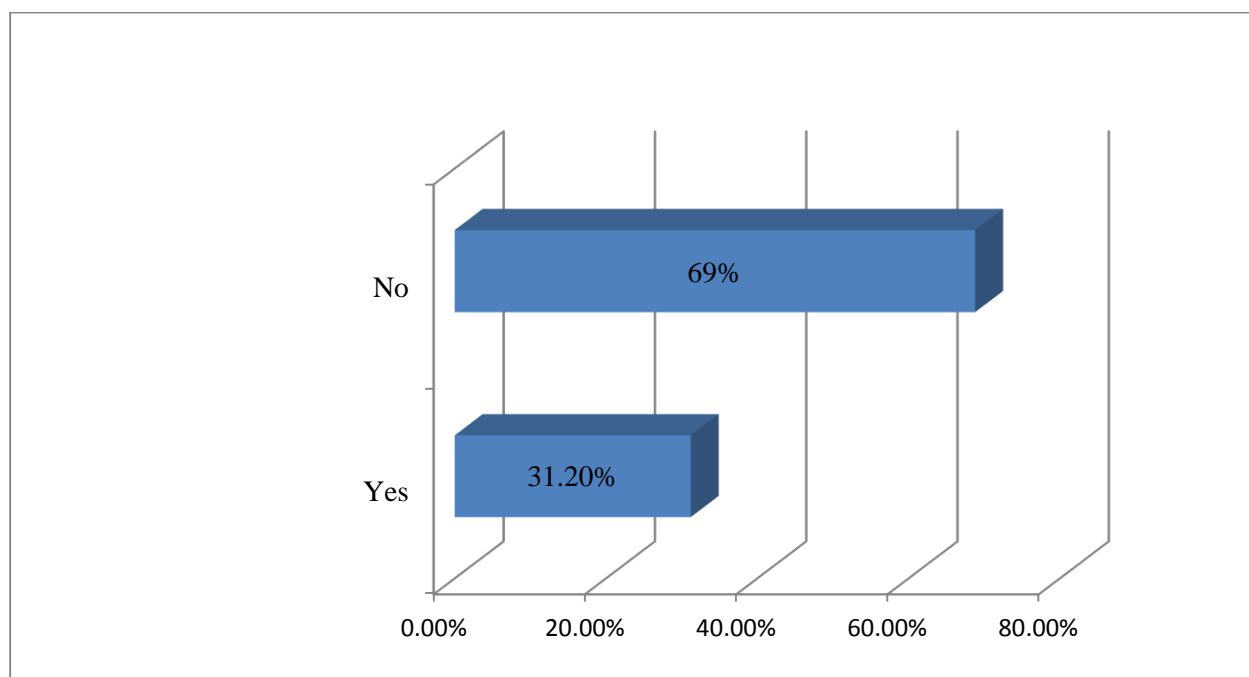
KII with Environmental Officer Mpigi district.

Results from the study reveal that the mechanism for the study indicates that the mechanisms in assessing the effectiveness of deforestation are not actually reducing the occurrence of poverty amongst the communities within the people.

4.4 Possible mechanisms for addressing deforestation in Mpanga Central forest reserve, Mpigi district.

The third research objective was to establish the possible mechanisms for addressing deforestation in Mpanga Central forest reserve, Mpigi district. The study results based on the study is presented in the tabulations and figures provided below.

4.1.1 Are there mechanisms in place for addressing the deforestation in Mpanga Central forest reserve, Mpigi district.



Source: Field Data, 2021

Figure 6: Are there mechanisms in place for addressing the deforestation in Mpanga Central forest reserve, Mpigi district.

Results on whether there mechanisms in place for addressing the deforestation in Mpanga Central forest reserve, Mpigi district, and the majority respondents 69% disagreed and 31% agreed. The studies findings imply that there exist few avenues for handling deforestation, the avenue are generally very low according to the responses.

4.4.2 Avenues developed by community in addressing the deforestation challenge in MFR, Mpigi district.

Table 4.13: Avenues developed by community in addressing the deforestation challenge in MFR, Mpigi district.

Responses	Frequency	Percent
Planting trees	40	12.5
reporting tree cutting	92	28.7
Arresting people conducting deforestation	101	31.5
Improving trees conditions	88	27.4
Total	321	100.0

Source: Field Data, 2021

Table 4.13 show results on avenues developed by community in addressing the deforestation challenge in MFR, Mpigi district, the majority indicate that there is arresting people involved in deforestation 31.5%, reporting tree cutting with 28.7% respondents, Improving trees conditions had 27.4% respondents and planting trees especially in replacing the cut trees. The study results indicate that respondents are in agreement with the existence of avenues for addressing deforestation occurrence in Mpigi district.

4.4.3 Whether Mpigi district local government provide guidance to local on the deforestation.

Table 4.14: Whether Mpigi district local government provide guidance to local on the deforestation.

Responses	Frequency	Percent
Yes	198	61.7
No	123	38.3
Total	321	100.0

Source: Field Data, 2021

Results in table 4.14 show that Mpigi district local government provides guidance to local on the deforestation with the 61.7% respondents who agreed while 38.3% disagreed. The study results show that Mpigi district local government has provided some guidance to local on the deforestation.

4.4.4 Mpigi district local government done in guidance to local on the deforestation in Mpanga forest reserve

Table 4.15 What Mpigi district local government done in guidance to local on the deforestation in Mpanga forest reserve.

Responses	Frequency	Percent
Community awareness campaigns on forest value	69	21.5
Establishment of bi-laws on forest preservation	73	22.7
Enhanced the development of skills for proper forest usage	69	21.5
Sensitized against deforestation	110	34.3
Total	321	100.0

Source: Field Data, 2021

Results in table 4.15 reveal that district local government guide to local on the deforestation in Mpanga forest reserve with 34.3% respondents on sensitized against deforestation, 21.5% agreed with enhanced the development of skills for proper forest usage, Establishment of bi-laws on

forest preservation had 22.7% respondents and Community awareness campaigns on forest value had 21.5% respondents. The study findings indicate that the state of the mechanisms for handling deforestation is done by minimally in existence.

Results from the Key informant interviews

The study reveals that NEMA has undertaken a direction for demarcation and preservation of the forests (Mpanga forest reserve) under the management of the district environmental officer, there has been issues that restrict and limit the people in occurrence and effective working. The work of NEMA and National forest authority (NFA) has undertaken to demarcate and manage the forests.

KII with Environmental officer, Mpigi district.

The study results based on the interviews are presented in the assessment below.

Through working with the traditions and activities of forest communities, a sharper interest towards forest resource management could be developed. It is important to emphasize that tackling deforestation requires a pragmatic integration of the activities of forest-dependent communities into national policy. In this regard, the communities will more readily appreciate the need to protect forest resources, as mitigating deforestation also implies safeguarding their own livelihood.

KII with Eco-trust Administrator, Mpigi district.

Government should employ people under the traditional council to look into forest conservation or preservation. Fines should be imposed for deforesting. Laws should be developed to mitigate deforestation in rural communities. People should pay wood collection fee before collecting.

KII with Environmental officer, Mpigi district.

There is need for media in raising awareness about the impacts of deforestation. Traditional leaders should call community members in traditional gatherings to raise awareness about the impacts of deforestation. Government should integrate

social and environmental policies by using community education model to mobilize, impart knowledge, change attitudes and practices to deal with the impacts of deforestation.

KII with Eco-trust Administrator, Mpigi district.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This chapter presents the results attained from the field alongside with the previous authors in literature review, it further provide the conclusions and recommendations based on the implied results for the conclusions in the study.

5.1 Discussion of findings

5.1.1 Factors that contributes to deforestation in Mpanga Central forest reserve, Mpigi district.

The factors responsible for deforestation around Mpanga forest as per table 4.7 economically deforestation in with charcoal burning, farming, institutional factors that cause deforestation were majorly limited institutional capacity to monitor forests, table 4.8 with poor policy management in figure 2, environmentally in table 4.9 the occurrence of drought is responsible for deforestation and social cultural factors responsible for deforestation was traditional ornaments and cultural bush burning. The results are in agreement with previous researcher such as Kayanja&Byarugaba (2011) who argued that poor planning, weak regulation and inappropriate processing technology have resulted in the unsustainable harvesting of forest products, and the degradation of the resource base. The results are in agreement with Hosonuma et al. (2012) who contend that current trends in forest activities toward a more climate and biodiversity friendly outcome. A number of factors have been identified as major causes of the reduction in forest cover over the. In Uganda, deforestation can be linked to both direct and indirect drivers and underlying causes. Direct drivers of deforestation include; conversion of forest land to agriculture, grazing land and forest resource degradation due to firewood collection, pitsawying and charcoal burning. Deforestation is rampant on the 70% of forests on private land which is not regulated and managed. On the central forest reserves conversion into agriculture, is due to weak monitoring mechanisms. Even Acheampong and Marfo (2011) provided that poverty and overpopulation are inextricably linked. Poverty, while undeniably responsible for much of the damage to rainforests, has to a large extent been brought about by the greed of the rich industrialized nations and the Third World elites who seek to emulate them. Development is often regarded as the solution to world poverty, seldom helps those whose need is greatest. Thus, it is often the cause rather than the cure for poverty.

5.1.2 Effect of deforestation on community livelihood in Mpanga Central forest reserve, Mpigi district.

The study results indicate that deforestation affect community livelihood in Mpanga Central forest reserve, Mpigi district majorly through affecting the food security in table 4.10 and 4.11 showing that negatively, it provides incomes and construction materials although environmentalists warned that this is short term and against nature risk the environmental stability in and around Mpanga forest reserve. Never the less the results are in agreement with previous authors such as Acheampong and Marfo (2011).Not only does forest loss reduce forest communities' contributions to national economic growth, but more critically, it threatens the livelihoods and traditions of rural and forest dwelling people across the country, the results are in agreement with Anon (2010) who contend that global warming or global change includes anthropogenically produced climatic and ecological problems such as recent apparent climatic temperature shifts and precipitation regimes in some areas, sea level rise, stratospheric ozone depletion, atmospheric pollution and forest decline. Tropical forests are shrinking at a rate of about five per cent per decade as forests are logged and cleared to supply local, regional, national and global markets for wood products, cattle, agricultural produce and biofuels. Bruijnzeel (2014) contend that the long term effect of deforestation on the soil resource can be severe. Clearing the vegetative cover for slash and burn farming exposes the soil to the intensity of the tropical sun and torrential rains. Forest floors with their leaf litter and porous soils easily accommodate intense rainfall. The effects of deforestation on water availability, flash floods and dry season flows depend on what happens to these countervailing influences of infiltration and evapotranspiration- the sponge versus the fountain, the results are in agreement with Mangave (2014) who contend that retaining the biodiversity of the forested areas is like retaining a form of capital, until more research can establish the relative importance of various plants and animal species. The results are in agreement with those of Bruijnzeel (2014) argued that deforestation also disrupts the global water cycle With removal of part of the forest, the area cannot hold as much water creating a drier climate. Water resources affected by deforestation include drinking water, fisheries and aquatic habitats, flood/drought control, waterways and dams affected by siltation, less appealing water related recreation, and damage to crops and irrigation systems from erosion and turbidity. Even Myers and Mittermeier (2010) argued that decreased biodiversity, habitat loss and conflicts for those in the tropics serve as storehouses of biodiversity

and consequently deforestation, fragmentation and degradation destroys the biodiversity as a whole and habitat for migratory species including the endangered ones, some of which have still to be catalogued. Tropical forests support about two thirds of all known species and contain 65 per cent of the world's 10, 000 endangered species

5.13 Mechanisms for addressing deforestation in Mpanga Central forest reserve, Mpigi district.

Results in table 4.13 show that community has designed few mechanisms for addressing the deforestation challenge in MFR, Mpigi district, the majority through arresting people in deforestation, reporting tree cutting with and improving trees conditions. The study further show in table 4.15 that environmentalist and UFA and local government of Mpigi district has sensitized against deforestation and enhanced the development of skills for proper forest usage, the results are in agreement with those of Rhett, 2016) who argued that a comprehensive implementation of the international conventions relevant to biodiversity protection and forest resource conservation, proper implementation needs adequate monitoring and measuring of performance of the expectation and therefore in any convention there need a commissions within the relevant departments of ministry of water lands and environment responsible to follow up the appropriate implementation of these conventions Obua, Agea&Ogwal (2010) contend that government in addition is required to put in place a regulatory framework, which will create a positive investment climate to encourage private sector investment in commercial forest plantations. The government is required, amongst other tasks, to set out priority areas for the development of carbon storage plantations in different areas of Uganda. Aliyu, Modibbo, Medugu, Ayo (2014) argued that Uganda lacks proper certification and audit guidelines therefore national initiative institute should be developed to define the international standards in relation to the national standards. These should be in line with the local situation of Uganda and in doing so all stake holders must be involved in the process of developing these guideline. Revision of the EIA process and procedure from the current system of allowing project owner. The results agree with those of Rhett, 2016) who argued that there is a comprehensive implementation of the international conventions relevant to biodiversity protection and forest resource conservation, proper implementation needs adequate monitoring and measuring of performance of the expectation and therefore in any convention there need a commissions within the relevant

departments of ministry of water lands and environment responsible to follow up the appropriate implementation of these conventions

5.2 Conclusion

The study set to assess the impact of deforestation on community livelihood in Mpanga central forest reserve, Mpigi district. The objectives were to examine the factors that contribute to deforestation in Mpanga Central forest reserve, assess the effect of deforestation on community livelihood and to establish the possible mechanisms for addressing deforestation in Mpanga Central forest reserve, Mpigi district.

On the first objectives, the study conclude that factors responsible for deforestation around Mpanga forest is economically charcoal burning, farming, institutional factors, limited institutional capacity to monitor forests, poor policy management and drought. The study concludes that deforestation causes were majorly economic with sale of the products inducing it, though poor policy and institutional mechanisms and social beliefs increased the occurrence of deforestation in and around Mpanga forest reserve.

Secondly deforestation was perceived by the locals as a positive venture towards the community livelihood, although short term gains through incomes from sale of forest products are reported, deforestation is a very deadly venture that risks the environment by causing lack of rainfall in future that can destroy the nature of not only Mpigi district but Uganda.

Thirdly the study conclude that the community and Mpigi district have developed few mechanisms to avert deforestation arresting people in deforestation and reporting tree cutting plus sensitization against deforestation and enhancing the development of skills for proper forest usage. The study concludes that few mechanisms are in place by the district and Uganda forest authority to manage the forest reserve in Mpanga.

5.3 Recommendations

The study recommends that

- i. There is need for promoting activities that reduce the pressure off the forest like sericulture, butterfly farming, improved bee- keeping, development of fodder banks, bio-intensive agriculture and farm forestry.
- ii. There should be extremely active and vigorous around the forests resources Increase per capita income and check on the population growth.
- iii. The government in addition is required to put in place a regulatory framework, which will create a positive investment climate to encourage private sector investment in commercial forest plantations.

Secondly

- i. There is need for increasing income and improved literacy levels because with improved standards of living, over dependence on forest products for example as a source of energy is checked and land use change due to literacy.
- ii. Local forest reserves are governed by district governments and community forests are managed by registered community-based organizations, which are monitored by the district forest officer.
- iii. There is need for development of effective institutional development necessary of increasing the capacity of the institutions in generating community wellness.

Thirdly the study recommends that

- i. There is need for Strong governance mechanisms and institutional capacity necessary to underpin the effective design and implementation of both economic and financial instruments and direct regulation.
- ii. There is need to increase the capacity of a government to design, implement and enforce policies on forest reserves to ensure their effectiveness capacity can be nurtured at

national, regional and local levels to ensure that each of these levels is allocated appropriate responsibilities and the resources to fulfill them.

- iii. People should be encouraged to plant trees at home. Most importantly, direct awareness campaigns that involve different relevant stakeholders should be raised in rural communities on the impacts of deforestation by following the community education model process.

5.4 areas for further research

The study results from the field on the impact of deforestation on community livelihood in Mpanga central forest reserve, Mpigi district. The study provides the following as areas for future research that need to be focused on in future studies.

- Policy mechanism for managing forest reserves in Mpanga forest reserve.
- Role of community in management of forests in Uganda
- Policy and institutional framework for the management of forests in Uganda

REFERENCES

- Acheampong, E. and E. Marfo (2011). The impact of tree tenure and access on chainsaw milling in Ghana.” *Ghana Journal of Forestry*, Vol.27: 68-86.
- Agyeman, K. O., Amponsah, O., Braimah, I., and Lurumuah, S. (2012). “Commercial Charcoal Production and Sustainable Community Development of the Upper West Region, Ghana.” *Journal of Sustainable Development*, Vol. 5 (4)
- Aliyu A, Modibbo MA, Medugu NI, Ayo O (2014). Impacts of deforestation on socio-economic development of Akwanga Nasarawa State. *International Journal of Science, Environment and Technology*, 3(2): 403-416
- Anon, D. 2012. *Road impact on deforestation and jaguar habitat loss in the Selva Maya*. Ph. D.
- Banana AY, Namaalwa JJ, Byakagaba P, Waiswa D, Buyinza M, Gombya-Ssembajjwe W. (2014). The impacts of decentralisation reforms on sustainable forest management in Central Uganda. In Katila P, Galloway G, de Jong W, Pacheco P, Mery G, eds. *Forests under Pressure-Local Responses to Global Issues*. IUFRO World Series Vol. 32. Vienna. 357–367
- Byakagaba P, Eilu G, Okullo JBL, Tumwebaze SB and Mwavu EN. (2011). Population structure and Regeneration status of *Vitellaria paradoxa* (C.F. Gaertn.) under different land management regimes in Uganda. *Agricultural Journal* 6(1):14–22.
- Basu A, Blodgett C, Müller N and Soezer A. (2013). *Nationally Appropriate Mitigation Action Study on Sustainable Charcoal in Uganda*. Perspectives Climate Change and UNDP MDG Carbon. (<http://mdgcarbonfacility.org/>)
- Bebbington, A (2009). *Capitals and Capabilities: A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty (PDF)*.
- Bruijnzeel, L. A. (2014). Hydrological functions of tropical forests: not seeing the soils for the trees? *Agriculture, Ecosystems and Environment* 104: 185-228.

- Bustic V, Baumann M, Shortland A, Walker S, Kuemmerle T 2015. Conservation and conflict in the Democratic Republic of Congo: The impacts of warfare, mining, and protected areas on deforestation. *Biological Conservation*, 191: 266–273.
- Chakravarty, S., Ghosh, S. K., & Suresh, C. P. (2011). Deforestation: Causes, Effects and Control Strategies, 3–29.
- Chomitz, K. M.; Buys, P.; Luca, G. D.; Thomas, T. S. and Wertz-Kanounnikoff, S. (2012). *At loggerheads? Agricultural expansion, poverty reduction and environment in the tropical forests*. World Bank Policy Research Report. World Bank, Washington DC.
- Clark, M (2012). Deforestation in Madagascar: Consequences of population growth and unsustainable agricultural processes. *Global Majority E-Journal*, 3(1): 61-71.
- Contreras-Hermosilla, A. (2011). Illegal activities and corruption in the forest sector. In: *State of the World's Forest 2001*, ed. FAO. Pp 76-89. FAO, Rome
- Dudley, N. and Stolton, S. (2013). *Running Pure*. World Bank and WWF, Washington DC
- Edward, Nector, M. (2007). *impact , in communities , diversity reserve , and regeneration budongo north- western Uganda Edward Nector Mwavu A thesis submitted to the Faculty of Science , University of the Witwatersrand , Johannesburg in fulfillment of the requirements for the degree.*
- Ellis, F (2009). *Rural Livelihoods and Diversity in Developing Countries*. OUP Oxford. ISBN 9780198296966.
- Food Agricultural Organisation, (2010) The United Nations' global forest resource assessment and the state of the world's forest cover; forest cover, Disturbances affecting forest land and value of forests. FAO, Rome
- Hamilton, A. C. (2010). *Deforestation in Uganda*. Oxford University Press.
- Hays, J. 2008. Deforestation and desertification in China.

- Hosonuma, N., Herold, M., Sy, V. De, Fries, R. S. De, Brockhaus, M., Verchot, L., ... Romijn, E. (2012). *An assessment of deforestation and forest degradation drivers in developing countries* (Vol. 044009). <http://doi.org/10.1088/1748-9326/7/4/044009>
<http://factsanddetails.com/china.php?itemid=389&catid=10&subcatid=66>
- Josephat M (2018). Deforestation in Uganda: population increase, forests loss and climate change, *Environ Risk Assess Remediat 2 Volume 2 Issue 2*.
<http://www.alliedacademies.org/environmental-risk-assessment-and-remediation/ISSN:2529-8046>
- Juuko, S (2008). MpigiPlant Reduces Load-Shedding". New Vision (Kampala). Archived from the original on 14 September 2012. *Retrieved 23 January 2013*.
- Kaimowitz, D. and Angelsen, A. (2008). *Economic models of tropical deforestation. A review*. Center for International Forestry Research, Bogor Indonesia
- Kayanja, F. I. B., &Byarugaba, D. (2017). Disappearing forests of Uganda: The way forward. *Current Science*, 81(8), 936–947.
- Kyambadde, S (2012). "Rift Valley Railways To Resume Passenger Services In Kampala". Uganda Dispatch. *Retrieved 23 January 2015*
- Malaba, T(2011).Rift Valley Railways To Resume Passenger Train Services". Uganda Radio Network (URN). *Retrieved 23 January 2015*.
- Mangave, H. R. (2014). *A study of Elephant population and its habitats in the northern West Bengal, North East India*. M. Sc. Thesis, Bharathidasan University. Unpubl
- National Forestry AuthorityNFA(2015). Uganda's Forests, functions and classification. NFA, Kampala, Uganda. 2005.
- NEMA (2016). National Environment Management Authority. National State of Environment Report for Uganda, NEMA House, Kampala. 2016.
- National Environment Management Authority. National State of Environment Report for Uganda, NEMA House, Kampala. 2016.

- Obua, J., Agea, J. G., & Ogwal, J. J. (2010). Status of forests in Uganda. *African Journal of Ecology*, 48(4), 853–859. <http://doi.org/10.1111/j.1365-2028.2010.01217.x>
- Otieno AC and Buyinza M (2015). Collaborative forest management in Uganda: A strategy for controlling deforestation in west Bugwe forest reserve, Busia district. *Online Journal of Earth Sciences* 4(2):95–102.
- Ozor N, Umunakwe PC, Ani AO, Nnandi FN (2015). Perceived impacts of climate change among rural farmers in Imo State, Nigeria. *African Journal of Agricultural Research*, 10(14): 1756-1764.
- Purnamasari, R. S. 2010. Dynamics of small-scale deforestation in Indonesia: examining the effects of poverty and socio-economic development. *Unasylva* 61: 14-20.
- Rhett A. Butler. (2016). *Deforestation rates jump in Uganda and Burundi, fall in Rwanda. Studies, F. O. (2001). Foresry outlook studies in Africa (FOSA), (December).*
- Sands, R. (2015). *Forestry in a Global Context*. CABI Publishing.
- Turyahabwe N, Tumusiime DM, Byakagaba P and Tumwebaze SB. (2013). Impact of collaborative forest management on forest status and local perceptions of contribution to livelihoods in Uganda. *Journal of Sustainable Development* 6(10):36–46.
- Vijay V, Pimm SL, Jenkins CN, Smith SJ (2016). The impacts of oil palm on recent deforestation and biodiversity loss. *PLoS ONE*, 11(7): e0159668. doi: 10.1371/journal.pone.0159668
- Werikhe, S. E. W (2014). Socio-demographic survey of the Mbwa river tract in Bwindi Impenetrable National Park, south western Uganda. A basis for the relocation of farmers utilising the Mbwa River Tract. Report submitted to the United States Aid for International Development. Uganda Mission, Ministry of Tourism, Wildlife and Antiquities, Uganda National Park and the World bank

Wynveen CJ, Kyle GT, Sutton SG 2014. Environmental worldview, place attachment, and awareness of environmental impacts in a Marine environment. *Journal of Environment and Behavior*, 46(8): 993- 1017

RESEARCH QUESTIONNAIRE

Dear respondent, I am a graduate student at Kampala International University; I am conducting a study on “**Assessing the impact of deforestation on community livelihood in Mpanga Central Forest Reserve in Mpigi District.** This questionnaire is in fulfillment of the requirements for the award of masters degree in environmental management. This questionnaire has been made for collecting data to conduct academic research. You are kindly invited to participate in this survey, by sharing your knowledge and experiences. The information you provide will be used for academic purpose and all information from you will be treated confidentially.

SECTION: PROFILE OF THE RESPONDENTS

1. GENDER

1. Male

2. Female

2. AGE

1. 20-25

2. 25-30

3. 31-40

4. 41 above

3. EXPERIENCE IN WORK / TIME OF STAY IN MPIGI DISTRICT

1. Less than a year

2. 1 – 2 years

3. 3 – 4 years

4. 5 and above

4. MARITAL STATUS

1. Single

2. Married

5. LEVEL OF EDUCATION

1. Secondary

2. Diploma

3. Bachelor

4. Master

B: FACTORS THAT CONTRIBUTES TO DEFORESTATION IN MPIGI DISTRICT.

1. There is high degree of deforestation in Mpanga forest reserve, Mpigi district?
 - a) Yes
 - b) No

2. What are the economic factors that contribute to deforestation in MpangaCentral Forest Reserve in Mpigi district?
 - a) Farming
 - b) Charcoal burning
 - c) Sale of firewood
 - d) Livestock keeping
 - e) Any Other (Mention)

3. What are the institutional factors that cause deforestation in MpangaCentral Forest Reserve in Mpigi district?
 - a) Low effectiveness in monitoring by NEMA
 - b) Limited institutional capacity to monitor forests
 - c) Limited institutional development for forests
 - d) Any Other mention

4. What policy factors are responsible for deforestation in Mpanga central forest reserve in Mpigi district?

Ineffective implementation of policy

Poor policy management

Ineffective leadership on vegetation

 - a) Any other, please mention

5. What are the environmental factors that are responsible for deforestation in Mpanga central forest reserve in Mpigi district?

Drought

Heavy rainfall

Biological factors

a) Any other mention,

6. What are the social cultural factors responsible for deforestation in Mpanga central forest reserve in Mpigi district?

a) Hunting

b) Cultural bush burning

c) Cultural farming

**SECTION C: EFFECT OF DEFORESTATION ON COMMUNITY LIVELIHOOD IN
MPIGI DISTRICT.**

1. Does deforestation affect your communities in Mpigi district?

a) Yes

b) No

2. How does deforestation affect the communities in Mpigi district?

a) Positively

b) Negatively

3. What is the effect of deforestation on food security in Mpigi district?

a) There is attainment of farm land for agriculture

b) There is loss of weather supporting food production

c) Loss of viable rainfall for food production

d) Deforestation lead to loss of food by animals

a) Any other (Mention) them

4. What is the effect of deforestation on health in Mpigi district?

a) Deforestation has improved our health through clearing bushes

b) There is reduction in harboring ground for diseases

c) Improves access to personal hygiene and sanitation

d) Enhanced development of the health facilities

e) Any other mention

5. How does deforestation affect poverty alleviation in Mpigi district?
 - a) Agriculture for livelihood is supported
 - b) Support for income generations such as charcoal burning
 - c) Deforestation has supported constructions
 - d) There is revenue to local government through tourists
 - e) Any other mention

**SECTION D: POSSIBLE MECHANISMS FOR ADDRESSING DEFORESTATION IN
MPIGI DISTRICT.**

1. Are there mechanisms in place for addressing the deforestation of Mpanga forest reserve?
 - a) Yes
 - b) No
2. What government mechanism is in place to handle deforestation problem of Mpanga forest reserve?
 - a. Instituted strict forest monitoring
 - b. Providing security in the forest
 - c. Community sensitization on deforestation
 - d. Enhanced legal framework for managing forests
3. Are there community induced mechanisms for addressing deforestation in Mpanga forest reserve?
 - a) Yes
 - b) No
4. What avenues has the community developed in addressing the deforestation challenge in Mpanga forest reserve?
 - a) Planting of tress
 - b) Reducing deforestation
 - c) Reporting those cutting trees
 - d) Any other Mention

5. Does Mpigi district local government provide guidance to local on the deforestation in Mpanga forest reserve?
 - a) Yes
 - b) No
6. If Yes, What has the Mpigi district local government done in guidance to local on the deforestation in Mpanga forest reserve?
 - a) Establishment of bi-laws on forest preservation
 - b) Community awareness campaigns on forest value
 - c) Enhanced the development of skills for proper forest usage
 - d) Any other, please mention

Appendix ii: Interview Guide

- 1) What are the factors that contribute to deforestation in Mpigi district?
- 2) What are the natural factors contributing to deforestation in Mpigi district?
- 3) What is the effect of deforestation on community food livelihood in Mpigi district?
- 4) How does deforestation support poverty alleviation efforts in Mpigi district?
- 5) What mechanisms has local government established in addressing deforestation in Mpigi district?
- 6) What has NEMA done in improving or restoring the Mpanga forest reserve in Mpigi district?
- 7) What need to be done to restore the Mpanga forest reserve in Mpigi district?