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THE EFFECT OF FOREST DEGRADATION ON THE LIVELIHOODS OF THE LOCAL COMMUNITY: THE CASE OF BOTI FALLS AND VOLTA RIVER BLOCK II FOREST RESERVES IN THE YILO - KROBO MUNICIPALITY

BY

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DECLARATION

I hereby declare that this project work is the product of an original piece of academic research work carried out by me under the supervision of Dr. Richmond Atta - Ankomah of the Institute of Statistical Social and Economic Research (ISSER).

This dissertation has not been submitted in whole or in any form or shape to any institution for any award or publication. All references to works of other authors have been duly acknowledged by way of citation.

25/04/2023

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(SUPERVISOR)

DEDICATION

I dedicate this dissertation to my heart beat, Jesse Nana Adjei Barfo-Bonney, my dear one Benjamin Barfo-Bonney (Esq), my sister Harriet Arthur-Baidoo, my brother Daniel Arthur-Baidoo and my mum Elizabeth Saim.

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ABSTRACT

The study aimed to determine the predictors of forest degradation in the Yilo Krobo Municipality and their impact on the local community's livelihoods. A mixed-method approach was used to collect data from 400 households through interviews with key stakeholders. The quantitative data were analyzed using multiple regression analysis, while the qualitative data were analyzed thematically.

The results of the regression analysis showed that population growth, legal and policy framework failure, and agricultural activities were significant predictors of forest degradation in the Yilo Krobo Municipality. The study found that forest clearing for agricultural purposes, illegal mining, chain sawing, and illegal logging were the main causes of forest degradation. Sand-winning, a previously underreported activity, was also found to be a strong force behind forest degradation.

The study also found that forest degradation had severe consequences on the local community's livelihoods, leading to erosion, low crop yields, decreased agricultural production, and reduced incomes. It also negatively affected the local economy and cultural values of the forest.

The practical implications of the findings indicated the need for policies and interventions that promote sustainable forest management practices, consider the cultural significance of the forest, and prioritize the reduction of forest degradation to support local livelihoods and protect the environment. The policy implications included the need for effective monitoring and enforcement of existing policies and legislation, allocation of adequate resources and logistics to the Forestry Commission, and a review of existing laws to ensure adequate and specific management plans and inventories for preserving the forest.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

FD & D	Forest Degradation and Deforestation
AVE	Average Variance Extracted
CR	Composite Reliability
CVD	Destruction of Cultural Value
DFID	Department for International Development
ED	Ecosystem Destruction
ELL	Economic Livelihood Losses
EU	European Union
FAO	Food and Agricultural Organization
FARC	Fuerzas Armadas Revolutionaries de Colombia (Revolutionary Armed Forces of Columbia)
FC	Forestry Commission
FoE	Friends of the Earth
FTT	Forest Transition Theory
GFW	Global Forest Watch
HD	Habitat Depletion
HIPC	Highly Indebted Poor Country
HRW	Human Right Watch
ITTO	International Timber Trading Organization
IUCN	International Union for Conservation of Nature
JHS	Junior High School
MCE	Municipal Chief Executive
MLNR	Ministry of Lands and Natural Resources
MTS	Modified Taungya System
OLS	Ordinary Least Square
POL	Pollution
SE	Soil Erosion
SHS	Senior High School
SPSS	Statistical Package for Social Sciences
TUC	Timber Utilization Contract
UN	United Nations
UNEP	United Nations Environment Programme
UNESC	United Nations Economic and Social Commission
UNFAO	United Nations Food and Agriculture Organization
UNFCCC	United Nations Framework Convention on Climate Change
UN-USCAP	United Nations Economic and Social Commission for Asia and the Pacific
WCED	World Commission on Environment and Development
YKMA	Yilo Krobo Municipal Assembly

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

It is not in doubt that forest play significant role in the livelihoods of mankind, especially in the developing countries (Langat et al., 2016). Indeed, the recent World Bank report indicates that significant number of people depend on forest in order to earn their living. The report further suggests that many communities worldwide partially rely on forest resources for their livelihoods (World Bank Report, 2016). Chao, (2012) also confirms in his study about mankind dependency on forest resources throughout the world. As a consequence, land has become an essential resource for mankind.

In spite of its importance, degradation of land has become one of the most important issues in many parts of the world especially in Sub-Saharan Africa (Gebreselassie et al., 2016). A forest is said to be degraded when its function, species composition, structure and productivity have been totally modified and permanently lost as a result of damaging human activities (Angelica Vasquez, et al 2018). Many countries in the continent have been experiencing forest degradation, particularly in the tropical areas where forest serves as a source of survival for the people in the communities. The result is that, globally, forest biodiversity faces an alarming loss due to forest degradation and deforestation. (Owubah et al. 2001).

Forest Degradation and Deforestation (FD & D) have become some of the global ecological challenges that have been brought to the notice of the international community (Kyere-Boateng, 2021). Indeed, FD & D has impacted negatively on food security and the economic development of nations, and thus affecting the living standard of many people in many parts of the world (Bizuayehu et al. 2002). Nachtergaele et al (2010) further submit that FD & D generates

significant impact on the livelihoods of the population, particularly in the rural areas. Other scholars also confirm that FD & D have gradually affected the socio-economic growth of many developing countries (Reddy 2003; Hammad and Tumeizi, 2012).

It appears there is no permanent solutions in sight (FAO, 2010). This has led to many conferences aimed at tackling these environmental challenges and finding strategic approaches to address them (FAO and UNEP, 2020). The result is that series of legal regulatory regimes have been introduced by both national and international bodies to regulate the management of forest in order to prevent or reduce the degradation of the forests as well as the resources therein (Biermann et al, 2012). An excellent example is the recent global intervention to reduce FD & D, conversation of forest and carbon stock enhancement, presently operating in some parts of Africa including other tropical countries globally (UNFCCC, 2019).

Deforestation is referred to as the process of converting forest into a different usage for a longer period of time, by reducing its tree canopy cover to the minimum of 10% threshold. (FAO, 2006). Forest degradation also refers to changes that take place in the forest, which potentially affect the structures of the forest as well as its functions and ability to offer services, and provide some benefits and goods (FAO, 2006). The United Nations Framework Convention for Climate Change (UNFCCC) submits that deforestation is caused by human activity, which eventually render farmlands non-forested (UNFCCC, 2019). The definitions show that deforestation expresses loss of forest cover due to the activities of human beings. On the other hand, forest degradation signifies human activity or any activity intended to reduce the potentials of the forest, thus incapable to fulfil its natural roles and objectives (FAO, 2006).

There has been a decline of ecosystem and global diversity for the past four decades as research carried out by FAO revealed (FAO, 2015). FAO is an international organization with a worldwide

recognition and acceptance. As a consequence, its data and definition on forestry issues are considered the most credible source of information, highly accepted and utilized. FAO has stated that much of these forest losses had been created as a has result of illegal activities of mankind (Sloan & Sayer, 2019). The second greatest producers of global greenhouse gas emissions could be attributed to forest degradation and deforestation, the twin environmental issue (Alex Fajardo et al, 2022). However, as noted, the significance of the forests in the lives of mankind cannot be over-emphasized.

Forest degradation and deforestation (FD & D) is a pressing global issue that transcends geographical boundaries. Instances of FD & D are prevalent across various regions, contributing to environmental degradation and numerous challenges. For instance, in Columbia, forest loss due to degradation increased by 9% between 2017 and 2018. The Revolutionary Forces of Columbia (FARC) occupation of the Amazon area for peace negotiations led to significant forest loss. Tinigua National Park faced substantial forest degradation, resulting in the loss of about 6% of its total forest area (Souza et al., 2013; Bullock et al., 2020).

Brazil has faced substantial forest degradation, with research indicating that the country's forest reserves have been significantly depleted through FD & D. A key driver of primary forest loss in Brazil is fire-related spikes and clear-cutting in the Amazon, which often occurs in local communities. In Bolivia and Peru, uncontrollable agricultural activities have been identified as major contributors to primary forest loss. These issues have far-reaching consequences, including disease outbreaks due to human-animal contact resulting from forest displacement (Walker et al., 2020; Azevedo-Ramos et al., 2020; Muller et al., 2014; Vijay et al., 2018).

The African continent also grapples with the challenges posed by FD & D. The Democratic Republic of Congo experienced a forest loss rate of 38%, reflecting a trend that is alarmingly

similar to other regions. Forest degradation is not confined to specific nations but extends across Africa. Common drivers of FD & D in African countries include forest clearance for agriculture and small-scale mining. Additionally, conflict-induced displacement of people who seek refuge in forest reserves further exacerbates the issue (Kyere Boateng, 2021; Nerfa et al., 2020; Nackoney et al., 2014; Daskin et al., 2018).

In Ghana, the situation regarding forest degradation is of particular concern. Despite being endowed with rich forest reserves and natural resources, Ghana's forests have faced significant depletion. Forest reserves primarily located in the middle and southern regions of the country, including Ashanti, Bono, Western, Central, Ahafo, Eastern, Volta, and parts of the Upper regions, have experienced alarming rates of depletion. According to a study by Global Forest Watch (GFW), Ghana's forest reserves were depleted by nearly 60% in 2018 compared to the previous year, marking the highest rate globally. This trend is mirrored in neighbouring Cote D'Ivoire, where forest depletion reached 28% in the same year (Kyere Boateng, 2021).

Theoretically, the Ecological Modernization Theory posits that society can navigate the intricate nexus between economic growth and environmental conservation through innovative strategies and technological advancements (Mol, Spaargaren & Sonnenfeld, 2013). This perspective acknowledges the traditionally observed negative correlation between economic progress and environmental well-being, while asserting that this relationship can be ameliorated as societies evolve.

While the context of the Yilo-Krobo municipality might not explicitly demonstrate forest transition, the principles of ecological modernization remain relevant. The theory's emphasis on

the potential for existing institutions to internalize environmental concerns aligns with the imperative to address forest degradation. It underscores those societal structures, encompassing political, economic, and social institutions, can collectively work towards sustainable solutions (Hajer, 1995).

The applicability of ecological modernization to the issue of forest degradation within the Yilo-Krobo municipality lies in its capacity to guide strategic interventions. By embracing innovative practices and policy frameworks, this theory offers a pathway for communities to harmonize ecological preservation with socio-economic development. As this study probes the causes of forest degradation, its impact on local livelihoods, and the role of legislation and policy, the Ecological Modernization Theory provides an insightful backdrop.

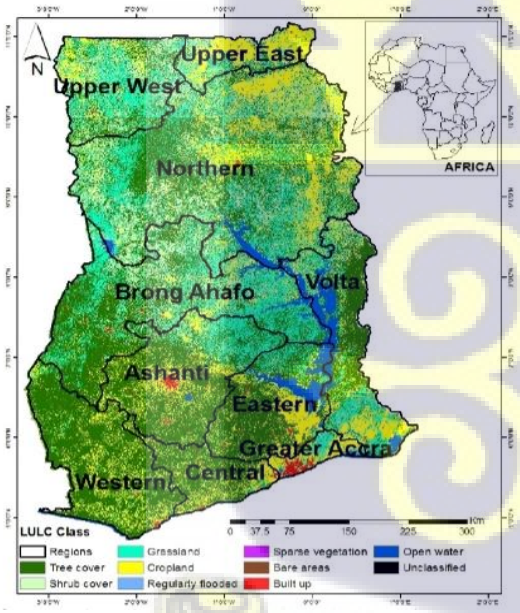

Figure 1.1: 2016 Land use land cover map of Ghana

Source: prepared by authors with data from European Space Agency (ESA) Climate Change Initiative (CCI) 20m sentinel land cover map of Africa

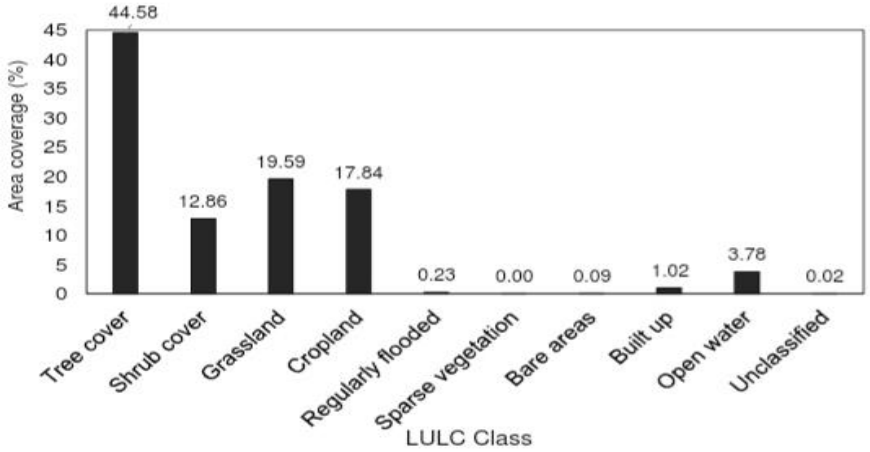

Figure 1.2: Percentage coverage of land use land cover (LULC) classes in Ghana from the 2016 ESA CCI cover map

Source: An overview of Forest conservation strategies in Ghana (Kwawuvi et al, 2021)

Further research by some scholars also suggests that, in or around 1989, Ghana had lost about 78% of its forest reserves (Appiah et al., 2009). ITTO predicts that Ghana's forest reserves may be completely disappear in the next 25 years in view of the fastest rate at which the forest reserves are depleting. A survey carried out by the Forestry Commission conclude that FD & D stands at 2% per year (Forestry Commission, 2015; IUCN, 2016).

In an effort to curb FD & D, some institutions have cooperated with the government of Ghana by initiating some programs aimed at preventing these phenomena. A program to clamp down illegal logging was initiated by Friends of the Earth (FoE) Ghana, a Non-Governmental Organization. The objective is to train people who would patrol these forest reserves by reporting the activities of encroachers to these forest reserves by means of mobile phone app. The government also has intensified effort to seek judicial intervention. This has led to the training of officials who arrest and prosecute offenders of the forest reserves to serve as deterrent to others having the same idea of encroaching the forests areas. The European Union (EU) has also intervened as it has cooperated with the government of Ghana, and in agreement with the latter, the former has pledged to

patronize the sale of only certified forest products from Ghana entering the EU market (Kyere Boateng, 2021). As a consequence, a system has been put in place that helps to track every piece of timber right from the bush to its final destination, be it in Ghana or any other external destination. The agreement with the EU is working perfectly to achieve the objectives.

There are significant number of civil society organizations (CSOs) such as Ghana Wildlife Society, Coalition to Protect Forest Reserves, National Forestry Forum Ghana, Community Forest Management Project, Forest Investment Programme, Government Plantation Development Programme Policy under the Highly Indebted Poor Countries (HIPC) initiative by Government of Ghana etc, that are assisting national and global efforts to protect these forest reserves. As noted, our forests and the resources contained therein potentially generate huge ecosystem services to enhance the livelihoods of mankind and the surrounding environments. The rural communities are the potential beneficiariesin the form of environmental and ecological services. As a consequence, forest depletion has serious impacts on the lives of not only the rural folks but on the general population as well (Sassenet al, 2013).

1.2 Problem Statement

Forest degradation, while not a new phenomenon, has taken on a more alarming scale and pace in recent times, presenting significant challenges to the global ecosystem. Studies indicate that tropical forests and their diverse species are disappearing at an accelerated rate, with approximately 13 million hectares lost annually (UNFAO, 2010; Hammond, 1996). This encroachment and destruction of forests have profound local and global impacts.

Ghana, endowed with abundant forest reserves managed by the Forestry Commission (FC) and the Ministry of Lands and Natural Resources (MLNR), faces severe threats to its forested areas.

Historical records reveal encroachments dating back to the 1970s (Kwawuvi et al., 2021). Despite these reserves playing a pivotal role in food security, habitation, and medicine for Ghanaians, the rapid depletion poses grave dangers to the population (MLNR, 2012).

Statistics indicate that Ghana has lost nearly 38% of its forest reserves over the past three decades due to illegal mining (galamsey) (FAO, 2010). United Nations research shows an annual degradation rate of 2.0%, equivalent to around 65,000 hectares of land. In the period from 2005 to 2010, Ghana ranked sixth globally in terms of forest degradation (UNFAO, 2010). The World Commission on Environment and Development (WCED) emphasizes the role of governments in preserving forest reserves (UNFAO, 2010). The Forestry Commission (FC) highlights gradual degradation rather than deforestation (FC, 2010), driven by economic, policy, demographic factors, and more (GoG, 2010).

Yilo Krobo Municipality, known for its Boti Falls and Volta River Block II Forest Reserves, faces consistent abuse and encroachment, resulting in forest degradation (Yilo Krobo Municipal Assembly). This degradation poses a threat to livelihoods, biodiversity, and contributes to climate change. About 1,840.00 hectares of degraded forest reserve land are earmarked for conversion.

Scholars like Andrade and Rhodes (2012) emphasize that forest degradation affects local livelihoods, underscoring the need to understand community perceptions for effective conservation policies. This study aims to assess local perceptions of forest degradation effects on the Boti Falls and Volta River Block II Forest Reserves, seeking insights for sustainable management.

Despite substantial research on forest degradation in Ghana, smaller reserves receive limited attention (Derkyi et al., 2013). These reserves, like the prominent ones, are crucial for local livelihoods (Tetteh et al., 2015). This study intends to address this research gap by investigating the significance of smaller forest reserves, focusing on Boti Falls and Volta River Block II reserves.

The socio-economic and cultural importance of these reserves is evident, providing sustenance to communities. However, the municipality faces challenges such as agricultural practices, illegal logging, and mining (YKMA Report, 2021). The effects of these prominent reserves on local livelihoods require thorough examination.

1.3 Research Objectives

This research seeks to achieve these objectives;

i. To investigate causes of forest degradation within the Yilo-Krobo municipality
ii. To investigate the impact of forest degradation on the livelihoods of the local community within the Yilo-Krobo municipality.
iii. To investigate the role of legislation and policy in preserving the integrity of the forests.

1.4 Research Questions

This research seeks to provide answers to the following research questions;

i. What are the causes of forest degradation in the Yilo-Krobo municipality?
ii. What is the impact of forest degradation on the livelihoods of the local community?
iii. How effective are the roles played by legislation and policy in preserving the integrity of the forests?

1.5 Significance of the Study

The following are the contributions that this study aspires to make to policy and scientific knowledge.

1.5.1 Informing Policy and Ecological Modernization

The completion of this research holds paramount significance in providing a roadmap for policymakers to navigate the complex landscape of forest degradation. Through the lens of the Ecological Modernization Theory, this study offers a nuanced perspective that aligns with the evolving discourse on sustainable development. The insights garnered from this research can guide policy formulation, aimed at promoting responsible resource management within the Yilo Krobo Municipality and beyond. By adopting the principles of ecological modernization theory, policymakers can explore innovative approaches to balance economic growth and environmental conservation.

1.5.2 Community Empowerment and Awareness

Beyond policy circles, the significance of this study reverberates within the Yilo Krobo communities and similar contexts facing environmental challenges. The findings illuminate the interconnectedness between forest degradation and local livelihoods, empowering residents with knowledge to actively engage in decision-making processes. This empowerment fosters community-driven initiatives that align with the principles of ecological modernization, where individuals play a pivotal role in shaping sustainable practices and advocating for environmental well-being.

1.5.3 Advancing Environmental Scholarship

This study's contributions extend to the realm of environmental scholarship, particularly in the context of ecological modernization. By delving into the intricate interplay between forest

degradation and socio-economic dynamics within the Yilo Krobo Municipality. This research will deepen our understanding of how ecological modernization can be operationalized in practice. The findings have the potential to enrich academic discussions by offering practical insights into how communities can navigate the complexities of environmental challenges using modernization principles.

1.5.4 Addressing Localized Ecological Concerns

This study strategically addresses a critical niche within the realm of forest degradation research. While the focus on larger forest reserves is prevalent, the study narrows its gaze to the Yilo Krobo Municipality's smaller forest reserves. By doing so, it sheds light on a crucial aspect that has not received the attention it deserves. This research serves as a foundation for understanding the intricacies and implications of forest degradation within these smaller reserves, pioneering a comprehensive exploration that could pave the way for future investigations into similar contexts.

1.5.5 Empowering Local Decision-Making

In the context of Yilo Krobo Municipality, this study resonates on a deeply local level. By bringing forth a nuanced understanding of forest degradation's impact on the livelihoods of the Yilo Krobo communities, the study equips local decision-makers with essential information for informed choices. The insights generated can foster community-driven interventions and strategies, enabling residents to actively engage in preserving their invaluable forest resources while simultaneously safeguarding their well-being. In summary, the significance of this study is multifaceted and far-reaching. From informing policy formulation to fostering community empowerment, contributing to scientific literature, addressing a research niche, and empowering local decision-making, the research bears the potential to catalyse positive change in forest conservation efforts within the Yilo Krobo.

1.6 Limitation of the study

Undoubtedly, there are many forest reserves in Ghana. These forest reserves have surrounding communities with various types of occupations through which the local population earn their living. In most cases, these reserves are blessed with rivers, mountains and other geographic features which further define other socio-economic activity of the surrounding communities. Indeed, not all these forest reserves have the same geographic features, which would further mean differences in occupations of the surrounding communities. In an attempt to explore the effects of forest degradation on the livelihoods of the local population, this study limits itself only to the two forest reserves in the Yilo Krobo Municipality.

As noted earlier, the geographic features of these two forest reserves may be different from the rest of the forest reserves areas in Ghana. The assumption is that the results and findings of this study in terms of the impact of forest degradation on livelihoods of the local communities within the Yilo Krobo municipality may be different from the other areas in Ghana. It is therefore suggested that the outcome of this study may not be a complete reflection of what pertains in the other forest areas in Ghana.

However, it must also be noted that other issues such as the high cost of funding such projects as well as the limitation of time to complete same justifies a single choice. Further, several studies have been carried out in the other forest reserves, leaving the two forest reserves within the Yilo-Krobo municipality, that have attracted few studies from researchers. This may constitute a limitation of this study. However, it is believed these limitations may not affect the quality and reliability of the outcome of this study.

CHAPTER TWO

LITERATURE REVIEW

2. 0 Introduction

The central theme of the present chapter is literature review. It focuses on the critical evaluation of the selected literature. It is made up of various books, scholarly articles and other sources relevant to the different themes and the problem being investigated in this dissertation till date. The study perused these literatures to get adequate information in relation to the state of the current knowledge of forest reserve and degradation in Ghana. Previous researches that have been publishedon the topic have been critically surveyed, read and analyzed in a chronological manner to describehow research on forest degradation in Ghana had developed over time and to highlight the progressin the field.

There is an abundant literature that are linked to almost all aspects of forests and forests degradation. This is not surprising given the fact that forest provides livelihoods and further sustain mankind on earth, among other things. Scholars have done several studies on the causes of forest degradation (Schoene et al; 2007; Carlson et al; 2012; Chakravarty et al, 2012; Kothke et al; 2013). Other studies also relate to the consequences of forests degradation on mankind, particularly on the livelihood of the affected communities, and the other species in the forests (Annor, 2008; Ankomah, 2009; Caviglia (1999). Indeed, a careful analysis of the causes of forests degradation in the literature point to human activities as the main drivers of these degradations wherever it occurred. The problems accompanying forests degradation, in the views of these authors, on the affected communities constitute one of the greatest threats for livelihood. Yet, there are several studies that also focus on the policy measures that have been employed by governments to deal with these degradations. FAO has also produced abundant literature on the efforts by governments

to deal with forest degradation and the challenges impeding such efforts (FAO, 2006; 2012). These studies have, in no small ways, made meaningful and significant contributions to the literature.

2.1 Definition of Forest

The definition of forest and forest degradation has been subject to controversy for some decades (Schoene et al; 2007). FAO has outlined some definitions for the above terminologies. As already stated, FAO is an international organization with a worldwide recognition and acceptance. As a consequence, its data and definition on forestry issues are considered as the most credible source of information, highly accepted and utilized. According to FAO (2006), forest is described as a land that spans 0.5 hectares or more, having trees higher than 5 meters, with a canopy cover of 10% or more. This definition excludes lands that are predominantly non-forest uses. Presently, global forest cover is on the decline (Kothke et al; 2013). FAO has stated that the total forest loss globally is nearly thirteen million hectares, representing nearly the total annual greenhouse gas emissions (Carlson et al; 2012). FAO further predicts that, in the coming years, as a result of increasing demand for food, biofuels and natural resources, more pressure would be brought on forests (FAO, 2006). Indeed, it is not surprising that D & FD have caused several global meetings of world leaders, leading to the creation of various conventions, protocols and interventions aimed at addressing these global environmental changes and to achieve sustainable forest management (Biermann et al., 2012).

2.1.1 Definition of Forest Degradation and Deforestation

Deforestation has been defined as the process of converting forests into other land uses for a long period, which reduces the tree canopy cover below the threshold minimum of 10 percent. On the other hand, forest degradation concerns the changes that take place within the forest, which potentially affect the structures of the forest as well as its functions, as well as its ability to generate

the appropriate and relevant services, goods, products and benefits. Deforestation has been described by the UNFCCC as activities created by human beings that potentially render the forestlands non-forested. We gather from the definition that deforestation denotes forest cover loss as a result of the activities and actions of human beings. In contrast, degradation of forest signifies human created activities that reduce the potentials of the forest and its capacity to produce common goods and services.

It is against this background that forests degradation and forests preservation continue to attract global attention (Chakravarty et al, 2012, p 6). This is not surprising given the fact that forests provide sustenance and livelihoods to mankind. The existing literature suggests that the loss of forests as a result of degradation continue to increase worldwide. Africa, for instance has recorded about 50% of annual rate of forests loss through degradation (Annor, 2008; FAO, 2010). Degradation poses serious threats on the forests, communities and ecosystems services, particularlyin Africa (Ankomah et al, 2020).

2.1.2 Livelihood

The concept of livelihood is explained as a means of living in the global system (UN, 2008). The concept concerns the way people utilize the available resources such as food, clothing, shelter etc to sustain themselves in the community. These necessities are essential to everyday life (Allison and Ellis, 2001). In other words, livelihood entails all resources, capabilities, including any activity essential for human sustenance.

According to the United Nations Economic and Social Commission (UNESC) sustainable livelihood is defined as "having the capability to manage and recover from unforeseen circumstances, while at the same time enhancing current and future capabilities without undermining the natural resource base" (UNESC, 2008). According to World Bank, 2007, it is

expedient we manage our environment more cautiously, as it determines our sustainability in the future. Within the livelihood framework, the UN has identified 5 fundamental factors that influence sustainability and the resilience of a community. These factors include human, natural, physical social, and financial capital. These factors are together known to as the Pentagon Model (UN-ESCAP, 2008). According to the UN, the well-being of humanity is positively linked to the increased in their incomes. This would further mean that if income decreases the livelihood of many people are affected, leading to the vulnerability of those affected.

It is no doubt that livelihood is linked to the quality of land and forest resources a nation possesses, especially in areas like Africa. As noted above, forest plays crucial role in the livelihood of mankind (Soini, 2006). It provides food security and also act as sources of shelter, employment, and natural resources, out of which communities depend on to sustain their livelihoods. As a consequence, events like forest degradation are likely to generate series of shocks including natural,investment, financial and physical (Cavendish, 2003).

The physical capital are all those existing resources that support viable livelihood. These include good shelter, adequate sanitation, clean water and basic infrastructure. On the other hand, human capital focuses on the skills, labor ability, knowledge and good health that collectively allow people to pursue livelihood (Lestrelin and Giordano, 2007). Natural capital consists of the natural resource stocks from which resource flows and derived. This includes, forest, land, river, sea, nutrient cycling and erosion protection. Financial capital handles financial resources that are needed for people to fulfill their livelihood objectives (UN-ESCAP, 2008).

Leaders are advised, as a matter of urgency, and as part of their agenda to guard, recover and to create the relevant resources required for food security in terms of both medium and long-term as well as future livelihoods, particularly in communities that have been affected by forest

degradation and deforestation. In instances of forest degradation, leading to the loss of forest resources as a result of illegal mining and logging, their livelihood activities are seriously restricted and come under threat. Livelihood initiatives in the forest zones should aim to protect and promote afforestation and reforestation programs (Pouliot et al, 2012).

It has become expedient, in view of the rampant destruction of our forests resources, that government should initiate the appropriate legal regimes, policies and strengthens the relevant institutions and other mechanisms to tackle the challenges facing the forests and their resources. Such effort demands immediate attention in order to sustain the livelihoods and survival of mankind.

2.2 Causes of Forest Degradation

As a consequence, research in relation to the causes of forests degradation has increased exponentially in recent times (Chakravarty et al, 2012). The existing literature has identified three aspects of the causes of forests degradation (Caviglia, 1999). First, scholars attempt to distinguish between the agents as well as causes of degradation. Caviglia (1999), for instance, contends that the agents of degradation are the human instruments such as public and private developers, charcoal burners, illegal logging, mining, bush fires, subsistence and commercial farmers. The author further argues that these agents perpetuating their businesses, either intentionally or unintentionally destroy the natural forests for their personal gains in defiance of the laws and the regulations backing forests preservation. Other scholars have also identified other factors of forests degradation and categorized them into direct and indirect causes (Angelsen & Kaimowtiz, 1999; Contreras-Hermosilla, 2000; Geist & Lambin, 2001; Kaimowtiz & Angelsen, 1998).

2.2.1 Direct Causes of Forest Degradation

One of the direct causes that contributes to forest degradation in Ghana has been the consistent expansion of agricultural activities (Kyere-Boateng & Marek, 2021). For instance, the proliferation of cocoa farms and palm oil production have led to shifting cultivation, with its associated use of, or application of inorganic chemicals such as weedicides, insecticides and pesticides, causing widespread of forest degradation in Ghana (Vijay et al, 2018). The above chemicals are powerful substances that causes the death of numerous bacteria that are beneficial to the growth and survival to several species as well as insects that contribute to the restoration of soil beneath the land. The result of the application of such chemicals is that farmlands are degraded, unable to yield higher crops, and consequently resulting to the clearance of virgin forest cum the destruction of economic trees such rosewood, shea trees, dawadawa and mahogany (Darkoh, 1993)

Another direct cause of forest degradation is attributed to the legal and illegal logging. Although some forest reserves have been allocated for timber concessions, the activities of chainsaw operators continue to threaten the sustenance of our forest reserves. These encroachers conduct their illegal in these forests particularly in the nights, weekends and public holidays where forests guards are not working (Kyere Boateng, 2021). They employ unapproved and illegal methods to fell these trees indiscriminately. In spite of the numerous legal regimes that sought to criminalize illegal loggers, the activity continued. The Timber Resources Management Act, 1977 (Act 547) and the subsequent Timber Resources Management (Amendment) Act of 2002 could not achieve the objective to stop all kinds of unlawful activities in the forests. It is also significant to mention that the aforementioned Act state that the Timber Utilization Contract (TUC) permits legal loggers to log timber from even the reserved segments of the forests. Such permission which authorizes loggers to cut many trees as they require, within the TUC framework, also significantly contribute to forest degradation in Ghana (Odoom, 2014).

The so-called 'Galamsey' or illegal mining has contributed quiet significantly to forest degradation in Ghana for the last decade (Boadi et al, 2016). Ghana is endowed with precious and sophisticated minerals such as gold, bauxite, manganese, diamond etc. Though there are regulatory regimes including the Minerals and Mining Act, 2006, (Act 703) as amended by the Minerals and Mining Act 2015 (Act 900), the Minerals Commission Act, 1993 (Act 450). The Republic owns all these minerals and licenses have to be obtained before exploration and subsequent extraction of these minerals. There is also a procedure for the acquisition of licenses (Obeng et al, 2019). Nevertheless, illegal mining, notably involving the teeming unemployed youth has grown quiet tremendously in recent times causing unlawful invasion into some of our forest reserves. Although, illegal mining offers employment leading to the reduction of poverty, the rate of destruction of our forests surpasses any advantage illegal mining offers to the people involved (Emmanuel et al, 2018).

2.2.2 Indirect causes of forest degradation

Some scholars argue that the indirect causes of degradation are connected to the external and trans-boundary factors (Sands, 2005; Humphrey, 2006). According to Humphrey (2006), such factors are difficult to measure. Population growth remains a key driver of degradation in the forest reserves in Ghana. Population explosion in the rural areas causes the local populace to rely on the forest resource for their sustenance and livelihoods. The population growth in Ghana in recent times has been associated with farm expansion, land fragmentation and increased shelter. These events undoubtedly constitute forest biodiversity loss and extinction. In addition, migration also put massive pressure on the scarce forest lands as immigrants' resort to farming for their welfare and survival and same contribute to the degradation of the forest lands (Zhang and Owiredu, 2007).

Policy failures and lapses also remains another indirect cause of forest degradation in Ghana. There

are several challenges embedded in our forest reserves. For instance, policies regulating the forest reserves in Ghana have not been addressing the issues of rights and benefits that permit prospective land users in relation to the accessibility of on-farm and fallow land trees, and the result is the accumulation of rampant illegal logging (Ameyaw et al, 2016). The policy of Modified Taungya System (MTS), which allows the local population to grow trees that generate 40% of income for the indigenes have not been properly executed. Feeling disappointed, these indigenes refuse to plant replacement trees. As a consequence, bare lands are eventually degraded (Acheampong et al, 2016).

There is lack of lapses in the forest framework Policy. Land owners holding allodia title do not get the deserving benefits from the trees extracted from their lands. Allodial title holders and the families who own these lands obtain scanty benefits from the existing forest policy. Forest policies have not clarified the rights and benefits in terms of income of stakeholders. This has generated incoherence in the forest policy, resulting in FD & D within the forest areas. Research shows that governance of the forest sector has been challenged by many factors including fragile structures for detecting and punishing, ineffective legal regimes and corruption (Ameyaw et al, 2016). The result of the inadequate penalties and weak sanctions of offenders of forest illegalities is the forest degradation and deforestation. In addition, the fragile nature in the forestry operations have influenced illegal chainsaw milling, illegal farming and illegal logging, which contribute to forest degradation (Fagariba et al., 2018).

The third category of the causes of forest degradation is natural climatic factors. According to Kumagai et al., (2012) in view of the fact that tropical rainforests commonly occur in areas with tropical ecosystem resources, hydrological changes affect ecological patterns, functions and processes. Further, decreasing precipitation patterns generates regular drought and bushfires which

potentially leads to degradation (Van et al., 2005). The consequences of these climatic and natural factors are drought, high temperature, low rainfall and long dry spells, leading to a remarkable decrease of the total production of farmers (Owusu, 2012; Abalo et al., 2017). Drought related fires caused huge destruction of Ghana's forest reserves in 2016, where recorded bushfires were estimated to be around 21.37 km (Dwomoh et al., 2019).

Incidence of bushfires related to droughtcan potentially emerge from deforestation and forest degradation. This occurs when degradation of forest ignites the fire to cover large areas in the forest. With the resultant low production, farmersare pushed to cultivate virgin forests instead of converting the old farms into highly intensive farms(Fagariba et al., 2018). Farmers perceive that, virgin forests yield bumper harvest. However, converting forest lands cover decreases forest ecosystem structures and functions and account for10% of the global carbon loss stock. Obodai et al (2019) submit that the consequences of such activities result not only in changes in climatic conditions, but also a change in water and rivers balance and degradation.

In addition, category of causes of degradation, in the opinion of Pearce and Brown (1994), emanate from the competition to use forests lands and the absence of the appropriate laws to regulate the use of the forest lands. People tend to compete for forests lands for the purposes such as agriculture, urban and industrial infrastructural development (Pearce and Brown, 1994). Some scholars argue that greater part of tropical forests have been destroyed through agriculture and the resettlement of subsistence farming settlers (Annor, 2008; Annor and Pfaff, 2008).

On the other hand, the inability of the government, particularly in Africa to enforce the laws regulating forests lands has led to the degradation of the protected forests lands. A study by the

Food and Agriculture Organization (FAO), also identified overgrazing and bush fires as part of the causes, though on a minor scale (FAO, 2010). It is estimated that many lands have been degraded by grazing, particularly in African countries (FAO, 2010). It is also estimated that bushfires destroy about 1% of forest cover on yearly basis (FAO, 2010).

In different areas of Africa including Ghana, the forest areas have become epicenter of mining. Carvalho et al; 2004; Sands, 2005) contend that mining activities, either surface or underground mining is very destructive. Mining is estimated to be one of the main drivers of land degradation in Ghana (Annor, 2008). As population grows, with towns and cities expanding, the hitherto forest areas become part of human habitation (Wilkie et al; 2000; Sands, 2005).

Some Ghanaian scholars such as Oteng-Yeboah (1997) and Annor (2008) have also identified other factors such as the demands of the industrial nations for woods products as an external cause of degradation of forest. Other indirect causes of forest degradation have also been identified by some scholars to include poverty (Chomitz et al; 2007); fiscal policies and market issues (Angelsen, 2004); population growth (Purnamasari, 2010); corruption and political issues (FAO, 2001) and under-estimation of forest preservation and resources (Sands, 2005).

2.3. Effects of forest degradation on livelihoods

Forest degradation generates huge impact on the forest biodiversity and ecosystem services. Forest degradation has caused widespread destruction of wildlife habitation within the forests (Emmanuel et al., 2018). Unable to find permanent habitation, animals and birds in particular, have become victims for hunters and poachers. There are many species of animals and plants that can no more be traced in forest in Ghana anymore, due to the destruction of our forest reserves. Several areas of forest zones in Ghana, including the famous Atewa forest reserve have suffered huge loss of flora and fauna as a result of D & FD. Oteng-Yeboah (1997) contends that the *Galamsey* taking

place in the forests have resulted in the pollution of most of our water bodies. On the other hand, in the views of Annor (2008), the rural areas in Ghana whose sources of water are the rivers, streams and other water bodies have been polluted as a result of *Galamsey*. Depending on these water bodies as sources of water for drinking and food have serious health implications on the inhabitants within the affected rural communities.

Forests are of utmost importance for the survival and prosperity of several communities globally. They serve as a vital source of resources and benefits that promote social, economic and spiritual well-being. Moreover, forests are home to numerous plants and animal species that hold cultural significance. Additionally, forests play a critical role in climate regulation, providing clean water, and maintaining soil fertility. Nevertheless, the loss of forests can lead to the degradation of cultural knowledge, customs, and identity. Cultural significance of Forest is an inextricable component of cultural livelihoods. It provides a multitude of resources and benefits that uphold the well-being of numerous communities globally.

According to Tscharntke et al. (2012), forest offer valuable ecosystem services, including biodiversity conservation, climate regulation and water provision, which contribute significantly to human well-being. Furthermore, forest harbor a diverse range of plants and animal species that hold cultural importance. Many of these species are utilized for various purposes, such as food, medicine and other cultural practices (Angelsen et al., 2014). Forests have an intense spiritual significance for many indigenous and local populations. As Gagné and Berteaux (2009) remarked, forests are frequently connected with cultural traditions and spiritual practices that have been transmitted across generations.

Impact of forest loss can have far-reaching impacts on indigenous and local population, causing adecline in cultural knowledge, custom and identity. Mistry and Berardi (2016) stated that the

lossof forest can result in a loss of cultural legacy and identity, as well as the degradation of traditionalknowledge and custom. Forest destruction can also lead to a loss of biodiversity and ecosystemservices that are critical to the survival and well-being of these population (Gillson et al., 2013). Additionally, forest loss can lead to social and economic marginalization of these communities, asthey lose access to the resources and benefits provided by the forest (García-López et al., 2017).

Forest Degradation is a major threat to cultural livelihoods worldwide, including traditional knowledge, spiritual practice, food system, crafts and medicines. Traditional knowledge is an important aspect of indigenous and local communities and forest play a significant role in its development. However, forest degradation can lead to the loss of this knowledge and the associated traditional practices. For instance, the Amazon rainforest is a home to various medicinal plants with significant cultural value. However, forest degradation is threatening the loss of these resources and the knowledge associated with them (Angelsen et al., 2014).

Forests also hold spiritual significance for many indigenous and local communities. However, forest degradation can result in the loss of cultural heritage and practices associated with these beliefs. In Meghalaya, India, the Khasi people have a deep spiritual connection to their sacred forest, but forest degradation is leading to the loss of these forests and the associated spiritual connection (Gagné & Berteaux, 2009).

Forests provide essential food resources for many communities worldwide, including fruits, nuts and game meat. However, forest degradation can lead to the loss of these resources and affect the nutritional needs and food security of these communities. According to Gillson et al., 2013, Madagascar has lost several fruits and nuts plants that were once important food sources for the local communities as a result of forest degradation.

Forests also provide raw materials for traditional crafts, such as wood, fibers and resins. Forest degradation can result in the loss of these resources and affect the livelihoods of artisans whose reliance are on these raw materials. In the Philippines, the loss of forest is threatening the livelihoods of basket weavers who use pandan leaves from the forest for their craft. (Angelsen et al., 2014)

Finally, forests are a source of many medicinal plants with significant cultural value. Forest degradation can lead to the loss of these resources and the associated knowledge and practices. For example, the loss of forests in Kenya is leading to the disappearance of many medicinal plants that were once widely used by local communities. (Gillson et al., 2013). In addition to the aforementioned impacts of FD & D, there are also changes in forests vegetationcover. Such changes, according to some scholars, do not only affect biodiversity and ecosystem health and functions, but at the same time result to the reduction of ecosystem services and functions (Kyere-Boateng and Marek, 2021). According to Tilahun et al (2021), the conversion of forests covers as a result of FD & D leads to the reduction of forest carbon stocks.

Further, a study by Arcilla et al (2015, p. 85) conclude that the undercover vegetation and habitats meant for birds and mammals are brutally destroyed as a result of both illegal and legal logging. It has been argued that uncontrolled illegal activities in our forests have led to climatic changes, that have resulted to prolonged droughts and high temperatures and same heavily impact on ecosystem services and forests biodiversity (Dwomoh et al., 2019). Yamba et al (2019) contend that high-temperature rise that leads to unreliable rainfall patterns occurs as a result of FD & D induced climate variability. Thus, Fagariba et al (2018) further contend that the changes in the high temperature as well as rainfall patterns impact on biodiversity and ecosystem functions. Forests resources are also subject to degradation due to these climatic changes (Vaglio et al 2016). FD &

D have been cited as the reason for the loss of the basic economic species including *Afzelia Africana* and *Khaya Senegalensis* (IUCN classified threatened species), pushing serious biodiversity loss (Jansen et al., 2018).

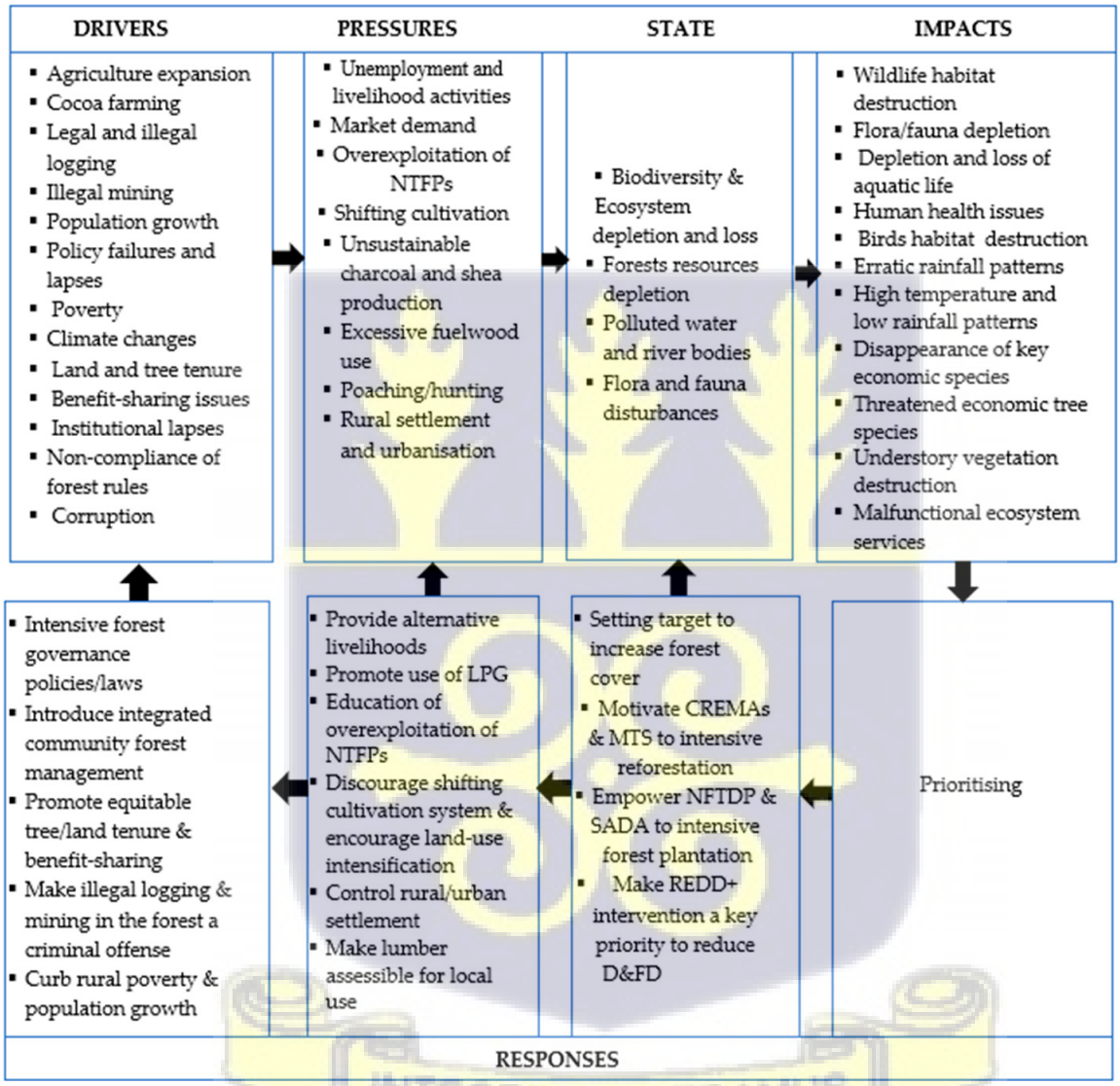

Figure 2.1: Drivers, Pressures and Consequential Impacts of FD & D on Livelihoods

Source: DPSIR 2021

2.4 Theoretical Perspectives

Two of the major theories that serve to explain the causes and solutions to forest degradation are discussed below.

2.4.1 The Forest Transition Theory (FTT)

There are numerous theoretical accounts on how FD & D take place. Following A.S. Mather (1992), this study draws on Forest Transition Theory (FTT) to illustrate the events surrounding forest degradation in the areas under study. The study offers FTT perspective to suggest that there is a relationship between the income level of the community and the degradation of the forest reserves in the Yilo-Krobo municipality.

The FTT is a concept that was first developed in 1992 by Alexander Mather. The theory describes the processes a forest landscape, region or even a country goes through when the forest cover stops growing, as a result of deforestation, and starts expanding as a result of afforestation and or reaforestation. Some scholars such as Farley, 2007; Mather, 1992 have statedthat the FTT affords a framework that helps to understand the scenarios in which acountry or region is ushered from a state of decreasing forest cover into a state of increasing forest cover from time to time.

The theory suggests that in the early stages, deforestation is faster leading to the decline of the forest zones, due to a surge in population, increase in agricultural activities as well as the need for timber products. However, with time, and as socio-economic developments flood the area or the region, forests become more of a treasured resource. Political demands for forest conservation increase and this stimulates protection, regeneration and plantation establishment (Mather, 1992).

Mather (1992) was a geographer and employed the term to illustrate the practical realities that occurred and are observed in many nations in relation to forest transitions. This observational process, according to Mather, included national-scale shift that reduces forest area to an expanded

forest area. This theory was a product of a long-term historical studies of forest cover in Europe. It was later applied to the modern-day dynamics in the development and tropical regions.

According to the theory, forest transition is driven by multiple factors. These include natural regeneration of forests, followed by planting of trees, implementation of agroforestry and continuing reforestation. The theory suggests that these factors work in several forest regions for longer periods to regulate and facilitate forest transitions (Farley, 2007).

The theory also describes several key impacts of forest transitions. According to Mather (1992), some of these effects include social and livelihoods impacts of the forest transitions, environmental impacts, impacts on recovery of forests on carbon stocks, biodiversity, water flows, soils and erosion, and a variety of other environmental resources and services.

The theory suggests that in spite of human population, expansion of forest cover can take place. One of the major drivers of forest loss is agricultural expansion. Forest areas are recovered through natural expansion of remaining forest, for example areas that have been abandoned, also goes through active landscape restoration and plantations programs. In transition period, not only does the forest change, but also its quality undergoes changes as well.

Forest cover losses are very common in Ghana, and surprisingly, the situation continue to worsen without consistent effort on the part of the government to employ the existing policies to control forest activities. According to Ghana Forest Watch, Ghana lost over 1.53Mha of tree cover and 843Mt of CO2e emission from 2001 to 2022. In Eastern Region alone, where these forest reserves are located, lost 173,539ha of its tree cover. Among the factors that affect forest transition is the introduction of policies.

The forests areas within the Yilo Krobo municipality have not been spared with consistent encroachment from the general public. Agricultural expansion and illegal acquisition of these reserved areas by some recalcitrant citizens are rampant. Yet, there are existing policies and legal regimes to prevent these illegal entries into these forests areas, and to facilitate forests transitions. Some of the existing laws regulating our forests include the Forestry Commission Act, 1999 (Act 571) and Regulations, Minerals and Mining Act, 2015 (Act 900), Timber Resource Management Act 1977 (Act 547) among others. Several policies and procedures exist to regulate entry, use and management of these forests reserves. It is not in doubt that these policies and legal regimes either facilitate or slow down the transition processes, but that depends on the seriousness the authorities attach to the processes to achieve the transition. For example, deforestation can flatten the curve of forest loss, whilst landscape restoration redresses the curve to the maximum ecological potentialities of a given locality.

FTT explains forest transition as a shift from a shrinking to an expanding forest area (Mather, 1992). The theory provides a general framework to understand the processes that a nation or region goes through in order to shift from a decreasing forest area to an increasing forest area over time (Mather 1992). To achieve forest transition, the key processes that were captured in the theory include natural regeneration of forest, planting of trees, implementation of agroforestry and continuing reforestation or afforestation. Practically, it was observed that the principles that emerged from this theory has not been fully applied by authorities to the forests areas within the Yilo Krobo in an effort to achieve forests transition, just like the other forests areas in Ghana. Currently, forests reserves within the Yilo-Kilo municipality continue to shrink through illegal activities (Ameyaw et al 2016). Not much has been done towards forest transition within the municipality (Oduro et al 2015).

Though, the Kufuor's administration made effort to carry out HIPC plantation to step up effort of transitioning our forests, the successive governments could not do much to sustain this natural regeneration project. Though, currently, there is a Green Ghana Project targeted at planting trees to cover the forests areas in the country, the Yilo Krobo area has not benefitted that much.

FTT preaches that trees must be constantly replaced to ensure a continuing or sustainable forest reserve. It must however be stated that since the forest reserves within the municipality are mostly primary forest, and mostly serve as tourist attraction centers, authorities should have promoted and encouraged the planting of certain recognized trees, for example those that provide shades and appear attractive to tourists. However, on the grounds, this is not what happens within the municipality. In view of the fact that tree planting exercise in Ghana is general, most of the trees that are planted within the municipality as part of forest transition effort are not relevant to sustain the reserves as key tourist attraction centers. As a consequence, it is on record that tourist attraction and events within the municipality have declined considerably, leading to considerable reduction of revenue, mass unemployment and migration of the youth to the urban areas (Kyereh, 2021).

Further, as noted above, the HIPC plantation policy initiated during Kufuor's administration targeted certain specific forest reserves, with Yilo Krobo municipality exempted. The essence of the policy was that such trees are allowed to mature within a period of ten years before they could be replaced. Yilo Krobo municipality was not benefitted from such forest transition effort. If they had benefitted, the result of such policy could have been a sustainable forest reserve within the municipality. In the nutshell, although the municipality has experienced forest transition, it seems to appear that the relevant principles that FTT generated have not been carefully applied and followed, whilst the various legal regimes were not given the considerable

attention to ensure effective application. Forests degradation within Yilo-Krobo municipality continues to shrink, prompting the urgent need for government intervention. Thus, judging from the suggestions raised by the transition theory, policy of preventing deforestation and restoring forest landscape are equally important in managing and shaping forest transition.

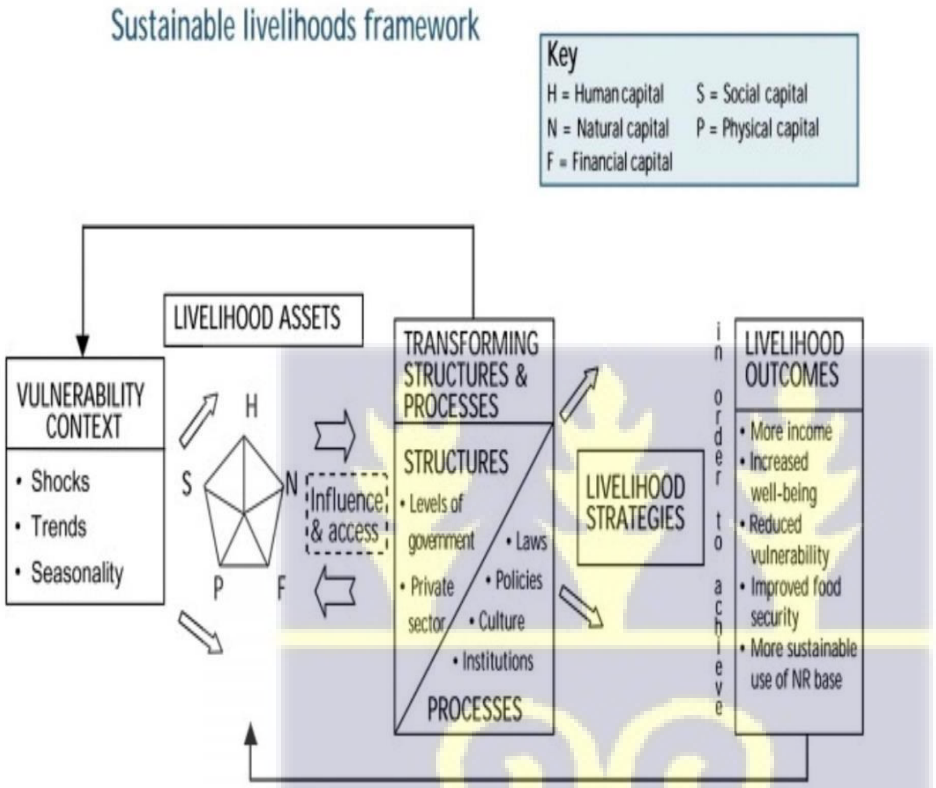

Figure 2.2: The Sustainable Livelihoods Framework

2.4.2 The Ecological Modernization Theory (EMT)

The Ecological Modernisation Theory, a prominent framework within environmental studies, offers valuable insights for comprehending and addressing the complex interplay between environmental degradation, technological advancement, and policy interventions. This theory asserts that societies can transition towards sustainability through the integration of ecological concerns into economic and political processes (Mol & Spaargaren, 2014). In the context of

investigating causes of forest degradation within the Yilo-Krobo municipality, the Ecological Modernisation Theory provides a robust foundation for understanding the multifaceted dynamics at play.

The relevance of the Ecological Modernisation Theory to this study is evident through its core tenets. As population growth and agricultural expansion contributes to forest degradation (Doe et al., 2017), the theory's emphasis on embracing innovative technologies to mitigate environmental challenges becomes pertinent. Technological advancements that promote sustainable land management and resource utilization align with the theory's vision of a shift towards greener and more resource-efficient economies.

Furthermore, the Ecological Modernisation Theory justifies its relevance by highlighting the pivotal role of policy and governance in driving environmental sustainability. Legislation and regulations play a critical role in preserving the integrity of forests (Ofori & Adu-Bredu, 2016). The theory's emphasis on policy reforms and the establishment of effective governance structures resonates with the need to develop and enforce measures that combat illegal logging and unsustainable land use practices within the Yilo-Krobo municipality.

By adopting the Ecological Modernization Theory as the theoretical foundation, this research acknowledges the imperative of aligning technological innovation, policy interventions, and socio-economic development with ecological sustainability. The theory's balanced perspective, rooted in the integration of economic, social, and environmental dimensions, positions it as a suitable lens through which to analyze the multifaceted dimensions of forest degradation and its implications on the local community.

In sum, the Ecological Modernization Theory provides a robust theoretical foundation for investigating the causes of forest degradation, its impact on local livelihoods, and the role of legislation and policy in preserving forest integrity within the Yilo-Krobo municipality. The theory's emphasis on sustainable technological advancements and effective governance aligns seamlessly with the research objectives and the need for a holistic understanding of the challenges faced by the region. These relationships are captured in the conceptual framework below.

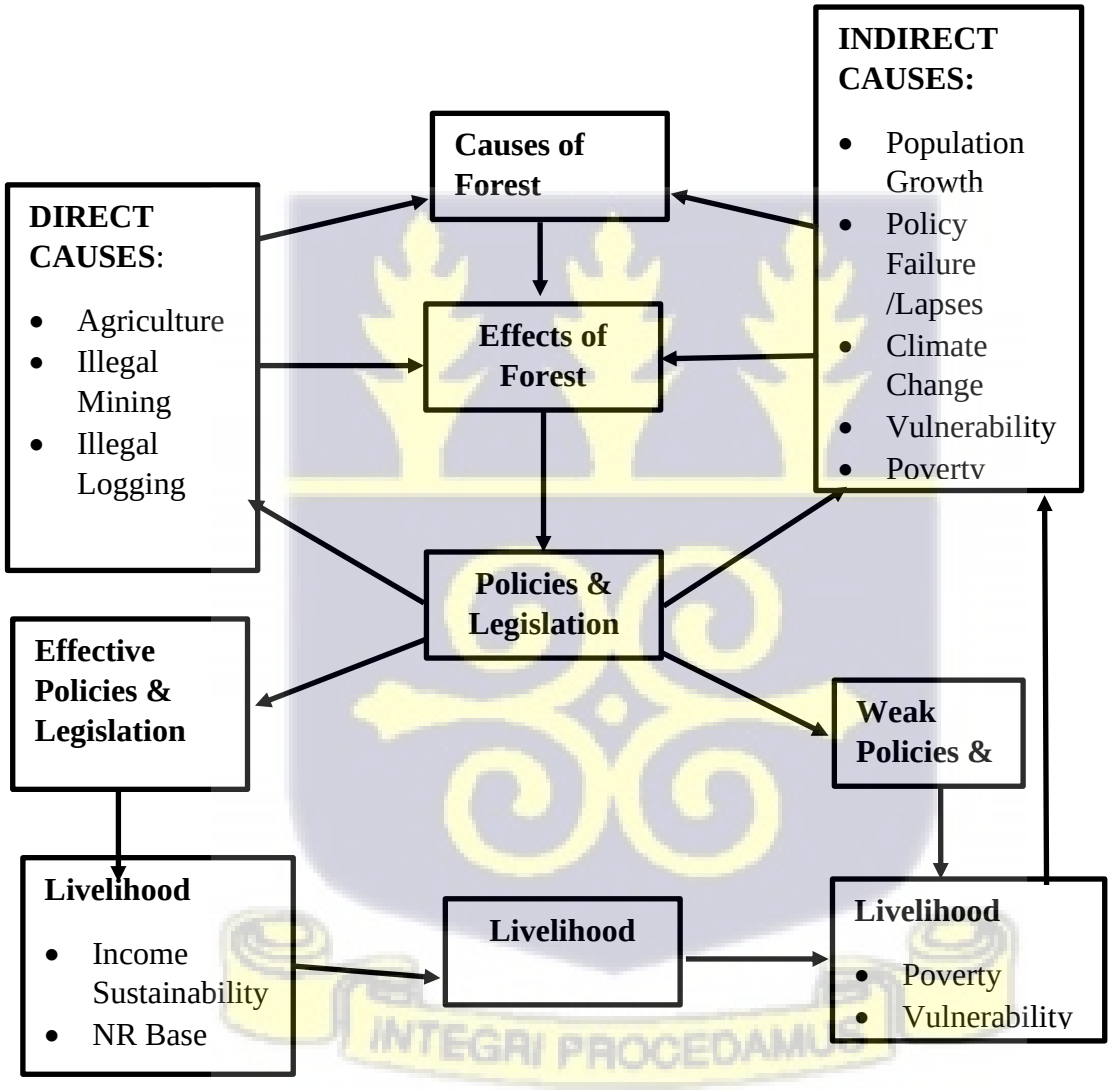

Figure 2.3: Conceptual Framework

Source: Author's Construct, 2022

2.5 Definition of key terms

2.5.1 Forest

Forest has been defined as a land that spans 0.5 hectares or more, having trees higher than 5 meters a canopy cover of 10% or more (FAO, 2006).

2.5.2 Forest degradation

Forest degradation has been defined as the changes that take place within the forest, which potentially affect the structures and functions of the forest, as well as its ability to supply services and provide benefits and goods (FAO, 2015).

2.5.3 Deforestation

Deforestation involves the conversion of forests into other land use over a long term, and decreasing tree cover to the minimum of 10 percent threshold (FAO, 2010).

2.5.4 Livelihood

Livelihood has been defined as the way people utilize the available resources such as food, clothing, shelter etc to sustain themselves in the community (Kyere-Boateng, 2021).

CHAPTER THREE

METHODOLOGY

3.0. Introduction

The chapter consists of the methodology employed toinvestigate topic understudy i.e. the impact of forest degradation on livelihoods of the local community surrounding the Boti falls and the Volta River Block II reserve areas. The chapter starts off by providing discussions on the research methodology and research design. Other components of this chapter include the population of the study, the data collection and procedure for analyzing the data and specifically the method used in collecting the data of a research of this nature and its suitability for the study discussed. Furthermore, the chapter discusses the various qualitative and quantitative data analysis conducted inthe study.

3.1 Qualitative and Quantitative Research Design

Research design is assumed to be the master plan of any research. It demonstrates how particular research is conducted. Research design shows how an aspect of the research, which is the population, sampling and the sampling procedure, grouped together address the research objectives (Mouton, 1996). Research design is said to be associated not only with quantitative method but also in qualitative as well as mixed methods approaches, indicating the exact direction for procedures in a research approach (Creswell, 2014). It can also be described as a form of strategy that is adopted in any research project (Denizen &Lincoln 2011). This study employs the elements of both qualitative and quantitative research design. This design allows for the collection of both quantitative and qualitative data which enable the results to be integrated during the analytical stage of the study.

3.2 Qualitative Research Design

This research method deals with problems that require the exploration of those problems. The researcher gathers information from participants selected, by asking broader and general questions. Data is then collected out of the views expressed by the participants, mostly in the form of words. What the researcher does is to carefully describe and analyze those views to generate themes for the study (Creswell et al, 2015). The objective is to explain the meaning and importance of events for a group of people living in aparticular community (Merriam & Tisdell 2016).

The role of the scholar, when pursuing this research method, is to discover the experiences of the people particularly how they see and interpret their own world, and meanings they attach to events and experiences (Merriam & Tisdell, 2016). The researcher then uses responses collected from participants in the form of data and analyze same in all sorts of ways (Braun & Clarke 2013).

According to Merriam and Tisdell (2016), in qualitative research, the researcher positions himself to achieve the following: First, the researcher seeks to understand the practical experiences of individuals in that particular field of study. Second, the researcher turns himself into an instrument of data collection and data analysis. Third, the researcher generates explanations gotten from the information gathered and transform them into theories. Finally, the researcher generates comprehensive analysis from the investigation through numerous sources of information gathered including interviews, notes from the field work and documents.

Scholars admit that this research method is suitable for small samples (Collis & Hussey, 2003). However, the results emanating from this method are not quantifiable and measurable. According to Collis & Hussey (2003), one of the vital advantages of this method is that, it is able to generate in-depth analysis of the research topic, while making effort to avoid the temptation of limiting the

scope of the research and the responses of those who participated in the interviews (Collis & Hussey, 2003).

In this study, the justification for the adoption of the qualitative research method includes the following:

i. As the main instrument of the research, it would enable the researcher to discover and understand the actual effects of forest degradation on livelihoods of local communities. This wouldbe made possible as the interviews and the interaction processes would be conducted in a differentenvironment within the local populace, which appears as natural setting to participants, usually with a small sample size.

ii. It is based on interviews, open-ended questionnaires, and focus group discussions in gathering data for interpretive analysis (Antwi & Hamza, 2015). The result is that participants would find the exercise convenient to patronize, speak for themselves and volunteer relevant information that would lead to the discovery of detailed and first-hand information about the phenomena being studied.

iii. It is dependent on deductive logic and also involves the extensive use of descriptive data (Creswell, 2009; Denzin & Lincoln, 2000). These features of qualitative method would be helpful to enable the researcher not only to formulate the relevant and appropriate themes and theories butalso to discuss and explain the topic being investigated (Denzin & Lincoln, 2000).

Bell (2005) argues that the beauty and efficacy of qualitative research strongly depends on the in-depth knowledge of the researcher. It is further argued that the findings generated from this type of research method are perceived as unreliable, in that the outcome of employing such method is influenced by the researcher's own personal experiences and backgrounds (Bell, 2005). In the

views of some scholars, the outcome of this approach does not reflect the views of the general populace, in view of the fact that this method appears to be more suitable for small samples (Bell, 2005; Creswell, 2009).

3.3 Quantitative Research Design

Quantitative research is a type of research in which the scholar studies a phenomenon that requires an explanation about variables. The researcher then chooses what issues to conduct a study on, with particular questions in relation to the problem being addressed. The researcher also gathers measurable data from those interviewed, and then begin to examine these numbers by making use of statistics and graphs and then conducts the enquiries in a subjective and objective manner (Creswell, et al, 2015). It is the method employed to evaluate objective theories and the links between various variables (Creswell, 2003). The reasons for adopting this approach for this research are as follows:

i. The quantitative approach provides the general framework for the researcher to address therelationships among the variables being studied within the research.

ii. Further, such an approach is employed to explain the cause-and-effect relationship.

iii. Data is readily available when using quantitative methods, it is convenient as well and also leans itself towards deductive logic.

iv. The quantitative method of collecting data ensures objectivity and reliability (Taruwinga, 2011), and the researcher is disconnected from the participants and as a result unable to influencethe findings of the study (Johnson & Onwuegbuzie, 2004).

3.4 Mixed Method Research Design

It is the third methodology of research. It combines both qualitative and quantitative research techniques in a particular study. This method integrates the strengths of the two approaches in order to minimize their weaknesses in a particular study (Wisdom & Creswell, 2013). This study uses the mixed method technique, which combines qualitative and quantitative techniques, in an attempt to address the objectives of this dissertation. Both approaches are very essential in that they offer support for each other. Both quantitative and qualitative methodologies are seen as appropriate for a study of this nature. Employing mixed methodology would provide a variety of ways to understand and appreciate the problem under investigation in different contexts rather than conducting this study through either quantitative or qualitative approaches alone. Specifically, the study adopts sequential explanatory research design.

The Sequential Explanatory Mixed Method Design is a research approach that begins with a quantitative phase followed by a qualitative phase. This design is characterized by an emphasis on explanation, where qualitative insights from the second phase are used to explain or elaborate upon the quantitative findings from the first phase. The aim is to provide a more comprehensive understanding of a research problem by integrating both qualitative and quantitative methods (Creswell & Plano Clark, 2017).

3.5 Quantitative Phase: Data Collection and Analysis

In the quantitative phase, researchers gather numerical data using methods such as surveys, experiments, or statistical analysis. The goal is to quantify relationships, patterns, and trends related to the research problem. Quantitative findings form the foundation for subsequent qualitative phase. In this research, the Likert scale, a commonly used measurement tool, allowed

me to gauge the participants' viewpoints and perceptions on a range of issues associated with these variables.

Participants were presented with a set of statements that pertained to each of the eight constructs, including Agriculture Activities, Forest Degradation, Habitat Depletion, Population Growth, Pollution, Ecosystem Loss, Legal and Policy Framework, and Livelihood. For each statement, respondents were asked to indicate their level of agreement or disagreement, with options typically ranging from "Strongly Disagree" to "Strongly Agree."

The Likert scale provided a structured framework for participants to express their opinions on the various dimensions of the research. The responses collected using this scale facilitated the quantification of their viewpoints, enabling me to derive numerical data that formed the basis for subsequent qualitative analysis. This approach allowed for a systematic assessment of the participants' perspectives across the diverse range of variables, shedding light on the patterns, trends, and degrees of consensus or divergence within the community.

The utilization of a Likert scale not only facilitated the quantification of qualitative viewpoints but also enabled a comprehensive exploration of participants' attitudes, contributing to a more holistic understanding of the factors affecting the community and aligning well with the aims of the Sequential Explanatory Mixed Method Design.

3.6 Qualitative Phase: Exploration and Explanation

The qualitative phase allowed me to explore the nuances, motivations, and underlying reasons behind the quantitative patterns observed in the community's responses to the Likert scale statements related to the eight variables.

During the qualitative phase, I engaged in various methodologies such as interviews, focus group discussions, or content analysis, depending on the specific research objectives and context. These methodologies provided a platform for participants to elaborate on their experiences, share narratives, and provide context to their quantitative responses.

I conducted individual interviews with community members to gain a deeper understanding of their perspectives on the variables. Through open-ended questions, I encouraged participants to share their thoughts, experiences, and perceptions related to agriculture activities, forest degradation, habitat depletion, population growth, pollution, ecosystem loss, legal and policy frameworks, and livelihood. The interviews allowed participants to express their viewpoints in their own words, offering rich qualitative data that complemented the quantitative findings.

In addition to interviews and focus group discussions, content analysis of documents, policies, and community narratives further enriched the qualitative phase. Analysing textual data allowed me to contextualize the qualitative findings within broader social, economic, and environmental dynamics, providing a holistic perspective on the research problem.

Throughout the qualitative phase, I employed techniques such as thematic analysis and narrative analysis to identify recurrent themes, patterns, and key insights emerging from the data. These qualitative insights were then woven into the interpretation of the quantitative results from the analysis of the Likert scale responses. By linking the qualitative narratives to the quantitative trends, the research aimed to provide a comprehensive and in-depth understanding of the variables and their implications within the community.

In summary, the qualitative phase served as a crucial component of the Sequential Explanatory Mixed Method Design, allowing me to explore, explain, and enrich the quantitative findings. By

capturing participants' narratives, motivations, and experiences, the qualitative phase provided a deeper layer of insight that helped to unravel the complexities of the eight variables and their interconnectedness in the community context.

3.7 Profile of the Study Area

The Yilo Krobo Municipality, situated in the Eastern Region of Ghana, is one of the administrative subdivisions encompassing a total of 26 municipalities and districts. Spanning approximately 805 square kilometres, it constitutes about 4.2 percent of the entire land area within the Eastern Region. This municipality comprises a network of approximately 230 settlements, with only two, namely Somanya, the municipal capital, and Nkurakan, boasting populations exceeding 5,000 residents each (YKMA, 2021).

Divided into seven distinct Zonal Councils—Somanya, Oterkpolu, Boti, Nkurakan, Nsutapong, Klo-Agogo and Obawale—the Yilo Krobo Municipality demonstrates a diverse and decentralized administrative structure. The most recent census data, as outlined in the 2021 Population and Housing Census General Report, reveals that the Yilo Krobo Municipality has an overall population of 122,705 individuals. Of this total, 48.6 percent represent males, while 51.4 percent constitute females. The calculated population density for the district stands at approximately 238.4 persons per square kilometre, accompanied by an annual population change rate of 3.2 percent (GSS, 2021).

Notably, the demographic distribution within the municipality shows that approximately 30.92 percent of the populace resides in urban centres, while the remaining 69.8 percent is situated in rural areas. This rural predominance is consistent with the municipality's occupational landscape, where a significant portion of the population is engaged in farming—a primary livelihood activity.

Consequently, people of varying age groups predominantly reside in rural regions rather than urban locales.

In summation, the Yilo Krobo Municipality, nestled within the Eastern Region of Ghana, presents a mosaic of settlements and administrative councils. Its demographic composition, marked by a majority residing in rural areas, reflects the municipality's agrarian livelihood orientation. These characteristics, as highlighted in the 2021 Population and Housing Census General Report, offer insights into the distinct dynamics and dimensions of the Yilo Krobo community (GSS, 2021).

3.8 Study Population and Data Collection

The study of population sample and sample size are important in research projects in that, in almost all cases, it is not possible to obtain a data on the whole population. According to Barreiro and Albandoz (2001), factors such as budgetary and time constraints, non-availability and other challenges presented difficulty to bring all participants on board in the face of such a larger population. It is only when the population size is smaller, that it becomes expedient to study and engage the entire population (Jacobs, 2010). As a result, the practice has been that data is gathered from a representative sample for the research analysis. Sample is defined as a group of participants who are selected to serve as representative of a larger population. The procedure involved in the selection is known as sampling (Sunitha & Sreevidya 2011). The essence of substituting the population sample for the whole population is that the sample adequately reflects the attributes of the general population and this allow the research outcome to be generalized without losing validity and reliability.

3.9 Study Population

The term population, in relation to this study is in reference to the gathering of people, objects places, etc. defined by certain characteristics that distinguish a qualified specific and target group of interest from others (Churchill, 1995). They are the selected class of people whose participation in the research project is of great importance to the researcher (Gravetter & Forzano, 2012). Such population target is also referred to as research frame population (Leedy 1995), which is smaller in size than the whole population. Consequently, the target population is smaller in size than the entire population. The general population in this study is made up of the section of the local population, the selected staff of the district assembly and the forestry commission. This is the sampling frame.

3.10 Sample size determination

Probability and non-probability sampling constitute the two basic kinds of sampling techniques that are employed in social science research (Bryman, 2012). The sampling design employed is single stage sampling procedure since the sampling frame contains adequate information for the sample to be drawn directly (Creswell, 2014). In most cases, the sampling method employed by aresearcher is determined by the desire to balance the need to produce accurate results without incurring so much cost, since the data cannot be gathered from the whole population.

3.11 Sampling procedure

In probability sampling, every item that is part of the population assumes an equal chance of being counted as part of the sample. Probability sampling ensures members of the target population are fairly represented in the sample to make it possible for the study results to be generalized (Gujarati, 2004). The randomness of the process is such that the researcher cannot influence the selection by any means (Creswell, 2014). On the other hand, non-probability (convenience) sampling is where the participants are selected based on convenience and availability.

Based on information gathered from the Yilo Krobo Municipality and the Population and Housing Census, it has been ascertained that the population of individuals aged 18 years and above within the designated communities of Somanya, Boti, Otekpolu and Klo Agogo who depend on the forest (directly and indirectly) for livelihoods amounts to approximately 3192. This demographic subset serves as the foundation for the study's investigative scope, focusing on diverse aspects tied to the variables of interest.

The study's aspiration to derive insights that accurately mirror the characteristics and trends of this specific population warrants the establishment of an appropriate sample size. In this pursuit, the calculation of an optimal sample size emerges as a pivotal aspect of research design. To fulfill the study's objectives, the adoption of Cochran's formula is pivotal in determining the requisite sample size. Cochran's formula is designed to factor in the desired confidence level and the estimated proportion of the population that embodies the targeted characteristic. The formula is articulated as follows:

$$N = n / ((1 / Z^2) * (p) * (1 - p))$$

Where:

N signifies the required population size.

n denotes the sought-after sample size.

Z correlates to the Z-score pertinent to the chosen confidence level (e.g., 1.96 for a 95% confidence level).

p signifies the approximated proportion of the population embodying the characteristic (a conservative estimate of 0.5 is often employed when precise proportions are elusive).

In alignment with the particulars of this study, the desired sample size is 399—a representation of the exhaustive data collection endeavor. By integrating the given values into Cochran's formula, the calculated sample size is derived:

$$n = N * ((1 / Z^2) * (p) * (1 - p))$$

$$n = 3192 * ((1 / (1.96^2)) * 0.5 * (1 - 0.5))$$

$$n \approx 364$$

Therefore, the study concludes that an optimal sample size of approximately 364 participants is required. However, I choose four hundred (400) participants to ensure a robust, reliable, and representative set of data. This calculated sample size guarantees the acquisition of comprehensive insights, substantiated by a 95% confidence level, for the variables within the Yilo Krobo Municipality.

The meticulous application of Cochran's formula exemplifies a rigorous research approach, ensuring the precision and validity of the study's findings.

3.12 Data Collection Methods and Sources

Data collection is explained as the procedure a researcher employs to gather accurate information from relevant sources on a particular field of study, and subsequently analyze same with the ultimate objective of providing answers to the research problem being investigated, evaluate the results from the analysis and predict trends and probabilities (Kabir, S. M. S. 2016). It is not in doubt that data collection constitutes an important stage in any research work. It is predominant in all areas of studies including humanities, business, social and physical sciences etc. This is due tothe fact that data gathered by the researcher has several and huge impacts on the achievement of the objectives of this research including the overall outcome of the research. Though methods

maydiffer depending on the discipline, yet the importance of ensuring precise and authentic collectionof data remains the same (Kabir, S.M.S. 2018).

The aim of data gathering is to obtain quality evidence and valuable information. Such information is subsequently converted into rich data analysis that would enable the researcher to build persuasive and reliable answers to questions that are directed to the participants. Kabir (2016) contends that, irrespective of the field of study, accurate data collection remains crucial to ensure and maintain the integrity of the research. Kabir (2016) further maintains that every researcher should make effort to reduce the occurrence of errors through the use of the appropriate data collection instruments.

Data collected for the project work was primary in nature for both qualitative and quantitative data. By definition, a primary data is the information collected directly through original or first-hand-experience by the researcher without necessarily going through any existing sources (Hox & Boeije, 2005). The source of the primary data was field notes generated through community interaction as well as information gotten the relevant entities having oversight responsibilities on our forest and forest reserves including Forestry Commission and Lands Ministry. This primary data was gathered using a combined set of structured questionnaires and interview guides. The interview guides were administered to the government institutions mentioned above and the structured questionnaire, administered to the communities in the study areas.

The primary data obtained served the needs of this research project at the time of compiling same, which represents the experiences and opinions of the participants and constituted the actual information needed to resolve the problem under study.

As earlier stated, the data collection method involved two phases. It begins with a quantitative stage, which involves the administration of questionnaires by the researcher, aimed at gathering empirical data and analyzing same to determine the impact of forest degradation on the standard of living of the local population within the study area. The last phase, being the quantitative stage, concentrated on interviews on a restricted set of issues (Vitterso et al; 2003, p. 207).

Table 3.1 Summary of Data Sources and Collection Techniques

Objectives of Research	Required Data	Source of Data	Collection Mode
To investigate the causes of forest degradation in the Yilo-Krobo Municipality	The trend and the extent of forest degradation	Sub-Chief Community Leaders / Members Municipal Chief Executive (MCE)	Interview Guide Questionnaire Discussion
To investigate the impact of forest degradation on the livelihoods of the community within the Yilo-Krobo Municipality	Community attitudesto forest degradation, bad farming activities	Municipal Chief Executive (MCE) Community Leaders / Members	Interview Guide Questionnaire Discussion
To investigate the roleof legislation and policy in preserving the integrity of the forests	Availability and effectiveness of forest legislative instruments and policies	Forestry Commission (FC) Ministry of Lands & Natural Resource (MLNR)	Interview Guide and Questionnaire

Source: Author's Construct, 2022.

3.13 Data Analysis

The analysis of the data analysis was carried out by using both qualitative and quantitative techniques. A descriptive statistic was used to analyze and summarize key variables. The data was then coded and keyed into the statistical package for social sciences (SPSS) for the analysis. Chronbach's Alpha was also used to check the internal consistency and reliability of the constructs used in the measurement. Bivariate correlation coefficient and Ordinary Least Square (OLS) regression was also employed to determine the relationships and influence of explanatory variables, such as population growth, legal and policy framework and agricultural activities on the dependent variable, forest degradation.

3.14 Reliability of the Measurement Instrument

Before carrying out the regression to determine the factors contributing to forest degradation in the Yilo Krobo municipality, I checked for the internal consistency and reliability of the constructs used in the measurement scale as measured by Chronbach's alpha and the composite reliability (Hair et al., 2013). Chronbach's alpha is the frequently adopted statistic for determining the internal consistency and hence constructs validity of questionnaire items. According to Hayes (2015), although Chronbach's alpha > .90 are highly esteemed, alpha values greater than .70 are not too bad to be relied upon and included in the analysis.

For this study, the internal consistency of the constructs used, apart from the illegal logging and mining items, the two items measuring the climatic factors, that is forest degradation item; *Food crops and cash crops production are causes of forest degradation in this community*, the legal and policy framework item; *Inadequate sanctions and penalties to offenders of forest illegalities contributes to forest degradation* along with the *changes in rainfall pattern* variable that were dropped to improve the scale since they either had low loadings or Chronbach's alpha. All the

items recorded Chronbach's alpha between .70332 and .8612 indicating that the items retained for analysis had good internal consistency and reliability (Nunnaly & Bernstein, 1994) as shown in table 3 below. Chronbach's alpha is a measure of the average split half reliability of all the correlations (Hayes, 2015). According to Yusuf (2018), the objective for carrying out reliability tests in quantitative analysis is to ensure the instrument used to gather data produces consistent results.

3.15 Construct Validity

To guarantee the validity of the constructs included in the measurement scale, the research tested for both convergent and discriminant validity.

3.15.1 Convergent Validity

Hamid et al (2017) disclosed that convergent validity relates to checks conducted to uncover the correlation of multiple indicators of the same variable that are in agreement. This is done by looking at the factor loading of the indicator as measured by its composite reliability (CR) and the average variance extracted (AVE). The author recommends for the AVE particular to be between 0 and 1 with values >.50 satisfactory for convergent validity.

3.16 Research Ethics

Research ethics is the most important rule to observe when conducting research. They are a set of rules that are established based on the welfare, mutual respect, and the wellbeing of the individuals that make up the sample frame. Before a researcher conducts research, he/she must discuss these ethics with the individuals to ensure they are fully accepting of the fact they are part of the sample frame for research and are comfortable with it.

Some researchers on the other hand are funded by organizations and the public with money and other resources and these ethics ensure they remain bones in their dealings. The research ethics

not only protect the public, but the environment as a whole; protecting and doing damage control where the research is concerned. All of the above considerations were noted and used for the study.

3.17 Conclusion/Summary of chapter

The chapter describes the procedures to be adopted that would enable the research project to achieve objectives set out, and further to answer the research questions. This includes the research approaches and designs. Others include the description of the population selected, the sampling processes and data gathering method.

CHAPTER FOUR

PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS

4.0 Introduction

The chapter consists and unravel the results and discussion of the data collected. The chapter begins with a discussion of the demographic characteristics of the respondents recruited for the study. It then proceeds to analyze the results in reference to the research questions and extant literature reviewed in chapter two. At every stage of the analysis, the researcher strives to complement the quantitative analysis with results obtained from the content analysis of the qualitative data.

4.1 Socio - Demographic Profile of Respondents

The demographic information of the 400 respondents selected to participate in the survey are presented in the table below.

Table 4.1. Demographic Information about respondents

		N	Percent
Age (Years)	Below 20	15	3.8
	21-30	100	25.0
	31-40	150	37.5
	41-50	90	22.5
	>50	45	11.2
	Total	400	100
Gender	Male	225	56.3
	Female	175	43.7
	Total	400	100

	Businessman/Woman		
Occupation		110	27.5
	Civil Servant	90	22.5
	Farmer	170	42.5
	Other	30	7.5
	Total	400	100
Household Size	1	45	11.2
	2	75	18.8
	3	92	23.0
	4	108	27.0
	5	60	15.0
	6	20	5.0
	Total	400	100
Marital Status	Divorced	95	23.8
	Married	145	36.2
	Separated	75	18.8
	Single	85	21.2
	Total	400	100
Highest Educ.Qualification			
	Primary	45	11.2
	JHS	105	26.2
	SHS	95	23.8
	Voc/Tech	85	21.2
	Tertiary	70	17.5
	Total	400	100

Source: Field Data, 2022

From the table above, majority of the respondents (150), representing 37.5% fall within the ages of 31 – 40 years. Only 45 respondents, representing 11.2 % are older than 50 years. Thus, the community has a young population on the average. The gender distribution is such that out of the 400 respondents, 225 representing 56.3% were males and 175 representing 43.7% were females. In terms of occupational profile, farmers accounted for the highest number of respondents 170 which represent 42.5%, followed by businessmen/women 110 representing 27.5%. The least number of occupational respondents were those working in other occupations with a figure of 30 which represent 7.5%. The fact that farmers were overrepresented in the sample should not come as a surprise since the communities chosen for the study are predominantly farming communities. This also shows that a large section of the community derives their livelihoods and sustenance from forest resources. Key informant 2, the Assemblyman, disclosed that many of the farmers are engaged in food production, particularly mango, cassava, yam, plantain, tomatoes, okro, pepper and maize.

Most of the respondents who participated in the study are married with a figure of 145, representing 36.2%, while the remaining are either single (21.2%), separated (18.8%) or divorced (23.8%). The average household ranged from 6 with a figure of 20 representing (5.0%) to 3 with a figure of 92 representing (23.0%). In between, 11.2% (45) belonged to households of 1, 18.8% (75) to households of 2, 15.0% (60) to households of 5 and 27.0% (108) households of 4.

A look at the final demographic variable education, which reveals that 45 representing 11.2% of the respondents could not further their education beyond the primary level. Junior High School Certificate holders constituted the highest with a figure of 105 representing 26.2% with Senior High School leavers figure of 95 representing 23.8% following suit. A figure of 85 representing

21.2% had vocational or technical education while the remaining figure of 70 representing 17.5%had tertiary education.

4.2 Descriptive Statistics of Latent Variables

The descriptive statistics of the variables retained for analysis after carrying out factor analysis and conducting reliability tests are presented in table 2. From the table, the agricultural activities variable had a mean of 3.221 and standard deviation of .6788 with skewness and kurtosis of -.13 and .162. Forest Degradation had a mean of 3.3197 and standard deviation of .56309 with skewness and kurtosis of -.503 and 1.08. Livelihood had the greatest average of 3.6715 and standard deviation of .65716 and skewness and kurtosis of -.421 and .408. All the other variables had mean values between 3.221 and 3.672, standard deviation between .5631 and .99343, skewness between -.551 and -.018 and kurtosis values ranging between -.943 and 1.08 which indicates that the respondents had a good appreciation of the constructs used in themeasurement scale.

Table 4. 2. Descriptive Statistics of Constructs (n = 400)

Construct	Mean	Std. Deviation	Skewness	Kurtosis
Agriculture activities	3.2209	0.67875	-0.13	0.162
Forest Degradation	3.3197	0.56309	-0.503	1.08
Habitat depletion	3.5088	0.82961	-0.123	-0.129
Population Growth	3.6504	0.87276	-0.551	-0.178
Pollution	3.2677	0.99343	-0.039	-0.943
Ecosystem loss	3.6527	0.79438	-0.23	-0.071
Legal and Policy Framework	3.3912	0.80681	-0.018	-0.783

Livelihood	3.6715	0.65716	-0.421	0.408

Source: Field Data, 2022

Table 4.3: Factor Loadings, Reliability and Convergent Validity (n = 400)

Construct	Items	Standardized Loadings	AVE	CR	Cronbach α
Agricultural Expansion	The inhabitants of this community are mainly farmers	0.740	0.729	0.608817	0.7650
	Most of the farmers in this community engage in food crops production	0.734			
	Most of the farmers in this community engage in cash crops production	0.713			
	Farmers in this community use inorganic chemicals, weedicides and insecticides in farming activities.	0.843			
	The method employed by farmers in farming activities is a cause of forest degradation in this community	0.695			
	Clearing of virgin forest for farming activities is common in this community	0.707			
Climatic Factors	Bushfires have caused massive destruction to forest trees.	0.751	0.553585	0.553585	0.225
	Drought has been a cause of forest degradation in this	0.737			

	community				
	Agricultural expansion and activities cause forest degradation in this community	0.658	0.647316	0.64732	
Forest Degradation	Policy failures by government contributes to forest degradation	0.774			0.766
	Weak implementation of legislation contributes to forest degradation	0.834			
	Food crops and cash crops production are causes of forest degradation in this community	0.779			
Habitat Destruction	Forest degradation leads to destruction of the habitation of wildlife	0.772	0.561641	0.7759	0.802
	Forest degradation leads to loss of flora and fauna	0.809			
	Forest degradation leads to loss and depletion of aquatic life.	0.666			
	Forest degradation leads to the destruction of the habitation of birds	0.722			
	Forest degradation leads to disappearance of key economic species	0.770			
	Policy failures by government contributes to forest degradation	0.774	0.647316	0.647316	
	Weak implementation of legislation contributes to forest	0.834			

	degradation				
Illegal Loggingand Illegal Mining	Illegal logging and illegal mining are common in thiscommunity	0.825	0.566777	0.566777	0.416
	Illegal logging and mining are causes of forest degradation in this community	0.673			
Pollution	Forest degradation leads to pollution and destruction of river and water bodies	0.841	0.715741	0.715741	0.7851
	Forest degradation creates health and environmental issues	0.851			
Population Growth	The population in this community has increased in recent times	0.856	0.762418	0.762418	0.8612
	Over-population has been the cause of forest degradation in this community	0.890			
Changes in rainfall pattern	Forest degradation leads to high temperature and low rainfall patterns	0.814	0.7002385	0.7002385	0.5455
	Forest degradation leads to erratic rainfall pattern	0.859			
Ecosystem Destruction	Forest degradation leads to understory vegetation destruction	0.830	0.6478705	0.6478705	0.70332
	Forest degradation creates malfunctioned ecosystem services.	0.779			
Livelihood	The people within this community depend on these forest reserves for their livelihood	0.804	0.6175765	0.56742	0.7615
	These forest reserves play indispensable roles in the livelihood	0.835			

	of the local community			
	These forest reserves serve as tourist attractions for the community.	0.693		
	The rural poor use the environment for almost all their livelihood needs and purposes	0.804		
Legislation andPolicy Framework	Policy and legislation are in place to protect the integrity ofthese forests	0.776	0.59882725	0.8211
	Policy and legislation failures contribute to the degradation of these forest reserves	0.765		
	Government is not doing enough to protect and preserve these forest reserves within the community	0.762		
	Corrupt government officials contribute to unlawful invasion of these forest reserves within the community	0.792		
	Inadequate sanctions and penalties to offenders of forest illegalities contribute to forest degradation	0.4645		

Source: Field Data, 2022 Note: CR = Composite Reliability; AVE = Average Variance Extracted

In table 4.3, it can be observed that all the questionnaire items used to measure the constructs in the study had factors loadings >.50 and hence exceeds the threshold value suggested by Hair et al.(2013). Additionally, the constructs' AVE were greater than the proposed minimum of .50 for convergent validity by Yusuf (2018) and thus satisfies the requirement for convergent validity.

4.3 Discriminant Validity

Discriminant validity is a concept used to refer to the assessment carried out to ascertain the extent to which constructs that are expected to be unrelated are actually related (Hamid et al., 2017; Yusuf, 2018). Thus, it assesses the extent to which constructs discriminate with respect to what they measure. One of the commonly measure of discriminant validity is the Fornell and Larcker criterion which compares the square root of the average variance extracted (AVE) with the correlation of the latent constructs, bearing in mind the observation that, latent variables are better account for variations in the indicator variable than the variance of other constructs (Hamid et al.,2017). The inter-correlation of a construct with other constructs is thus expected to be lower thanthe AVE for discriminant validity to be established.

From the bivariate correlations in table 4 below, the inter-correlations between many of the items are greater than the inter-image correlations between the constructs hence discriminant validity is achieved. The low correlation between population growth and agricultural activities could be explained the shift-towards alternative livelihoods or economic diversification. Economic diversification and opportunities in non-agricultural sectors may have led to a reduced reliance on agriculture as the primary source of livelihood. As people explore alternative income-generating activities, the impact of population growth on agricultural activities might be mitigated.

Table 4.4. Bivariate Correlation between Latent Constructs

Construct	Agriculture Activities	Forest Degradation	Destruction of Habitat	Population Growth	Pollution	Ecosystem Loss	Legal and Policy Framework	Livelihood
Agriculture Activities								
Forest Degradation	.874**							
Destruction of Habitat	.588**	.595**						
Population Growth	.203**	.321**	0.049					
Pollution	.556**	.525**	.804**	-0.04				
Ecosystem Loss	.514**	.526**	.720**	.164*	.718**			
Legal and Policy Framework	.534**	.623**	.769**	0.042	.764**	.651**		
Livelihood	.444**	.370**	.372**	0.097	.440**	.343**	.396**	1

** Correlation is significant at 0.01 level (2-tailed).

* Correlation is significant at 0.05 level (2-tailed)

4.4 Normality and Linearity Tests

Before carrying out the Ordinary Least Square (OLS) regression to answer research question one,I tested for homoscedasticity to establish whether the variances of the residuals were the same across all levels of the predictors. There does not appear to be a general agreement on the criterion for determining normality of a distribution in the literature. For example, while Tabacknick and Fidel (2007) explained that normality of a distribution is established when the

Skewness and Kurtosis values fall within the limits of □3.5, whereas Looney (1995) contends that the acceptable range of values of Skewness and Kurtosis for which normality of a distribution is achieved is between 2. The variables under consideration in this study meet the requirement for normality onboth scores as evidenced by the descriptive statistics in table 2 above. Orcan (2020), however, hints that a variable's normality is established when both the Kolmogorov-Smirnov and Shapiro- Wilk test statistic for that variable are significant. For this study, the variables, forest degradation and livelihoods were significant as per both the Kolmogorov-Smirnov and Shapiro-Wilk test of normality, as shown in the table below.

Table 4.5. Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	*df*	Sig.	Statistic	*df*	Sig.
Forest Degradation	.095	226	.000	.970	226	.000
Livelihood	.128	226	.000	.957	226	.000

a. Lilliefors Significance Correction

Additional tests were carried out to check for collinearity, the presence of which could bias the regression results. The collinearity diagnostics from the SPSS output in Appendix 3 shows that tolerance values are 0.710 **Legal and Policy Framework** failures, 0.953 for **Population Growth** and 0.682 for **Agriculture activities.** The literature suggests that tolerance value < 0.1 is an indication of collinearity problem (Field, 2009, p. 295; Menard, 1995). However, since all the tolerance values of the predictors are greater than 0.1, no collinearity is deemed to exist under the circumstance and OLS regression can be proceeded with.

4.5 The Regression

A regression was carried out predicting forest degradation from agricultural activities (Agriculture activities), population growth (Population Growth) and legal and policy failure (Legal and Policy)using the equation below.

$$Y = a + b_1X1 + b_2X2 + b_3X3$$

Where;

Y = the predicted score on the dependent variable i.e., forest degradation.

a = the intercept; the value of Y when all Xs = 0.

b_i = the regression coefficient for the ith predictor which takes on the values of 1, 2, and 3, the first **(population growth)**, the second (**legal and policy framework**), and the third (**agriculture activities**) predictors respectively.

X_j = the score on the *i*th predictor (independent variable) for the participants. This assumes the value of 1, 2, and 3 for the first, second and third respectively.

The SPSS output tables are presented below. The model summary table shows that the three predictors together account for approximately 83% of the predicted changes in forest degradation.

Table 4.6. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.908[a]	.825	.822	.23737	2.029

a. Predictors: (Constant), Agriculture activities, Population Growth, Legal and Policy Framework.

b. Dependent Variable: Forest Degradation

Table 4.7. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	58.831	3	19.610	348.044	.000[b]
	Residual	12.509	222	.056		
	Total	71.340	225			

a. Dependent Variable: Forest Degradation

b. Predictors: (Constant), Agriculture activities, Population Growth, Legal and Policy Framework

A look at the model summary, the ANOVA and coefficient table show that the overall regressionwas significant, $F(3, 233) = 348.04$, $p < .05$, $R^2 = .83$.

Table 4.8: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.463	.099		4.668	.000
	Population Growth	.107	.019	.166	5.755	.000
	Legal and Policy Failure	.163	.023	.234	7.017	.000
	Agriculture Activities	.594	.028	.716	21.033	.000

a. Dependent Variable: Forest Degradation

4.6 Research Question One: What are the causes of forest degradation in the Yilo Krobo Municipality?

From the coefficients table below, all the predictors considered, population growth (□ = .116, *t*(233) = 5.76, p < .05, legal and policy failure (□ = .234, *t*(233) = 7.02, *p* < .05, and agriculture activities (□ = .716, *t*(233) = 21.03, *p* < *.05,* and were significant. The fact that each of the regression weights for the predictors are positive means that a one-point increase in population growth would result in an increase in forest degradation score by .107 point assuming all the otherpredictors are held constant. Similarly, one-point increase in legal and policy failure would increase forest degradation in the communities by .163 while a unit increase in agriculture activities will lead to an upsurge in forest degradation by .594 points.

Interestingly, the findings that a test of significance of the constant or the intercept *a* show that theintercept is significantly different from zero since the p-value for the test (.000) is lesser than .05.Thus, the impact of forest degradation is already being felt in the community even in the absenceof legal and policy failures, population growth and agricultural expansion activities.

The regression equation for the observed relationship predicted by the model predicting forest degradation from population growth, legal and policy failure and agricultural activities scores is thus:

*Y*degradation = .463 + .107(Population Growth) + .163(Legal and Policy Framework failure) + .594(Agriculture Activities).

Thus, with respect to research question one, the study established that the major causes of degradation in the Yilo Krobo municipality are population explosion, agriculture activities and legal and policy lapses. Analysis of the qualitative interview transcript of **key informant 4,** a sub-

chief in one of the communities, in response to the question "what are the causes of forest degradation in this your community?" revealed that

"*Clearing of forest for agricultural purposes, especially farming is the main cause. In the course of burning the weeds, the fire sometimes spread to other areas that are not part of the farming areas and thereby having adverse effect on the forest.*" (Key Informant 4, a sub-chief).

In effect, human activities are also part of the direct causes of forest degradation. These human activities include illegal mining, chain sawing and illegal logging.

These findings align with those established in previous studies by Asiedu (2019), Kyere-Boateng and Marek (2021) that the major factors contributing to the rapid depletion of Ghana's forests are agricultural activities, population growth as well as legal and policy challenges which culminate in institutional weakness, although other findings such as climatic conditions, illegal mining and logging were not supported by the quantitative data. Although key informant 5, an official from Forestry Commission, in her response to the question "Do you think the forest reserves have beendegraded over the years?" observed that;

"*Close to 0.5 hectares of the original forest reserves have been destroyed by wild fire, lumbering, and farming. The effect of sand-wining, although very small during the turn of the decade, has increasingly become an issue of concern lately since attention has shifted from Accra and its environs to this area by those engaged in this environmentally damaging activity."* (Key informant 5, from the Forestry Commission).

Arguably, although not statistically significant, this revelation drives home the point that illegal mining and logging however small, the perceived effects on forest and ecosystems destruction contributes one way or the other to the observed levels of forest degradation within the study

community. Some of these factors could well account for why the intercept of the dependent variable (forest degradation) in the estimated equation above is statistically significant.

In a nutshell, the conclusions from previous studies by Fagariba et al (2019), Amor (2008), Pierce and Brown (1994) and Amor and Pfaf (2008) are corroborated by the findings from this study. Also, although the findings that mining activities are chief culprits in forest degradation by Carvalho et al (2004) and Sands (2005) were established in this study, unlike the results from those studies, sand-winning appears to be a strong force behind forest degradation within the study community.

4.7 Research Question Two: What is the impact of forest degradation on the livelihoods of the local community?

Having established the causes of forest degradation in the communities within the Yilo Krobo municipality, the next objective is to explore its effects on the livelihoods of the local community. Forest degradation appears to be the biggest impediment to the municipality's crop production growing at a required rate. When I asked key informant 3, the Municipal Chief Executive (MCE) to explain some of the impacts of forest degradation in the municipality, he responded as follows;

"Erosion and low crop yield by far are the most damaging outcome of forest degradation. Farmersnow use more fertilizers than before because the erosion caused by forest degradation has reducedthe nutrient content of the soil. As a matter of fact, the top soil rich for crop production has eitherbeen washed away or destroyed by the chemicals used for farming, especially the weedicides" (MCE).

For nations like Ghana, whose economy is heavily reliant on agriculture, decreased agricultural production due to erosion leads to low socioeconomic development as it leads to reduction in incomes. The Yilo Krobo municipality of Ghana is highly erodible, with significant sections of the

land degraded, hence erosion, which causes low soil fertility, reduced soil depth, soil structure degradation, the creation of rills and gullies, and the siltation of rivers and reservoirs. Results from the analysis of the key informant interviews support the findings that, forest degradation has very severe implications on the community and the environment in Yilo Krobo.

When the participants were asked "How has deforestation impacted the local community and the environment?" These were what they had to say:

Key Informant 1: *"Forest Degradation has caused soil erosion and habitat depletion in our community. Without trees and vegetation to hold the soil in place, it washes away during heavy rains, and the fertility of the land decreases. This has a significant impact on our ability to grow crops and earn a livelihood from farming."*

The respondent further explained that*:*
"The depletion of our forests due to degradation has significantly affected our ability to gather non-timber forest products, which were once a crucial source of income and sustenance for our families. Our options for generating income have narrowed, forcing us to seek alternative livelihoods that may not be as reliable or sustainable." (Key informant 4).

In fact, many of the participants of the interview reiterated similar concerns about the devasting impact of depletion of forest cover on their livelihoods leading them to seek for alternative but unreliable means of survival. Some of these are captured below:

"*As a farmer, I've noticed that the changing forest conditions have disrupted the delicate balance of our ecosystem. With reduced forest cover, water sources have dwindled, impacting our agricultural productivity. Our crops are no longer as bountiful, and we struggle to secure adequate water for irrigation, affecting our overall food security*." (Key Informant 2).

"The loss of biodiversity resulting from forest degradation has directly impacted our cultural practices and traditional medicines. Many plants and herbs that were once abundant in our forests are now scarce or disappearing altogether. This threatens our cultural heritage and the knowledge passed down through generations."

These anonymized statements provide a glimpse into the multifaceted impact of forest degradation on the livelihoods of people in the Yilo-Krobo municipality. The dimensions of the Sustainable Livelihoods Framework, including financial capital, natural capital, human capital, social capital, and cultural capital, are clearly reflected in these perspectives, underlining the interconnectedness of the various aspects of livelihoods that are affected by environmental changes.

Key Informant 2: *" Tourism used to thrive here due to the natural beauty of our forests. However, with degradation, the allure of our region has diminished. This has resulted in fewer visitors and a decline in tourism-related income. Our local businesses that depended on tourists are struggling to survive. Things are really getting bad"*

Key Informant 3: *"Forest Degradation can affect cultural values of the forest, especially for indigenous communities. The forest is often seen as a source of cultural identity and spirituality, and its destruction can have a significant impact on their way of life. More so, forest degradation can lead to increased pollution and other negative environmental impacts, which can affect the health and well-being of local communities."*

Key Informant 4: *"Forest Degradation can cause ecosystem destruction and loss of biodiversity. Forests are home to a vast array of species, and their destruction can have cascading effects on the ecosystem as a whole. Nonetheless, forest degradation can lead to decreased carbon*

sequestration and contribute to climate change, which can have far-reaching impacts on both localand global scales."

Key Informant 5: *"The decline in forest resources has increased our reliance on external markets for fuelwood and other essentials. This has led to rising costs and limited availability, making it harder for us to afford basic necessities. Our household budgets are strained as we allocate more funds to meet our energy needs."*

The observation by Andrade and Rhodes (2012) that, forest degradation leads to loss of livelihoodsis thus corroborated by the results from this study. The finding also agrees with those from previousstudies by Tetteh et al., (2015), Schoene et al., (2007), Carlson et al., (2012) and Fajardo et al., (2022), that small communities that rely on the forest for their livelihoods tend to suffer greatly from the adverse effect of forest degradation. Additionally, the observation by Asare-Nuamah et al (2022), that soil depletion, a consequent of forest degradation, is one of the most serious types of soil deterioration threatening Ghana's future agricultural output was confirmed in this study.

When the survey respondents were asked to evaluate the extent to which forest degradation significantly impacts them, males and females evaluated the effects differently in percentage. Thisis shown in the table below.

Objective 2 requires examples of the lived experiences of the people to justify any conclusions. What is written here are hypothetical situations of what FD can do. We already read that from chapters 1 and 2. What are the real impacts on livelihoods – food, water etc.? For objective 3: the reader wants to see the policies already in place. These should have been reviewed in chapter 2. Some of the questions do not even relate to role of policy and legislation. What is the purpose

of the regression of gender on the five items for policy and legislation? If gender is significant, what does that mean in improving policy and legislation and the enforcement mechanisms? That should be our concern not this exercise in demonstrating knowledge of statistics.

Table 4.9: Effects of Forest Degradation on Gender & Occupation

Demographic Group	Ecosystem Destruction (ED)	Habitat Depletion (HD)	Soil Erosion (SE)	Destruction Of Cultural Values (CVD)	Economic Livelihood Losses (EL)	Pollution (POL)
Females	49%	39%	41%	28%	49%	33%
Males	53%	47%	46%	35%	50%	41%
Farmers	68%	62%	61%	44%	76%	52%
Businessmen	52%	48%	38%	24%	45%	34%
Civil Servants	38%	29%	28%	19%	33%	21%
Others	50%	42%	42%	33%	42%	33%

Source: Field Data (2022)

In table 4.7, each row represents a demographic group (i.e., Females, Males, Farmers, etc.), and each column represents a category of the effects of forest degradation (i.e. Ecosystem Destruction, Habitat Depletion, etc.). The percentages in each cell represent the proportion of respondents in that group who reported that category as a significant effect of forest degradation.

From this table, we can quickly see that farmers generally report higher proportions of significant effects across all categories, while civil servants and respondents in undisclosed professions generally report lower proportions of significant effects. Additionally, we can see that there are some differences between males and females in terms of the proportion reporting certain categoriesas significant i.e. destruction of cultural values and pollution.

The findings suggest that there are differences in how different demographic groups perceive andexperience the effects of forest degradation. For example, farmers who rely on forests for their livelihoods are more aware of the negative impacts of forest degradation on their economic and cultural well-being. On the other hand, civil servants who work in urban areas may have less directexposure to the impacts of forest degradation and therefore less likely to report these effects as significant.

Understanding these differences is important for developing effective policies and interventions toaddress forest degradation and its impacts. For example, policymakers may need to consider the different priorities and concerns of different demographic groups when designing and implementing forest conservation policies and programs. Providing compensation for economic losses resulting from forest degradation may also differ considering the different concerns of the demographic groups. This may involve engaging with and soliciting input from diverse stakeholders, including farmers, businessmen and women, civil servants and other members of thecommunity.

Moreover, the differences between males and females in terms of the proportion reporting certaincategories as significant, such as destruction of the cultural values and pollution, suggest that gender may also play a role in how people perceive and experience the effects of forest degradation. Understanding these gender differences can be useful in designing targeted interventions that will consider the different needs and concerns of males and females. For example, policies aimed at preserving cultural values of forests may need to be tailored to address the specific concerns of males or females, depending on which group is more likely to be affected.

4.8 Research Question Three: How effective are the roles played by legislation and policy inpreserving the integrity of the forests?

The answer for research question 3, the mean and standard deviations of the responses from the 5-item scale on the *legislation and policy in preserving the integrity of the forest* were examined and finding from the data analysis are presented in table 4.7 above.

Table 4.10: Legislation and Policy in Preserving the Integrity of the Forest

Statement	Mean	*SD*	
Policy and legislation are in place to protect the integrity of theseforests	3.24	1.028	SA
Policy and legislation failures contribute to the degradation ofthese forest reserves	3.38	1.082	SA
Government is not doing enough to protect and preserve theseforest reserves within the municipality	3.51	1.128	N
Corrupt government officials contribute to unlawful invasion ofthese forest reserves within the municipality	3.41	1.175	SA
Inadequate sanctions and penalties to offenders of forest illegalities contributes to forest degradation	3.41	1.133	A

Source: Field Data, 2022

From the table, the mean and standard deviation of the first item:

That Po***licy and legislation are in place to protect the integrity of these forests*** scored 3.24 and 1.03 respectively. This clearly indicates that the respondents and participants stronglyagreed that policies and legislation are in place to protect the integrity of the forest. This suggests that forest degradation within the study community could not be attributable to the absence of policies or laws. This is supported by the submission of key informant 1, an official from Forestry Commission who revealed that "*several laws exist for safeguardingthe forest, among them are;*

the Forest and Wildlife Policy 2012, the Forest Protection Amendment Act, Act 624, the Timber Resource Management Regulation 1998 (LI 1649), Amendment LI 1721". She stated that "*what seems to be lacking is inefficient enforcementof these laws through monitoring and arrests of offenders."*

During the discussions with key informant 1, an official from Forestry Commission, disclosed that *"there are many by-laws that have been passed by the assembly with the support of the communitymembers to help protect the forest so I would not say our forests are being destroyed due to the fact that there are no laws."* (Key informant 1, Forestry Commission).

Item 2, ***Policy and legislation failures contribute to the degradation of these forest reserves*** andjust like the first item, is a reflection that the participants strongly perceive failure of legislation asone of the reasons contributing to forest degradation in the municipality. The interview with key informant 5 from the Ministry of Lands and Natural Resource (MLNR) revealed that;

"Sometimes resources needed to protect the forest are woefully inadequate and if they are disbursed at all, they come in very late. This, added to logistical challenges that hampers the effectiveness of the forestry commission to effectively discharge its mandate." Moving further, herelated;

"I think approaching forest management with a big broad-brush sustainable forest management is a problem because perhaps it limits appreciation of the extent of effort needed to actually preserve the forest. That, in my view may be the reason behind the limited resources that are committed by government for such a purpose" (Key informant 5, Ministry of Lands and Natural Resources).

The submission by key informant 5 obviously ties in with the evaluation by the respondents that is not the absence of laws that hampers efforts to stem forest degradation but legislation failure, manifested in impediments in resource mobilization which wreath the major havoc on the forests.Additional revelation made by key informant 5 has to do with;

"*The fact that apart from laws on lumber and mineral exploitation, many of the laws on forest reserves fail to make concrete provisions that contain adequate and specific management plans and inventories for preserving the forest with many of them just capturing this under the umbrella terms such as sustainable forest management or forest preservation."*

These findings are supported by Kishor (2012) who expressed that inventories preferably must encompass both marketable and quasi-forest resources and should draw on traditional usage or knowledge.

The third legislation and policy item ***Government is not doing enough to protect and preserve these forest reserves within the municipality*** had a mean of 3.51 and a standard deviation of 1.3.Per the structure of the question, it would seem that the respondents were not completely neutral but only moderately agree that government is not doing much to help protect the forest reserves inthe community especially because if the respondents were aware of any serious efforts being madeby government to protect the reserves it makes little sense to withhold that from the researcher. Ineffect, these finding confirms the conclusion arrived at in the study by Amoah and Korle (2020) government seem not to be doing much to protect the forests.

Corrupt government officials contribute to unlawful invasion of these forest reserves within the municipality, had an average of 3.41 and a standard deviation of 1.18 showing that the respondentsidentified well with the statement that corruption by public officials is behind the

forest degradation suffered in the community. During the interview with key informant 2**,** the assemblyman, one of the drivers of forest degradation he made mention of was the intersection of bribery and corruption. This is how he puts it;

"*The ease with which offenders are set free after they have been arrested is so appalling. It is as though law enforcers do not have the time to see the case go for trial at the courts or that the courts are for a cross section of people"* – (Key Informant 2, Assemblyman).

A similar observation was made by key informant 5, an official from MLNR, who intimated that *"many public officials are taking bribes to allow for the destruction of our forests, which is causingwidespread degradation in the area."*

The final statement which investigated the effectiveness of sanctions and penalties to offenders offorest degradation, item 5, had a mean of 3.41 and standard deviation of 1.13 suggesting that the respondents of the quantitative study generally agreed that weaker sanctions and penalties contribute to forest degradation in the community. The informants who took part in the qualitativeinterviews did not differ on this item as well as the data was replete with many themes which corroborate the premise that inadequate punishments and penalties for forest illegalities lead to forest degradation. According to key informant 2, the assemblyman, reiterated that *"the lack of law enforcement and punishments has become a key element in forest devastation".*

Key informant 5, an official from MLNR also hinted that "*the absence of judicial action against individuals who breach the law has caused significant devastation to forests"*. Finally, key informant 3, the MCE averred that the inefficient mechanism for enforcing the law and the weakness of a deterrent consequence is a key factor for forest destruction in this community."

This shows that imposing fines and punishments is not enough to stop illegal activities in countrieswith fewer resources, which is in line with the results of research by Pereira et al., (2019), Mazur et al., (2019), Alemu et al (2017) who observed that, when penalties and sanctions are not imposed,criminals can escape the consequences of their conduct, which can lead to continuous forest destructions. This may have a disastrous impact on the ecosystem, resulting in the extinction of species, soil erosion, and climate change. Without the imposition of fines and penalties, forest degradation would continue unabated, perhaps resulting in permanent harm.

Since policy and legislation failure seem to derail effort at curbing forest degradation in the study community, I asked the participants to discuss with me measures they have put in place to stem the tide of Forest Degradation. Key informant 2 explained that "*The District Assembly has formed a Forest Management Committee, which meets on a regular basis to examine and monitor the status of the forest and propose conservation policies."*

Key informant 4 also disclosed that "*the locals have taken the lead in conserving their forest resources, establishing patrols to prevent illicit operations in the forest and encouraging the use of other sources of energy to avoid destruction."*

To further investigate the effectiveness of the roles played by legislation and policy in preserving the integrity of forests, a regression analyses were conducted to determine whether gender had a significant effect on the overall score on the 5-item scale. The results are presented below:

Table 4.11: Model Summary

	R-squared	Adjusted R-squared	Std. Error of the Estimate
Males	0.002	-0.004	0.883
Females	0.035	0.030	1.074

Table 4.12: ANOVA Table

	Sum of Squares	df	Mean Square	F	Sig.
Males	0.129	1	0.129	0.098	0.789
Females	8.464	1	8.464	9.812	0.002

Table 4.13: Regression Coefficients

	B	Std. Error	Beta	t	Sig.
Males	3.22	0.304		10.594	0.000
Gender	-0.06	0.18	-0.05	-0.330	0.742
Females	3.13	0.201		15.578	0.000
Gender	0.24	0.077	0.25	3.131	0.002

The model summary table for males revealed a very low R-squared value of 0.002, indicating thatgender explains only a very small proportion of the variance in the overall score on the 5-item scale for males. The adjusted R-squared value was negative, suggesting that the model may be overfitting the data. The ANOVA table indicated that the regression model was not significant (F= 0.098, p = 0.789), meaning that gender is not a significant predictor of the overall score on the 5-item scale for males.

The model summary table for females revealed a higher R-squared value of 0.035, indicating thatgender explains a moderate proportion of the variance in the overall score on the 5-item scale for females. The adjusted R-squared value was positive and indicated a more reliable fit for the model.The ANOVA table indicated that the regression model was significant (F = 9.812, p = 0.002), meaning that gender is a significant predictor of the overall score on the 5-item scale for females.

The regression coefficients showed that for females, the intercept (b0) was 3.13 and the coefficientfor gender (b1) was 0.24. This indicates that on average, females scored 0.24 points higher on the5-item scale than males, after controlling for other variables in the model.

In summary, the results of the regression analyses indicated that gender has a significant effect onthe overall score on the 5-item scale for females but not for males. Specifically, females scored higher on the 5-item scale compared to males. These findings suggest that gender may play a rolein the perception of the effectiveness of policy and legislation in preserving the integrity of forestsamong females. However, caution should be exercised when interpreting the results for males given the low R-squared value and non-significant results. Further research is needed to investigate the relationship between gender and perceptions of policy and legislation in preserving the integrity of forests.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

The study was conducted in the Yilo Krobo Municipality of Ghana and aimed to assess the causes and impact of forest degradation in the area, as well as the effectiveness of existing legal and policy frameworks in preserving the forests. The study utilized both quantitative and qualitative research methods, including regression analysis and focus group discussions, to collect data from community members, local authorities, and forestry officials.

Chapter 1 introduced the research problem, objectives, research questions, and significance of the study. The chapter provided an overview of the current state of forests in Ghana, highlighting the increasing rate of forest degradation and its impact on the environment and communities. The chapter also presented the theoretical framework and methodology used in the study.

Chapter 2 reviewed relevant literature on the causes and impact of forest degradation, as well as the legal and policy frameworks in place to protect forests in Ghana. The chapter provided a comprehensive analysis of the sustainable livelihoods framework and its relevance to the study. The chapter also identified gaps in the literature and research, which the study aimed to address.

Chapter 3 described the research methodology used in the study. The chapter provided an overview of the study area and the sampling technique used to select respondents. The chapter also discussed the data collection methods, including the use of questionnaires, focus group discussions, and key informant interviews. Additionally, the chapter provided a detailed explanation of the statistical analysis techniques used in the study, including regression analysis.

Chapter 4 presented the findings of the study. The chapter began by describing the demographic characteristics of the respondents and their perceptions of the causes and impact of forest degradation. The chapter then presented the results of the regression analysis, which identified population growth, legal and policy framework failure, and agriculture activities as significant predictors of forest degradation in the Yilo Krobo Municipality. The qualitative data analysis revealed that clearing of forests for agricultural purposes, illegal mining, chain sawing, and illegal logging were identified as direct causes of forest degradation. The chapter also discussed the impact of forest degradation on the livelihoods of the local community and the environment, highlighting erosion, low crop yields, decreased agricultural production, and reduced incomes. Finally, the chapter examined the effectiveness of existing legal and policy frameworks in preserving the integrity of the forests.

Chapter 5 discussed the policy and practical implications of the study's findings. The chapter presented recommendations for policies and interventions that promote sustainable forest management practices, consider the cultural significance of the forest, prioritize the reduction of forest degradation to support local livelihoods, and protect the environment. The chapter also provided recommendations for improving the effectiveness of the forestry commission in discharging its mandate by addressing logistical and resource mobilization challenges and strengthening anti-corruption policies. Additionally, the chapter highlighted the need for a review of existing laws on forest reserves and the development of policies that will protect forests' integrity in the long term. Finally, the chapter concluded by summarizing the study's main findings and contributions to the literature.

5.2 Conclusion

The following are the major conclusions of the study based on the findings in the previous chapter:

5.2.1 Ecological Modernization and Policy Interventions

The findings of the study resonate with the principles of the Ecological Modernization Theory, which emphasizes the potential for environmental sustainability and economic development to coexist. The identification of policy and legislation failures contributing to forest degradation highlights the need for modernization of governance structures. This aligns with the theory's proposition that societies can transition toward sustainability by enacting effective policies and regulations that address environmental challenges. The study underscores the importance of implementing forward-looking policies that incentivize sustainable practices, promote transparency, and deter corruption among government officials responsible for safeguarding forests.

5.2.2 Forest Transition and Socioeconomic Dynamics

The Forest Transition Theory, centered on the relationship between forest cover and socioeconomic development, finds resonance in the study's findings. The documented causes of forest degradation, including population growth and agricultural expansion, reflect the early stages of the forest transition process. As societies seek economic growth, forests are often initially depleted. However, the study's focus on the impacts of this degradation on livelihoods aligns with the theory's premise that transition can lead to a shift in values, wherein societies prioritize forest conservation to ensure long-term socioeconomic well-being. The research demonstrates the significance of recognizing these transitional dynamics in designing effective conservation strategies.

5.2.3 Integrated Approach for Sustainability

Both theories emphasize the importance of integrated approaches to environmental sustainability. The study's findings highlight the interconnectedness between policy, socioeconomic factors, and ecological health. The emphasis on soil erosion's impact on agricultural productivity underscores the need for holistic approaches that bridge economic and ecological considerations. This aligns with the Ecological Modernization Theory's call for fostering sustainable development through technological innovation, environmental awareness, and effective policies. Similarly, the Forest Transition Theory's focus on societal shifts towards valuing forests aligns with the study's identification of cultural, economic, and environmental factors intertwined in forest conservation efforts.

In sum, the research contributes to the discourse on ecological sustainability and forest management by providing empirical evidence that aligns with the Ecological Modernization Theory and the Forest Transition Theory. The study underscores the need for innovative policy interventions that promote sustainable practices, considering both environmental and socioeconomic factors. The findings emphasize that sustainable forest management is not merely an ecological endeavor but a complex and integrated pursuit that requires collaborative efforts from policymakers, communities, and various stakeholders.

5.3 Recommendations

On the basis of the findings and the conclusion, it is suggested that the government as the sole custodian of these forest reserves should embark on a massive reform that are intended to protect these forests from external encroachment. As a consequence, the following suggestions are made, out of which the government can make policy decisions and guidelines, going forward.

i. The policy of HIPC plantation should be a continuous program. With this the people in the community attention of cutting down illicit trees from primary forest to degrade the land would be channeled on those trees legally allocated to them to fell.

ii. The government should introduce the practice of burning coconut husks as a means of charcoal burning instead of cutting down of trees. This is a new and modernized way of burning charcoal as we talk of ecological modernization theory.

iii. The community should be encouraged to use fuel-efficient stoves to reduce the demand on firewood. To make this policy work, the government can subsidize the price of stoves to make it cheaper. This will encourage the people in the community to patronize the use of stoves to discourage the people from relying on charcoal.

iv. The government should direct investors' attention to the area and highlight on the numerous potential opportunities in the municipality. The result would be employment creation for the youth in order to prevent them from entering the forest to degrade by way of felling trees indiscriminately. It is further suggested that the government should conduct periodic sensitization programme involving key stakeholders and the affected community at large. Key issues that are suggested to be highlighted include the socio-economic values and importance of these forest reserves to the local community, especially tourism and its associated indirect employment as well as increase in the standard of living.

v. It is further suggested that the youth should be encouraged to enter into entrepreneurship programs by way of empowering them through the help of government and any relevant stakeholders. By this the youth can be socio-economically sufficient and prevent them from relying on forests products for survival.

vi. A sensitization program should be conducted periodically to encourage the youth in particular to promote and participate in the tree planting exercise (Green Ghana Project) conducted yearly. The youth in the community can inculcate the habit of planting a tree as and when a tree is felled.

vii. It is also suggested that, the promotion of peasant farming or backyard farming be encouraged. This will somehow prevent the community from degrading lands / forests for agricultural activities.

viii. There is the need to encourage and support conservation of forest. Therefore, there should be an effort gearing towards the promotion of sustainable forest management

ix. The respective laws also prescribe punishment for those who flout the laws. The findings revealed that encroachers of forest reserves are not punished. It was further noticed in the research that absence of punished induce other people to commit the same offence of encroaching these reserves. Therefore, it is suggested that offenders should be severely dealt with according to the punishment prescribed by those laws. This is likely to deter future encroachers from disturbing the forest reserves.

x. It also suggested that, the government should make effort to recruit people from the local population and train them to serve as forest guards. The training should inculcate into them the essence of patriotism and the need to jealously guard these reserves as the community property for the current and future generation. The advantage of such recruitment is that, as local people who know each other, understand each other and communicate directly among themselves on daily basis, they would be able to work diligently and effectively to protect these reserves which they have understood through training that the forests are their own.

xi. The relevant public entities such as the Forestry Commission and the mother ministry of MLNR whose mandate is to guard and protect the integrity of these forest reserves should ensure timely deployment of security officers to prevent unlawful entry of suspects of illegal activities in the forest reserves.

xii. The local community should also be encouraged to take the integrity and the protection of the forest reserves very seriously by collaborating strategically among themselves including chiefs and elders of the community.

xiii. The local community should be educated to, as a matter of urgency, look out to identify strange people wandering around these forest zones and monitor their activities. They should be educated on how to question these people about their presence around the area and if possibly make immediate report to the relevant authorities and entities.

In the nutshell, if these suggestions are keyed into institutional agenda, they may go a long way to protect the integrity of these forest reserves and save the environment from further degradation.

In view of the fact that, the research demonstrated that women have better appreciation and understanding of forest preservation, it is suggested that more women should be included in training programs as well as serving on committees, entrusted with the preservation of our forest reserves and resources.

Transitioning from forest-dependent livelihoods to alternative sustainable livelihoods is a crucial step towards mitigating the impact of forest degradation. While command approaches for forest protection discussed above are valuable, addressing the human factors that contribute to degradation requires a multifaceted approach. Here are some recommendations for fostering alternative livelihoods and shifting the focus away from the forest:

i. Promoting Agroforestry and Sustainable Agriculture

Encourage the adoption of agroforestry practices that integrate trees with crops. This approach can provide multiple benefits, including diversified income sources, improved soil fertility, and reduced pressure on natural forests. Training and support for sustainable agricultural techniques can enhance productivity while safeguarding the environment.

ii. Investing in Eco-Tourism and Cultural Heritage

The municipality could capitalize on the region's cultural heritage and natural beauty by developing eco-tourism initiatives. This can create new job opportunities and income streams for the local community. Community-based tourism programs can empower residents to share their culture and traditions while preserving the environment.

iii. Skill Development and Micro-Enterprise Support

Offer skill development programs to equip individuals with the expertise needed for non-forest-based livelihoods. Provide micro-enterprise support, such as training in entrepreneurship and access to small-scale financing, to enable community members to establish and manage businesses that align with sustainable practices.

iv. Capacity Building for Natural Resource Management

Strengthen local capacity for sustainable natural resource management through training Programs. This can include education on conservation techniques, resource monitoring, and community-led initiatives to protect and restore degraded areas.

v. Supporting Handicrafts and Artisanal Skills

Identify and promote local handicrafts and artisanal skills that can generate income without relying on forest resources. This can include weaving, pottery, carving, and other crafts that utilize locally available materials.

vi. Collaboration with NGOs and Government Agencies

Partnering with non-governmental organizations (NGOs) and government agencies to facilitate the establishment of alternative livelihood projects. These collaborations can bring in expertise, resources, and funding to support the transition process.

vii. Community Engagement and Ownership

The local community in the design and implementation of alternative livelihood initiatives. Ensuring that residents have ownership over these projects increases the likelihood of their success and sustainability.

viii. Continuous Monitoring and Evaluation

Regular monitoring and evaluation of the effectiveness of alternative livelihood interventions and adapting strategies based on feedback and changing circumstances to ensure long-term success is also one of the ways to guarantee successful alternative interventions.

In conclusion, promoting alternative livelihoods that are sustainable and independent of forest resources is crucial for mitigating the impact of forest degradation. The recommendations provided here offer a comprehensive approach that encompasses various sectors and dimensions of livelihoods, fostering economic resilience and environmental conservation.

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