

**EFFECTS OF DEFORESTATION ON LIVELIHOODS OF
FOREST FRINGED COMMUNITIES IN THE AWUTU-
EFFUTU-SENYA DISTRICT**

BY
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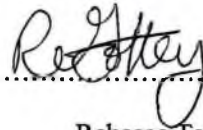
DEDICATION

This study is dedicated to my husband, Carl Sabah.



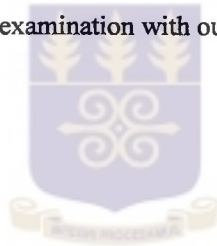
DECLARATION

I, Rebecca Teiko Dottey, author of this MA thesis do hereby declare that the work presented in this thesis titled 'The Effect of Deforestation on Livelihoods of Forest Fringed Communities in the Awutu-Effutu-Senya District' was entirely done by me in the Institute of Social, Statistical and Economic Research, University of Ghana Legon from August 2004 to July 2005. This work has never been presented either in whole or in part for any other degree in this university and elsewhere.



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This thesis has been presented for examination with our approval as supervisors



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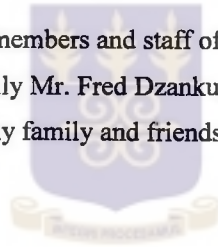
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ABSTRACT

The main objective of the study was to determine the effects of deforestation on livelihoods on forest fringed communities along the Yenku and Obotomfo forest reserves in the Awutu-Effutu-Senya District of the Central Region. These two FRs exhibit different levels of forest cover.

The study found a high level of livelihood diversification in FFCs along both reserves with FFCs along the Yenku exhibiting higher standards of living than FFCs along the Obotomfo. The study found a higher level of capabilities in FFCs along the Obotomfo while levels of assets and asset conversion was not significantly different in FFCs along the two FRs. However, there was greater level of forest activity in FFCs along the Yenku leading to a greater level of direct economic benefit from the forest resource than was present in Obotomfo. This was regardless of the fact that the Yenku was more depleted than the Obotomfo. The study therefore concluded that deforestation had actually improved the economic lives of FFCs along the Yenku while an improved forest had been to the economic detriment of FFCs along the Obotomfo.

The study therefore recommended that other forms of livelihood diversification that are forest based but sustainable are researched into, eg ecotourism and value addition to forest products. Also avenues should be created to make better ease of transfer between and within the three variables of capabilities, assets and activities at FFC level.

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ABBREVIATIONS

AAC – Annual Allowable Cut

AESD- Awutu-Effutu-Senya District

DFID- Department for International Development

FAO- Food and Agricultural Organisation

FC- Forestry Commission

FFC- Forest Fringed Community

FR – Forest Reserve

FRA – Forest Resource Assessment

GDP – Gross Domestic Product

GPRS – Ghana Poverty Reduction Strategy

HFZ – High Forest Zone

MDG – Millennium Development Goals

MTDP – Mid Term Development Plan

MTS- Modified Taungya Scheme

WDI- World Development Indicators

WSSD- World Summit on Social Development

CHAPTER ONE : INTRODUCTION

1.1 Background

Forests and forest resources play a major role in the growth and development of a country's economy worldwide. In addition to contributing to the overall macroeconomic growth of nations, its people also depend on these resources for their basic livelihood needs. This is especially true for the poor and rural populations. The World Bank estimates that forest resources directly contribute to the livelihoods of some 90% of the 1.2 billion people living in extreme poverty.

Indirectly, forests support the natural environment that nourishes agriculture and the food supplies of nearly half the population of the developing world. In addition to contributing to food security, forest resources also provides commercial opportunities and employment. Additionally, they provide immensely important environmental services, such as maintaining soil stability, protecting water flow and quality, regulating global climate through carbon sequestration, and serving as the repository of the bulk of terrestrial biodiversity.

Yet, in spite of these benefits, forests continue to be poorly managed and indiscriminately felled. Continuous and unsustainable exploitation of this invaluable natural resource to meet socio-economic needs has led to deforestation, destruction of wildlife habitats as well as resource degradation and depletion.

A consequence of this is that people who depend on these forests for important elements of their livelihood—and these include many of the poorest and most marginalized communities in the world—are facing a grim future, if these forests continue to degrade and disappear.

1.2 Problem statement

Ghana's forested area covers a total of 63,000 sq. km approximately 30% of its total land size. Seven out of Ghana's ten administrative regions are classified as forests.¹ The FAO country report on Ghana confirms the fact that two thirds of the population and most of Ghana's economic activities (cocoa, timber and mineral production) are concentrated in its forested areas (also GPRS).

Ghana's forest cover has shrunk from 8.2 million hectares to 1.8 million hectares in less than a century. Most of this forest loss happened in the last 20 years. The Forest Commission (FC) reports that some forest reserves e.g., Pamu Berekum in the Brong Ahafo Region have lost over 98% of its forested cover within this time period.

The only significant forest left is in the Western Region with a total forest cover of 64%. Other regions in the high forest zone have total forest cover ranging from 10 to 24%.

Ghana's population has increased at a rate of 3.0PA from 10.7 million in 1980 to 19.3 million in 2000. It is further estimated that this will increase to 24.7 million by 2015 (World Development Indicators 2002). As population increases, there is increased

¹ With the exception of three regions; the Northern, Upper East and Upper West Regions.

pressure to convert 'unused' (mostly forested) land into agricultural lands, settlements, industrial developments and other economic activities.

Timber from the High Forest Zone (HFZ) has traditionally ranked third behind gold and cocoa contributing up to 6% of GDP and 11% of total export earnings in 1996. Since the 1980s however, timber harvesting has been at unsustainable levels. Harvesting is twice the annual allowable cut (AAC) of 1 million m³. Illegal logging is three times the AAC. At this rate of logging, Ghana's forests would disappear in the next ten years and Ghana would become a net importer of wood (Forest Watch Ghana 2004).

In the transition zone of Ghana, bush fires annually cause havoc on forest resources resulting in large tracts of reserves being burnt to the ground. In 1996, there were 127 incidences of bush fires in four major forest regions (Eastern, Ashanti, Western and Brong Ahafo) leading to a loss of 27km².

Forest and forest products are the main source of livelihood for 70% of Ghanaians while 59% of poor people in Ghana are rural crop farmers (GPRS). The FAO Ghana report estimates that the forestry sector directly employs 75 000 people and provides livelihoods for over 2 million people countrywide. (FAO). In addition to providing fuel wood, bush meat, medicinal plants and other natural products, the forest contributes significantly to the welfare of most Ghanaians being used for various purposes ranging from agricultural, economic, to socio cultural activities.

Another major problem is that forests are consistently undervalued in both economic and social terms, with much of the environmental value of forest ecosystems falling outside of formal markets. These failings mean that the value of forests is not fully realized in the countries where they are situated, and, as a result, has little or no bearing on the land use decisions that drive forest change and therefore loss of forest resources.

Loss of forest resources, therefore, make rural people poorer due to loss of direct access to forest resources, disappearance of arable land due to soil erosion, ethnic based conflicts over scarce fertile farm lands, loss of animal and plant species of medicinal value, poor environmental quality and loss of water bodies.

The impact is that the economic base of 70% of Ghanaians is eroded resulting in perpetuation of rural poverty, rural–urban migration, unemployment and underemployment, and natural resource base conflict situation.

The question these issues raise is; if 70% of Ghanaians depend on the forest for their livelihoods, how would these deleterious effects on the source of livelihoods affect them? What coping strategies would be developed to help them overcome this and most importantly, how do we sustainably manage the forest for continuous use and benefits?

1.3 Objectives of study

The main aim of this study is to investigate the effect of deforestation on livelihoods of forest fringed communities surrounding the Yenku and Obotomfo Forest Reserves in the

Awutu-Effutu-Senya District. These two forest reserves exhibit different levels of forest cover.

The specific objectives of the study are as follows;

1. To compare the capabilities of Forest Fringed Communities (FFCs) along the Obotomfo and Yenku Forest Reserves.
2. To compare the assets base of Forest Fringed Communities (FFCs) along the Obotomfo and Yenku Forest Reserves.
3. To compare the activities of Forest Fringed Communities (FFCs) along the Obotomfo and Yenku Forest Reserves.

1.4 Research Questions

1. What differences exist regarding capabilities in FFCs along the Obotomfo and Yenku Forest Reserves and can they be attributed to deforestation?
2. What differences exist regarding assets of FFCs along the Obotomfo and Yenku Forest Reserves and can they be attributed to deforestation?
3. What differences exist regarding activities of FFCs along the Obotomfo and Yenku Forest Reserves and can they be attributed to deforestation?

1.5 Justification of study

There are several reasons why this present study is relevant.

First, the 1994 Forest and Wildlife policy has the aim of ‘maintaining environmental quality and perpetual flow of optimum benefits to all segments of society’. This is an improvement on the previous 1948 forest policy that focused only on protection and conservation.

The World Bank has also recognised that focusing exclusively on protection misses opportunities for poverty reduction and improved management and conservation of productive forests. This study seeks to add weight to academic literature that ‘the focus of development should not only be on the forests for the trees but only as far as it serves the needs of people’ (Jack Westoby 1989).

Secondly, both the World Bank and DFID have indicated that focusing on the economic potentials of forest resources would contribute significantly to the achievement of the Millennium Development Goal (MDG) of halving the number of people living in absolute poverty by 2015. This research work will justify the reasoning for this whiles collecting evidence to the fact that the local forest resource is an important source of rural economic livelihood, which when managed sustainably, can contribute to wealth creation.

Thirdly, the Plan of Implementation of the World Summit on Sustainable Development (WSSD) held in Johannesburg in 2002, reiterated this vision for responsible growth and recognized the vital role for the forest sector in realizing it:

“Sustainable forest management of both natural and planted forests and for timber and non-timber products is essential to achieving sustainable development and is a critical

means to eradicate poverty, significantly reduce deforestation, halt the loss of forest biodiversity and land and resource degradation, and improve food security and access to safe drinking water and affordable energy...The achievement of sustainable forest management, nationally and globally, including through partnerships among interested Governments and stakeholders, including the private sector, indigenous and local communities and non-governmental organizations, is an essential goal of sustainable development... ” (Paragraph 45, Plan of Implementation, Report of the World Summit on Sustainable Development).

Finally, evidence from this study will contribute to achieving the first two objectives of the Ghana poverty Reduction Strategy (GPRS) that are

- a. Ensuring sound economic management for accelerated growth
- b. Increasing production and promoting sustainable livelihoods

It would also contribute to addressing the aim of the Awutu-Effutu-Senya (A-E-S) District Assembly’s MTDP 2002-2004 which is ‘to reduce poverty which is endemic and pervasive’.

This study is therefore justified both nationally and internationally.

1.6 Organisation of study

This study is organized into five main chapters.

Chapter one gives the introduction to the study, outlines the problem statement, the objectives of study and justification for undertaking the study in its present form.

Chapter two presents a review of relevant theoretical and empirical literature. It discusses the concepts outlined in the study citing relevant literature sources. It also presents the conceptual framework for the study.

Chapter three presents the methodological framework of the study outlining data sources, target population and tools of data collection and data analysis. It also gives a brief background to the study area.

Chapter four presents and discusses results of the study organised along its specific objectives.

The final chapter, chapter five, presents a summary of the study's findings and gives policy recommendations based upon these.

CHAPTER TWO LITERATURE REVIEW

2.1 Introduction

This chapter seeks to investigate the principles and practices in the area of deforestation, forest livelihoods and the theoretical link between deforestation and forest livelihoods.

The chapter will define the major terms used in the study from various authors and narrows the definitions down in terms of relevance to the present study. Literature is reviewed on similar works done and finally ends with a look of the situation as pertains to Ghana.

2.2 Definition of terms and concepts

2.2.1 Forests

The Forest Resource Assessment (FRA) 2000 definition of what constitutes a forest has been adopted for purposes of this study. The FAO's most recent definition of forest is 'land with tree crown cover (or equivalent stocking level) more than 10% and area of more than 0.5 hectares. The trees should be able to reach a minimum height of 5metres *in situ*. This definition includes both natural forests and forest plantations but excludes stands of trees established primarily for agricultural production, eg fruit tree production. However, it should be noted that in literature, there is no single definition of what constitutes a forest. The FAO argues that the fact that forests have been defined in many ways is a reflection of the diversity of forests and forest ecosystems in the world and of the diversity of human approaches to forests.

There is however, general agreement to the fact that forests form a vital part of the environment. In addition to being the source of biodiversity and habitat for various forms of life, forests supply many goods and services.

According to the World Bank, and as outlined in its Forest Strategy paper, forests resources are valued from a variety of perspectives and for a variety of purposes. Over 90% of the 1.2 billion people living in extreme poverty depend on forests for some part of their livelihoods. Forests are home to at least 80% of the worlds remaining terrestrial biodiversity and are a major carbon sink that regulates the global climate. Forests also help to maintain the fertility of the soil, protect watersheds and reduce the risk of natural disasters such as floods and landslides.

2.2.2 Deforestation

Deforestation, like forests, has been defined in several ways by various authors. In its simplest terms, deforestation refers to the loss of trees in forests (www.findyourfeet.com). Annually, www.findyourfeet.com estimates the rate of deforestation to be at 4 million hectares or 10,000 square metres.

The World Bank World Development Index (WDI 2002) defines deforestation as the permanent conversion of natural forest area to other uses, including shifting cultivation, permanent agriculture, ranching, settlements and infrastructure development. The WDI 2002 looks at deforestation as the major cause of losses in biodiversity and habitat. It

reports that worldwide, nearly 34,000 plant species, 21.5% of the total, are threatened with extinction.

Seip (1996) gives a more technical definition of deforestation. He defines it as a change in land use from forests to other land use or the permanent depletion of forest crown cover to less than 10%. Using this definition therefore, temporary clear cutting as an instrument in forest management is not deforestation. FRA (2000) reports that the net change between 1990 and 2000 was 94 million ha/yr. the sum of -14.6 million hectares of deforestation and 5.2 hectares of gain in forest cover (FRA 2000). About 60% of the total deforestation that took place in Africa between 1990-2000 was the conversion of forested land to agriculture.(www.fao.org).

Throughout the 1990s, World Bank figures estimate the rate of deforestation worldwide as between 15 to 17 million hectares per year. (World Bank Forest strategy)

2.2.3 Underlying Causes of deforestation

Evans (1982) lists the main causes of deforestation as follows: Land clearing, intensive logging, shifting cultivation, urban and industrial expansion, overgrazing and gathering of fodder for domestic animals, accidental or deliberate burning of forest, ravages of wars.

Francois (1989), Awuku-Apaw & Quagraine (2000) however attribute deforestation to underlying causes such as poverty, inequitable land distribution, low agricultural productivity, poor land use policy, weak institutions and rapid population growth.

In 1998, the United Nations set up the Intergovernmental Panel on Forests to promote and monitor the implementation of Chapter 11 of Agenda 21 and the Forest Principles, and to address a wide range of forest –related issues, including ‘underlying causes of deforestation and forest degradation’. In its report, the panel noted the historical dimensions of deforestation. (IGES 1998).

The panel also noted that many of the factors causing deforestation or forest degradation interact, and some are synergistic. An interesting finding was that most causes were social and economic in character. The Panel pointed out some courses of action, such as unsustainable timber extraction, as linked the forest sector itself, inappropriate policy choices and approaches in other sector can also influence deforestation and forest degradation.

A number of potential underlying causes mentioned by the Panel included production and consumption patterns, land tenure patterns, land speculation and land markets, illegal logging, illegal land occupation and illegal cultivation, grazing pressure, unsustainable agriculture, the demand for fuelwood and charcoal to meet basic energy needs, refugee-related problems, mining and oil exploitation, natural climatic events and forest fires,

discriminatory international trade and trade distorting practices, poorly regulated investment, structural adjustment programs, external debt, market distortions and subsidies, including those for agricultural commodities, poverty and demographic pressure. (ibid)

2.2.4 Livelihoods

The concept of 'livelihoods' has gained scholarly attention in the past three decades. It has been found by many to be a people centred concept that aims at addressing poverty related issues (Kaag, et al 2002).

Chambers and Conways (1995) define livelihoods to comprise the capabilities, assets and activities (including material and social resources) that are required for a means of living. A livelihood is sustainable when it can cope with and recover from the shocks and stresses and maintain or enhance its capabilities and assets now and in the future, while not undermining the natural resource base'. (Quoted in Carney 1998, Kaag et al 2002). This is the adopted definition of the DfID Sustainable Livelihoods Approach (SLA) (Carney 1988).

Kaag, et al (2002) adds to the definition by stressing that livelihoods as an approach to development concentrates on the actions and strategies of people in making a living under adverse conditions.

Ellis and Freeman (2002) define the concept of livelihoods to encompass the wider context of governance, institutions and an enabling environment for poverty alleviation. They argue that an 'institutional context' for rural livelihoods is important because it helps to track the effects of expansion or contraction of opportunities that permit the poor to build their own pathways out of poverty.

Livelihoods, has also been seen as an interlocking concept.

Ellis and Freeman (2000) in a study of rural livelihoods and poverty reduction in four African countries, noted the interlocking nature of livelihoods in rural areas. In this study they surmised that livestock could be substituted for land or small businesses and vice versa; that non-farm income could be used to build up herds, etc. They therefore identified the five interlocking areas as household size, livestock, education, area owned and tools.

Broadening the debate on the interlocking nature of livelihoods, the DfID livelihoods concept focuses on assets also referred to as capital, upon which individuals draw on to build their livelihoods. These are natural capital, human capital, social capital, financial capital and physical capital. This is represented diagrammatically in the shape of a pentagon with each asset occupying one pointed edge. (Carney 1998)

DfID also goes on to construct an elaborate framework for Sustainable Livelihoods which links these capital assets to structures, processes and strategies that affect livelihood

outcomes. This framework is however, set in a 'vulnerability context' consisting of trends, shocks and culture. (Carney 1998)

There has however been several critics of the DfID strategic livelihoods framework in particular and livelihoods framework in general. Kaag et al (2002) in their paper '*Poverty is Bad, Ways Forward in Livelihood Research*' outlines several important points upon which criticism has been based.

Kaag et al (2002) contest that many of the existing livelihood studies focus too narrowly on the actions and strategies of a group of people and take insufficiently into account the context of structural constraints such as power inequalities in which these people have to make a living. One of the consequences therefore is that a positive image of poverty is created. Kaag et al (2000) state that this is dangerous because it diminishes the urge to address the structural causes of poverty which include unequal power relations and unequal access to productive resources.

Secondly, the livelihoods approach is criticised that in as much as it focuses on poor people's actions and strategies, it overemphasises this to the detriment of studying the relationships that exist and should exist between poor people and the broader society.

The third and most important criticism stems from the fact that most livelihood research is clouded in schemes, tools, definitions, and frameworks. These, however, cannot adequately capture the complex dynamics of the livelihood systems. In the end therefore, livelihoods research is used as a rigid frame to be put over the social reality of

researchers. They conclude therefore that this is detrimental to an approach which claims to be people centred, dynamic and sensitive to diversity.

2.2.5 Forest livelihoods

Forests and forest products have generally been accepted to contribute significantly to livelihoods options of the world's people and its continuing existence by several researchers.

The World Bank (World Development Indicators 2002) agree with this by pointing out that the continuing ability of the world to feed itself would depend 'in large part' to the future of the world's natural resource base, which includes the forest. It then states categorically that 'poverty and environmental degradation are closely interlinked' and most importantly, forests provide income for more than 1.6 billion people world wide (ibid).

The contributions that forests and forest resources make to livelihoods are summarised by Arnold (1998) as follows;

- Increased income- large numbers of people generate a portion of their income from forest/ tree products. Such activities are a major income source.
- increased well being – forests serve as the source of subsistence goods and material and supplementing inputs from farming activities for forest fringed communities and poor people.

- reduced vulnerability- forests and trees stocks provide a biomass reserve upon which people can fall back for subsistence and income in times of crop failure, unemployment and other kinds of hardships or to meet exceptional needs;
- More sustainable use of the natural resource base – trees and woodlands in agricultural landscapes can help protect crops and soil and can contribute to maintaining site productivity.

Research has shown however, that a rural forest fringed community uses several income generating pathways as a means of livelihood. Diversification of livelihoods is a significant part of the rural life. (Ellis 1998) reports that diversification appears to be an enduring and pervasive practice in many low income countries especially in sub-Saharan Africa.

Indeed Cain and McNicoll (1988) are quoted as saying that 'rural families' come increasingly to resemble miniature highly diversified conglomerates'. Ellis (ibid) reports that in sub-Saharan Africa, between 30% and 50% of rural household income are derived from non-farm sources. While in Southern Africa, this can reach 80-90%.

Rural livelihood diversification takes many forms and may be defined in several ways. Of interest here however is the distinction between natural resource based activities and non natural resource based activities. This can also be distinguished on the basis of farm income, off farm income and non farm income.

Farm income refers to income generated from own-account farming. This is broadly defined to include livestock as well as crop income and comprises both own consumption and cash income obtained from output sold.

Off-farm income refers to wages from one's labour on other people's farms. It also includes income obtained from local environmental resources such as firewood, charcoal, household building materials, wild plant, etc.

Non-farm income refers to non-agricultural income sources such as rural wage or salary employment, rural self employment in non farming sectors, urban to rural remittances arising from within national boundaries, other urban transfers and international remittances arising from cross border and overseas migration.

Out of these three diversification distinctions, it has been found that non farm income, especially migration as one of the most important methods of diversifying rural livelihoods. Remittances also feature prominently accounting for 24% in Botswana and 15% in Pakistan, Sri Lanka and Bangladesh (Ellis *ibid*). This does not however, detract the value of other sources of livelihoods and to different groups of society. It is recognised that no matter how diverse the livelihoods of rural communities are, indirectly or directly, forest products contribute to their livelihoods and should not be underestimated.

According to Arnold (1998), forest products are important to rural livelihoods in three main ways; subsistence goods, income and reduced vulnerability.

As subsistence good, forest supplement/complement inputs of fuel, food, medicinal plant products, etc from the farm system. It is also important filling seasonal and other food gaps. Forests become more important when farm income declines. Therefore, its importance declines as income rises. This suggests the ever increasing importance of forests to the poorest of the poor and its continuous existence is indelibly tied up to poverty reduction and rural livelihoods.

As an income base, forests provide a source of raw material that can be processed with minimum skills and capital for sale on local markets and for household use. Though this processing activity may become a major source of employment, it is mostly a part time activity engaged in to fill particular income gaps or needs.

As a means of reducing vulnerability, forests diversify the household economy by providing counter-seasonal sources of food, fodder and income. The 'buffer' role of forest are most important during times of hardships, e.g. crop failures, drought, shortage of wage employment, etc.

2.3 Forests and forest livelihoods in Ghana

Forestry contributes to the Ghanaian economy as well as to the social welfare of its peoples. However, apart from the timber industry, the contribution of forestry to the

economy is greatly undervalued, mainly because of the lack of reliable statistics, especially with respect to non-wood products which generate a wide range of income generation opportunities for many forest communities.

The timber industry accounted for 6 percent of GDP and 11 percent of total export earnings in 1996. The forestry sector directly employs 75 000 people and provides livelihoods for over 2 million people.

Overall, fuel-wood and charcoal meet about 75 percent of the country's fuel needs. Woodfuel harvesting has particularly heavy impacts in the savannah zone, which has experienced uncontrolled deforestation and soil erosion as a result.

In both forest zones, forests are important sources of non-wood forest products and services for the rural economy. On farm, agroforestry systems help maintain soil fertility and trees yield a wide variety of non-wood products (traditional medicinal products, tubers, fruits and nuts) which are important for subsistence use and for income generation. Of particular significance is the reliance on bushmeat as a source of animal protein in rural areas, and the commercial trade supplying bushmeat to urban areas.

2.4 Underlying causes of deforestation in Ghana

Kaimowitz and Angelsen, (1997) report that the underlying causes of deforestation differ substantially for different countries. Indeed, in the literature the importance of analysing the deforestation process in a particular country is emphasised (also Kummer and Sham,

1994) thus this section looks at the peculiar situation of what causes deforestation in Ghana.

Ghana's forests have undergone rapid depletion over the past 100 years but more so in the most recent 10 years. (Forest Watch Ghana 2004) The main causes of this rapid depletion can be attributed to the following factors;

- Lack of Stakeholder Participation in Forest Management.
- High Profitability in the Timber Industry.
- Weak Institutional Structures.
- Lack of investments in the forestry sector.
- Population Pressure.
- Policy Interventions Failures.
- Poor Institutional Coordination.

2.4.1 Lack of Stakeholder Participation in Forest Management

Most rural communities in Ghana live very close to the forest and are major and direct consumers of the goods and services from the forest; especially the non-timber forest products. Their livelihood activities especially cash crop and food crop farming, hunting and currently, chainsaw operations contribute considerably to unsustainable use of forest resources. Their exclusion from forest management, decision making and conservation of their heritage makes them lose self-image as trustees of the forest resources.

There is evidence that the rate of deforestation has seemingly declined since the concept of community participation in forest management was introduced about a decade ago.

2.4.2 High Profitability in the Timber Industry

From the economic point of view in the timber industry, a substantial residual economic value remains (before tax) after accounting for production costs and imputing sufficient profit to sustain the enterprise over the long term. This residual value or stumpage value in reference to the value of the standing timber is the maximum price a logger would be willing to pay under competitive condition to the government. If the government leaves a large proportion of the stumpage uncollected, pervasive economic incentives sets in to influence the rate of log harvesting. Thus the forest revenue regimes have a critical role in determining the rate of environmental decay.

Also, forest fees do not cover the full economic cost of managing the forest neither does it cover full operating cost. Until recently, timber royalties were charged per tree and value was estimated at less than 2% Free On Board (FOB) price per m³ of round log multiplied by the average tree volume of the species at the minimum felling diameter. The logger's liability was assessed from the yearly log production complied by the Forest Products Inspection Bureau. The system is inefficient as a mechanism for recovering stumpage value, thus promoting wastage both in the forests and mills.

An analysis of the forest fees in Ghana shows that forest fees have been too low in absolute terms to protect the resource or slow down exploitation. The current system has resulted in an inadequate market incentive differentiation between species, thus leading to over-exploitation of highly desirable timber species and under-exploitation of abundant but less-desirable species.

2.4.3 Weak Institutional Structures

The failure of the Forestry Commission to adequately control and manage the forest sustainably has resulted in large-scale encroachment on the forest reserves. Weak administrative machinery to monitor and patrol the forest is also the underlying factor for increasing bush fire in the forest areas.

The income generating ability of the FC determines the efficiency in managing the forest. Until 1998, the Forestry Commission was able to collect less than 58% of its potential revenue due to be collected. The Service was therefore unable to cover the full cost of forest management. FC could thus not acquire the basic equipment needed for forest management and monitoring. This gave rise to widespread illegal timber operations across the country.

2.4.4 Lack of investments in the forestry sector

Investments in the forestry sector can have an indirect pressure on the forest. Where people fail to invest in timber plantations, it exerts undue pressure on the natural forest since the demands of the installed milling capacity exceeds the supplies for the forest. In the past the private sector failed to invest in the timber plantations for almost a century and the natural forest continued to be the source of raw materials for the over-capacity milling industry. Research proves that the Ghanaian industry has capacity to mill currently four times Ghana's existing timber resources. (Forest Watch Ghana 2004)

2.4.5 Population Pressure

Rapid population growth is one of the root causes of poverty and forest resource degradation in Ghana. Rapid population growth coupled with internal migration to forested areas, also accounts for the high rate of forest degradation. In most parts of the country especially in Western, Ashanti and Central as the population density increases and land becomes scarcer, farmers resort to clearing virgin forest for additional cultivation of cash crops especially cocoa. The situation is aggravated where large-scale farmers respond to growing pressure to expand primary commodity export like cocoa and cashew and thus enlarge the areas on which cash crops are grown.

2.4.6 Policy Interventions Failures

Another stream of factors responsible for the forest degradation in Ghana is policy intervention failures. The traditional approach to solve environmental problems is for the public authorities to promote natural regeneration programmes and activities controlling pollution. Where these policy interventions fail, the rate of deforestation stands out glaring.

The failure of the *Taungya* system in the reforestation strategy in the mid-1970s accounts for the large track of degraded forestlands in the transitional zone. Under the *Taungya* system, farmers were allowed to cultivate food crops in forest reserves while the forestry authorities planted timber trees. However, due to poor supervision and unclear terms of future benefits, most farmers flouted the terms and conditions regulating the operations and thus failed to nurture the trees resulting in large degraded areas. Government's policy

of waiving export taxes on some processed wood products, subsidized credit and export financing, tax holidays and concession bases as stated in the 1989 Investment Code of Ghana, encouraged over investment in the milling sub-sector. This resulted in over-exploitation of timber resources.

The Government policies in most cases have had adverse effects in both environmental and standard economic terms and offer fairly direct incentive for wasteful environmental management. Implicit in this analysis is the fact that ineffective government policies dealing with forest offences lead to increased forest degradation. The increasing trends in forest offences are due to abysmally low court fines that are imposed on forest offenders. In most cases, it is more profitable to break the law and be fined than being honest with the law. Government policies therefore have greater influence on the rate of deforestation.

2.4.7 Poor Institutional Coordination

Although the activities of most agencies in the other sectors of the economy like agriculture, mining, road infrastructure and population have direct impact on the forest resource base, yet there are no mechanisms for coordinating the activities of these institutions. Lack of effective coordination and communication has resulted in increased assault on the forest resource base, which has contributed to its fast degradation.

2.5 Conceptual framework

As noted in the previous sections, forest depletion and degradation is the effect of the complex interactions between social, cultural, political and commercial factors. The forest resource-using activities and forest degradation are at first sight only remotely connected.

The conceptual framework (Fig. 1) consists of three small loops linking each of the concepts to forests and a larger loop linking all the concepts to each other. Their interaction and logic however, seek to explain the relationship between forests (deforestation) and the three concepts that operationalise livelihoods.

Here, it is argued that forests are an important base for livelihoods and that a continuing existence of forest based livelihoods provides an important reason for sustaining the forest. Forests also provide a basis for direct economic benefits to resource users and owners and indirect social and environmental benefits which form a basis for sustainable development and impacts positively on livelihoods.

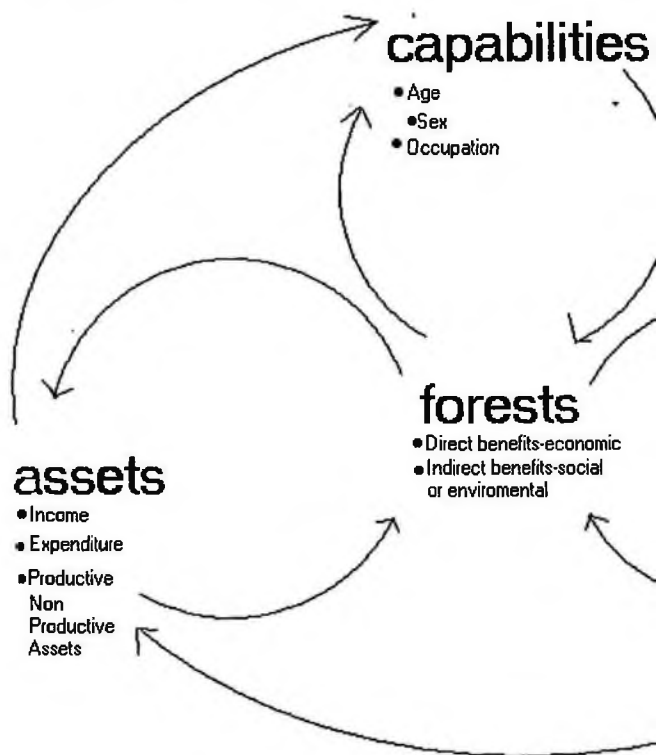
The capabilities of FFCs to sustainably manage and conserve the forest resource will help to maintain the quality, quantity, use and its contribution to total livelihoods. This relationship if managed well, acts as a positive and reinforcing loop. However, inadequate capabilities on the part of FFCs, and society at large(in the form of good policy frameworks and benefit sharing schemes) acts as a strong factor for deforestation and depletion total livelihoods.

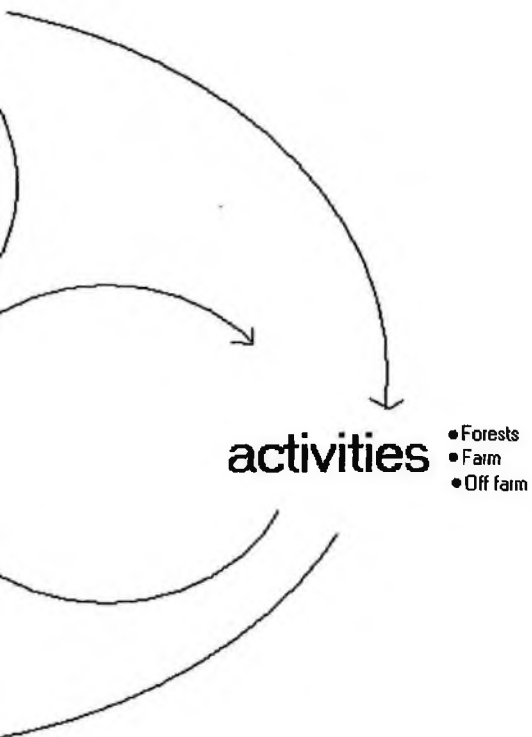
Also, forests provide a good basis for income production ventures contributing significantly to the total income base of the community and the society at large. It also features prominently in both farm and off farm production enterprises and gives rise to improving standards of living of community members through an increase in their asset base. However, unsustainable use of the forest base through appropriation of the resource by a few people or increased population may lead to a rapidly depleting resource that affects the asset base of future generations.

The forest in itself gives rise to several activities which may be individual or collective, social, economic or environmental, etc. depending on the type or intensity of the activity undertaken in relation to the forest, it may act as a great contribution to livelihoods or it may act as a reason for forest resource depletion.

Finally, the conceptual framework (Fig. 1) recognises the interlocking nature of the three concepts of livelihoods. At any one time, a particular capability may be translated into an activity which may give rise to an asset. Also, an asset can form the basis for an activity that finally results in the generation of capability or the learning of new skills.

FIG 1 CONCEPTUAL FRAMEWORK





CHAPTER 3 METHODOLOGY

3.1 Introduction

This chapter describes the design for the study, the analytical framework explaining the methodology/ analytical tools. It also presents the sampling methodology, types of data and data collection methods employed to achieve the objectives of the study. Finally, the chapter gives a brief background to the study area.

3.2 Study Design

The study explores in a comparative manner, the relationship between deforestation and livelihoods within communities along two forest reserves in the Winneba Forest District. The study compares the levels of capabilities, assets and activities as exists within FFCs along the two Forest Reserves (FRS) finds a relationship between these variables and the level of deforestation that exists in the two FRs (Yenku and Obotomfo).

The Obotomfo Forest Reserve is reasonably intact. This is evident in the fact that there is no invasion of *Chromolena odorata*. The Yenku Forest Reserve is classified as severely degraded. This is evident in the fact that a plantation development scheme has begun within the reserve to curb the degradation (Winneba Forest District Fact Sheet 2004).

3.3 Sampling design

A random sampling method was used to select 100 respondents from 4 communities along the Yenku and Obotomfo Forest reserves. Two communities were chosen along the

Yenku Forest Reserve and two communities along the Obotomfo Forest Reserve with similar sociological features, i.e. ecological, socio-cultural, ethnical and historic. Using the following criteria, Mankoadze and Gomoa Dahom were chosen along the Yenku Forest reserve while Akuaku and Kojo Wusu were chosen along the Obotomfo Forest Reserve.

The criteria used to select communities were

- Population and size of the community - communities should fall within the 'rural' category with population not exceeding 5000 individuals. The communities should however be accessible by vehicle and not too close to a major trading centre or a main road.
- Distance from Reserve boundary to community - forest fringed communities (FFCs) are defined to be communities located not more than 5km from the boundaries of a gazetted forest reserve. This helps to prove that such communities do have an interaction with the reserve, may even own it or that the forest was one of the reasons for the settlement.
- Dominant economic activities of the community – the dominant economic activity should be related to the forest or be agrarian in nature. This will help in showing whether the forest, as a basis for these activities, either now or in the past, has had any relevance to the livelihoods of community members.

Pre-tested questionnaire and focus group discussions were used to gather information from respondents. Data was analysed using SPSS and Microsoft excel packages.

The simple random sampling method was used to select respondents from these communities. In all 62 males (62% of sample population) and 38 females (38% of sample population) were interviewed.

3.4 Analytical Tools

This section presents the methods that were used to attain the objectives of the study. Simple frequency tables which showed both percentages and absolute figures were used to explain the variables of capabilities, assets and activities. Also students t-test, f-test and correlation coefficients were used where necessary to show significance.

3.4.1 Comparism Of The Effect Of Deforestation On Livelihoods Of Forest Fringed Communities Along The Obotomfo And Yenku Forest Reserves

IFAD in a study of three project areas in Southern Asia, operationalised the concepts of capabilities, assets and abilities as follows;

The concept of ‘capabilities’ was represented by the following variables

- Human capital (sex, age, literacy and household size)
- Income and employment (type of employment, total farm and off-farm income and remittances)

The concept of ‘assets’ was represented by the following variables

- Productive assets (total amount land farmed, number and type of livestock);
- Non-productive assets (buildings, electrical appliances, vehicles, canoes)

The concept of ‘activities’ was represented by the following variables

- Farm activities, off farm activities and forest based activities.

The major variables outlined above would be compared across the two situations in a tabular form. Major variables were then tested at 1% and 5% significance levels.

3.5 Data Sources

Both qualitative and quantitative methods of data collection were used during the study.

Data was also collected from both primary and secondary sources.

Qualitative data was in the forms of questionnaires, structured interviewing and secondary data sources. These were then quantified and analyzed statistically and objectively. Quantitative data through in depth informant interviews, focus group discussions, unstructured interviews and personal observations. Information collected was then analyzed for perceptions and stand point analysis.

One on one interview with primary informants was done to triangulate data gathered and establish facts. Key informants interviewed included the following persons;

- Awutu-Effutu Senya District Planning Officer,
- Winneba District Forest Manager,
- Range Supervisors of the two Reserves,
- other staff members of the FC,

- the Assembly members for the two forest reserves,
- the chiefs, Odikros and Elders of communities, and
- identified opinion leaders

3.6 Study area

3.6.1 The Obotomfo Forest reserve

The Obotomfo Forest Reserve was constituted as a gazetted forest reserve under the Forests Ordinance by Governor's order 21 of 1930. In conjunction with Ahirasu, and Akrabong forest reserves, these three were collectively referred to as Obotomfo and Akrabong Hills forest reserve. The then governor of the Gold Coast appointed a reserve settlement commissioner in 1929 for the purpose of their constitution. Obotomfo has 1.3 Km² in area with a perimeter of 5.0 km lie in the Agona district.

This reserve was selected among 26 other forest reserves in 1999 and designated Globally Significant Biodiversity Areas (GSBAs). The Asona No. 1 family of Agona Kwanyarko owns Obotomfo. Communities around the reserve are Akuaku, Kojo Wusu, Akroma, Asubo, Kwesi Budu and Ahentia. The inhabitants speak predominantly Awutu and Fante languages.

Obotomfo Forest Reserve is an intact forest reserve. On a condition score it will score a mark of 7. The forest floor is intact. Its admitted farms are however poorly managed.

3.6.2 The Yenku Forest Reserve

The total Area of the reserve is 2,120 ha with a perimeter of 29.37 Km. The reserve comprises of Block A and B. The entire forest reserve falls within the Gomoa District Assembly with the Headquarters at Apam.

According to office records the reserve is owned by Gomoa Otsew Jukwa Stool Land. However, other stools are also claiming ownership of some portion and investigations will have to be conducted to ascertain the true owner of the reserve. The reserve is located in the Gomoa traditional area.

The main settlements close to the reserve includes: Onyadze, Otsew Jukwa, Mankoadze, Amenfi, Asebu, Oguakrom, Gomoa Dahom, and Gomoa Lome.

The estimated population of the fringe forest communities ranges from 362 to 1998.

Yenku Forest Reserve was among the many poorly stocked forest reserves in which large scale plantations were started in the early 1970s. The total area planted was 841hactres. The dominant species were *Eucalyptus tereticornis* and *E. alba*.

3.7 Scope and Constrains in Data Collections

The researcher could not visit all communities along each of the forest reserve due to financial constraints and the level of accessibility to these project sites. Thus the study concentrated on four main Forest fringed communities that were consistent with her criteria for selection of communities.

Also, several secondary data was not available to the researcher especially data on number of trees within each forest reserve over a period of ten (10) years. The figures available were from a 1974 survey done on only the Yenku Forest Reserve. Proxy data and perceptions of community members therefore had to be used as a substitute for the actual figures.

Another limitation was that it was very difficult to collect reliable information on expenditure patterns and levels of income for various activities being undertaken by members in the community. Thus some of these figures were inflated or just thought up by respondents.

CHAPTER 4: RESULTS AND ANALYSIS

4.1 Introduction

This chapter presents the results of the study with interpretations and discussions. It presents the major livelihood activities existing in forest fringed communities along the Obotomfo and Yenku Forest Reserves. It also presents the results of the simple t-tests, f-tests and correlation done that shows the extent to which deforestation can be said to contribute to livelihood changes along the two communities.

4.2 Comparism Of The Capabilities Of FFCs along the Obotomfo And Yenku FRs.

As discussed in chapter 3, the concept of 'capabilities' was defined with the following;

- Human capital (sex, age, literacy and household size)
- Economic livelihood and employment (type of employment, expenditure, total farm, off farm income and remittances).

These variables were compared across FFCs along the Obotomfo and Yenku FRs and discussed regarding their relevance to deforestation.

4.2.1. Comparism Of Human Capital Variables Across The Two FRS.

Comparing the mean variable of age, respondents along the Yenku Forest Reserve were found to be almost ten (10) years older than respondents in communities along the Obotomfo Reserve. This may be due to out migration by the youth from rural to urban areas that happens throughout Ghana (table 4.1). The survey found that respondents along the Yenku had a mean age of 49 years whilst those along the Obotomfo had a mean age

of 39 years. This shows the age profile of community members to be quite high with the youth not forming a large proportion of community members.

However, table 4.1 also shows the mean family size for both areas to be almost the same at 6 people per household. Thus the number of hands available for work does not vary across forest reserves with households being relatively large.

Table 4.1 Means Of Age And Household Size Variables

Variable tested	Name of reserve	Number of respondents	Mean	F	Sig	t-value	df
Age	Yenku	50	49.08	6.268	.014*	3.984	98
	Obotomfo	50	39.60				
Household size	Yenku	50	6.08	9.420	.003	-.559	98
	Obotomfo	50	6.40				

Table 4.2 Literacy Level Across The Two Forest Reserves

Name of forest reserve	Literacy levels					Total
	No formal education	Non formal education	Primary education	Secondary education	Tertiary education	
Yenku	(23) 46%	(3) 6%	(7) 14%	(14) 28%	(3) 6%	(50) 100%
Obotomfo	(15) 30%	(0) 0%	(26) 52%	(7) 14%	(2) 4%	(50) 100%

From table 4.2, communities along the Yenku have a higher percentage of respondents who have not had any formal education (46%) while respondents in communities along the Obotomfo have a higher primary school level education (52%).

4.2.2. Comparison Of Employment Variables Across The Two FRS.

It can be seen from table 4.3 that farming was the predominant occupation with 66% of all respondents involved in this activity (48% of respondents along Obotomfo and 18% along Yenku forest reserve). The second highest ranking occupation in communities along Yenku was fishing (14%) with trading in the third position. Other major areas in which community members were employed include masonry, cooked food seller, drinking bar operator and undertaker. Table 4.3 also shows the wide variety of employment that exists within the Yenku communities whilst employment along the Obotomfo is restricted to mostly farming (48%) and masonry (2%). This may be a reflection on the level of social organisation existing in communities along the two forest reserves.

Table 4.3 Primary Employment Activities Of Community Members

Livelihood activity	Name of Forest reserve		Total
	Yenku	Obotomfo	
Farming	(18) 18%	(48) 48%	(66) 66%
Fishing	(14) 14%	-	(14) 14%
Trader	(10) 10%	-	(10) 10%
Mason	(2) 2%	(2) 2%	(4) 4%
Cooked food seller	(2) 2%	-	(2) 2%
Drinking bar operator	(2) 2%	-	(2) 2%
undertaker	(2) 2%	-	(2) 2%
Total			100

The survey results indicated that most community members were involved in more than one employment activity. Sixty percent (60%) of all respondents had secondary employment while only 4% replied that they had a tertiary livelihood activity (tables 4.4 and 4.5). This indicates a level of livelihood diversification which includes both farm and off-farm activities.

This information reflects statistics from the 2003 Mid Term Development Plan for the district. It ranked agriculture as the major economic activity (including both farming and fishing) though the plan also recognised that the majority of such agricultural activity was at a subsistence level. The next major activities ranked by the plan were commerce, service, manufacturing and processing.

With a second source of employment, table 4.4 shows that communities along Obotomfo had a wider variety of agro-based activities ranging from processing of local gin and oils to hunting. These activities have a direct bearing on the forest. It should be noted that a small proportion of respondents recognised being part of the local government as an employment activity. However when members of the local community bio-diversity advisory group were interviewed, none saw this as an occupation or employment activity.

With tertiary sources of employment, no respondent in Obotomfo attested to having any while only a small proportion of respondents along the Yenku attested to having a tertiary occupation (4%). These were also predominantly agro based.

Table 4.4 Secondary Livelihood Activities By Community Members

Livelihood activity	Name of Forest reserve		Total (%)
	Yenku	Obotomfo(%)	
Farmer	(18) 30%	(2) 3%	(20) 33%
Trader	(2) 3%	(7) 12%	(9) 15%
Food seller	(5) 8%	(3) 5%	(8) 13%
Processor (oil)	-	(7) 12%	(7) 12%
Processor(local gin)	-	(5) 8%	(5) 8%
Hunter	-	(5) 8%	(5) 8%
Area council member	-	(2) 3%	(2) 3%
carpenter	-	(2) 3%	(2) 3%
Salt miner	(2) 3%		(2) 3%
Missing		-	(40) 40%
Total			(100) 100%

Table 4.5 Tertiary Livelihood Activities By Community Members

Livelihood activity	Name of Forest reserve		Total
	Yenku (%)	Obotomfo(%)	
Driver	(2) 2%	-	(2) 2%
Farmer	(2) 2%	-	(2) 2%
Missing		-	(96) 96%
Total	(4) 4%	-	(100) 100%

These values agree with Ellis (1998). In a paper presented at the DFID's natural Resources Advisers' Conference, Ellis reported that most rural families have multiple income sources and that these may include a mixture of farm activities, off-farm activities and remittances. Hulme (2000) also observed that diversification of livelihoods is an important tool for poverty alleviation.

It can therefore be concluded that though the use of capabilities in communities along the Obotomfo FR is either agro based or forest based, community members seem to be involved in almost the same kind of activities and very dependent on the natural resource base for their livelihoods.

On the other hand, communities along the Yenku have a much more diversified capabilities base branching into areas like trading, undertaking, driving and masonry. Though this is not in a large proportion, it points to a tendency for community members to survive on areas other than agrarian or forest based economies.

4.2.3 Comparism Of Economic Livelihood Variables Across The Two Frs

Economic livelihood as defined earlier, is represented by expenditure, off farm income and non farm income for communities along the two forest reserves. Remittances, though a part of non-farm income, was discussed separately due to its significance.

From table 4.6, it was found that the average expenditure levels of communities along Yenku were higher by ₵2,467,944 than expenditure levels existing in Obotomfo. The average annual expenditure level for a family in Yenku was ₵12,356,804 while that for a family in communities along Yenku was ₵9,888,860. This point to a higher standard of living in communities along the Yenku Forest Reserve while it can be inferred that standards of living along the Obotomfo FR are much lower.

Remittances were also found to be higher in Yenku by an average of ₵3,813,636.36. However this statistics should be looked at carefully due to the difference in numbers of respondents in each case. Only 3 respondents along the Obotomfo attested to having received any remittance within the past 12 months while 22 respondents attested to having received any form of remittance within the past 12 months.

Testing for significance of these means, it can be seen that total expenditure of communities along the two forest reserves are significantly different, with expenditure for Yenku being higher than that for Obotomfo. Also, the variable of total non farm income (defined to include non-agricultural income sources such as non-farm, rural wage or salary employment, and remittances) was also found to be significantly higher.

However, off farm income (defined to include income obtained from local environmental and forest resources such as firewood, charcoal, household building materials, wild plant, etc.) was not significantly different in the two situations.

Table 4.6 Tests Of Significance For Economic Livelihood Variables

	Name of forest reserve	N	Mean	Standard error	F-test	sig	t-test	sig
Remittances	Yenku	22	¢986,363.64		1.347	.258 **	.529	23
	Obotomfo	3	¢4,800,000					
Total expenditure	Yenku	50	¢12,356,804	992148.869	6.471	.013 *	2.332	.022 **
	Obotomfo	50	¢9,888,860	368050.894				
Total off farm income	Yenku	50	¢7,860,000	1036310.843	12.470	.001	3.373	.001
	Obotomfo	50	¢4,012,800	476401.995				
Total non farm income	Yenku	50	¢1,736,200	246199.337	.034	.844 **	.716	.476 **
	Obotomfo	50	¢1,449,387.76	317111.808				

*-significant at 1%

** - significant at 5%

This point to the changing nature of livelihood variables in rural communities. Thus one form of livelihood may be transferred into another depending on the issue at hand (Ellis, Ade Freeman 2002). Ambrose-Oji (1998) also confirms this by reporting that many rural people have coping strategies for dealing with changes in livelihoods. One important

coping strategy is the ability to maintain a mixed asset base of natural resource as well as non-natural resource components.

The relationships between the component assets making up any livelihood are dynamic and reflect the risk management and vulnerability aspects of livelihood strategies. Resilient livelihoods are able to transform assets between one form and another and back again in response to changing social, physical and economic contexts. In the above table, it is clear that asset endowments and entitlements change in form and function depending on circumstance – livestock for example may form a part of savings, provide an income stream, and at other times can be used as a nutritional base in communities along the Obotomfo whiles remittances and other physical assets may serve the same purpose in communities along the Yenku FR.

A correlation matrix (table 4.7) was used to further test the variables for economic livelihoods. The analysis of the correlation matrix indicates that a few of the observed relationships were very strong. The strongest relationship was between total expenditure and total off farm income ($r=.459$). Total expenditure was also positively correlated to total farm sizes ($r=.211$). This indicates that farm sizes have a bearing on expenditure of community members. Though relatively weak, total expenditure was also positively correlated with total non farm income ($r=.70$).

Table 4.7 Table Of Correlation For Economic Variables

	Total farm size	total off farm income	total non farm income	total expenditure of respondent
Total farm size	1	-.123	-.164	.211*
total off farm income	-.123	1	-.157	.459**
total non farm income	-.164	-.157	1	.070
total expenditure of respondent	.211*	.459**	.070	1
	100	100	99	100

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

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

Total off farm income, defined to include environmental and forest products was found to form a significant percentage of total expenditure of community members. Though income from off farm sources have been shown to play an important role in the economies of forest fringed societies, they are most of the time undervalued, underestimated and relegated to the informal, non monetary system of national accounting (State of the World's forest 2005).

Arnold (1998) reiterates the importance of forest products during non farming periods to the poorest of the poor. In such times, forest products act as a 'buffer' which provides food and sources of income to the rural poor. He however concludes that as income level rises, the importance of forest products declines.

4.3 Comparism Of The Assets Of FFCs along the Obotomfo And Yenku FRs.

As discussed in chapter three, the concept of ‘assets’ was operationalised using the following variables

- Productive assets (total amount land farmed, vehicles, canoes and type of livestock);
- Non-productive assets (buildings, electrical appliances,)

These variables were compared across FFCs along the Obotomfo and Yenku FRs and discussed regarding their relevance to deforestation.

4.3 1 Comparism Of Productive Assets Variables Across The Two Frs

Assets in the form of fridges, canoes and other electrical appliances were more plentiful among respondents along the Yenku FR than within communities along the Obotomfo. This may be attributed to the fact that Yenku communities have electricity and this increases their livelihood diversification activities. Most respondents who had fridges were using them for economic purposes as opposed to just home use as can be seen in table 4.8.

However, respondents in Obotomfo had more livestock than respondents in Yenku. It can thus be said that community members living along each FR have livelihood strategies that meet their individual needs and are location specific taking advantage of existing environmental conditions.

Table 4.8 Comparison Of Livelihood Variables

Variable tested	Name of reserve	Number of respondents (N)	Mean	F	Sig	t-value	df
Livestock	Yenku	38	10.18	1.717	.194	-3.142	83
	Obotomfo	47	14.62				
Car/bus/canoe	Yenku	6	1.5	-	-	-	-
	Obotomfo	0	-				
Buildings	Yenku	17	1.00	64.65	0.00	-2.489	44
	Obotomfo	29	1.28	9			
Total farm size (acres)	Yenku	50	3.16	11.22	.001	-3.679	98
	Obotomfo	50	6.30	3			

*-significant at 1%, **-significant at 5%

4.3 2 Comparism Of Non-Productive Assets Variables Across The Two Frs

From table 4.8, the survey revealed that non productive assets in the form of building was widespread among community members along the two forest reserves. Most people owned houses though the quality of homes owned differed significantly from one place to the other. Community members in communities along the Yenku lived mostly in sandcrete structures with tin roofs whiles the houses of community members along the Obotomfo were mostly landcrete structures with grass or bamboo roofs.

Also, due to the presence of electricity in communities along the Yenku, more respondents had access to electrical appliances in the form of fridges, TV sets. Indeed, two respondents from communities along the Yenku attested to being drinking bar operators making their livelihoods from the presence of electricity in their towns. The most common form of appliance in communities along the Obotomfo were battery operated radio sets.

4.4 Comparism Of The Activities Of FFCs along the Obotomfo And Yenku FRs.

As discussed earlier in chapter three, the concept of ‘activities’ is operationalised using the following variables

- Perception of change in forest cover
- Access to the forest

These variables are discussed to the extent to which they are related to forest and forest activities.

4.4.1 Perception of Change in Forest Cover

In response to the question, ‘what was the state of the forest ten years ago?’ response varied according to forest reserves. Responses are collated in table 4.9. Communities along the Obotomfo FR were unanimous in their answer that there was less forest cover ten years ago (100%). On the other hand, majority of respondents in communities along the Yenku FR had the perception that there was more forest cover in their reserve ten years ago (48%). The remaining 52% was distributed among respondents who answered that there had not been significant change (22%) and there had been less forest covers (30%). These results reflect the existing social organisations in communities along the two reserves. Communities along the Obotomfo appear more homogenous while communities along the Yenku are more diverse.

Table 4.9 Distribution Showing Community Member's Perception On The State Of The Forest Ten Years Ago

Name of forest reserve	More forest cover	No change	Less forest cover	Total
Yenku	(24) 48%	(11) 22%	(15) 30%	(50) 100%
Obotomfo	-	-	(50) 100%	(50) 100%

Table 4.10 Distribution Showing Perception Of Community Members On Current State Of The Forest Reserve

Name of forest reserve	More forest cover	No change	Less forest cover	Total
Yenku	(12) 24%	(11) 22%	(27) 54%	(50) 100%
Obotomfo	(50) 100%	-	-	(50) 100%

Table 4.9 revealed that a significant proportion of community members along the two FRs recognised that there had been changes in forest cover over the period of ten years. Community members along Yenku (78%) were sure about some degree of change although those who agreed to there being less forest over now than ten years ago were more than those that said there was less forest cover. Twenty two percent (22%) however said there was no changes in forest cover over the ten year period under consideration. They however conceded that they were benefiting more economically now than ten years ago.

In table 4.10, community members along Obotomfo were again unanimous in the fact that there had been a positive change in forest cover over the ten year period under consideration. However, these same community members attested to the fact that they were not getting any economic benefits from the enhanced forest. In answer to the

question, ‘what did you benefit from the forest ten years ago?’ community members had the following answers as shown in table 4.11 below.

Table 4.11 Distribution Showing Benefits Derived From The Forest Reserve Ten Years Ago

Forest reserve	What benefits did you gain from the forest reserve ten years ago?							Total
	None	Farming	Gathering food	Gathering firewood	Money from selling forest products	Other*	Missing	
Yenku	(23) 46%	(8) 16%	(5) 10%	(2) 4%	-	(11) 22%	(1) 2%	(50) 100%
Obotomfo	(5) 10%	(2) 4%	(4) 8%	(6) 12%	(4) 8%	(24) 42%	(8) 16%	(50) 100%

*other activities include cane weaving, hunting, free entry into forest and gathering twines, ropes, etc.

Table 4.12 Distribution Showing Benefits Derived From Forest Reserve Now.

Forest reserve	What benefits did you gain from the forest reserve now?						Total
	None	Farming	Fresh air	Clean water	Other*	Missing	
Yenku	(11) 22%	(25) 50%	-	-	(8) 16%	(6) 12%	(50) 100%
Obotomfo	(37) 74%	-	(5) 10%	(3) 6%	(5) 10%		(50) 100%

*other activities include less fertile lands, less food and lack of access of entry

From table 4.12, it can be seen that almost 50% of respondents along the Yenku FR did not benefit from the forest resource ten years ago as opposed to only 22% currently. Looking at Obotomfo FR, it is almost the opposite with 10% attesting to no benefits ten years ago and 74% (almost three quarters of respondents) attesting to no benefits currently from the regenerated forest.

Also, only 16% of respondents in communities along the Yenku FR were benefiting from farming within the FR ten (10) years ago as compared to 50% of respondents currently.

Comparing with communities along Obotomfo, only 4% benefited from farming within the FR ten years ago as opposed to none (0%) now.

However, communities along the Obotomfo FR attested to having indirect benefits from the reserve. These included fresh air and clear drinking water. It was also noted that 12% of respondent along the Yenku were indifferent to benefits gained from the forest currently as opposed to 16% of respondents along the Obotomfo (10) ten years ago.

4.4.2 Access to the forest

The study revealed that community members along the two FRs did not have equal degrees of access to the forest reserves and therefore its resources. Table 4.13 shows 72% of respondents along the Yenku FR had access while only 36% along the Obotomfo were reported to enter the FR.

Table 4.13 Number Of Respondents Who Have Access To The Forest

	Forest reserve	No of respondents	Yes (%)	No (%)
Access into Forest	Yenku	50	72	28
	Obotomfo	50	36	64

The survey went further to find out reasons for there being access in FFCs along one FR and less in FFCs along another FR. In Obotomfo, community members gave reasons such as restriction against entry as the highest ranked answer (50%) followed by have nothing to take there (14%) and finally no reason (6%) as shown in table 4.14. Yenku however had a smaller proportion of respondents attesting to no entry. Their highest ranked reason was no reason (20%). The percentage for 'missing' for Yenku can be seen to be as high as 60% of respondents. This shows that as many as 60% of respondents do enter the

forest for one reason or the other. While the figure is relatively lower for Obotomfo at 30% (table 4.14).

Table 4.14 Reasons For Non Entry Into Forest Reserves

Name of Forest Reserve	Reasons for non-entry					Total
	No reason	Have nothing to take from there	Restriction against entry	Other	Missing	
Yenku	(10) 20%	(4) 8%	0	(6) 12%	(30) 60%	(50) 100%
Obotomfo	(3) 6%	(97) 14%	(25) 50%	0	(15) 30%	(50) 100%

These statistics may be attributed to the different management practices being undertaken in the two forest reserves. The Yenku Forest Reserve, due to its level of degradation, has been put under the Modified Taungya Scheme (MTS). Modified Taungya is a system of forest management whereby FFCs are allowed to farm within degraded forest reserves by intercropping foodstuff with trees. A farmer maybe allowed to farm a particular portion for about five to six years until such a time that his trees crops grown till close canopy phase of tree development. Modified Taungya was initiated in 2002 in the Yenku Forest Reserve and so far only about five compartments have been opened up to community members for farming purposes. In this case, community members have direct access to benefits from the forest in terms of proceeds from farming firewood collection, etc.

Obotomfo FR however has been designated a Globally Significant biodiversity Area (GSBA) by the International Union for the Conservation of Nature. The GSBA is a system whereby forest reserves with unique biodiversity (flora and Fauna) are declared wholly protected for the well being of all society. Here the law of non entry and no access

into the forest is rigorously enforced in a bid to protect endangered species within that area. Community members do not therefore directly benefit from such GSBAs but only benefit indirectly through changes in the environment eg, access to fresh water and clean air.

CHAPTER FIVE; SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary and Conclusions

The main objective of the study was to determine the effects of deforestation on livelihoods on forest fringed communities along two forest reserves in the Awutu-Effutu Senya district of the Central Region. Three main objectives were investigated into in a bid to discuss the problem identified.

In comparing the capabilities of FFCs along the Obotomfo and Yenku FRs, the study found that the average age of respondents in FFCs along the Yenku was ten (10) years higher at 49.08 years than the average age of respondents in FFCs along the Obotomfo at 39.60 years. Household size was however found to be almost the same for both areas at an average of 6 persons per household. Literacy rates were higher in Obotomfo with a larger percentage of respondents having reached primary school level.

The study also found community members to be engaged in more than one economic activity. The major livelihood activities was found to be both farming and fishing in FFCs along the Yenku whiles along the Obotomfo, major economic activity was predominantly farming. It also realised some differences in livelihood variables between communities along the two forest reserves. Expenditure levels of communities along Yenku were significantly higher by ₵2,467,944 than expenditure levels existing in Obotomfo. Remittances were also significantly higher in Yenku by ₵3,813,636.36.

From the analysis done in chapter 4, the study revealed that off farm income form a significant part of total expenditure of FFCs along both Forest Reserves. It can therefore be concluded that, in terms of capabilities, FFCs along the Yenku FRs though much more handicapped in age and literacy levels are making better use of their capabilities through a wider diversification of economic activities.

In answer to the objective on comparing the assets of FFCs along the Obotomfo and Yenku FRs, the study found productive assets in the form of fridges, canoes and other electrical appliances were more plentiful among respondents along the Yenku FR than within communities along the Obotomfo. The study also found that respondents in Obotomfo had more livestock than respondents in Yenku.

For non productive assets, the study found that there were no significant difference in the number of buildings owned by respondents though the quality of building was different with FFCs along the Yenku having access to sandcrete houses and FFCs along the Obotomfo having access to landcrete houses. The study therefore concluded that in terms of assets, FFCs along each Forest Reserve met their asset needs based on existing environmental and local condition. Community members therefore used innovative ways to meet their individual and collective assets needs.

In answer to the objective on comparing the activities of FFCs along the Obotomfo and Yenku FRs, the study revealed that communities along the Yenku FR had a perception that the forest resource base had depleted over the period of ten years. However,

communities along the Obotomfo FR had the impression that their forest resource base had improved over the past ten years. Another revelation was that community members along the Yenku FR though depleted were benefiting from the FR in terms of the Modified Taungya Scheme agreed in conjunction with the District Forestry Officer. On the other hand, communities along the Obotomfo FR reported less economic benefits from the improved forest resource base.

The study therefore concluded that the activities being undertaken along the two Frs reflect the levels of diversification existing within the FFCs. However, FFCs along the Yenku were benefiting more from forest activities now than ten years ago while FFCs along the Obotomfo were benefiting less from forest reserves now than ten years ago.

The overall conclusion therefore was that based on the facts and figures discussed in chapter four above, communities along the deforested forest reserve have greater direct benefit from the resource in terms of access to the forest, access to land for farming leading to improved livelihoods and a greater level of livelihood diversification.

On the other hand, communities along the improved forest resource were benefiting less from the resource than they did ten years ago leading to a shrinking in levels of diversification of economic livelihoods. However, they were benefiting from the resource indirectly in terms of fresh water and clean air.

5.2 Recommendations and policy implications

Based on the results of the study, the following recommendations are made;

Capabilities;

- that more avenues that create opportunities for FFCs to take advantage of off farm and non farm activities are put into place. This will remove the pressure on farming and especially farming in forest reserves while still building on the existing capabilities and opportunities that FFCs have.
- That community members living around both forest reserves will benefit from training in improved technology for the major economic activities prevailing in the FFCs. This will improve the average income for community members and improve livelihoods.

Assets;

- Structures and systems should be put into place that enable assets owned by community members to be easily transferred from one productive form to another. This will ease periods of overdependence on forests and forest resources.
- The asset base of FFCs should also be widened to include strategies for savings in monetary forms and not only as natural resource and non-natural resource forms. This will help FFCs take better advantage of their existing livelihood strategies while finding new ones.

Activities;

- that activities that simultaneously promote reforestation and also provide direct economic benefits to FFCs should be promoted. The spill off effect is that such activities would also form the basis for the indirect social and environmental benefits that area enjoyed by all.

General livelihoods;

To promote the overall picture of livelihoods of FFCs and reduce the effect of deforestation, it is recommended that other forms of livelihood diversification strategies are researched into and actively marketed to FFCs. This would form the basis for sustained forests.

Other forms of livelihoods that can be looked at include value addition to farm products, value addition to non timber forest products such as canes, raffia and bamboo for sale. The potential of eco- tourism can also be explored in FFCs along Obotomfo as a means of income generation and sustaining the forest resources. .

It is recommended that further research be done to explore the long term effects of the use of gazetted forest reserves in the Modified Taungya Scheme. Based on the study, communities may get the erroneous impression that depleting their forest reserves will put them in a good position to 'acquire' more land from the Forestry Commission. There will therefore be little motivation for conserving standing forests.

For communities along the Obotomfo to have a full economic value of their regenerated forest resource, effective channels should be created by all parties to enable forest fringed communities to gain direct access and benefit directly from their available resources. Otherwise forest fringed communities would not be motivated to continue to protect a resource to which they are not benefiting directly. On the other hand, forest fringed communities along the Yenku should be encouraged to use the opportunity for farming in the forest reserves, eg. The Modified Taungya System as the first step towards managing their forest resource.

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Appendix 1

INSTITUTE OF SOCIAL STATISTIC AND ECONOMIC RESEARCH
MA DEVELOPMENT STUDIES
QUESTIONNAIRE ADMINISTRATION

INTRODUCTION



Part 1
Socio-demographic Characteristics of Respondents

1. Name of town

2. Origin of respondent		3. Age (completed years)	4. Religion				5. Family size (number of people in household)	6. Sex	
Indigenous	Migrant		Christian	Muslim	Traditionalist	No Religion		Male	Female

Part 2 Existing livelihoods Capabilities

7. OCCUPATION		
What is your occupation? Your primary occupation is your main work. For instance if you area driver and have a farm, indicate what crop you farm or what type of vehicle you drive.		
Occupation		How long have you been doing this? (No of years)
Primary		
Secondary		
Other		

8. EDUCATIONAL LEVEL (Please Tick one)				
No formal	Non formal	Primary	Secondary	Tertiary

9. INCOME BY EXPENDITURE PATTERN

List the expenditure you may have incurred within the time periods specified below.

	Day	Week	Month	Year	When do you buy what?
Food					
-market					
-own produce					
Clothing					
Education (school fees, books, etc)					
Rent (actual or imputed)					
House utilities (water, electricity, etc)					
Fuel (firewood, kerosene)					
Healthcare					
Donations, gifts and remittances					
Farm inputs (seeds, fertilizer, other than labour)					
Farm machinery (chainsaw, transportation, rental)					
Farm labour (cash & imputed)					
Transportation					
Raw materials (artisanal producers)					
NTFPs					
Levies					
Other (specify)					
education	education				

When do you buy what?

- | | | |
|--------------------|---------------------|---------------------|
| 1. Weekly | 2. Market days | 3. Once a month |
| 4. Once a while | 5. During harvest | 6. School reopening |
| 7. Planting season | 8. During festivals | 9. During funerals |
| | | 10. Other |

Assets

10. Give the following information about your farm or land				
Farm or	Size (acres,	Locations	Is yield increasing	Yield increase or decrease

land No.	poles)		or decreasing?	by how much?	
1.					
2.					
3.					
4.					

11. Other assets (take respondents through one by one)				
Type	Quantity	Year of purchase of newest one	Purchase price of newest (¢)	Estimated current total value of assets (¢)
1. Land				
2. Building				
3. Livestock				
4. Tree crops				
5. Electric Appliances				
6. Jewelry				
7. Car/bus/truck/ bicycle/ Tractor				
8. Other (specify)				

Activities Off farm income

12. Have you received any off farm income within the last 12 months?

Yes No

13. If yes, how often and what is the total off-farm income?

Activity	How often?	Total off-farm income (¢)			Flow of income at what time of yr?
		Weekly	Month	Year	
Trading					
Artisan					
Teaching					
Mining					
Office work					
Hunting					
Gathering (canes, ...)					
Medicinal plants					
Processing					
Carving					
Remittance					
Others					

Forest activities

14. Have you ever entered the forest? Yes				No	
15. If no, why?					
No reason	Have nothing to take from there	Restriction against entering	Other specify		
16. How yes, often do you enter the forest?					
Daily	Once a week	Once a month	Once a year	Less often	Other specify

17. Which of the following activities do you undertake in the forest? Please rank as many as possible				
Activity	Rank	What do you use this for?	What time of the year do you do this?	What is the monetary value? (£)
Farming				
Fetching firewood				
Hunting				
Gathering snails				
Gathering fruits				
Searching for mushrooms				
Medicinal herbs/plants				
Performing rituals				
Consulting shrines				
Other specify				

Rank 1= 1 st activity most undertaken 2=2 nd activity most undertaken	Use 1= for sale 2= for personal use	Time of year 1=during harvest 2=during planting season 3=throughout the year 4=in the dry season 5=in the rainy season
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Part 4

18. What was the state of the forest ten years ago?								
More forest cover		No change			Less forest cover		Don't Know	
19. What benefits did you derive from the forest then?								
20. What is the state of the forest now?								
More forest cover		No change			Less forest cover		Don't Know	
21. What benefits do you derive from the forest now?								
22. What, in your opinion accounts for the change, if any?								
Nature	Animal activities	Chainsaw	Bushfires	Replanting	Logging	Farming	Indiscriminate use	Don't Know
23. Has this had any effect on your economic activities? Yes							No	
24. If yes, in which ways?								
Farming	Artisanal	Fishing	Fuelwood	Hunting	Other			
25. by how much? (in percentages)								
26. What are some of the reasons why it has led to an increase/decrease in your economic activities?								

Thank you.