UNIVERSITY FOR DEVELOPMENT STUDIES

DEPARTMENT OF ENVIRONMENT AND RESOURCE MANAGEMENT

THE EFFECTS OF CUSTOMARY LAWS ON BIODIVERSITY CONSERVATION IN THE NADOWLI/KALEO DISTRICT OF THE UPPER WEST REGION OF GHANA

AMADU ADAMU

THESIS SUBMITTED TO THE DEPARTMENT OF ENVIRONMENT AND RESOURCE MANAGEMENT, FACULTY OF INTEGRATED DEVELOPMENT STUDIES, UNIVERSITY FOR DEVELOPMENT STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PHILOSOPHY IN ENVIRONMENT AND RESOURCE MANAGEMENT

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MARCH, 2019

DECLARATION

Student's Declaration

I, Amadu Adamu, declare that this thesis is my own work and a result of my own investigation. All the sources that I have used or quoted have been indicated and acknowledged by means of complete references. To the best of my knowledge, this work has not been submitted before for any degree at any other university.

Candidate's Signature:…… Date……..

Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis was supervised in accordance with the guidelines on supervision of dissertation/thesis laid down by the University for Development Studies.

Certified by:

Supervisor's Signature:……Date…….

Name: Dr. Isaac Agyemang

ABSTRACT

Customary laws have been used in most African countries to conserve biodiversity even before the coming of modern laws. Modern laws on biodiversity conservation aim at complementing the already existing customary laws on biodiversity conservation. This report presents the findings of a case study that examined the effects of customary law on biodiversity conservation in the Nadowli/Kaleo District of the Upper West Region of Ghana. The study examined the customary laws that exist in support of biodiversity conservation, the ways and means that customary laws support biodiversity conservation, the role of traditional leaders in biodiversity conservation and how customary laws can complement modern laws on biodiversity conservation. Key informant interviews, focus group discussions and structured and unstructured questionnaires were administered at the household level to assess the customary laws that exist in support of biodiversity conservation, the ways and means that customary laws support biodiversity conservation, the role of traditional leaders in biodiversity conservation and how customary laws can complement modern laws on biodiversity conservation. The study revealed that customary laws are effective and significant in biodiversity conservation. Traditional leaders enact the customary laws. They were responsible for making sacrifices to the gods, protecting the taboos and totems, punishing of offenders and management of conflicts. Sometimes they carry out these roles together with the entire community. The study concludes that it is important to seriously take into consideration customary laws and practices, as these are vital for conserving biodiversity in the District.

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DEDICATION

I dedicate this thesis to my wife Amadu Laila, the memory of my late father Atote Adamu. To my lovely mother, Assana Adamu, and my friends Agana Thomas, Abdul-Razak Adama, Abayange Gerald Atibila and Tietaah Gideon for their support and inspiration in all my studies.

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LIST OF ACRONYMS

CBD	Convention on Biological Diversity
CIG	Conservation International Ghana
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
DGWL	Department of Game and Wildlife
EPA	Environmental Protection Agency
FAO	Food Agriculture Organization
FC	Forestry Commission
GSS	Ghana Statistical Service
I DA	Impact Development Associates
ICBP	International Council for Bird Preservation
IIED	International Institute for Environment and Development
IK	Indigenous Knowledge
MES	Ministry of Environment and Science
MLNR	Ministry of Lands and Natural Resources
MOFA	Ministry of Food and Agriculture
NGO	Nongovernmental Organizations
SPSS	Statistical Product and Service Solution
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environmental Programme
WSSD	World Summit on Sustainable Development

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Biodiversity conservation has become a major global concern to many organizations including Economic Development, Environmental organization, Human Rights Groups, Corporations, National and International Nongovernmental Organizations (NGOs), and Indigenous Organizations because biodiversity plays a prominent role in many sectors of our society (Sobrevila, 2008). Biodiversity conservation was, thus, achieved through environmentally friendly customary human cultural practices and beliefs in the past (Boaten, 1998, Amlalo *et al.*, 1998). This nurtured a close and commonly supportive relationship between humans and biodiversity for several years (McNeely *et al.*, 1995). Goldman (2003) reports that accepting and integrating indigenous beliefs and practices are the surest way of accomplishing biodiversity conservation developments. Dove *et al.* (2005) argues that biodiversity conservation would work better if the people executing it use local knowledge rather than transporting different ideas and undertakings.

However, customary information and principles keep changing with time. Turvey *et al* (2010) reports that the absence of information from generation to generation can prevent people from knowing the previous kinds of plants and animals. Chacon (2012) and Krech (2005) have pointed out that the mere presence of totems, norms, beliefs and taboos are not assurances of the sustainability of our biological natural resources. Throughout the world, Africa and Ghana in particular, leaves and roots of plants are used in averting and treating ailments of people. In Ghana, there are still problems of getting quality medical care and orthodox medicines despair the numerous CHPS compounds, clinics and hospitals. Traditional African Religion (ATR) and cultural practices in many African

societies are ecologically friendly and in its own traditional way try to conserve natural resources to meet the needs of the present generation without compromising the needs of the future generation (IIED, 1992).

Majority of people living in the countryside depend heavily on local medicines as well as people in the cities and urban centers (PRPI, 1992). The local medicines are inexpensive and available for use for the treatment of stomach ulcer, dysentery and many sexually transmitted diseases and infections (PRPI, 1992).

Safo and Oduro (2007) have however suggest that such traditional edicts only inadvertently promoted natural resource conservation but were strictly adhered to, in order not to incur the wrath of deities or ancestral spirits. No matter the original intention of such belief systems, their influence on natural resource management is enormous (Gyasi, 1997, Arhin, 2008). The urge for continued existence has led humans to exploit their natural surrounding for extracting and using the vast diversity of available ecological resources which has greatly threatened the conservation of natural resources (Attuquayefio and Fobil, 2005).

In recent times, biodiversity has become much easy targets for human over-exploitation due to increasing human populations and the pursuit for a better life. Biodiversity has, therefore, been exploited at much higher rates than ever before with negative implications for sustainable human livelihood (Turner *et al*, 1990). Wilson (1992) reports that, biodiversity is confronted with crisis which could ultimately lead to mass extinctions of

species of plants, animals, fungi and microbial organisms in the very near future as a result of cutting down trees, overused of resources, institutional failures and many more.

In Ghana, increasing evidence indicates that the rate of environmental degradation has increased in recent times, this could be largely attributable to neglect, the influx of foreign cultures, increased population and unsustainable human activities such as bush fire setting, grazing, hunting, farming, fuel wood harvesting, estate development etc. (Gyasi *et al.*, 1995). These led to the deterioration of the environment, biological diversity and the fading of certain species of plants and animals.

With formerly rich forests being altered to savanna woodland and prevailing savanna woodlands altered into near desert (Hawthorne and Abu-Juam, 1995). It is projected that Ghana's high forest area of 8.2 million hectares at the turn of last century had diminished to about 1.7 million hectares by the mid-1980s (Hall, 1987), and about one million hectares by the mid-1990s (FSD, 1996). According to EPA (2005a) the degree of devastation of the grassland forest has accelerated to 22,000 hectares per year. Numerous reasons are responsible for the cause of the environmental degradation including bush burning, clearing of land for farming, grazing and the increasing demand for wood.

1.2 Problem Statement

There is indication that natural resources such as forests, land, water and wildlife and the systems developed for their continued existence in the tropical zone, particularly in sub-Saharan Africa, are being endangered. These intimidations come not only from external forces and policy decisions but also from internal tensions, including increased

incorporation into the market economy, increased contact with western cultures, and population pressures (Vivian, 1991, Gyasi *et al.,* 1995).

These pressures have in many occasions caused the degradation and fading of some biological resources and the traditional management practices that ensured their continued utilization (Vivian, 1991, Gyasi *et al.,* 1995). It has been argued that, as a result of the environmental impact of these forces, forests and the sustainable farming practices associated with them have extinct to a great extent in tropical Africa (Gyasi *et al.,*1995). Widespread habitat destruction, degradation and major reduction of flora and fauna, with serious consequences on biodiversity conservation, have also occurred on the continent (Ntiamoa-Baidu, 1995).

Ghana's biological diversity is in danger owing to the pursuit for expansions and improvement in living conditions of the people, social change and sprawl (Allotey, 2007)**.** The utilization of forestry for fuel wood remains a major challenge to most rural communities in Ghana (FAO, 2000).

According to Fondel *et al* (2008) the exhaustion of the country's forestry further negates the struggles by the Government of Ghana and her Development Partners to alleviate the effects of the increasing global temperatures. This is considered to be a huge financial lost to the state in the form of GDP (Tutu *et al.,* 1993). This is attributable to weak institutions and therefore making the lives of plants, animals, water bodies and many more under danger if nothing is urgently done to prevent the issue. The state knowing the importance of biodiversity has taken numerous initiatives to protect it. Few of them comprise, training given to people to recognize the importance of biodiversity conservation, ensure public involvement in the day to day organization of biodiversity

conservation projects and consolidate the establishment of national parks and forests reserves in the country (Tutu *et al.,* 1993). These are all bedeviled with problems. Ghana and for that matter Nadowli/Kaleo district has experience tremendous deterioration within the past hundred years ago as a result of numerous anthropogenic activities of man such as cutting down of trees, bush burning, over grazing, illegal small scale mining popularly called galamsey and many more. The country's biodiversity has dwindled drastically. Sixty three percent of Ghana's woodlands were in a pure or almost pure state at precisely 80 years from today (Dickson, 1969).

Currently, Ghana's woodlands stand at 15 percent which is as a result of human manipulations of the land resources to suite their interest, needs and demands. As a result of the country's dependence on farming, more lands are being changed to farmlands which may persist until the country's reduces its dependence on farming (Beler *et al.,* 2002).

Ghana has insufficient information and data with regards to biodiversity (Da Fonseca *et al*., 2000). The information and data usable today is considered imprecise and bare (MES, 2002). In Ghana and Nadowli/Kaleo in particular, the exhaustion of plants and the extinction of animals is as a result of lack of respect for indigenous knowledge (IK), customary laws, totems, taboos and religion in the direction of biological resources (Mensah *et al.,* 2000).

This research examines the effects of customary laws on biodiversity conservation in the Nadowli/Kaleo District in the Upper West Region of Ghana.

1.3 Main Research Question

The main research question is: to find out the effects of customary laws on biodiversity conservation in the Nadowli/Kaleo District?

1.3.1 Specific Research Questions

Specific Research questions are:

i. What are the customary laws and practices that exist in support of biodiversity conservation in Nadowli/Kaleo district?

ii. What are the ways that customary laws and practices support biodiversity conservation in Nadowli/Kaleo district?

iii. What are the roles of traditional leaders in biodiversity conservation in Nadowli/Kaleo district?

iv. How can modern laws complement customary laws to promote biodiversity conservation?

1.4 Objectives of the Study

1.4.1 General Objective

The research is to find out the effects of customary laws on biodiversity conservation in the Nadowli/Kaleo District in the Upper West Region of Ghana.

1.4.2 Specific Objectives

The specific objectives of the study are;

i. To identify customary laws and practices that exists in support of biodiversity conservation in Nadowli/Kaleo district.

ii. To examine the ways that customary laws and practices support biodiversity conservation.

iii. To examine the role of traditional leaders in biodiversity conservation.

iv. To explore how modern laws can complement customary laws to promote biodiversity conservation.

1.5 Significance of the Study

The study aimed at revealing the effects of customary laws on biodiversity conservation in the Nadowli/Kaleo District in the Upper West Region of Ghana. Again, the study will find out the customary laws and practices that support biodiversity conservation internationally, nationally and in particularly the study area. The study also examines the ways that customary laws and practices support biodiversity conservation. The study further more identifies the modern laws that support biodiversity conservation. Findings and subsequent recommendations may be useful to the Ministry of Environment Science and Technology (MEST), the Forestry Commission (FC), Ministry of Food and Agriculture MOFA) the Environmental Protection Agency (EPA), Ministry of Lands and Natural Resources (MLNR) and many more to enable them have much insight in to the state of things. If the recommendations are properly implemented, there will be a positive attitude of the public towards biodiversity conservation in a bid to achieve the sustainable development goal fifteen (15) which seeks to promote sustainable use of terrestrial ecosystem, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss. The academia can also use the study as a basis in investigating similar issues at other study areas.

1.6 Scope of the Study

Geographically, the study was conducted in Nadowli/Kaleo district in the upper west region of Ghana. The Nadowli/Kaleo district is appropriate for this study because the

district is experiencing a tremendous destruction of the environment, forest, plants and animals and the general biodiversity of the area. This is as a result of unwanted felling of trees, bush burning, lack of respect for traditions, illegal small scale mining popularly called galamsey and many more.

Contextually, the study revealed the effects of customary laws on biodiversity conservation in the Nadowli/Kaleo district. The study focuses on customary laws and biodiversity conservation.

1.7 Organization of the Study

The study will be organized into five (5) chapters. The opening chapter (Chapter one) introduces the research. Here, the background of the study, the problem statement, the objectives of the study and research questions, significant of the study, scope of the study and organization of the study. This chapter is important because it guides and puts the study into good context by checking deviations.

Chapter two will comprise review of literature significant to the study, related works or writings on the concept of biodiversity conservation, customary laws, and effects of customary laws on biodiversity conservation. Theoretical and conceptual information needed to carve out methodology for the study will be provided by this chapter.

Chapter three will present the methodology of the study including the profile of the study area. The research design, types and sources of data, sampling techniques, data collection techniques and methods of data analysis will also be presented in this chapter.

Chapter four will center on analysis of the data collected and presentation of the findings of the research. This chapter will contain tables, figures, graphs among others to elaborate more on the data ascertained. This chapter provides answers to the research questions and will be done based on the objectives of the study.

The last section will be chapter five and comprises the conclusions based on the findings, summary of findings and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2 Introduction

This chapter gives the theoretical basis of this research paying particular attention to concepts that are relevant to the subject matter. Major concepts such as; biodiversity conservation; policies and programs related to biodiversity conservation and institutions (Traditional and Non-Traditional), totems and taboos, customary laws and practices (nationally, regionally and the study area) in relation to biodiversity conservation were reviewed. Discussions are made on key concepts and theories that provided the framework as perceived differently by different authors. Their general meaning and specific meaning are explained. An over view of traditional authorities (Chiefs, tindanas, clan heads, magazias (Women leaders), rainmakers, soothsayers, and diviners) and their natural resource management systems are explained.

2.1 Definition of terms and concepts

2.1.1 Conservation

Several authors have come out with different definitions of the word conservation base on their orientation and background. According to Smith and Wishnie (2000) conservation refers to actions that stop or palliate biodiversity loss and are designed to do so. Usher (2000) defines conservation as the sustenance of genetic, species and ecosystem diversity in the physical environment in which they occur. Thomas (2003) explains conservation as the sacrifice of present rewards for future ones. It can be realized from the definitions of the three authors that, conservation has to do with activities that ensured the sustainable and continues utilization of resources.

2.1.2 Biodiversity

The term biodiversity is the short form for biological diversity and it is defined by Article 2 of the Convention of Biological Diversity (CBD) as: “the variability among living organisms’ from all sources including terrestrial, marine and other aquatic ecosystem and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystem ". (CBD, 1992).

According to Wanjui (2013) biodiversity refers to the biological diversity which includes the variety of the whole species present on earth. It includes different animals, plants, micro-organisms and their genes, water ecosystems, terrestrial, and marine ecosystems in which they all are present.

2.2 Components of biodiversity

2.2.1 Species diversity

There are 1.8 million species which science has described as incredibly diverse. They range from tiny, single-celled microbes like Nanoarcheum equitans, 400 nm in diameter living as parasites on other microbes in thermal vents at temperatures of 70–98°C, to giant organisms like blue whales, the humungous fungus and Pando (Huber *et al.*, 2002). People have ventured to all parts of the globe, so one may belief that the new species being unearthed every year would be microscopic organisms that can only be distinguished at the metabolic level. But it is a known fact that new species identified are insects, microbes and fungi, but discovering is ongoing for new vertebrates. Since 2000,

53 new species of primates have been described including a new species of Brazilian monkey, Mura's saddleback tamarin (IUCN, 2008).

2.2.2 Species Types and Their Current State in Ghana

Birds

There are 794 birds' species belonging to 101 families that are documented in Ghana. The mole national park perhaps as a results of it wide coverage of the land area has the greatest number of birds species richness of 314 (Ntiamoa-Baidu *et al.,* 2001). This indeed is the case for species since habitat destruction leads to extinction of species and species will move from an environment that is not friendly to a friendly environment.

In this regard, Beler *et al* (2002) attest to the fact that species richness of birds and the type of habitat are very much interconnected. Birds are the best studied taxa in terms of spatial coverage but current information on their variety, copiousness and dispersion is still not enough (Weckstein *et al.*, 2009). This is probably because the information or data needs to be updated frequently since new species are evolving whiles some are also extinction.

Table 2.1: The regional distribution of birds' species in Ghana

REGION	RICHNESS
Brong Ahafo	533
Central	528
Eastern	528
Volta	526
Greater Accra	518
Ashanti	515
Western	495
Northern	472
Upper East	390
Upper West	375
Total	4880

Source: Lepage (2014)

Mammals

According to IUCN (2013) there are 307 species of terrestrial mammals. Researches on mammals have focus mainly on small and medium size mammals. In terms of species distribution small mammals are the best studied. Small mammals distribution is high in places where there is no disturbance and distraction of their habitats, dense vegetation, enough food to feed on and many more(Attuquayefio and Wuver, 2003, Ofori *et al.*, 2013). Vordogbe *et al* (2005) states that, the principal reason for the decreased of biodiversity for big and small mammals are hunting and bush burning.

Table 2.2: Summary of mammals' species in Ghana

Order	Richness
Chiroptera	124
Rodentia	86
Carnivora	30
Artiodactyla	29
Primates	26
Soricomopha	18
Pholidota	5
Hyracoidea	4
Lagomorpha	2
Others	3
Total	327

Source: IUCN (2013)

Amphibians

According to Rode *et al* (2005) western region has the largest diversity of amphibians in the country. Prior to the 21st century, the largest amphibians richness documented for a single site was 20 species (Rode and Adjei, 2003).

The diversity of amphibians correlates negatively with height and density of ground litter (Wiafe and Adjei, 2013).

Table 2.3: Summary of amphibians' species in Ghana

Family	Riches
Hyperoliidae	34
Phrynobatrachidae	21
Arthroleptidae	17
Ptychadenidae	14
Bufonidae	13
Ranidae	11
Pipidae	4
Dicroglossidae	2
Hemisotidae	2
Others	5
Total	123

Source: IUCN (2013)

2.2.3 Genetic Diversity

Organisms exhibit traits as a result of genes and, as populations of species decrease in size or go extinct, unique genetic variants are lost (Kearns, 2010). Many of the crops that we grow for food are grown in monocultures of genetically homogeneous individuals. This is because all individuals are the same, a disease, insect pest, or environmental change that can kill one individual can extirpate an entire crop. Majority of our high-yield varieties show substantial declines in yield within about 5 years, as pests are able to overcome the crops' natural fighting ability. Plant breeders look to wild plant relatives

and to locally grown landraces to find new genetic varieties. They can then introduce these genes into crops to renew their vigor. However, according to the UN Food and Agriculture Organization, 96 percent US apple varieties cultivated prior to 1904, 95 percent of the US cabbage varieties, and 81 percent of tomato varieties are extinct, and the genes that made these varieties unique are gone. Genetic variation allows species to evolve in response to diseases, predators, parasites, pollution, and climate change (Kearns, 2010).

2.2.4 Ecosystem Diversity

Ecosystems refer to all the species including all the abiotic factors characteristic of a region. For instance, a desert ecosystem has soil, temperature, rainfall patterns, and solar radiation that affect not only what species occur there, but the morphology, behavior, and the interactions among those species. When ecosystems are intact, biological processes are preserved. These processes include nutrient and water cycling, harvesting light through photosynthesis, energy flow through the food web, and patterns of plant succession over time. A conservation focus on preserving ecosystems not only saves large numbers of species such as non-charismatic species but also preserves the support systems that maintain life (Kearns, 2010).

2.3 Approaches to Biodiversity Conservation

Recent approaches to biodiversity conservation have focused on the combination of the modern scientific strategies and traditional and cultural methods (Danso and Abekoe, 2005). Cultural and traditional biodiversity conservation methods are still important, because they cover a large sector of society and are mostly vital in the third world

countries where most of them do not have western education. Because of the disposition to understate the connection between traditional and scientific conservation approaches, most developing countries including Ghana have not been efficient in the conservation initiatives. There are two approaches to biodiversity conservation**.**

2.3.1 Traditional Biodiversity Conservation

Abayie (1997) reports that the African traditional concept of land ownership orders the people to control and preserve the environment for unborn children while reporting to their ancestors. This is common in every Ghanaian society where land is considered a common pool property, communal property and is passed on from generations to generations.

Traditional African societies practiced religious and cultural belief systems that were geared towards biodiversity conservation by using taboos and myths for the preservation of certain vital resources before even the coming into effect of CBD. In some African societies such as Ghana, there are taboo days for fishing, farming and others with many trees, shrines, sacred groves and water bodies worshiped as gods. Such practices ensured the preservation of biodiversity from human destruction and exploitation. Sacred groves serve many vital functions such as ecological and socio-cultural by protecting and preserving the natural forests, which serves as asylum for local biodiversity and source of herbs for medicinal, social and religious purposes (Dorm-Adzobu *et al.*, 1991, Decher, 1997).

Gordon (1992) reports that in Ghana, there are an approximately 2,200 -3,200 sacred groves of which about 80 percent of them being in the southern part of the country.

As a result of the connection between traditional beliefs and the gods, ancestral spirits, disrespect or disregard for taboos will invite grievous punishment for offenders and prices to expiate the gods such as making sacrifices and other rituals to prevent any misfortune, sickness and death. This works well in some communities and in other communities do not work effectively.

But undoubtedly, as stated by Decher (1997) this does not scare people from the careless and unwanted use of the biological resources by rural people as a result of;

- Increased population growth and its inherent troubles on urbanization, resettlement and migration.
- Increased dependence on western cultures and technology and
- The growing influence of foreign religions and beliefs.

2.3.2 Modern Approaches to Biodiversity Conservation

a. In situ conservation

Modern in situ conservation uses all the protected areas in Ghana such as wildlife conservation areas, forest reserves and others such as ramsar sites. As it stands now, there are 280 forest reserves in Ghana under the control of the Forest Service Division which covers a total land area of about 23,729km^2 or 11 percent of the total land area of Ghana. Approximately, 75 percent of these reserves are production reserves which are exploited for timber, with the remaining 25 percent as protection reserves which are not under exploitation at the moment perhaps as a result inaccessibility (MES, 2002). But with the increase in population and technology most of these production reserves will become accessible.

According to Decher (1997) there are two proposed wildlife conservation areas which include national parks and wildlife sanctuary as well as six Ramsar sites under the control of the Forestry Commission (FC).These huge protected areas are important to the conservation and protection of many big wildlife species such as elephants, primates, carnivores and others. This is the case in Ghana where the Mole national park can be cited as an example.

b. Ex situ conservation

Ex situ conservation uses zoos, botanical gardens and genetic resource centers to carry out captive breeding programs for selected species which will be later introduced to the wild to re-stock decreasing natural population. Currently, some of the ex situ conservation facilities in Ghana are situated at the following places;

i. University of Cape Coast (Botany Department Herbarium)

ii. Kwame Nkrumah University of Science and Technology Botanical Gardens and Forestry Herbarium.

iii. Accra zoo

iv. Kumasi zoo

v. Aburi Botanical Gardens and many more (Danso and Abekoe, 2005). Most of these zoos and botanical gardens are losing their value because of inadequate funding from governments and other corporate bodies to be able to perform their duties and functions properly.

2.4 Why Conserve Biodiversity?

Fisher (1971) reports that about 1 percent of the earth species of bigger birds and mammals are no longer in existence with man accounting for about 75percent of the lost.

Table 2.4: Causes of extinction of birds and mammals since 1600

Causes of extinction	Birds (%)	Mammals (%)
Natural	24	25
Human	42	33
Introduced predators	15	17
Habitat destruction	15	19
Other factors	4	6
Total	76	75

Source: Fisher (1971)

Close to 173 known species of birds and mammals, 654 species of plants and 191 species of molluscs are no longer in existence since 1600 (Allen, 1972; ICBP, 1980; David, 1981, Honneger, 1981).

Table 2.5: Extinction of plants and animals species (1600 to present)

Taxa	Number of extinct species since 1600
Mammals	58
Birds	115
Reptiles	19
Amphibians	1
Plants	654
TOTAL	847

Source: Allen (1972); David (1981); Honneger (1981) and ICBP (1980)

2.4.1 Benefits of Biodiversity Conservation

Biological Resources

Biological resources are those products that we harvest from nature. These resources fall into several categories: food, medicine, fibers, wood products, and more. Over 7,000 species of plants for instance are used for food, even though we depend heavily on only 12 major food crops. Many people all over the world depend on plants for medicines. In the developed world, many of our medicines are chemicals produced by pharmaceutical companies, but the original formulas were often derived from plants. For example, opiate pain relievers are derived from poppies, aspirin is derived from willows and many more (Kearns, 2010).

Ecosystem Services

According to Gallai *et al* (2009) Ecosystem services are processes provided by nature that support human life. These services include the decomposition of waste, pollination, water purification, moderation of floods, and renewal of soil fertility. Ecosystem processes are taken for granted and are not generally valued as part of the economy until they cease to function. When economic value is assigned to these services, it is often startlingly high. For example, insect pollinators help produce many commercially important fruits such as almonds, melons, blueberries, and apples. The global economic value of pollination services performed by insects has been valued at $217 billion. The ecosystem services are important Ghana where many rural folks depend on nature as their source of livelihood.

Social and Spiritual Benefits

Conservation throughout the history of human has involved safe guarding and preserving nature for the spiritual gifts it provides, and protecting sacred places in the local landscape. Stories of indigenous people incorporate detailed knowledge of the animals and plants that make up their world. The heterogeneity of the world's mythology, folk art, and folk dances show the effects of biodiversity on cultural development, and contribute to the richness of global arts and literature (Kearns, 2010). In recognition of the aesthetic value of nature, in 1892 the US Congress set aside the first national park "for the benefit and enjoyment of the people" (NPS, 2010).

2.5 Biodiversity Conservation of Key Resources

In Africa and Ghana in particular, natural resources are conserve through the use of rules and regulations (Ntiamoa-Baidu 1995, Abayie, 1998). These rules and regulations are not backed by law but the beliefs have been formidable adequate in the past to make people abide by the rules and regulations (Ntiamoa-Baidu, 1995). There are arrays of inhibition regarding the use of natural resources. For instance, sexual activity in the bush was seen by the Akan's to be desecration against the fertility of mother earth. Various tribes and groups in Ghana consider certain days of the week as sacred and do not allow people to go to the farms or bush. These days are termed resting days (Abayie, 1998).

The resting or non-farming days cut down the amount of pressure on natural resources and land. In many rural communities, these resting days are now used for civic works or communal works (McLeod, 1981). In this regard, biodiversity conservation is enhanced and reduces the pressure on natural resources (Ntiamoa-Baidu, 1995, Abayie, 1998). It must however be noted that due the influence of Christianity and Islamic religious, these beliefs, taboos, totems, resting days are no longer adhered to in some communities. Based on the above concepts, the traditional conservation of natural resources in Ghana may be grouped in to the following: Protection of certain animals and plant species such as totems and taboo species; protection of certain ecosystems or habitats such as water bodies and sacred groves and the regulation of the use of certain natural resources as hunting or a closed season for harvesting (Ntiamoa-Baidu, 1995, Abayie, 1998). The practices are common on forests, trees, wild life, marine farming systems and many more (Abayie, 1998).

Trees

In most parts of Africa and Ghana in particular, trees are very important to humans. Trees such as Odum (milicia excels) and African mahogany (kha ivorenses) are considered as gods and have special spiritual powers in them (Abbiw, 1990, Falconer, 1992). Indeed it is common in many communities in Ghana were trees are considered gods and spirits. Again they can as indicated by Sarpong (1974) be the "residential areas" of the gods and spirits and should not be felled down unless sacrifices are performed on them. For example, among the Ashanti's, craftsmen will try to appease certain trees before attempting to cut them down (Busia, 1951). Busia noted that, an Ashanti craftsman will provide an egg to the Odum tree saying "I am about to cut you down and carve you, do not let me suffer harm". It is an inevitable fact that this practice (taboo) has played a major role in the protection and sustainable use of these trees. Some similar trees are tall palms, Betene (Elaeis guineensis), and Osese (Funtumia spp), are used for carving stools. Also, the Shea butter (Butrespermum parkii) and dawadawa (parkia clappertoniana) trees are protected in the northern part of the country for their economic importance.

Abayie (1998) notes that some ethnic groups in the north such as the Dagomba and Manprusi have chiefs in charge of the economic trees to ensure their continue existence and sustainable utilization. This in fact is a very important practice and should be replicated in many communities in the country to help conserve biodiversity. There are also some trees that are not considered useful in terms of spiritual and economic considerations but are regarded as relevant for environmental reasons. Trees such as Akonkodie (Bombax buonopenzense), Onyina (Leiba pentandra) in the forest and the

Baobab (Adansonia digitata) in the northern savanna zone. Most of these trees are protected by disallowing people from cutting down or setting fire on them.

Abbiw (1990), reports that, trees are also protected and conserved because of their medicinal value. Trees with medicinal properties are not only protected because of their importance in curing ailments but are regarded as sacred and possess spiritual powers. The spirits of these trees can harm or hunt the people who cut them down or set fire on them (Sarpong, 1974, McCaskie (1995). In this regard for example, Falconer (1992) reports that, some communities in the forest zone of the south regard medicinal trees as sacred.

Again, trees are protected and conserved because of the spiritual protection they offer to families and the community as a whole. For example, a special cut branch of the Onyame Dua, literally God's tree was in the centuries used by many families of Ashanti's as an altar to the sky God from whom they depended on for their spiritual protection (Rattray, 1923, Mcleod 1998).

Forest, sacred groves and sanctuaries

Among people living in the forest in the south, especially the Ashanti's and the Brongs, vegetation is grouped into three types: forest, savanna and the transition between the forest and the savanna (Afikurah, 1998). Among these three groupings, Forest are regarded as the most important culturally, economically and ecologically (Abbiw, 1990, Afikurah, 1998). The forest environment undeniably has a profound effect on the social lives of many ethnic groups in Ghana. Thus the identification of vegetation as forest and

their conservation in Ghana started in the early centuries. Most trees in the forest especially large trees are considered to have spiritual powers which are reserved for many reasons (Rattray, 1923; Mcleod, 1981, falconer 1992). This is also the case in the northern savanna regions, patches of forests have been recorded too (Dorm-Adzorbu *et al.*, 1991).

Abbiw (1990) reports that, forest in many ethnic groups in the country serve as a dwelling place for the spirits such as the dwarfs. This is actually the case since it is uncommon in many communities with forest to house the spirits of the dwarfs. Other traditional beliefs about forests are as a result of their socio-economic and environmental value as a source of fertile land for farming, timber, food, shelter, game, medicinal plants and for the maintenance of environmental and ecological stability (Ntiamoa-baidu, 1991). Traditional conservation approaches to these forests are grounded on local beliefs which serve as a tool for the protection of forests and non-forest areas. Sacred groves and sanctuaries are major examples of traditional approaches. Sacred groves are common in the southern part of the country (Falconer, 1992). The total number of sacred groves in Ghana are not known. However, Forestry commission' survey came out with a figure of 1,904 groves of which 79.1 percent were in the southern Ghana (ntiamoa-Baidu, 1995). A significant number of these sacred groves have the tendency for biodiversity conservation. In the light of this, Anane (1997) notes that about 80 percent of sacred groves in Ghana serve as watersheds for their areas where they protect sources of drinking water.

Falconer (1992) reports that, the patches of forests where royals of a particular ethnic groups are buried are protected and disallow human destruction in such forests because of the belief that the ancestors and spirits live there. Also forests are protected for they serve as abode for totems and taboos which they belief to have special spiritual or cultural values and connections. Almost every clan in Ghana has wild animals or plant species as their symbol. The leopard is a totem for the Bretuo clan of the Akan people.

Like other traditional conservation approaches, taboos, prohibitions, beliefs and restrictions are used to protect, conserve and maintain sacred groves and sanctuaries (Fargey, 1991; Dorm-Adzorbu *et al.*, 1991; Ntiamoa-Baidu, 1992, Anane 1997). These beliefs, rules and regulation differ from community to community (Falconer, 1992). For example, in some ethnic groups, having access to the sacred groves is strictly limited, but in other ethnic groups, they may be used or their used limited to certain forest resources.

Falconer (1992) argues that, Nanhini community in the western part of Ghana where Numafoa and Kobri sacred groves are found, that one grove is not allowed to be farmed or used for hunting nor allow snails to be harvested from there. However, the palm trees can be tapped and medicines collected.

The existence of sacred groves are connected to the belief that the gods are performing some important roles as it is believed by the Ga people in connection to the making of hoes and cutlasses by the blacksmith god in the Guako sacred grove of Pokuase, Ghana (Adomako *et al.*, 1998). It is crucial to note that, although the social, cultural, economic and ecological importance of sacred groves and sanctuaries are acknowledged, their

control and existence have only currently become important to government, NGOs and other corporate bodies in the country (Dorm Adzorbu *et al*., 1991; Anane, 1997, Abayie 1998).

This late recognition has led to the devastation of many sacred groves and a menace to the survival of those remaining (Anane, 1997). It has been recognized that, sacred groves have been able to survive to this far because of the local people respect for beliefs, totems and taboos and the spiritual, religious and cultural attachments to the sacred groves (Ntiamoa-Baidu, 1995).

Water bodies

In Ghana, there are many ethnic groves that regard water bodies as gods (Rattray1923; Ntiamoa-Baidu1991 and 1995; Abayie, 1998, Entsua-Mensah *et al*., 1998). Rivers in some ethnic groups play very important roles for the communities (Rattray, 1923; Ohemeng, 1980, McLeod 1981).Most of these rivers are very common among the Akans and are protected and reversed in many parts of their tributaries. This practice has been used to protect water bodies that serve as a source of drinking water to community members. Rattray (1923) referred to river Tano as an example which rises in the Brong Ahafo region and Ohemeng (1980), also mention river Bomsompra that runs through Kwahu in the Eastern region of Ghana. These rivers are worshipped and protected due to the fact that, they serve as a source of life and fertility. Women who cannot give birth go to bath in these waters with the hope of being fertilized (Ohemeng, 1980). There are rules and regulations regarding the control and use of fisheries and other aquatic resources.

Abayie (1998) reports that there are taboos that prohibit the clearing of vegetation for agricultural purposes close to the edge of streams and rivers. The benefits of this conservation practice are crystal clear to the environmentalist, and the rural people are also mindful of its importance in curbing undue evaporation from the rivers and streams. Other taboos such as the prohibition of women in their menstruation to fetch water from the rivers prevent the pollution of river deities and gods (Sarpong 1974, McLeod 1981).

The conservation of marine resources is controlled and protected through the use of religious beliefs and practices connected with superstitions that are applied by taboos. For instance, coastal ethnic groups have days that are considered taboo for fishing and as such people are not allow to fish on those days (Ntiamoa-Baidu 1991 and Enstua-mensah *et al.*, 1998). Tuesdays for example is considered as one of the taboo days in many coastal communities (Abayie, 1998).

Again, farmers and fishermen are not allowing to fish during the time that the fishes are laying their eggs (Abayie, 1998). However in some fishing communities, these taboo days are not strictly adhered to and thus not functioning well as a result of lack of regard for taboos that are meant to preserve and protect them (Ntiamoa-Baidu 1991, Enstua-Mensah *et al.*, 1998).

2.6 Overview of Biodiversity Conservation Initiatives in Ghana

UNEP (2000) reports that The united Nations Convention to Combat Desertification (UNCCD) in countries with severe drought, particularly in Africa, emphasis the need for countries to beef up where appropriate, relevant existing legislations and, where they do

not exist, enact new laws and establish long-term policies and action programs in the management of natural resources. In most African countries especially Ghana and Cameroon for instance, forest policies and management plans, formulated mainly to combat biological diversity, wildlife management and sustainable forestry have been adopted as a result of the Convention on Biological Diversity (CBD). Countries especially in the Western and Central Africa have favoured legislations while others in North Africa have depended mainly on Presidential and Ministerial degrees and environmental codes (UNEP, 2000).

Fairhead and Leach (1994), reports that efforts over the years to deal with environmental problems in West Africa and Ghana in particular have been largely adhoc, or better still sector oriented and therefore limited in scope. It has become evident that the body of existing legislation on the various aspects of the environment is inadequate and unimplemented, and many provisions have no bearing on present day realities as well as the aspirations of the people of the country. Wardell, (2003) and Katere, (1997), as cited in Millar, (2003), states that, early policies in the conservation and management of natural resources were regulated by rules and practices and of the local people under the control of the traditional leaders. Scholars have critique and failed to recognize the vital role played by local custodians and the extent to which they are influential in the management and conservation of natural resources.

2.6.1 Wild Fire Management Policy

Early colonial governments in their own way have made attempts to prevent, control and suppress bushfires in the 1920s involved both colonial agricultural and forestry officers in a systematic programed of rural education to educate the rural people on the prevention of bushfires whiles the chiefs were held responsible for all the bushfires in their areas

(Wardell, 2000). Bush, grass and vegetation burning laws were first introduced by the native authority in the northern sectors- after the promulgation of the land and native rights (Cap 121) Ordinance in 1935- as part of the British colonial government's policy of "indirect rule". Some officials of the colonial forestry administration had by then already recognized that: "complete (fire) protection is usually unworkable and unsuitable" (Moor, 1935 as cited in Wardell, 2000).

Even though, the British colonial government was very much concerned about the indiscriminate bush fires, it was not until 1934 that the first official efforts were made to control bushfires were seen in the savannah woodland policy of 1934. This policy however was aimed at convincing rural communities to embrace fire management as a tool for savannah wood land management. It however did not succeed because; the strategies proposed were inconsistent with the cultural practices of the people. (WFM Policy, 2005). In the 1940s, new schemes for fire management were formulated. These strategies included annual trace burning, construction of fire belts, early burning, and patrols during bushfire awareness campaigns and green fire belt establishment. Whereas these strategies worked effectively in Protected Areas and Forest Reserves, they failed to combat bushfires in the reserves (WFM Policy, 2005).

Since independence a number of efforts have been made to control and manage bushfires. These include the Wild Animals Prevention Act, 1961; the Wild Animals Prevention (Game Reserve) Regulations 1967 and the Forest Protection Decree, 1874 were enacted with provisions disallowing the indiscriminate burning of bush and its resultant effects on the forest and wildlife. These were however, limited in scope and were applicable to specific areas, and therefore remained mostly ineffective and easily avoidable. Thus, the management and control of bushfire throughout the country after independence witnessed

the promulgation of laws criminalizing bushfire in 1983 and amended in 1990 as the control of bushfires law, PNDCL 46 and control and prevention of bushfire law, PNDC law 229 respectively. The law made provision for the chief conservator of forest or chief wildlife officer to permit the use of fire for management within conservation area.

However, very little was accomplished in preventing and controlling bushfires because the policy implementation strategies proposed were inconsistent with the cultural practices of the people. Again, the law did not mandate its execution to any specific government agency. The power and authority of traditional rulers who are mandated to implement local rules and regulations on the use of fire in the past has been reduced by education, modernization and urbanization (Fairhead and Leach, 1994, Wardell, 2000). Hence, traditional practices in the use of fire appeared to have broken down under modernization with damaging environmental consequences. The above suggest that existing policies did not adequately address the menace of bushfires in the country. Therefore, all legislations and laws that were enacted did not emanate from comprehensive policies. These weaknesses therefore constrained bushfire management efforts in the country at all levels of governance (WFM Policy, 2005).

2.6.2 Wild Life Protection

The protection of wild life started the time of the colonial governments in 1901 when they were mandated by the landing convention to manage wild life sustainably. As a result of that, wild life preservation ACT(1961) came into force with various laws and amendments to deal with some particular areas of wild life preservation such as the formation of several wild life conservation areas(Ntiamoa-Baidu et al., 2001).

According to Ampadu-Adjei (2002) in 1971 the wild life conservation regulations (LI 685) delineated limitations on hunting, game licenses list of protected animals in Ghana and many more. In 1974, the first national wild life policy came into force and was revised in 1994 to state clearly the functions of protected areas and the formation of wide life protected areas. National forest and wide life policies were both established in 1993. In 1974, the environmental protection council (EPI) was formulated by the government of Ghana to;

i. advice on and conduct research into environmental issues
ii. coordinate national efforts at environmental improvement
iii. establish guide lines for the wise used of Ghana natural resources.

The EPC was a toothless bull dog since it does not have the powers of implementation (Sarpong, 1996).

2.6.3 Forest Protection

About 70 percent of the original forest cover of Ghana has been devastated at the turn of the last ten years (IIED 1992), remaining about 11 percent of the original forest of which a large number is within the protected areas. A great deal of this deforestation estimated to be 22,000 to 75,000 ha per year, are mainly caused by clearing of the forest for farming, timber logging and bush fires (Hawthorne, 1990). Efforts to conserve the country's forest and its resources date back to the 20th century, when exploding populations as well as a surged demand for wild life resources and agricultural land has led to a significant increase in the rate of deforestation. In 1906, legislations were made to manage the cutting down of commercial trees, followed by the establishment of a forestry department in 1909.A bill forest ordinance came in to being granting power to the colonial government to establish forest reserves (MES, 2002).

In 1948, a forest policy was adopted to fulfill the need for specific guidance and control of forestry activities in the country through (i) the creation and management of permanent forest estates, (ii) research in to all branches of scientific forestry, (iii) maximum utilization of areas not dedicated to permanent forestry and (iv) provision of technical advice and cooperation in schemes for the provision of soil erosion and in land use plans (MES, 2002).

2.7 Institutions and Biodiversity Conservation

The term institution has been defined differently by different writers or authors. Bacho (2004) refers institutions as the jointly agreed upon social arrangements that control the interactions of a given group of people. Laudon (1985: pp 732), defines institution as: "... a set of widely shared values and interest pertaining to areas of strategic and social importance”**.** According to him these values and interests are served by certain organizations through the allocation of status and roles, and are internalized by individuals through prolong socialization executed by organizations. Through a process of internalization, the individual becomes aware and used to the norm.

Bacho (2004) reports that Institutions have the power to direct the individual in natural resource utilization, management and conservation. In African societies, natural resources are managed by institutions. All institutions have a common role; they assist individuals of the group in the internalization process (Bacho, 2004). They also have powers to sanction or punish people who go contrary to norms and laws. For instance, the criminal law which applies equally well to a number of other religious, economic, or state settings, each of which has its own formal or informal enforcement mechanisms. In another

dimension, institutions can also be purposely formed based on social, economic, political and physical background of the given group. Pejovick (1995) as cited in Bacho (2004) defines those institutions as constitutions, decrees, common laws and governmental regulations whose enforcement comes from exterior.

In this study, institutions would simply be referred to as the socio-political structures such as public and private, formal and informal with respect to natural resource management, utilization and conservation.

2.7.1 Formal Institutions and Biodiversity Conservation

Formal institutions are commonly created through powers outside of a given community, and are marked by practical and structural procedures that are objectively standard (Appiah-Opuku, 1997). Some of these formal institutions in Ghana include the Department of Game and Wildlife (DGWL), the Forestry Commission (FC), Environmental Protection Agency EPA) and associations with special interests of various kinds in natural resource management and local government bodies. These institutions have general authority for natural resource management in the state.

AZTREC (1994) argues that, the colonial government vested powers and responsibility for biodiversity conservation to state agencies in order to wrestle control from local peoples and to hold the benefits for itself. This in fact is still evident in contemporary times. State institutions have taken control and responsibility for biodiversity conservation from local communities and have been able to control, regulate and generate income for these government services throughout West Africa (Painter, 1994).

In contemporary times, so many formal institutions are expressing interest and willing to venture into biodiversity conservation as a result of widespread socio-political changes,

such as governments 'decentralization processes, the privatization of hitherto state-controlled initiatives, the occurrence of new democratic institutions, and the proliferation of NGOs, and associations. Many such "new actors" recognize environmental or social challenges and opportunities and have the conviction that they can effectively respond to those issues if they take part in management decisions and actions (Ridell, 1999).

2.7.2 Traditional Institution in Biodiversity Conservation

Many traditional institutions are becoming more and more involved in natural resources management in their respective areas in the continent (Adams and Anderson, 1988; Little, 1887 and shepherd, 1992). Traditional institutions are laid down local systems of authority and other systems obtained from the behaviour, lifestyle, cultural as well as the history of a particular society. They are usually from the culture of the people, are deeply rooted from the past and are normally referred to as informal institutions (Appiah-Opoku, 1999; Commons, 1970; Dimaggio, Powell, 1991, Goodin, 1996a). In this write up, traditional institutions are those local systems that form the unit of organization in the society in biodiversity conservation. They are chiefs, tindanas, clan heads, women leaders, family heads, soothsayers etc.

According to Goodin (1996b) they are human groups and structures that have unique socio-political systems, languages, cultures, beliefs and values by a close connection with the land and natural resources in general in their area.

These institutions are laid down agencies and are in every society where the belief in secret powers exist (Mbiti, 1969 cited in Haverkort *et al*., 2002). Thus the operations of traditional institutions are largely dependent on the spiritual world in their desire to

conserve biodiversity (Millar, 2004). Maintaining a close connection with them brings about the establishment of a form of understanding and mutual respect and are vital mechanisms for community entry (Millar and Haverkort, 1994). These institutions are very important for natural resource management since they play a major role in the choice and integration of externalities into the practices of the people. In recent times, colonialists have weaken the abilities and strengths of the local people to manage their own problems and thus designing technologies and skills that serve their own interest (Haverkort *et al.*, 2003).

Traditional institutions such as local cooperation groups, traditional council customary laws are vital in settling conflicts, enforcing acceptable standards of behaviour and bring people together within the community (I DA, 1991). In the northern part of the country, these institutions are the chiefs, tindanas or the priest, heads of clans, sectional heads, women leaders, heads of families and other community leaders. They all have various religious beliefs and a number of sacred and cultural practices (Awedora, 2002). Similarly, the belief that lesser gods or spirits live in natural resources such as hills, trees, rocks and some animals is a way of given animals and objects their intrinsic value.

On the contrary, traditional institutions are relegated to the background when it comes to the formulation of plans and policies that are vital with regards to biodiversity conservation (Marcussen, 1994). This in fact is common in many areas of Ghana were traditional rulers are not consulted with regards to biodiversity conservation in the areas. According to Pillien and Walpole (2001), the introduction of external forces, technologies and livelihood systems has been a major evidence of colonization,

imperialism and uneven relationships with traditional and indigenous peoples. In contemporary times, new policies, conventions and concepts, such as sustainable use of natural resources and biodiversity conservation are considered as a new form of such imposition, it is evident that local control, use and management over natural resources which stood the test of time has been and continue to be steadily reduced (Achim and Gonzalo, 2004). Therefore, while some local peoples and institutions may be willing to enter into management partnerships with government agencies, others are hesitant to be part of any type of outside influence on their livelihoods and environments. They would rather clench to their ancestral land traditional rights and management systems. This usually is attributable to the awareness of the local people that any interference or compromise by them will lead to the erosion of their culture and tradition.

Planners and policy makers' do not see the need for partnership or collaboration within these institutions, mainly as a result of ignorance and also as a result of urbanization and modernization which have disregard for tradition. On the part of leaders of traditional institutions, they are loath in adopting current issues and concerns. In the light of these setbacks, Ostrom (1990), reports that traditional leaders remain the symbol of a close bond with their communities. The physical connection with their members make them able to set rules, norms and practices that are important to the management and conservation of the resources in their jurisdiction (Thompson, 1994).

In this write up, traditional institutions (social, religious, political, judicial and economic) are referred to as those establishments that form the units of organization in the community in the management of natural resources. They are the traditional authorities

such as the Chiefs, Tindanas, Clan heads, Magazias, Family heads, and Soothsayers, Diviners, Rainmakers and many more local groups, and organizations as well as the societal norms, values, beliefs and practices that ensure community natural resource management and conservation. According to Goodin (1996b), they are self-identified human groups and structures marked by unique socio-political systems, languages, cultures, taboos and totems, norms, values and beliefs, by a close connection with the land and natural resources as a whole in their area

2.7.2.1 An Overview of the Nature and Forms of Traditional Institutions

In the northern part of the country, conservation methods were strictly adhered to with respect to the management and use of natural resources (Abu and Millar, 1998). Traditional institutions were responsible for the management, utilization and conservation of the natural resources of their land, forest, water bodies and many more are under the care and protection of these institutions. Some of these institutions are chiefs, tindanas, clan heads, sectional heads and other community leaders. These institutions are discussed in details below.

2.7.2.2 Traditional Authorities

Traditional authorities refer to the chiefs, tindanas, clan heads, sectional heads, household heads and opinion leaders who acquired their powers by virtue of ascription or election and as such have the right and responsibility to protect the norms, practices and values of their communities (Mohammed-Katerere, 2004).

Traditional leadership is an institution that existed since time in memorial in the continent. It has served the people of Africa in terms of wars, famine, slavery freedom

struggles and with regards to natural resource management of the continent (Williamson, 1995).

The Chiefs

Before the coming in to being of the colonial masters, people in the northern part of the country were organized based on ascriptive norms and patriarch (Mohammed-Katerere, 2004). Even in this century, the chiefs organize the people and manage natural resources. He is considered as the highest authority in the traditional hierarchy and performs roles assigned to him not for his own parochial interest but for the interest of the community together with his council of elders. His people see him as a medium of communication between them and their ancestors, spiritual, cultural and responsible for the protection and preservation of the norms and values of the community (Lar, 1999). He is responsible for the day to day administration of his community as well as the creation of a peaceful atmosphere for his community. Chiefs make customary laws for his people for easy administration and preservation of customs and norms in accordance with customary practices of the community and in line with African democracy and accountability (AZTEC, 1997).

The coming in to being of colonialism has impeded the functional of African traditional governance and the relationship that existed between the traditional leaders and their people (IDS, 1993).Colonialism has denied the local people their lands, eroded their culture and self-respect. In the light of this, Paula (2004), asserts that, chiefs are not fully involved in the making of decisions as far as natural resource management is concern. This is as a result the incapability of chiefs and the development pattern that do not see

the role of traditional institutions important (Warren, 1992). The inclusion and empowerment of traditional leaders is more than just including them in the formal structures of development with regards to natural resources management. Various functions and mandates of different groups deserve to be recognized for biodiversity conservation initiatives to work effectively.

The Tindana (land owners)

Bonye and Millar (2004) reports that in the Upper East and Upper West regions, the tindana or the earth priest is considered a spiritual leader of his people and has powers over the management and control of land. A person becomes a tindana by virtue of inheritance. The tindanas are the original and first settlers of the land. The tindanas are the descendants of the first settlers and have powers, control and authority in their areas (Kasanga, 1994). The tindanas offer sacrifices and protect and preserve sacred places. In the communities, natural resources exploitation and utilization was done taking in to consideration the culture of the people. People who do not obey these rules and regulations did not go unpunished (UDS/CARE, 2004). Their conservation rules and regulations with regards to natural resource management ensured the continued existence of vegetation, forest, animals, mountains and rivers.

Female leaders

Women leaders are the aged women who have exhibited various leadership attributes in the management and organization of their communities (Bonye and Millar, 2004). The office of the women leaders is based on nomination as a result of leadership skills exhibited by those women in the community. It is argued that women in savannah

woodlands rely on natural resources for their livelihood (Appiah-Opoku *et al.,* 1999; Grimble, 1992, Sen, 1988). According to Sen and Grown (1987), they sell fuel wood, burn charcoal, tap honey and many others which serve as a major source of their income.

World Bank (1997) reports that, in the less developed countries, women contribute 70 percent of agricultural labour, 60-80 percent of household production of food, 100 percent labour making the household food stuffs, 80 percent for storing and transporting the food from the farm to the village. Thus, the importance of women leaders in resource exploitation and the conservation of natural resources enormous.

Clan/household heads

According to Nukunya (2003) a clan is a group of people who trace through a common ancestor or ancestress. They are usually related to one another by spirituality (Assimeng, 1999). In Ghana, every clan has a totem (plants and animal) and taboos which members are enjoin to respect. These taboos and totems play a crucial role in natural resource management and conservation in the northern Ghana. Among the Dagaabas in the Upper West region particularly the Kuseile, the python is considered a totem and people of the clan are not expected to kill it or even take the meat. When a python dies, they give it a befitting burial (Bonye and Millar. 2004). In fact this belief has significant impact on wild life resources

Rainmakers, Soothsayers, Diviners

In many African societies, traditional leaders, specialist and spirit mediums play many roles in their societies (Mbiti, 1969 as cited in Haverkort and Millar, 1994). There are also female representatives who perform roles as spirit mediums, rain makers and soothsayers. Literature has it that some women rainmakers and soothsayers in the Upper East Region executed various ritual functions to cause rain to fall when drought occurred in the region (CECIK Field Report, 2007). The primary function of the rain makers are to make and stop rains when the need arises.

Haverkort and Millar (1994) reports that, the three northern regions in the country have one raining season and depend mainly on rain fed agriculture. It is therefore not uncommon to see rituals being performed to mark occasions like the beginning of rainfalls, first planting, fruiting, harvesting and the beginning of hunting wildlife. Therefore in biodiversity conservation, the importance of rainmakers cannot be underestimated. Their ability to stop and make rains can impact negatively or positively on the available natural resources.

2.8 Totems and Taboos

The word totems originate from a North American Indian language, which refers to animals or vegetables that are respected by people of a particular society or clan as holy sacred. Totems are considered as a symbol consisting of an object such as plants or animals that represent an emblem of a family, clan or society. Taboo on the other hand comes from the Polynesian term Tabu, which means ‘forbidden’ (Adu-Gyamfi, 2011). Taboos are the prohibition as a result of social customs or emotional dislike which are

considered sacred and forbidden by people. Taboos are an embodiment of unwritten social rules that guide human behavior.

Totems and taboos are used differently by different groups of people for different reasons. Whatever the reason(s) may be, totems and taboos at the local level at least play a crucial role in biodiversity conservation, species and ecosystems. As a result of this, Freud (2004) and Alun (2005) state that people from the same blood, descendants of a common ancestor all pay respect to the same totems. Totem animals are mostly used to prohibit killing of the totemic animal (patricide) and against having a sexual relations between members of the same totem or clan (incest). A totem can be a plant, animal or any other natural thing or object that is considered to be connected ancestrally to an ethnic group, clan or family which the people are emotionally attached to. People from these clans, ethnic groups or family do not kill, trap or eat such totemic animals such as birds or fish. When a totemic animal or object dies, members of the clan would show respect for that totem by mourning and burying it as is normally done for human beings (Lumor, 2009).

Awedora (2002) reports that some animals and natural objects are considered as relatives, or ancestors of their respective social units. Thus, it is a taboo for members to trap, kill and eat these animals that are considered totems. Therefore, certain species of animals could not be killed or hunted during certain periods of the year which serves as a means of ensuring conservation and sustainability of the resources. Hunting and killing animals were limited to males or older animals. This system is close to the culling practice of sustainable harvesting of wildlife resources among the people of Central Southern Africa. Abiding to their taboos and totems ensure the continued population growth of their

wildlife resources, while at the same time benefiting from the protein which is usually lacking in environments where livestock keeping is difficult because of tsetse flies (Warren, *et. al.,* 1999).

Significantly, traditional societies use taboos and totems in the management and conservation of forest, water bodies, sacred groves, shrines and many more in their areas. These taboos and totems limited the accessibility to these sites to activities that may cause harm to the environment as a result; protected areas thrived over several years and acted as reservoir for biodiversity conservation (Gorjestani, 2004). Nukunya (2003), also reports that it was a taboo to catch some species of fish (Mudfish) belief to be totems among the *Bosumburu* clan of the Akans.

There are many ceremonies that come with fishing seasons which community members observed. These ceremonies are normally open to the fishing season for a given period. These practices ensured sustainable resource exploitation in the past and enhanced fairer distribution of income because the communities themselves respected the temporal dimensions of the exploitation of the resources.

2.9 Traditionally Protected Areas

Traditionally Protected Areas in this write up are referred to as sacred groves, water bodies, selected forest, burial sites and sacred hills where shrines may be located. These may be located in, flat lands, high lands, near homes or far in the bush or forest (Millar, 2004 b). These protected places are where trees and plants are allowed to grow without human interference or activities and where reptiles, birds, fish and animal could live

freely without fear of poaching or interference by man. Thus, the management of these areas is reserve for specialized people like the tindanas, fetish priest, rain makers and other spiritual mediums. In the light of this, the management and conservation of these protected areas are pivotal to community's spiritual sustenance. Therefore there are taboos that restricted access to these sites to particular activities and members of a community as a result, these sites survived over several years and acted as reservoir for biodiversity despite the religious battle against them (Millar, 2004 b).

It is an undeniable fact that these sacred places are strictly protected in some parts in Northern Ghana but religious use of these resources are not prohibited (Gadgil, 2005). Wood may be used for sacrifices; animals in the sacred groves such as deer or a goat might also be hunted and offered to the deity; trees in the grove could be used for building a temple inside it. Wood from these sacred trees are believed to have spiritual powers when fashioned into other objects and are used for making a variety of objects like statuses of the departed, staffs and gods (Achim and Gonzalo, 2004). These protected areas also have in them powers that can be used to solve problems in areas such as health, fertility for men and women and regulates the amount of rain fall in the community (UDS/CARE, 2004). Among the Gurunsi in the Upper East Region of Ghana, it is believed that birds which live in these protected areas could alert the community of an impending danger such as when a house is in fire and an impending funeral of a prominent community member (UDS/CARE, 2004). Hence, the need for these places to be protected and reserved. Water bodies were considered as sacred and therefore it is a taboo to catch and eat fish from these water bodies. For example fish from the river Bafo in the Ashanti Region are not eaten by the inhabitants of the village (Appiah-Opoku,

1999). The management and conservation of these natural resources are very much depended on unwritten regulations hence the *tindanas*, the chiefs and elders all play a role to ensure that those who break the rules are punished (Millar, 2004a). These regulatory mechanisms accounted for the survival of these protected areas over time.

2.10 Customary Laws

There are many definitions of customary law by many scholars base on their orientation and location. However, there is no universally accepted definition of customary law. A term considered by many writers as problematic. Its connection with custom has for instance been considered as a possibly confounding and an indicative of a number of traditional behaviors' to which a number of them have nothing to do with law (Alison and Alan, 1994).

Elias (1962), explains customary law as an embodiment of rules, customs or traditions considered binding upon them by the people or community to whom they refer.

In this write up, customary laws are rules and regulations emanating from the culture of the people and are enforce by the traditional authorities of the community.

Traditional people have for a very long time battle for the acknowledgement of their rights to their lands, resources, culture and self-determination. Following many years of marginalization and discrimination and not being recognized by international law, the twentieth century has seen tremendous changes in the recognition of local peoples' human rights. New international instruments, constitutional provisions, agreements of treaty bodies and national courts have change radically to recognize and protect local peoples' rights.

Although, there is the disposition to consider customary laws as something less than law, it is a dynamic and important part of the legal system. Customary law is practice in all countries of the world and in all legal systems as such, it is evident not only in national and trial law. It is also present in municipals and national law and in court practice. It again forms the foundation upon which international laws are built upon. At the local level, it guides communities, clubs, associations, groups of farmers and many more (Bederman, 2010). Its impact on specifying land and natural resources rights is very enormous (Morgan, 2010).

Woodman (2007) has grouped customary law under six headings;

i. Customs that people observe in certain local areas
ii. Some elements of the English common law which judges have historically stated to be the custom of the realm
iii. Customary laws of the traditional minority peoples, the most publicized examples being in North and South America, Australia and New Zealand
iv. Customary laws of the diverse ethnic groups that make up the populations of states of sub-Saharan Africa.
v. Observe religious laws important in many areas of the globe and
vi. Customary norms of international law as well as the customary norms of the worldwide commercial community.

2.10.1 Indigenous Peoples' Customary Law

Globally, there are about 350 million aboriginal people with not less than 5,000 ethnic groups in more than 70 countries speaking over 4,000 various languages (UNPFII, 2007). The United Nations Permanent Forum on Indigenous Issues (UNPFII) (2007), argues that, it is rational to claim that there are many legal systems as there are different indigenous peoples. Customary laws and practices have the direct or indirect recognition in many areas and countries where local people live. This recognition is in the form of formal constitution to accommodate customary laws and practices that are contrary to national laws. For many people in the Amazon rural areas who reside outside the reach of the national laws, custom is the only immediate source of law they are aware. ICHRP (2009) also reports that, likewise in post-conflict countries, non performing states and states with no formal functional government, customary law may be the only source of law for the people to depend on for their justice.

Many traditional and tribal people's customary legal regimes are the major if not the only source of justice common and available to them. Traditional tenure for instance, govern over 80 percent of land rights and considerable marine areas in pacific island countries, while, 75 percent of land in Africa is subject to some form of customary tenure (Chirayath *et al*., 2005).

In nations with feeble central governments and those hit by conflict, customary law may be the only source of justice accessible to them. The 2006 world Development Report claims that 85 percent of the people in Sierra Leone in 2003 depended mainly on

customary laws, while in Somalia and Sudan, it is now broadly agreed that, no rule of law program can operate without taking in to account customary law (World Bank, 2006).

2.10.2 Sources of Customary Law

There is a growing awareness that customary legal systems are changing constantly, mainly oral in nature and aim to bring about community togetherness rather than punishment (Glenn, 2000). Borrow (2001; 2002), identifies the elementary origins as the stories, songs and ceremonies of aboriginal people. Customs come from the political, spiritual, economic and social values which are conveyed in the form of teachings and behaviours of influential people and elders. These values are articulated in the rich stories, ceremonies and traditions of various groups of people.

2.11 Customary Laws and Practices on Biodiversity Conservation

Boaten (1998), reports that in Western Ghana, trees which were regarded as housing spirits should not be felled without performing rituals. This custom had a protective effect on trees such as odum (Chlorophora excelsa), African mahogany (Khaya ivorensis) and tall palm trees as betene (Elaesis Guineensis) and osese (Funtamia sp.). Also shea butter (Butyrospermum parkii) and the Dawadawa (Parkia Clappertoniana) trees, in the Northern savannah zone of Ghana are subject to the same traditional protection system (Boaten, 1998).

In Ghana, Tuesdays and Fridays are days that Coastal ethnic groups do not fish. These days are set aside and people and the ecosystem were expected to rest. In addition, many lagoons have periods that fishing is prohibited. This period concurs with the time that the fishes are laying their eggs. In the Fesu laguna in Cape Coast, the prohibited period of

fishing is between the month of May and June. This is the time that the fishes are reproducing and the young ones are also growing (Hens, 2006).

Table 2.6: Customary laws and related practices on biodiversity conservation in Ghana

Area of activities	Practices
Ecosystem preservation	Trees that are regarded as housing spirits: Odum, African mahogany, tall palm trees Sacred animals: black and white colobus, mona monkey Totem animals and associated species Sacred groves
Water farming	vegetation cannot be cleared along a strip of 30m at both banks of streams and rivers Traditional, 10 year bush fallow system Traditional crops as cocoa and vegetables
Fish hunting	Days and periods of banned fishing Do not hunt pregnant females
Herbal medicines	Use of herbs to prevent and treat (common) diseases in humans, animals and plants

Source: Hens (2006).

2.12 Ways Customary Laws Protect Biodiversity Conservation

In Ghana, animals in a particular habitat are regarded as sacred and are therefore protected from hunting. This applies to the Black and White colobus (*Colobus*

polykomos) and the mona monkey (*Cercopithecus mona*) in the Boabeng- Fiema wildlife sanctuary of Central Ghana (Ola – Adams, 1998). A similar situation is reported for the bats of Wli in the South Eastern part of the country. The overhanging rocks of the mountains that form the border with Togo, house an impressive colony of large bats that are said to be conserved by the local community. In Ghana, almost every traditional ruler, chief or King has a totem. Many wildlife species are regarded as totems due to their historical or socio-cultural significance. Totemic animals vary significantly from tribes and clans. They include leopard, elephant, lion, monkey, buffalo (mammals) and falcon, raven, parrot (birds). Others are turtles, crocodiles, snakes, python, scorpions, crabs fishes are all totems. The members do not eat, kill or trap the totemic animals because there is a belief that, there is a close connection between the animals and the tribes (CIG, 2005). Sacred groves are also scattered all over Ghana. An example is the sacred grove of Sefwi Wiaswo near the border with Ivory Coast. The sacred grove areas are untouched and other human activities such as farming, hunting, tree cutting, burning and fire wood gathering are not allowed.

Table 2.7: Instruments and System Underlying IK Action that are Biodiversity Related

Instrument/system	Examples
Taboo and prohibition	clearing vegetation along riverside
	Days and periods where fishing or hunting is prohibited
Respect traditional spirits	sacred groves
	Trees that should only be felt after accomplishment of rituals
Common belief	Cultivate land in such a way that it can rest afterwards during a period that is long enough for the recuperation of the fertility of the soil
Land tenure	Land owned as common, communal, clan or extended family Property

Source: Kamla-Raj (2006).

2.13 Modern Laws on Biodiversity Conservation

According to Hens and Nath (2003), biodiversity loss has been a key concern to mankind, particularly throughout the last quarter of the20thcentury. This concern resulted in the "Biodiversity Convention" that was opened for signature at the United Nations Conference on Environment and Development (UNCED) in Rio Janeiro, Brazil, in June 1992. Ever since diverse conferences such as the Beijing Conference for Women in 1995, echoed the problems of continuing environmental degradation.

A decade after Rio, the World Summit on Sustainable Development (WSSD) that was held in Johannesburg, South Africa, August-September 2002, could only state that in spite of significant efforts, the loss of Biodiversity worldwide was continuing at an unprecedented speed and that a reverse in this ongoing decline should urgently be

realized. Ghana was the 12'" of the 157 countries which signed the Convention on Biological Diversity during the Earth Summit, in June 1992.

Subsequently, she has since August 29, 1994 ratified the Convention on Biological Diversity. In line with her program for implementation of the Convention, a Biodiversity Country Study was undertaken. The study, in addition to providing the baseline information on the country's biological diversity, also identified a number of measures that have to be put in place to ensure the conservation and sustainable use of the country's biological resources. Article 6 of the Convention provides for countries to develop national strategies for the conservation and sustainable use of their biological diversity. This document, the National Biodiversity Strategy for Ghana, has been prepared in fulfillment of this provision. It is an indication of the plans envisaged for activities that have to be undertaken by the country to achieve the goal of conservation and sustainable management of the country's biological diversity (MES, 2002).

2.13.1 Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar convention)

The Ramsar convention was adopted on the 2 February 1971 at Ramsar in Iran but became operational on the 21 December 1975 and up to date has a membership of 122.The convention offered membership countries the platform for international collaboration for conservation and judicious use of wetlands and demand the parties involved to (i)assign suitable wetlands within their jurisdictions for a list of wetlands of international importance (Ramsar sites) (Article 2.1) (ii) formulate and implement plans to promote the conservation of wetlands listed and make judicious use of wetlands

available in their catchment area (Article 3.1), (iii) promote conservation of wetlands and waterfowl by making natural reserves on wetlands and cater enough for their widening (Article 4.1) (MES, 2002). Ghana became a member of this convention in 1988 following the coming in to being of the Owabi Ramsar site in the Ashanti Region. Five coastal Ramsar sites since then have been added. They include, Keta, Songor, Sakumo, Densu and Muni-pomadze. Major wetland conservation attempts in Ghana began in 1991, with the publication of a management strategy document for Ghana coastal wetlands (Ntiamoa-Baidu and Gordon, 1991).

A national wetlands strategy also came in to force with the main aim of conservation and sustainable utilization of the country's wetlands resources in the form of documenting strategies for bringing wetlands management into the actions of government, organizations, traditional leaders, communities and the people (MLF, 1999). It must however be noted Ghana can do better with regards to wetlands management that it is doing now. This could be attributable to lack of a concrete source of funding for the convention.

2.13.2 African Convention on the Conservation of Nature and Natural Resources

This convention was signed in Algiers on 15 September 1968 and came in to effect 7 March 1969. By this convention members are to; (i) adopt important measures to ensure conservation, utilization and development of soil, water, flora and fauna resources in line with scientific lay down rules and regulations with consideration to the welfare of the people, (ii) give special protection to these plants and animals species that are endangered and near extinction, (iii) set up conservation areas. Ghana became a member of this

convention in 1968 and set up a number of conservation areas in line with the definitions outlined in the convention (MES, 2002).

2.13.3 Convention on Biological Diversity (CBD)

As a result of the pressing need to deal with the problems related to biodiversity conservation globally, the governing council of the United Nations Environmental Programme (UNEP) in 1987 and 1989 had two unplanned working groups of biodiversity experts to reconcile conventions that were already in place associated with biodiversity conservation and to develop an international document for conservation and judicious use of biological resources. This document subsequently became the Convention on Biological Diversity (CBD), which was out door at the earth summit in Rio de Janeiro, Brazil in June 1992. The convention came in to effect on December 1993 and Ghana becoming a member on the 29 August 1994 as the 12th out of the 157 signatory parties. In July 2001, the membership of CBD increased to 181 with the main aim of (i) conservation of biodiversity (ii) sustainable use of its components and (iii) fair and equitable sharing of benefits arising from the use of genetic resources (SCBD, 2002).

Article 6 of the CBD mandated membership countries to prepare national strategies for the conservation and judicious use of their biological resources. In line with this, Ghana has produced a National Biodiversity Strategy and Action Plan document (MES, 2002).

Article 7 (a) also committed signatory members to carry out biodiversity inventories to acquire information on the dispersal and abundance of biodiversity (UNEP, 1992, Stort and Samways, 1995).

2.13.4 Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)

The convention was adopted in 6 March 1973 in Washington Dc, USA and came in to force on 1 July 1975 with 154 members. It main aim is to protect the endangered species from harmful effects of international trade through the control of trade in specific plants and animals to prevent their over exploitation. CITES listings include 30,000 plants and 2,500 animal species that are considered endangered (Moulton and Sanderson, 1997).

2.14 Theoretical Framework

Ecological system theory is a theory that studies human development which includes the scientific study of the advanced, joint accommodation, during the life cycle of any active growing person and the varying properties of the immediate environment in which the growing person lives, as this course is affected by the relations among these environments and by the larger circumstances in which the settings are embedded (Bronfenbrenner, 1979).

The theory was published in 1979 by Urie Bronfenbrenner to study human beings and their environments. The ecological theory stresses environmental factors as playing a major role to development.

The theory has five systems:

***Microsystem*:** This refers to the organizations or establishments and groups that most immediately and directly affect human development such as family, school, religious institutions, neighborhood and peers.

***Mesosystem*:** This refers to the linkages among the microsystems, interactions between the family, school, religious institutions and peers.

***Exosystem*:** Involves linkages between the social setting in which people do not play an active part and the individual immediate context.

Macro system: this talks about the culture in which people live. Cultural setting comprises developing and industrialized countries, socio-economic status, poverty and ethnicity. Members of a particular cultural setting share a common identity, heritage, taboos, totems, norms and values. Macro system evolves over time; this is as a result of every generation changing the macro system which eventually will give birth to a unique macro system.

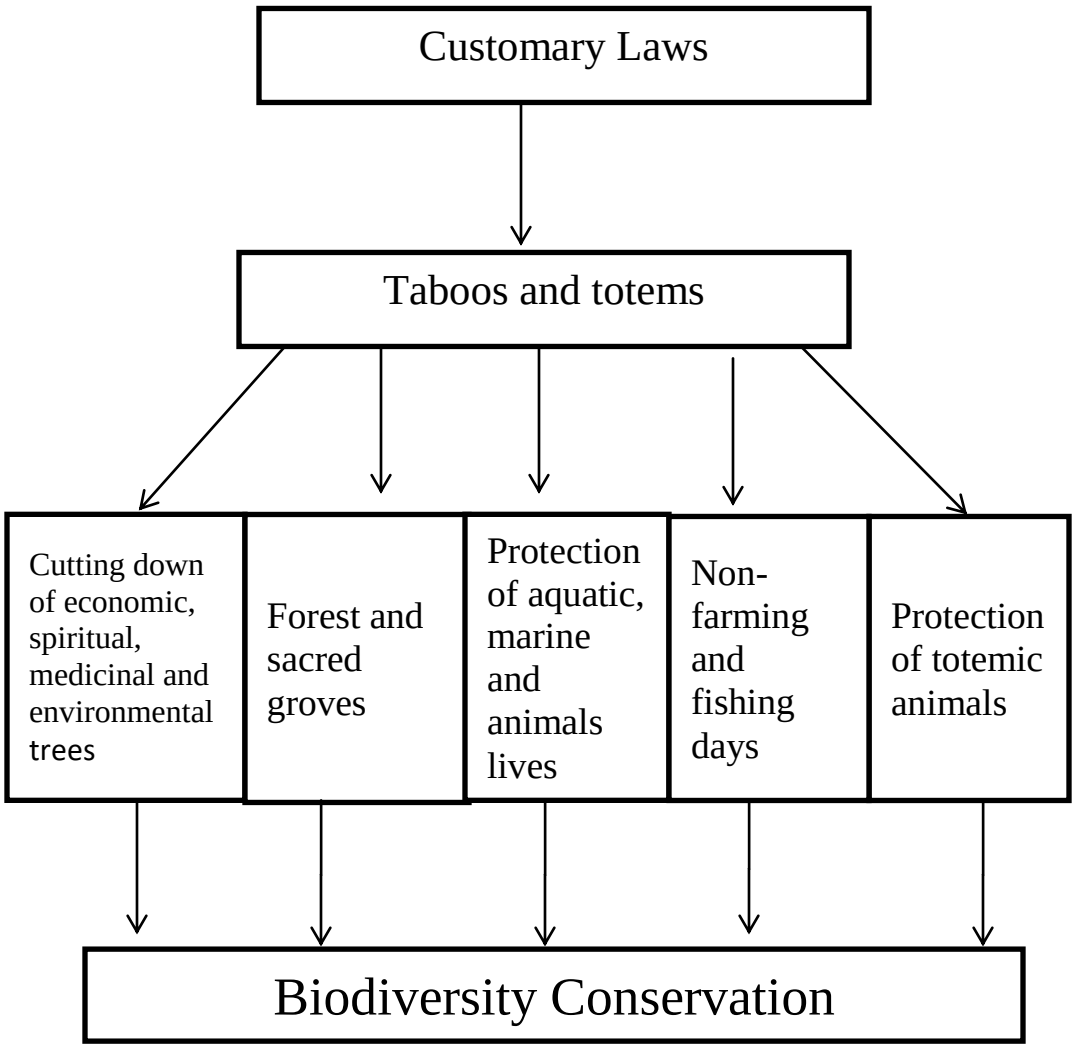
***Chronosystem*:** the patterning of environmental happenings and changes over human life cycle as well as social and historical circumstances. Per this theoretical construction, each system comprises roles and norms.

The ecological system theory gives information concerning people and their environment in order to facilitate their understanding of their interconnectedness. Individuals need environmental assistance in all aspects of their life and endeavor. Social issues such as healthcare, family relations, inadequate income, and conflicts with law enforcement agencies, unemployment, and educational difficulties are all factors considered in the ecological model.

2.15 Conceptual Framework

The conceptual framework shows the interconnectedness or the relationship between customary laws and biodiversity conservation. In the diagram below, it is clear and evident that customary laws have and can be used to protect and promote biodiversity conservation in many areas of the country and the world as large.

Figure 2.2.1: Conceptual Framework



Source: Author, 2017

In the diagram, it can be seen that customary laws are protected using taboos and totems. In the diagram also, it is clear that, it is a taboo to cut down economic, spiritual, medicinal, environmental trees, forest and sacred groves. Taboos are also used to protect aquatic, marine and animal lives. Certain days of the week and some periods within the year are considered non farming and fishing days especially when the fishes and animals are pregnant and the young ones are also growing. Lastly, some animals in communities in Ghana are considered totems and for that matter, members are not allowed to hunt, trap and kill those animals. Some communities even perform burial rites for the totemic animals when they die. It can be realized that customary laws (taboos and totems) are used to prevent people from cutting down trees, forest and sacred groves, protection of aquatic, marine and animal lives, setting up non farming and fishing days and protection of totemic animals lead to biodiversity conservation.

CHAPTER THREE

THE STUDY AREA AND METHODOLOGY

3 Introduction

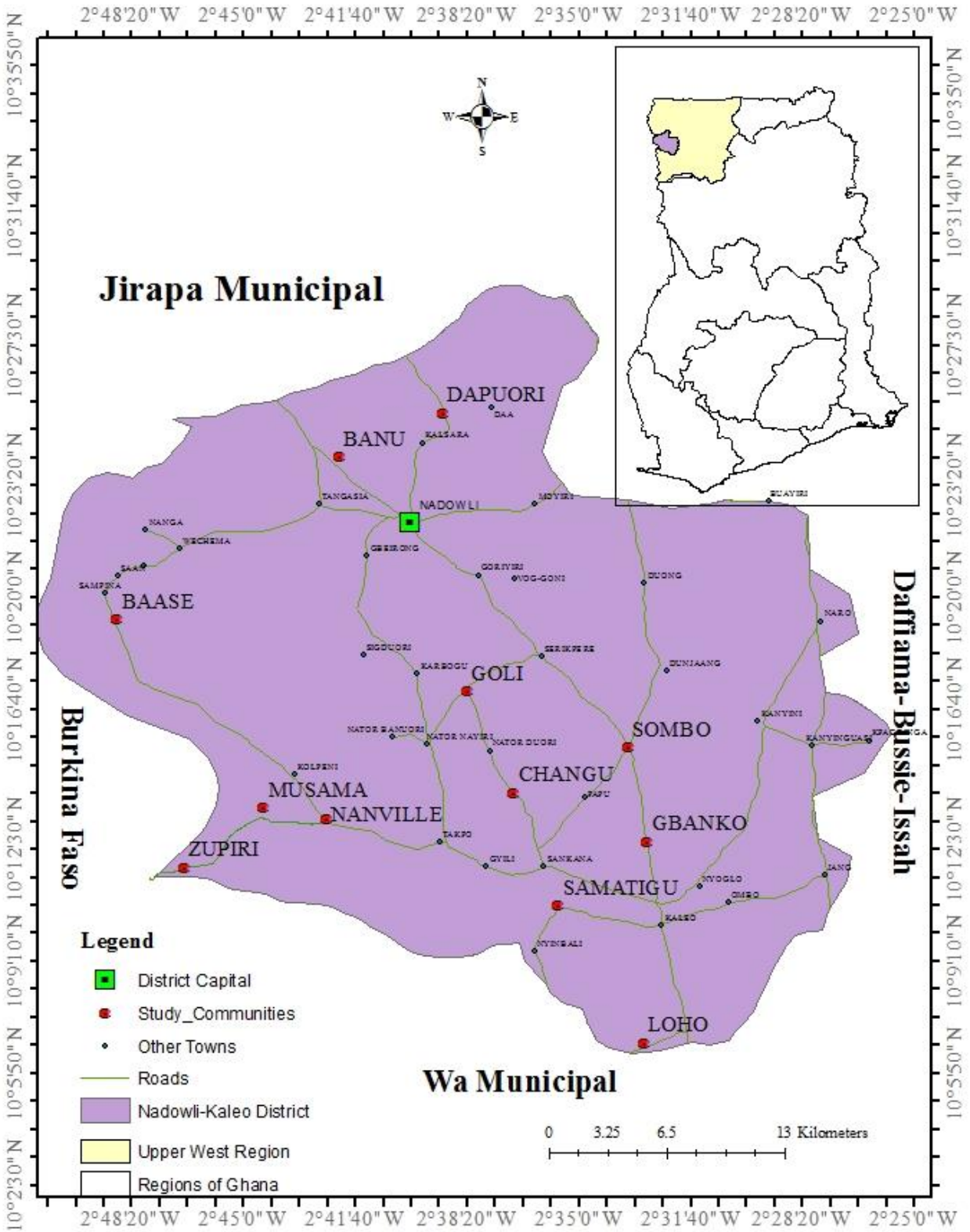
This chapter provides information on the characteristics of the study area. The study was carried out in the Nadowli/Kaleo District of the Upper West Region and consisted of two (2) communities each of the six (6) traditional councils. The traditional councils are Sankana, Sombo, Nadowli, Kaleo, Takpo and Charikpon in the Nadowli/Kaleo District in the Upper West Region of Ghana. The communities are Samatigu, Changu, Sombo, Goli, Dapour, Banu, Loho, Gbankor, Zupiri, Nanville, baase and Musama respectively. The communities are farming communities and a mixer of all the three main religions and experience deforestation and a general destruction of the biodiversity of their communities.

3.1 The Geography of Nadowli/Kaleo District

3.1.1 Location

The Nadowli/Kaleo District is located in the Upper West Region of Ghana. The district is bounded to the north by the Jirapa District, to the south by the Wa Municipal, to the west by Burkina Faso and the East by the Sisala East District. The Nadowli District Capital is 41.0 km from Wa, the Regional capital. It lies between latitude 10.8’ 28’ and 9.8’ 18’ north and longitude 2.7’ 10’ and 1.9’10’ west. The location of the District promotes international trade between the district and neighboring Burkina Faso. Figure 3.1 is the map of Nadowli District.

Figure 3.1: Map of Nadowli-Kaleo District



Source: Author (2018)

3.1.2 Topography and Drainage

The land of the district is generally low lying but gently undulating at altitudes ranging between 150m-300m above sea level though some parts average 600m. There is one major stream, the Bakpong and several ephemeral streams, which flow into the Black Volta.

3.1.3 Climate and Vegetation

The district lies within the tropical continental or guinea savannah woodland characterized by shrubs and grassland with scattered medium sized trees. Some economic trees found in the district are kapok, shear, baobab, mango and dawadawa, which are tolerant to both fire and drought. These trees are a major source of income to households particularly women who play important roles in the provision of household needs and these economic trees provide a potential for the establishment of processing industries to increase employment opportunities for the people (GSS, 2012).

The District has a mean annual temperature of 32°C and a mean monthly temperature ranging between 36°C in March to 27°C in August. Mean annual rainfall is about 1100mm with its peak in August. Between October and March, there is virtually no rain and this long dry season becomes harsh by the dry north-eastern harmattan winds. Relative humidity is between 70 and 90 percent during the rainy season but is as low as 20 percent during the long dry season (GSS, 2010).

3.2 Demographics

3.2.1 Population Size and Growth

According to the 2010 population and Housing Census, the District has a total population of (61,561). Going by the international standard for the definition of an urban settlement, for the 2010 population and Housing Census which defines an urban community as any community with a population of 5,000 or more none of the communities in the Nadowli/Kaleo District has attained an urban status (PHC, 2010). With a total population of (61,561) distributed across all ages and different sexes, the total population has (28,753) males and (32,808) female representing 46.71 percent 53.29 percent respectively. Out of the total population, persons between the ages of 10-14 years with population of (8,592) constitute the highest proportion (14.0%) of the total population than any other age group. It means that there were more children born in the past 10-14 years than the number born in the past 0-9 years. The number of persons found between the ages of 95-99 is the least, constituting only (0.1%) of the total population (GSS, 2012).

3.2.2 Age-sex Distribution

Sex ratio, which is a measure of the number of males per every 100 females in the population, stands at 87.6 for the district. This indicates that the total population has a higher number of females than males. However, it varies from one age group to the other. The highest sex ratio (109.6) is found in the age group, 10-14. Other age groups that have sex ratios greater than 100 were 0-4, 10-14, 15-19 and 20-24 years (GSS, 2012).

The age and sex distribution of the population has some implications for socio-economic and demographic development as well as for labour force and gender related activities in the district.

3.2.3 Population Density

The population density was about 38.53 persons per square kilometer in 2010 as compared to 31.0 persons per square kilometer in 2000. The distribution is however uneven throughout the district. Population density around Nadowli and Kaleo areas is about 52.3 persons /Km2 but as low as about 15 persons per square kilometer in the eastern portions (GSS, 2012). The generally low population density in the district implies less pressure on the land for human activities that could compound the problem of environmental degradation in the district. The district has therefore a great potential of minimizing poor environmental hygiene and sanitation through public sensitization (GSS, 2012).

3.2.4 Migration

Migration is defined as a geographical movement involving a change from a usual place of residence over a defined territory beyond a defined period (United Nations, 2012). The District had a total of 11,730 migrants, 61.4 percent of whom constitutes those born elsewhere in the region. For migrants born elsewhere in another region, Northern region recorded the highest (9.0%), followed by Ashanti region (8.9%) and Volta recording the lowest number (0.6%). Considering the duration of residence of migrants, those from Ashanti region recorded the longest stay in the district while migrants from the Western

region recorded the shortest duration. Migrants born outside Ghana and residing in the district were 237 (GSS, 2012)

There is seasonal out-migration by the youth especially males to the southern part of the country to work, thereby reducing the potential labour force needed for agricultural development. There is also intra-district migration from the west to the fertile east for farming purposes. This partly explains the low agricultural output levels and food insecurity experienced in the district particularly in the west (GSS, 2012).

3.2.5 Ethnicity and Religion

The district has two major tribes, the Dagaaba and the Sissalas. The Dagaaba constitute 96% of the total population and the Sissala represent 4%. The Sissala are confined only to the southeastern parts of the district (GSS, 2012)

There are three religious groups in the district. Christians (59%) Moslems (18%) and African Traditional Religion (23%). The Catholics dominate the Christian population. In spite of this heterogeneous religious composition, there is religious tolerance, harmony and peaceful co-existence among the people in the district. This is a major pre requisite for development not only in the district but also other parts of the northern region (GSS, 2012).

3.2.6 Economic Activities

About 66.9 percent of the population aged 15 years and older are economically active and 33.1 percent is economically not active. Out of the economically active population the proportion of the employed is 97.3 percent and unemployed is 2.7 percent. Also of the employed population, those who worked forms 97.4

percent, while those who did not work but had jobs to do were 1.9 percent and less than one percent (0.7%) did voluntary work without pay. On the other hand, of the unemployed persons, those who worked before, seeking work and are available for work constitute 48.9 percent and those seeking work for the first time and are available to work form 51.1 percent (GSS, 2012)

3.3 Methodology

This section is on the methods employed in collecting data for the study. It also examines the methods employed in the data analyses and presentation.

3.3.1 Research Approach and Design

According to Neuman and Wiegand (2000) a research design refers to the arrangement or organization for the study, used as a guide for collecting and analyzing the data. The research type for this study is cross sectional and descriptive. This will help to provide information about the existence and state of the situation as it is in the time of the study (Creswell & Plano, 2007).

The research made used of a mixed method approach in order to achieve the research objectives. The design was selected because it gave the researcher the chance to conduct thorough and comprehensive analyses of the data collected. Creswell and Plano (2007) explain mixed methods research as an approach to inquiry that combines both quantitative and qualitative forms. It involves the use of quantitative and qualitative approaches as well as the mixing of both approaches in a study. This is because, they complement each other when used together (Bryman, 2008). Therefore both qualitative and quantitative data was collected for the study at the same time.

3.3.2 Sources of Data

There are two major approaches in social science used in collecting data (miller, 1991). They are the primary and secondary sources. However, it is worth noting that, the choice of a particular source must be decided upon based on one's problem, the rational of the study, the resource available and many more. In choosing a method for data collection the socio-economic features of the study population is very paramount. Therefore in deciding on the type of data collection method, the researcher should bear in mind the type of respondents he is dealing with, the nature of the social situation, the mode of the social environment and the psychology of the people (Grady, 1998). The study made used of both secondary data and primary data.

3.3.2.1 Primary Data

Primary source of data was collected through field survey from the people of Nadowli/Kaleo District, the chiefs and their elder, traditional area councils and the tindanas. This was done through the use of interviews, questionnaires, key informant interviews, focus group discussions and observation to solicit information from the residents on the effects of customary laws on biodiversity conservation.

3.3.2.2 Secondary Data

Saunder *et al* (1997) explained that, when using secondary data you have an upper hand compared to another researcher using primary data. This is so because, the data is already in existence and you can assess them before their use.

Ghana statistical service provided data on the 2010 population and housing census of the district. The district assembly also provided the profile of the district. Other sources included journals, newspapers, textbooks, handbooks and manuals, articles and editorials, published and unpublished which were important to this study were used. This aided in the evaluation of the general views of people on the effects of customary laws on biodiversity conservation which enlarged the scope of variables and definitions of concepts.

3.4 Data Collection Tools/Techniques

The study made used of unstructured questionnaires with formal interviews, structured questionnaires, key informant interviews, focus group discussions and observation to solicit information from the people in the District. The structured and unstructured questions were administered to the household heads. . Interview guides were used to interview key informants such as such as the chiefs, tindanas and family heads. The elders also constituted the focus groups. The questions asked were focus on the customary laws and practices that exist in support of biodiversity conservation, the ways that customary laws support biodiversity conservation, the role of traditional leaders in biodiversity conservation and how conventional laws can support customary laws in biodiversity conservation.

Interviews

Karma (1996) explained interviews as individual to individual interaction between two or more people with a particular aim in mind.

This therefore supports Yin (1993) assertion that, a good interview is the one in which the interviewee takes in charge of the interview and express him/herself freely.

The researcher used interviews to collect information from respondents. In all, four hundred (400) interviews were conducted. Three hundred and eighty (380) interviews were conducted to households especially heads of households or any person in the household from forty years and above. It was a mix feeling since some could read and write whiles others could not read and write. The researcher therefore has to administer the questionnaires to respondents who could not read and write and on the part of those who could read and write, the questionnaires were given to them to answer themselves. Questions on the awareness of the existence of customary laws on biodiversity conservation were mostly closed ended whiles questions on the types of customary laws on biodiversity conservation, the role of traditional leaders in biodiversity conservation were open ended to give respondents the opportunity to unearth the types of customary laws on the study area since customary laws on biodiversity conservation are location specific. Responses that appeared contradictory were accompanied by follow up questions for clarifications.

Key informant interviews

Key informant interviews involve interviewing a chosen group of persons who possess much information, ideas and insights on a particular subject (Karma, 1999). With respect to key informant interviews, six (6) tindanas, six (6) chiefs (6) household heads and two (2) women were interviewed. The six (6) household heads were purposefully selected from the six (6) communities visited. The household heads for the key informant interviews were selected during the household interviews. Special consideration were given to respondents who were observed to be knowledgeable and experienced with regards to customary laws on biodiversity conservation. On the part of the chiefs, most of

them could read and write thus the questionnaires were given to them to answer at their own convenient time and taken later within two weeks by the researcher.

In conducting these interviews, the venue and time of meeting was agreed. Respondents consent were also sought for the interviews to be recorded. The main aim of these key informant interviews were to get additional information to support the individual interviews. In conducting the interviews, the researcher was careful on the norms and manner of putting the questions to them. This was because; all the key informants were heads of clans and elderly people. Follow up questions were asked to clarify issues that were not clear. Each of the key informant interviews lasted about one hour.

Observation

Karma (1999) defined observation as a focus, systematic and discriminating way of looking and listening to an interaction or an event as it unfolds without asking the respondent. He further made mention of the conditions under which observation is suitable: learning concerning interactions, functions and behaviours in a group. This is very important in situations where correct information cannot be obtained from questioning. The observation was however, non-participant as participant observation requires that the researcher should live in the study area and take part in the day to day activities of the people under study for a specific period of time.

During the questionnaire administration, the researcher made some observations in the field. In the process of the observation, the researcher asked questions were he was in doubt for clarification and easy understanding of issues. The researcher also used photography in order to give pictorial view of some vital places and events in the field.

Focus group discussions

With regards to focus group discussions, six focus group discussions were held in six different communities and they were Sankana, Sombo, Nadowli, Kaleo, Takpo and Charikpon. The minimum number was six and the maximum number was seven. The elders of the communities constituted the focus groups so all the elders of the six communities were contacted. The group was gender bias since women were not part of the group. The youngest participant was forty years and the oldest participant was in his early seventies. The discussions was on the types of customary laws on biodiversity conservation, ways and means customary laws protect biodiversity conservation, role of traditional leaders in biodiversity conservation and how customary laws can complement conventional laws in biodiversity conservation. The discussions in all the communities ended successfully and lasted about one hour.

3.5 Sample Frame

Nadowli/Kaleo District is made up of six traditional councils with a total population of 61,561 with 28,753 as males and 32,808 as females. The sample frame included the household respondents, chiefs, women leaders, elders and tindanas.

3.6 Sample Size Determination

The basis for any research is to make generalizations or draw conclusions based on samples about the limitations of population from about which the samples are taken (yin, 1993). Thus, Miller (1991) reports that, the researcher needs few units from the universe for his study purpose. He argued that a study conducted using a representative sample is

usually better than the research based on a bigger sample or the whole population. He sees it as a waste of time interviewing a bigger number saying the same thing. This however, according to Karma, (1999) should be a matter of choice by the researcher. When choosing on the size of the sample the researcher must take into consideration the desired precision and also an acceptable level for approximations (saunders *et. al*, 1997).

The sample size for the study was determined using the formula for sample size determination given by Miller and Brewer (2003), as follows:

$$n = \frac{N}{1 + N(\propto)^2}$$

Where n= required sample size, 1= constant, N= sample frame, ∝= level of significance or margin of error.

$$n = {}^{61561}/_{1 + 61561\ (0.0025)} = 400$$

The representative sample selected was then proportionally distributed between the Traditional Councils included in the study using the simple proportions where x = $\frac{n}{N} \times P\ of\ T.C.$

where X= number of respondents per Traditional Council, p = population and T.C= Traditional Council.

Table 3.1: Sample Size Distribution

Traditional Council	Population	Sample Determination
Kaleo	14620	$\frac{400}{61561} \times 14620 = 95$
Nadowli	16592	$\frac{400}{61561} \times 16592 = 108$
Takpo	10578	$\frac{400}{61561} \times 10578 = 69$
Sankana	10259	$\frac{400}{61561} \times 10259 = 67$
Sombo	3904	$\frac{400}{61561} \times 3904 = 25$
Charikpong	5608	$\frac{400}{61561} \times 5608 = 36$
Total	**61561**	**400**

Source: Author, 2017

3.7 Sampling Techniques

The Nadowli/Kaleo District has 148 communities and six traditional councils with each traditional council having a number of communities under it. The study made use of simple random sampling technique. Simple random sampling was used to select two communities each of the six traditional councils in the District. The communities selected were Baase and Musama (Charikpong traditional council), Kaleo and Loho (Kaleo traditional council), Dapour and Nadowli (Nadowli traditional council), Changu and Samatigu (Sankana traditional council), Goli and Sombo (Sombo traditional council), and Zupiri and Nanville (Takpo traditional council). The houses in each of the twelve communities were selected using the accidental or convenient sampling and at the end Baase 15, Nanga 20, Kaleo 25, Loho 15 Dambaa 20, Tangasie 25, Changu 20, Samatigu

15, Goli 20, Duong 20 Zupiri 15, Nanville 20 houses were selected using the lottery method.

A purposive sampling which is a non-probability sampling technique was however used in the selection of household heads or any person in the household from forty years and above, key informants such as the chiefs and tindanas and focus group such as elders of the communities.

3.8 Techniques of Data Analyses

The study made used of both quantitative and qualitative analytical methods in the interpretation of results from the study.

The data analysis used both quantitative (SPSS) and qualitative (descriptive) approaches to analyze the data.

Quantitative data analysis

In quantitative analysis, simple quantitative operations from questionnaire were tabulated and processed using the SPSS. The use of graphs, charts, frequencies, percentages and averages attracted statistical considerations using SPSS (Leach *et al*, 2005).

Data from the study was analyzed using the Statistical Product and Service solution (SPSS). This software was employed to facilitate the quantitative analyses by producing descriptive statistics such as frequencies and percentages as well as establishing the relationship between variables. The software was also used to produce graphical figures and tables. The tables and graphs were used to depict trends and pictorial diagrams for

easy analyses. Data was also changed into descriptive statistics for purposes of analyses and interpretation.

Qualitative data analysis

Qualitative data analysis was made at the same time during the data collection process and after the whole data was collected. This is in support of Yin (1993), view that data analysis should not be separated from the collection process but should be continues and simultaneous.

Qualitative data was analyzed by employing content analysis and intuitive interpretation of responses. Audio data from focus group discussions were transcribed for easy analyses and interpretations. Discourse analysis technique was used for the purposes of key informant interviews and focus group discussions analyses and interpretations.

3.9 Limitations of the Study

Limitations are inevitable in every social research and thus this research cannot be an exception. The first major challenge was that at the time of the research, the paramount chiefs of Nadowli traditional area and Kaleo traditional area had passed on. This makes it very difficult to get information since the people and the royal gates taught the researcher was coming from government or one of the royals' sides. To address this challenge, the researcher had to explain to them to understand that it was an academic exercise and not to influence or interfere in their chieftaincy issues.

Again, the researcher had challenges with regards to the collection of secondary data from the district assembly and Ghana Statistical Service. After several letters and return visits to these departments, the information was finally gotten.

The third challenge was with language of communication on the study area. In this regard, the researcher had to seek the assistance of a translator to make things easy.

The forth challenge had to do with the distance from the school to the study area especially the studied communities was very far. To address this challenge, the researcher had to use motor bike and pick the translator to all the studied communities.

The last challenge was cost as the researcher used motor bike in going round the studied communities. To address this challenge, the researcher sleeps in the studied communities occasionally.

CHAPTER FOUR

DATA PRESENTATION, ANALYSES AND DISCUSSIONS

4 Introduction

In this study, as mentioned before, an attempt was made to find answers to several questions relating to customary laws and conventions on biodiversity conservation in the Nadowli-Kaleo District of the Upper West Region. The study recorded a 100% response rate as 400 responses out of the calculated 400 respondents had completed the questionnaires administered. Each research question and its results have been discussed in this section.

4.1 Presentation of Demographic Data of Respondents

Although it was not part of the purpose of the study, this set of data was intended to describe demographic variables of the sample and to assess for any influence on the research findings. The demographic data consisted of gender, age, marital status, education and occupation.

4.1.1 Gender of Respondents

Data obtained from the survey based on preliminary information of respondents with regards to gender is shown in Figure 4.1. The survey recorded 24% female respondents as compared to their male counterparts of 76%. This means that customary laws are usually made by the heads of house hold, soothsayers, chiefs, tindanas which are all male dominated positions. The heads of households, chiefs, tindanas and soothsayers also protect, preserve and execute punishment where necessary to customary law breakers.

However, female leaders in the communities take part in the making of customary laws. Just like their male counterparts, female leaders do not have equal powers like the male leaders. A fifty two years informant in a key informant interview said:

*"Women leaders or elders do not have powers like their male counterparts. We (women) are under the control of our husbands. We (women) cannot even execute any form of punishment to the male subjects and our powers are only limited to our female colleagues" (*Key informant interview, December, 2017).

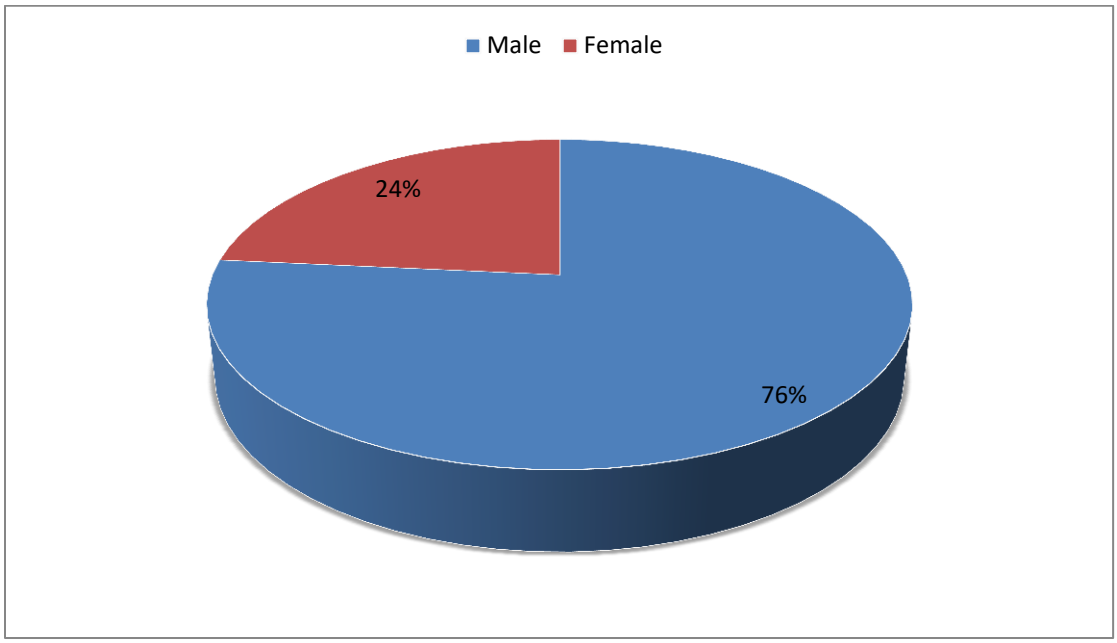


Table 4.1: Gender of respondents

Source: Field Survey, 2017

4.1.2 Age of Respondents

The study covers respondents age forty (40) years and above. Participants were asked to tick the age category appropriate to them as shown in Fig 4.2 below. 52.3% (209) out of the 400 respondents were in the 40-49 years age category which constituted the bulk of

the sample, 38.0% (252) respondents were in the range of 50-59 years old. 5.5% (22) respondents were of the age of 60-69 and 70 years and above were 4.3% (17) representing as the lowest category of age range. It can be realized from the data that 52.3% of the respondents age 40-49 and 38.0% of the respondents age 50-59 are within the economically active population who are engage in biodiversity related activities as well as customary laws of the district. However, even those 60years and above still engage themselves in biodiversity related activities and the preservation and protection of customary laws. These groups of people have experience and much knowledge about the customary laws on biodiversity conservation of the district. This is captured in the words of an aged (70 years) participant in focus group discussions:

"*The youth of today have not seen what we the aged have seen and do not have the patience that we had in our time to learn from our forefathers. We used to obey customs of the land but the youth are not ready to obey and learn the customary laws and traditions that are pass on from generation to generation. My fear is that when we the aged are gone, our grandchildren will not have the opportunity to know and learn the customary laws and traditions that existed in relation to biodiversity conservation"* (Focus group discussions, December, 2017).

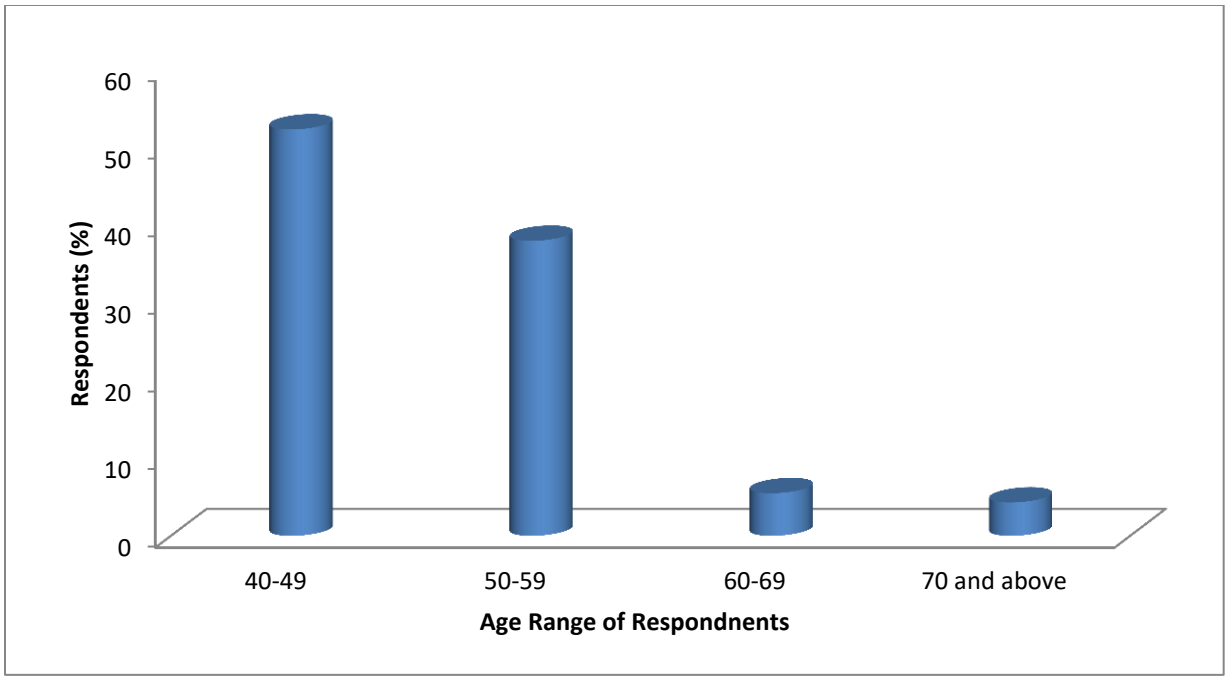


Figure 4.1: Age of respondents

Source: Field Survey, 2017

4.1.3 Educational Level of Respondents

One's level of education is vital in determining his acceptance, involvement and beliefs about the customary laws on biodiversity conservation. The study therefore sought the educational background of the respondents as shown in Figure 4.3 below. The study recorded 37.0% (146) respondents who did not go through formal education. 34.4% (136 out of 400) respondents had gone through the basic level of education. Figures obtained from the study show that 9.9% (39 out of 400) respondents had acquired secondary school education. 9.6% (38) out of the 400 respondents had acquired Diploma/HND and 9.1% (36) respondents had degree (Figure 4.3). From the data gathered, 37.0% respondent did not even go through formal education and 34.4% respondents had only basic level education. This means that majority of the respondents had only basic

education and for that matter can have respect for customary laws on biodiversity conservation. Some did not have education and those with the basic education have not gone that high to be influenced by education not to respect customary laws on biodiversity conservation. However, those with the secondary and tertiary education could find it difficult to belief customary laws on biodiversity conservation but rather find it easy to belief in the conventional Laws on biodiversity conservation. According to a fifty seven years old participant in a focus group discussions:

"*The problem is that, our people who used to obey and respect certain customary laws and traditions on biodiversity conservation when they were growing up are the very people who will disrespect and disobey the very customary laws and traditions when they attained higher education later in life*" (Focus group discussions, December, 2017).

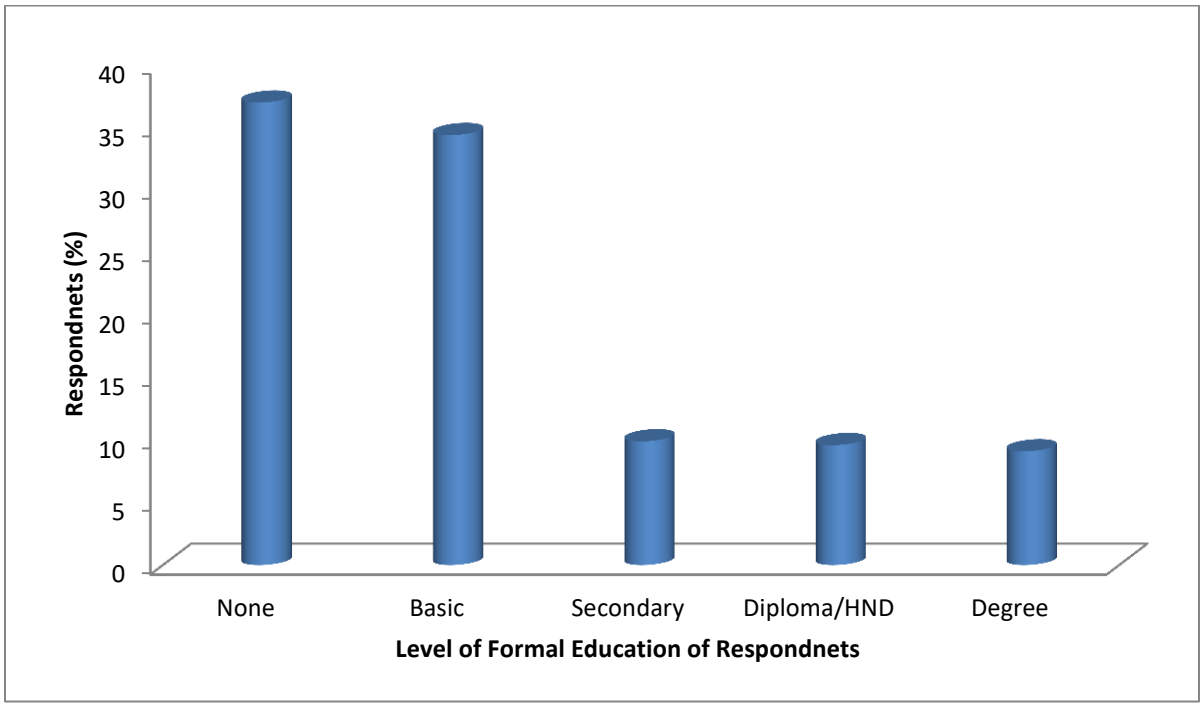


Figure 4.2: Educational background of respondents

Source: Field Survey, 2017

4.1.4 Occupation of Respondents

Figures obtained from the study on the occupation of the respondents as shown in Table 4.1 showed that, majority of the respondents were farmers (221 of the respondents out of the 400 representing 55.3%). The figure further showed teachers were 90 representing 22.5% out of the total number of respondents. Health personnel also made up 57 (14.3%). 3 representing 0.8% were security officers and 29 representing 7.3% had other jobs such as pito brewing, food vending and other traders. This means that, the district is a farming community and relies on farming for food. Because majority of the respondents are farmers, they respect and obey the customary laws on biodiversity conservation. Farmers are not allowed to burn bush, cut down economic trees for fire wood or char coal and many more.

Table 4.2: Occupation of respondents

		Frequency	Percent
Valid	Farmer	221	55.3
	Teacher	90	22.5
	Nurse/Doctor	57	14.3
	Security force	3	.8
	Other	29	7.3
	Total	400	100.0

Source: Field Survey, 2017

4.1.5 Religious Denominations of Respondents

The survey recorded respondents across the three major religious denominations in the District as shown in Fig 4.4. Figures obtained showed that majority were Christians as

219 representing 54.8% were Christians. Islam follows with 106 (26.5%) of the respondents of the study. The remaining 75 representing 18.8% 75 were traditionalist. The Traditionalist was the least religious group from the survey. Majority of the respondents 54.8% (Christians) and Islam 26.5% find it difficult to belief and respect the customary laws on biodiversity conservation that they think conflict with their belief and orientation. This makes it difficult for customary laws on biodiversity conservation to be protected, conserved and passed on from generation to generation. An informant in a key informant interview said:

"*These days, the advent of Christianity and Islam has spoiled our traditions and culture. Our people after becoming Muslims and Christians no longer respect the traditions, taboos and totems that they used to respect. They even go about preaching to the people of the communities not to also respect the customs and traditions of the communities making work difficult for us the traditional leaders to protect and preserve the traditions of the communities"* (Key informant interview, December, 2017).

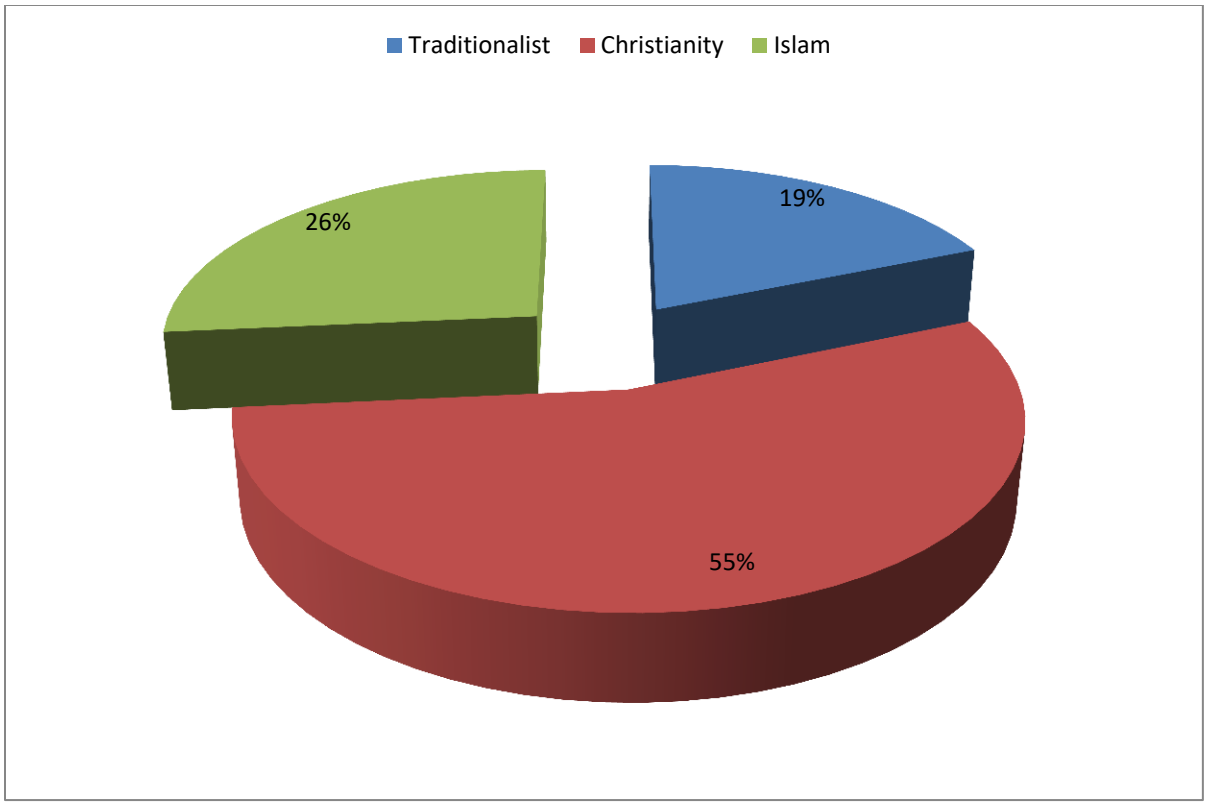


Figure 4.3: Religious background of respondents

Source: Field Survey, 2017

4.2 Customary Laws and Practices

4.2.1 Presence of Customary Laws on Biodiversity Conservation

The study seeking to ascertain the presence of customary laws on biodiversity in the District as shown in Figure 4.5 found that, there exist customary laws on biodiversity in the Nadowli-Kaleo District of the Upper West Region. Figures obtained showed an overwhelming 378 representing 94.5% said there are customary laws on biodiversity as against 22 representing 5.5% of respondents who were of the view that there are no customary laws on biodiversity to. Just like every district in the study region, Nadowli/Kaleo District is a farming community and majority of the respondents are

farmers who have customary laws and traditions in place to protect biodiversity. This is what a participant in a focus group discussion has to say:

"*Our forefathers had customs and traditions that were aimed at protecting land, certain species of plants and animals, forest, and water bodies that have played very significant role in their lives. They practiced and protected those plants, animals and farming systems that they considered very important and ask their generations to continue to do so. So we have customary laws on biodiversity conservation*" (Focus group discussions, December, 2017).

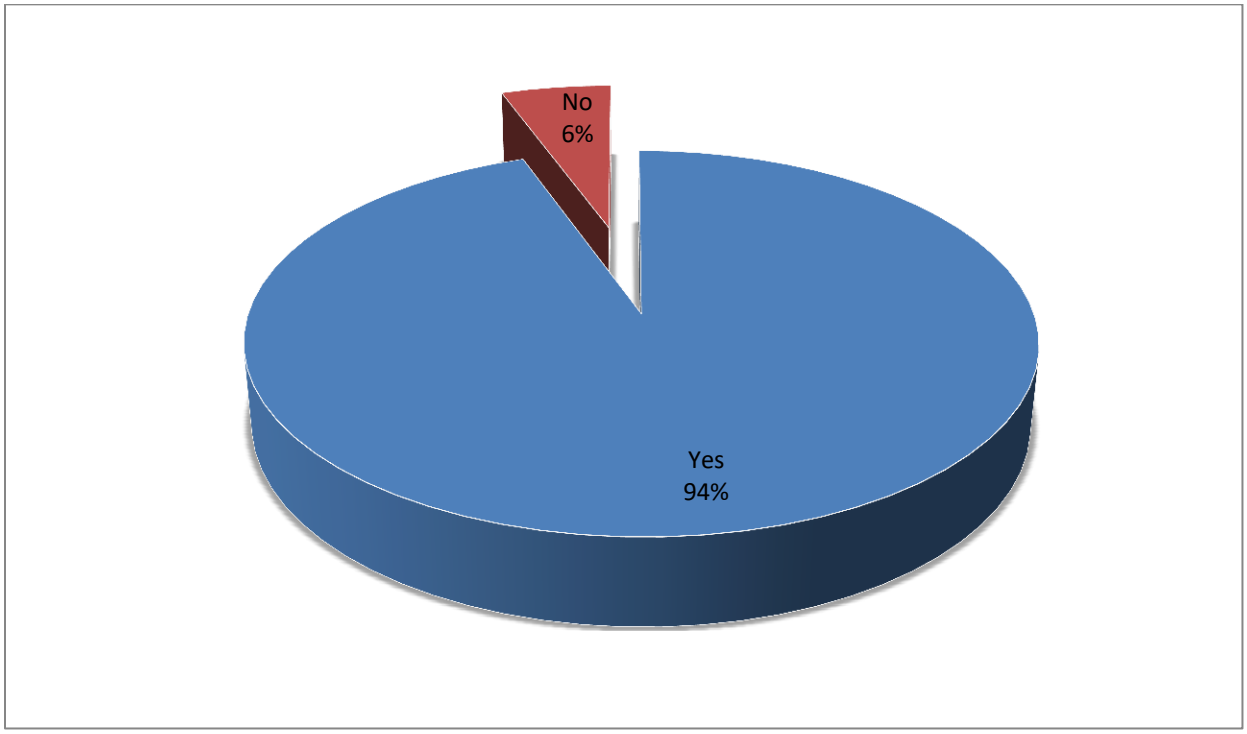


Figure 4.4: Presence of customary laws in the Nadowli/Kaleo District

Source: Field Survey, 2017

4.2.2 Customary Law (s) Practiced on Ecosystem

Figures obtained from the study on identifying customary laws practiced in the Nadowli-Kaleo District on ecosystem are presented in Table 4.2. It was found that several customary laws are practiced on ecosystem. The study results showed that, 158 representing 39.5% respondents out of the 400 participants indicated that customary laws are practiced on bush burning. Farmers, hunters and Fulani herdsmen were not allowed to burn the bush for farming or hunting purposes. People found burning the bush are punished by traditional leaders. In line with this, an informant in a key informant interview said:

"*We have customary law on bush burning so burning the bush is illegal in this place and any farmer, hunter or Fulani herdsmen found burning the bush is usually punished by the traditional leaders"* (Key informant interview, December, 2017).

Also 132 representing 33.0% (out of 400) reported the practice of customary laws on sacred groove or forest. People are not allowed to cut down trees from the sacred groves and forest. However, people are allowed to pick fire wood that has fallen down as well as fruits from the forest and sacred groves. 105 representing 26.3% (out of 400) respondents reported the practice of customary laws on indiscriminate cutting down of economic trees. Farmers and women into char coal production are not allowed to cut down economic trees such as dawadawa and shea nut trees. This is captured in the words of a participant in a focus group discussion:

"People are not allowed to cut down economic trees and any body found cutting down economic tree will have to plant three economic trees to replace the one that she/he has cut down and he/she will not be given the opportunity to use the economic tree that she/he has cut down" (Focus group discussions, December, 2017).

5 representing 1.3% of respondents reported the practice of customary laws on hunting; that there are periods which hunting is prohibited or banned.

Table 4.3: Distribution of respondents on customary laws on ecosystem

		Frequency	Percent
Valid	Bush Burning	158	39.5
	Indiscriminate cutting down of economic trees	105	26.3
	Sacred grooves or Forest	132	33.0
	Banned period of hunting	5	1.3
	Total	400	100.0

Source: Field Survey, 2017

4.2.3 Customary Law (s) Practiced on Water Bodies

Figures obtained from the study on identifying customary laws practiced in the Nadowli-Kaleo District on water farming are presented in Figure 4.6. It was found that there are customary laws that are practiced on water bodies. The study results showed that, 255 representing 64.2% participants indicated that customary laws prohibit some days for visiting ponds, rivers and streams. This confirms Rattray (1923) that in Ghana, there are many ethnic groves that regard water bodies as gods. Fridays are considered resting days for fishermen and people and a day for the gods. A sixty years old informant in a key informant interview said:

"*Fridays, people are not allowed to go to the dams to fish, swim or do any other activities in the dam. It is a day for our gods. People who do not listen to this and go to the dams on Fridays usually get drowned"* (Key informant interview, December, 2017).

109 representing 26.8% respondents reported the practice of customary laws on banned period of fishing. People are not allowed to fish on Fridays and the periods that the fishes are pregnant.

The remaining 36 representing 9% respondents reported that they are not aware of customary laws on water bodies in the district.

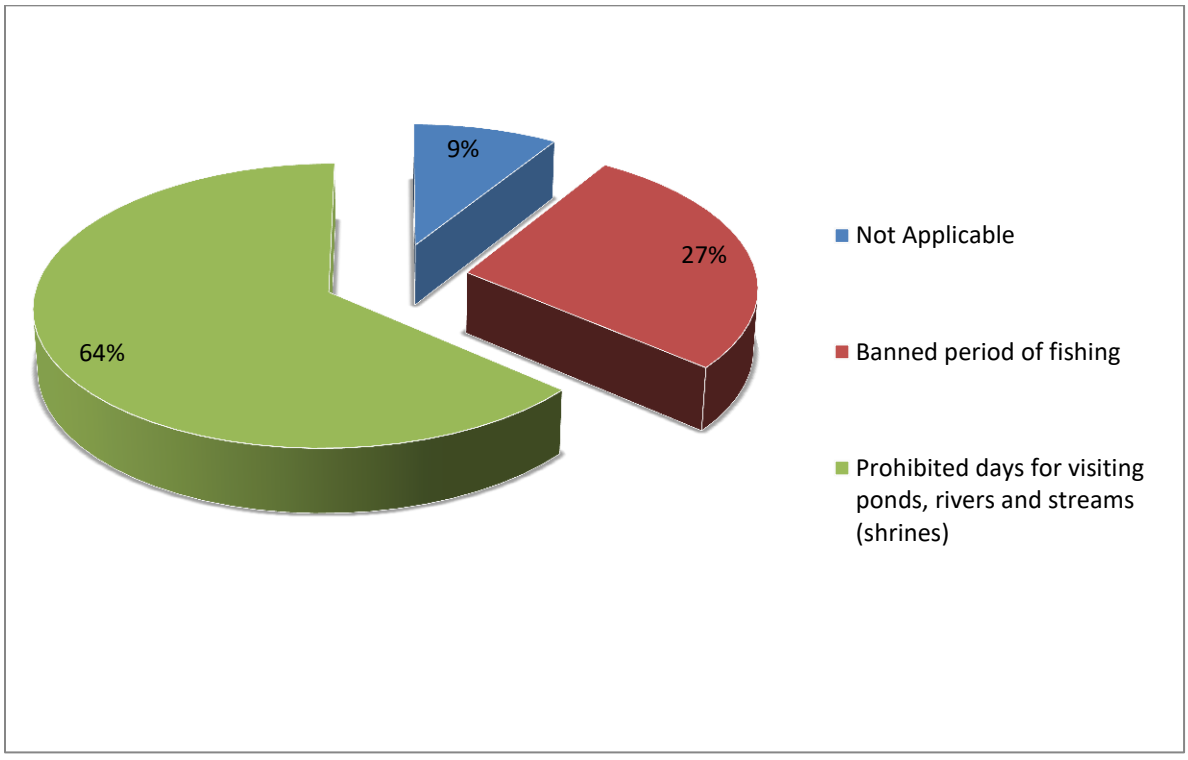


Figure 4.5: Distribution of customary law (s) on water bodies

Source: Field Survey, 2017

4.2.4 Customary Laws Practiced on Herbal Medicine

Figures obtained from the study on identifying customary laws practiced in the Nadowli-Kaleo District on herbal medicine are presented in Table 4.3. It was found that there are customary laws that are practiced on herbal medicine. The study results showed that, 251 representing 62.8% of participants indicated that there are customary laws prohibiting the cutting down of medicinal trees and shrubs. Medicinal trees such as neem, mango, pawpaw, mahogany and many other trees are protected from being cut down. This confirms the findings of Abbiw (1990) that, trees are also protected and conserved because of their medicinal value. Trees with medicinal properties are not only protected because of their importance in curing ailments but are regarded as sacred and possess spiritual powers. This is as a result of the medicinal value that those trees have to the communities.

149 representing 37.3% reported that there are no customary laws prohibiting the cutting of medicinal trees and shrubs.

Table 4.4: Distribution of respondents on customary laws on herbal medicine

		Frequency	Percent
Valid	Prohibited of cutting medicinal trees and shrubs	251	62.8
	Not Applicable	149	37.3
	Total	400	100.0

Source: Field Survey, 2017

4.2.5 Significant of Customary Laws in Biodiversity Conservation

Figures obtained from the study on identifying the significance of customary laws in ensuring biodiversity conservation in the Nadowli-Kaleo District are presented in Table 4.4. The study results showed that, 104 representing 26.0% respondents out of the 400 participants indicated that there is very high significance of these customary laws in ensuring biodiversity conservation.

189 representing 47.3% respondents out of the 400 participants indicated high significance of these customary laws in ensuring biodiversity conservation. 87 representing 21.8% respondents out of the 400 participants indicated that there is low significance of these customary laws in ensuring biodiversity conservation.

The remaining 5% of respondents reported that there is very low significance of these customary laws in ensuring biodiversity conservation. From the data gathered, it can be realized that majority of respondents indicated very high and high significance of customary laws in ensuring biodiversity conservation. A participant in a focus group discussion said:

"*This place, it is our customary laws that we use to protect our biodiversity conservation even the time of our forefathers. These days however, we have challenges because of the Christians and Muslims who no longer believe in certain customs and traditions. So the customary laws are significant in biodiversity conservation*" (Focus group discussions, December, 2017).

Again, when results or data obtained from the study were subjected to statistical analysis using person correlation, it was found that there is a relationship between customary laws and biodiversity conservation in the Nadowli-Kaleo District as shown in table 4.5.

Table 4.5: Significance of customary laws in ensuring biodiversity conservation

		Frequency	Percent
Valid	Very High	104	26.0
	High	189	47.3
	Low	87	21.8
	Very Low	20	5.0
	Total	400	100.0

Source: Field Survey, 2017

Table 4.6: Relationship between customary laws and biodiversity conservation

		Are they customary laws on biodiversity in your area	How significant are these customary laws in ensuring biodiversity conservation
Are they customary laws on biodiversity in your area	Pearson Correlation	1	.357**
	Sig. (2-tailed)		.000
	N	400	400
How significant are these customary laws in ensuring biodiversity conservation	Pearson Correlation	.357**	1
	Sig. (2-tailed)	.000	
	N	400	400

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

4.2.6 Effectiveness of Customary Laws on Biodiversity Conservation

Figures obtained from the study on identifying the effectiveness of customary laws in ensuring biodiversity conservation in the Nadowli-Kaleo District are presented in Table 4.6. The study results showed that, 75 representing 18.8% participants indicated that, customary laws are very effectiveness in ensuring biodiversity conservation.

264 representing 66.0% participants indicated that, customary laws are effective in ensuring biodiversity conservation.

The remaining 61 representing 15.3% respondents reported that there is low effectiveness of these customary laws in ensuring biodiversity conservation. There is a mix feeling about the effectiveness of customary laws on biodiversity conservation. Majority of respondents from the data indicated that customary laws are very effective in ensuring biodiversity conservation. According to an informant in a key informant interview:

"*Customary laws are the only effective way of ensuring biodiversity conservation in this area. Institutions responsible for ensuring biodiversity conservation are not seen in the community so we rely on our own to conserve our biodiversity*" (Key informant interview, December, 2017).

Others are also of the view that customary laws are not effective in ensuring biodiversity conservation. This is captured in the words of an informant in a key informant interview:

"These days, people do not belief in the customs and traditions again because of their belief in Christianity and Islam. So where you say they should not go or do that, they will do or go without any fear" (Key informant interview, December, 2017).

Table4.7: Effectiveness of customary laws on biodiversity conservation

		Frequency	Percent
Valid	Very Effective	75	18.8
	Effective	264	66.0
	Not Effective	61	15.3
	Total	400	100.0

Source: Field Survey, 2017

4.3 Ways of Customary Laws and Practices on Biodiversity Conservation.

4.3.1 Taboos and prohibitions on biodiversity in Nadowli/Kaleo

Figures obtained from the study on identifying whether there are taboos and prohibitions on biodiversity conservation in the Nadowli-Kaleo District are presented in Table 4.7. The study results showed that, 375 representing 93.8% participants indicated yes meaning there are taboos and prohibitions on biodiversity conservation. This agrees with Abayie (1997) that the traditional African societies practiced religious and cultural belief system that were aimed at biodiversity conservation by using taboos and myths.

The remaining 25 representing 6.2% respondents reported no meaning there are no taboos and prohibitions on biodiversity conservation.

Table 4.8: Taboos and prohibitions on biodiversity conservation

		Frequency	Percent
Valid	Yes	375	93.8
	No	25	6.2
	Total	400	100.0

Source: Field Survey, 2017

4.3.2 Applicable Taboos in the Study Area

Figures obtained from the study on identifying the applicable taboos practiced in the Nadowli-Kaleo District are presented in Figure 4.8. It was found that there are various forms of taboos that are practiced within the Nadow-Kaleo District. The study results showed that, 155 representing 38.8% participants indicated that there are taboos on forests and trees. A participant in a focus group discussion has this to say:

"Some trees, forests and shrines are considered as gods and we worship those trees, shrines and forest and for that matter we do not cut down those trees, shrines and forest" (Focus group discussions, December, 2017).

14.8% (59 out of 400) reported that there are taboos on water bodies. This is in line with Abayie (1997) that some African societies such as Ghana, there are taboo days for fishing, farming and others with many trees, shrines, sacred groves and water bodies worshiped as gods. People are not allowed to go the dams on Fridays as Fridays are considered taboo days and a day for the gods.

The remaining 46.5% representing 186 out the 400 respondents reported that they are taboos on wild life in the District. This is in line with Awedora (2002) it is a taboo for members to trap, kill and eat these animals that are considered totems.

Table 4.9: Applicable taboos in the study area

		Frequency	Percent
Valid	Forest and Trees	155	38.8
	Water bodies	59	14.8
	Wild life (animals, snakes and birds)	186	46.5
	Total	400	100.0

Source: Field Survey, 2017

4.3.3 Effectiveness of Taboos in the Study Area

Figures obtained from the study on identifying the effectiveness of taboos on biodiversity conservation in the Nadowli-Kaleo District are presented in Table 4.9. The study results showed that, 63 representing 15.8% participants indicated that taboos are very effective in biodiversity conservation in the District.

303 representing 75.8% reported that taboos are effective in biodiversity conservation. This is in line with Ntiamoa-Baidu (1995) and Abayie, (1998) that in Africa and Ghana in particular, natural resources are conserved through the use of rules and regulations). From the data it is seen that majority of the respondents are of the view that taboos are very effective means of conserving biodiversity in their communities. An informant in a key informant interview said:

"*We have the belief that taboos can harm us and because of that, we do not go contrary to the taboos and that is what our grand fathers were practicing and handed it over to us and we will also do our best and pass it to our children*"(Key informant interview, December, 2017).

The remaining 34 representing 8.5% respondents reported that taboos are not effective in conserving biodiversity. This is similar to Ntiamoa-Baidu, (1995) and Abayie, (1998) that due to the influence of Christianity and Islamic religions, these beliefs, taboos, totems, resting days are no longer adhered to in some communities.

An informant in a key informant interview has this to say on why taboos are not effective on biodiversity conservation

"These days, people do not believe in the taboos again because of their belief in Christianity and Islam. So they know all the taboos and will go against them if it conflicts with their beliefs" (Key informant interview, December, 2017).

Table 4.10: Effectiveness of taboos on biodiversity conservation

		Frequency	Percent
Valid	Very Effective	63	15.8
	Effective	303	75.8
	Not Effective	34	8.4
	Total	400	100.0

Source: Field Survey, 2017

4.3.4 Significance of Taboos in Biodiversity Conservation

Figures obtained from the study on identifying the significance of taboos on biodiversity conservation in the Nadowli-Kaleo District are presented in Table 4.10. The study results showed that, 56 representing 14.0% participants indicated that taboos are very high in ensuring biodiversity conservation.

322 representing 80.5% respondents reported that taboos are high in ensuring biodiversity conservation. 19 representing 4.8% respondents reported that taboos are low in ensuring biodiversity conservation.

The remaining 3 representing 0.7% respondents reported that taboos are very low in ensuring biodiversity conservation. Majority of the people are of the view that taboos have very high significance in ensuring biodiversity conservation. This is because of their beliefs and practices that enjoin them to respect taboos. On the other hand, some people

are of the view that, taboos have low and very low significance in ensuring biodiversity conservation. This is because; some people do not belief in taboos because of their religious orientations.

Again, when results or data obtained from the study were subjected to statistical analysis using pearson correlation, it was found that there is a relationship between customary laws and biodiversity conservation in the Nadowli-Kaleo District as shown in table 4.11.

Table 4.11: Significance of Customary Law (s) on Biodiversity Conservation

		Frequency	Percent
Valid	Very High	56	14.0
	High	322	80.5
	Low	19	4.0
	Very Low	3	.8
	Total	400	100.0

Source: Field Survey, 2017

Table 4.12: Relationship between taboos and biodiversity conservation

		Are there taboos and prohibitions on biodiversity in your area	How significant are these taboos in ensuring biodiversity conservation
Are there taboos and prohibitions on biodiversity in your area	Pearson Correlation	1	.403**
	Sig. (2-tailed)		.000
	N	400	400
How significant are these taboos in ensuring biodiversity conservation	Pearson Correlation	.403**	1
	Sig. (2-tailed)	.000	
	N	400	400

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

4.3.5 Totems Observed in the Study Area on Biodiversity

Figures obtained from the study on identifying whether there are totems observed in the Nadowli-Kaleo District are presented in Figure 4.7. The study results showed that, 384 representing 96.0% participants indicated that there are totems observed in the District in relation to biodiversity conservation. This confirms Assimeng, (1999), that in Ghana, every clan has a totem (plants and animal) and taboos which members are enjoin to respect. Overwhelming respondents are of the view that, totems exist in the communities which are geared towards biodiversity conservation. This was captured in the words of a participant in a focus group discussion:

"*Just like any other community, tribe or clan, we also have totems that we respect in our community like the crocodile, python, and horse. We do not trap, kill or eat animals that we consider as totems*" (Focus group discussions, December, 2017).

The remaining 16 representing 4% respondents reported that there are no totems observed in relation to biodiversity conservation.

However, some people are of the view that, totems are not observed in the community. A participant in a focus group discussion said:

*"Nowadays, because of Christianity and Islam, our people eat any animal that their religion tells them to eat. They will only not eat an animal because their religion tells them not to eat but not because of it being a totem" (*Focus group discussions, December, 2017).

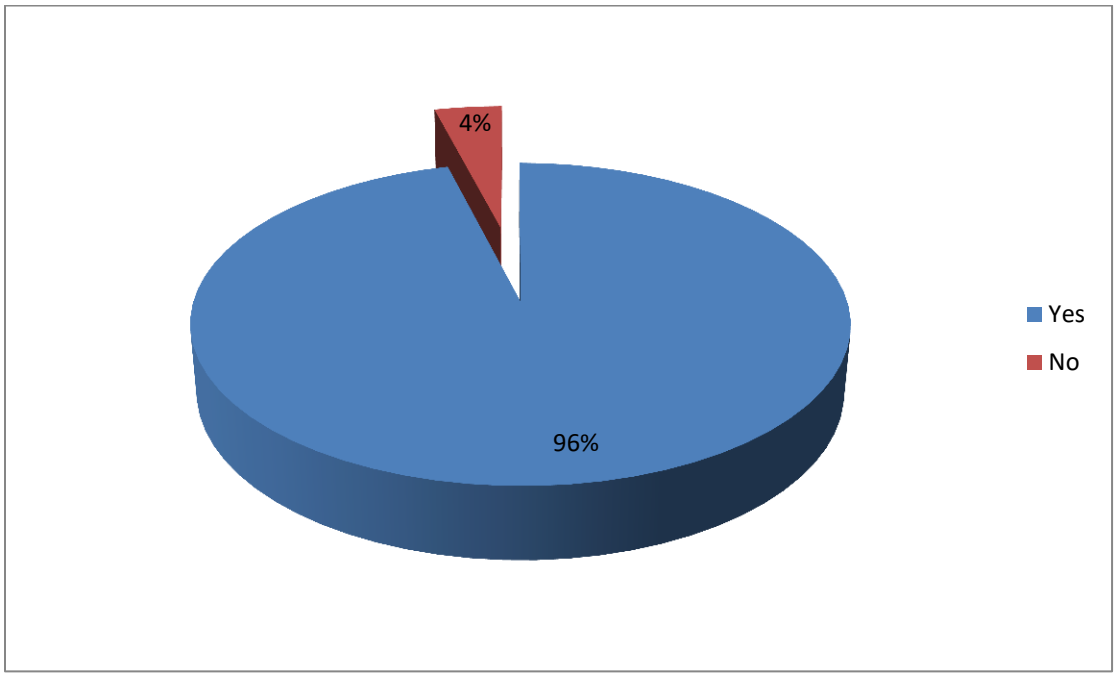


Figure 4.6: Responses on totems observed in biodiversity conservation

Source: Field Survey, 2017

4.3.6 Applicable Totems in the Study Area

Figures obtained from the study on identifying the applicable totems practiced in the Nadowli-Kaleo District are presented in Table 4.12. It was found that there are various forms of totems that are practiced within the Nadow-Kaleo District. The study results showed that, 218 representing 54.5% participants indicated that, they consider some animals such as donkey, horse, porcupine, hedgehog as totems. People are therefore not allowed to kill or eat those animals.89 representing 22.3% reported that they consider birds such as dove and chicken as totems. The remaining 93 representing 23.3% respondents reported that there are totems on sea life such as fish, crocodile, frog and toad in the district. A participant in a focus group discussion said:

"*We do not kill or eat our totems and if they die we bury them. An example is the crocodile, when it dies, we do not touch it, and so we bury it by cutting the leaves of shea trees to cover it. In the case of a horse, we use white cloth and cover it and dig a hole and bury it*" (Focus group discussions, December, 2017).

Table 4.13: Applicable totems in Nadowli/Kaleo

		Frequency	Percent
Valid	Animals (donkey, porcupine, hedgehog)	218	54.5
	Birds (dove, chicken, etc.)	89	22.3
	Sea life (Fish, crocodile, frog, toad)	93	23.2
	Total	400	100.0

Source: Field Survey, 2017

4.3.7 Effectiveness of Totems in the Study Area

Figures obtained from the study on identifying the effectiveness of totems practiced in the Nadowli-Kaleo District are presented in Table 4.13. The study results showed that, 46.5% representing 186 respondents out of the 400 participants indicated that totems are very effective in biodiversity conservation in the District. 48.3% (193 out of 400) reported that totems are effective in biodiversity conservation. The remaining 5.2% representing 21 out of the 400 respondents reported that totems are not effective in biodiversity conservation in the District. Majority of respondents are of the view that, totems are very effective means of conserving biodiversity. This is because; members do not trap, hunt or kill those animals and treat those animals like human beings and this is aimed at conserving biodiversity in the study area. However, some people are of the view that, totems are not effective means of conserving biodiversity. According to a participant in focus group discussions:

"Nowadays, because of Christianity and Islam, our people eat any animal that their religion tells them to eat. They will only not eat an animal because: their religion tells them not to eat but not because of it been a totem" (Focus group discussions, December, 2017).

Table 4.14: Effectiveness of totems on biodiversity conservation

		Frequency	Percent
Valid	Very Effective	186	46.5
	Effective	193	48.3
	Not Effective	21	5.2
	Total	400	100.0

Source: Field Survey, 2017

4.3.8 Significant of Totems in Biodiversity Conservation

Figures obtained from the study on identifying the significance of totems in ensuring biodiversity conservation in the Nadowli-Kaleo District are presented in Table 4.14. The study results showed that, 22.0% representing 88 respondents out of the 400 participants indicated that totems have very high significance in ensuring biodiversity conservation. The remaining 78.0% (312 out of 400) reported that totems have high significance in ensuring biodiversity conservation. People are expected not to kill or hunt totems but rather treat them with respect and the necessary assistance they deserve and for that matter are considered significant in ensuring biodiversity conservation.

Again, when results or data obtained from the study were subjected to statistical analysis using person correlation, it was found that there is a relationship between totems and biodiversity conservation in the Nadowli-Kaleo District as shown in table 4.15.

Table 4.15: Significance of totems in biodiversity conservation

		Frequency	Percent
Valid	Very High	88	22.0
	High	312	78.0
	Total	400	100.0

Source: Field Survey, 2017

Table 4.16 : Relationship between totems and biodiversity conservation

		Are there totems observed in your area on biodiversity	How significant are these totems in ensuring biodiversity conservation
Are there totems observed in your area on biodiversity	Pearson Correlation	1	.108*
	Sig. (2-tailed)		.030
	N	400	400
How significant are these totems in ensuring biodiversity conservation	Pearson Correlation	.108*	1
	Sig. (2-tailed)	.030	
	N	400	400

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

4.3.9 Sacred Groves and Shrines in the Study Area

Figures obtained from the study on identifying whether there sacred groves and shrines in the Nadowli-Kaleo District are presented in Figure 4.8. The study results showed that, 98.5% representing 394 respondents out of the 400 participants indicated that there are sacred groves and shrines in the District. This is in line with Falconer (1992), that sacred groves are common in the country. For example, in some ethnic groups, having access to the sacred groves is strictly limited, but in other ethnic groups, they may be used or their used limited to certain forest resources.

An informant in a key informant interview said:

"We have sacred groves and shrines. We have the Kukure shrine for instance that houses crocodiles. People are not allowed to cut trees within that area and the shrine offer us protection, money, children and everything that we want" (Key informant interview, December, 2017).

The remaining 1.5% representing 6 out the 400 respondents reported that there are no sacred groves and shrines in the district.

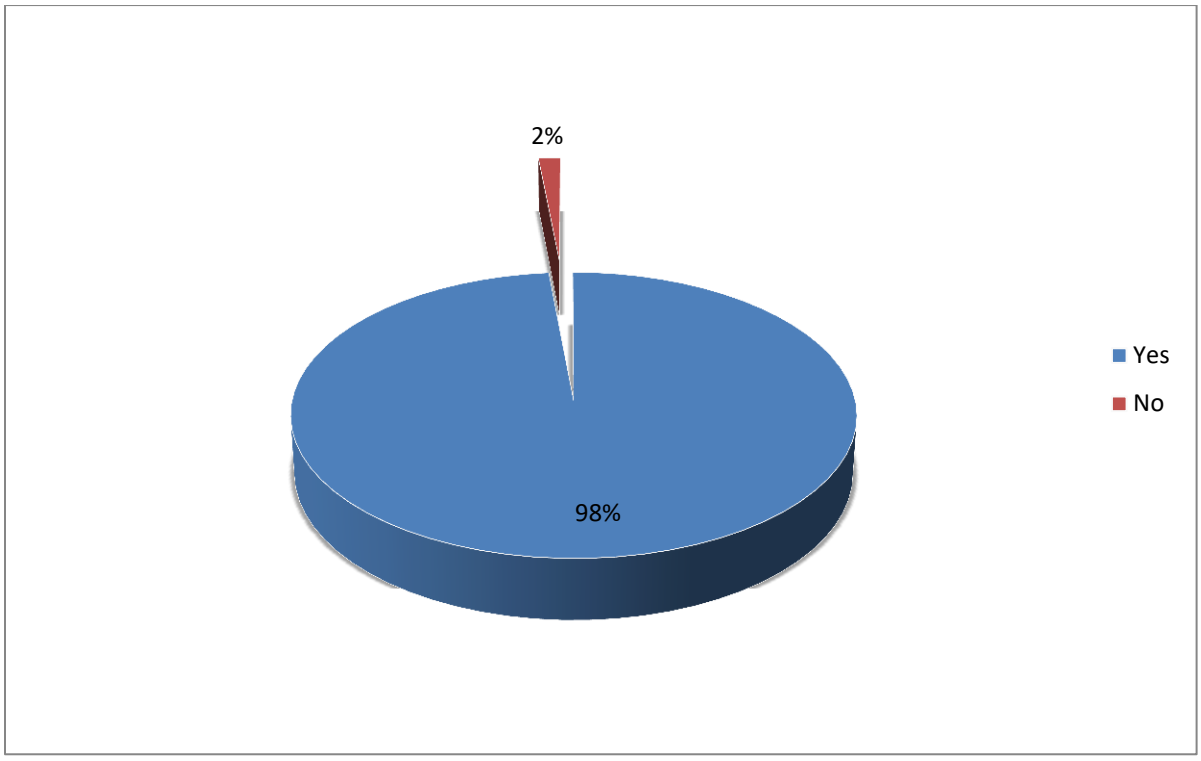


Figure 4.7: Responses as to whether there are sacred groves and shrines in Nadowliu/Kaleo

Source: Field Survey, 2017

4.3.10 Respect for Sacred Places in the Study Area

Figures obtained from the study on identifying whether these sacred places are respected in the Nadowli-Kaleo District are presented in Table 4.16. The study results showed that, 86.3% representing 345 respondents out of the 400 participants indicated that these sacred places are respected in the District. This is similar to Ntiamoa-Baidu, (1995) that sacred groves have been able to survive to this far because of the local people respect for beliefs, totems and taboos and the spiritual, religious and cultural attachments to the sacred groves

In focus group discussions with the participants, this is what an elderly person has to say: "*We respect our sacred places, do not respect our sacred groves and shrines and see whether you will live to see the next day. Our gods will inflict pain, ailments and eventually you will die if you do not confess" (*Focus group discussions, December, 2017).

The remaining 13.7% representing 55 out of the 400 respondents reported that these sacred places are not respected in the district. This is captured in the words of a participant in a focus group discussion:

"Our sacred places have lost their value and power that they used to have during our forefathers time" (Focus group discussions, December, 2017).

Table 4.17: Respect for sacred places

		Frequency	Percent
Valid	Yes	345	86.3
	No	55	13.7
	Total	400	100.0

Source: Field Survey, 2017

4.3.11 Practice of Land Tenure Systems in the Study Area

Figures obtained from the study on identifying whether land tenure systems are practiced in the Nadowli-Kaleo District are presented in Figure 4.9. The study results showed that, 93.3% representing 373 respondents out of the 400 participants indicated that land tenure system are practiced in the district.

The remaining 6.7% representing 27 out the 400 respondents reported that land tenure systems are not practiced in the District.

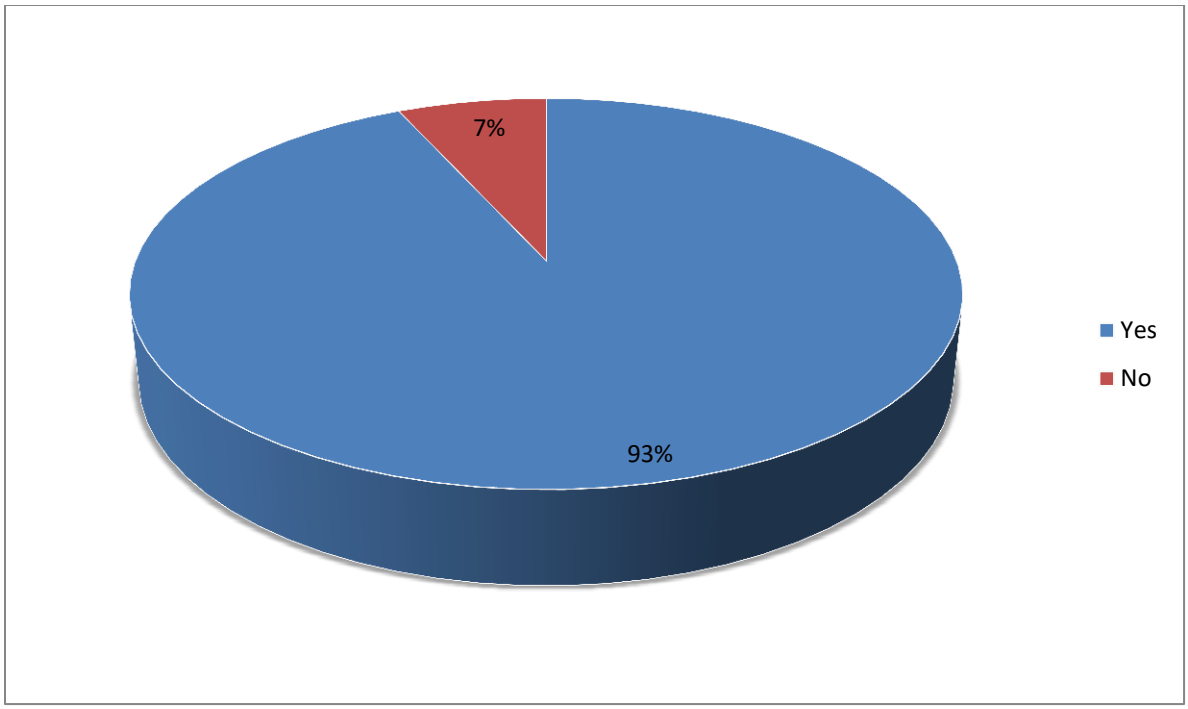


Figure 4.8: Land tenure system

Source: Field Survey, 2017

4.3.12 Land Ownership in the Study Area

Figures obtained from the study on identifying how land is owned in the Nadowli/Kaleo District are presented in Figure 4.17. The study results showed that, 58.2% representing 235 respondents out of the 400 participants indicated that land is owned as an extended family property. This is captured in the words of a participant in a focus group discussion;

"*Since from the time of our forefathers, we inherit land, when an elder dies the next elder inherits the family land and manage it on behave of the whole family*" (Focus group discussions, December, 2017).

"The remaining 58.8% representing 165 out the 400 respondents reported that land is owned as a private property in the district. This is captured in the words of a participant in a focus group discussion

"*Because of modernization and conflict, some families have shared their lands among heads of households to manage privately with their immediate families*" (Focus group discussions, December, 2017).

Table 4.18: How land is owned in Nadowli/Kaleo

		Frequency	Percent
Valid	Extended family property	235	58.2
	Private property	165	41.8
	Total	400	100.0

Source: Field Survey, 2017

4.5 Role of Traditional Leadership on Biodiversity Conservation

4.5.1 Applicable traditional institutions in biodiversity conservation

Figures obtained from the study on identifying the role of traditional leaders on biodiversity conservation in the Nadowli-Kaleo District are presented in Table 4.18. It was found that various forms of traditional leadership are practiced within the Nadow-Kaleo District. The study results showed that, 18.8% representing 75 respondents out of the 400 participants indicated that, the tindana plays a role in ensuring biodiversity conservation. Bonye and Millar (2004) reports that in the Upper East and Upper West regions, the tindana is considered a spiritual leader of his people and has powers over the management and control of land.

An informant in a key informant interview said:

"*Our tindanas perform rituals with regards to the purification of the land. Our tindanas pour libation on behalf of the people of the community to the gods for protection, good harvest, peace and unity in the community"* (Key informant interview, December, 2017).

44.3% (177 out of 400) reported that the chief plays a major role with regards to biodiversity conservation. Abayie (1998) notes that some ethnic groups in the north such as the Dagomba and Manprusi have chiefs in charge of the economic trees to ensure continues existence and sustainable utilization. AZTEC, (1997) also reports that chiefs make customary laws for his people for easy administration and preservation of customs and norms in accordance with customary practices of the community and in line with African democracy and accountability.

This is also captured in the words of an informant in a key informant interview:

"Our chiefs are the custodians of the community and they make the customary laws of the community and they protect our water bodies and forest" (Key informant interview, December, 2017).

23.5% representing 94 respondents out of the 400 participants reported that rainmakers, soothsayers and diviners also play a role in biodiversity conservation of the District. 5.3% representing 21 respondents out of the 400 participants reported that female leaders play a role in biodiversity conservation.

The remaining 8.3% representing 33 out the 400 respondents reported that clan heads/household heads play a role in biodiversity conservation in the district. This is captured in the words of an informant in a key informant interview:

"*Our rainmakers, soothsayers and diviners, female leaders and our clan heads all play a role in biodiversity conservation by helping the chiefs implement the customary laws of our land"(*Key informant interview, December, 2017).

Table 4.19: Traditional institutions in biodiversity conservation

		Frequency	Percent
Valid	Tindana	75	18.8
	Chiefs	177	44.3
	Rainmakers, soothsayers and diviners	94	23.5
	Female leaders	21	5.3
	Clan heads/ household heads	33	8.3
	Total	400	100.0

Source: Field Survey, 2017

4.3.13 Effectiveness of Traditional Leaders in Ensuring Biodiversity Conservation in the area

Figures obtained from the study on identifying the effectiveness of traditional leaders in ensuring biodiversity conservation in the Nadowli-Kaleo District are presented in Table 4.19. The study results showed that, 16.0% representing 64 respondents out of the 400 participants indicated that, traditional leaders are very effective in ensuring biodiversity conservation. 65.3% (261 out of 400) reported that traditional leaders are effective in ensuring biodiversity conservation. Majority of respondents indicated that the traditional

leaders are very effective in ensuring biodiversity conservation. According to an informant in a key informant interview:

"*Without our traditional leaders, we will not have customs and traditions, we will not have customary laws in our land and we will not have someone to implement them for us. All these things are done by our traditional leaders*" (Key informant interview, December, 2017).

The remaining 18.7% representing 75 out the 400 respondents reported that traditional leaders are not effective in ensuring biodiversity conservation. This is captured in the words of a participant in a key informant interview:

"Our traditional leaders have problems especially with the advent of Christianity and Islam and also with wealthy people and politicians. The Christians and Muslims make the work of the traditional people difficult" (Key informant interview, December, 2017).

Table 4.20: Effectiveness of traditional leaders in ensuring biodiversity conservation

		Frequency	Percent
Valid	Very Effective	64	16.0
	Effective	261	65.3
	Not Effective	75	18.7
	Total	400	100.0

Source: Field Survey, 2017

4.3.14 Significant of Traditional Leaders in Biodiversity Conservation

Figures obtained from the study on identifying the significance of traditional leaders in ensuring biodiversity conservation in the Nadowli-Kaleo District are presented in Table

4.20. The study results showed that, 4.0% representing 16 respondents out of the 400 participants indicated that, traditional leaders have very high significance in ensuring biodiversity. 82.8% (331 out of 400) reported that, traditional leaders have high significance in ensuring biodiversity conservation.

10.0% representing 40 out of 400 respondents reported that traditional leaders have a low significance in ensuring biodiversity conservation.

The remaining 3.2% representing 13 out of the 400 respondents reported that traditional leaders have a very low significance in ensuring biodiversity conservation in the district.

Table 4.21: Significance of traditional leaders in biodiversity conservation

		Frequency	Percent
Valid	Very High	16	4.0
	High	331	82.8
	Low	40	10.0
	Very Low	13	3.2
	Total	400	100.0

Source: Field Survey, 2017

Table 4.22: Relationship between traditional leaders and biodiversity conservation

		applicable traditional institutions in biodiversity conservation	How significant are these traditional leaders in ensuring biodiversity conservation
applicable traditional institutions in biodiversity conservation	Pearson Correlation	1	.004
	Sig. (2-tailed)		.929
	N	400	400
How significant are these traditional leaders in ensuring biodiversity conservation	Pearson Correlation	.004	1
	Sig. (2-tailed)	.929	
	N	400	400

4.3.15 Punishment of Offenders of Customary Laws on Biodiversity

Figures obtained from the study on identifying whether people are punished when they break customary laws on biodiversity conservation in the Nadowli-Kaleo District are presented in Figure 4.10. The study results showed that, 85.0% representing 340 respondents out of the 400 participants indicated a yes meaning people are punished when they break customary laws on biodiversity conservation. This confirms Gordon (1992) that there is connection between traditional beliefs and the gods, ancestral spirits, disrespect or disregard for taboos will invite grievous punishment for offenders and prices to expiate the gods such as making sacrifices and other rituals to prevent any misfortune, sickness and death.

The remaining 15.0% representing 60 out the 400 respondents reported a no meaning that people are not punished when they break customary laws on biodiversity conservation in the district.

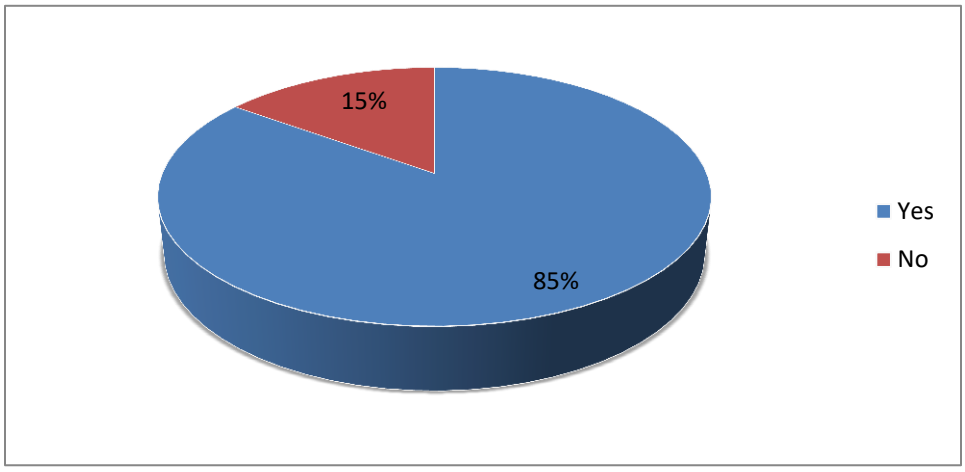


Figure 4.9: Responses as to whether people are punished when they break customary laws

Source: Field Survey, 2017

4.3.16 Execution of Punishments to Law Breakers

Figures obtained from the study on identifying who executes punishment to customary law breakers in the Nadowli-Kaleo District are presented in Table 4.22. The study results showed that, 19.0% representing 76 respondents out of the 400 participants indicated that, the tindana executes punishment to customary law breakers in the district. According to an informant in a key informant interview:

"*The tindana executes punishment to law breakers and pour libation where necessary to appease the gods and to bring relieve and peace to the one who broke the law*" (Key informant interview, December, 2017).

44.3% (177 out of 400) reported that the chiefs execute punishment to customary law breakers in the district. This is captured in the words of an informant in a key informant interview:

"When someone beaks any of our customary laws we send her/him to our chief palace for the chief to punish her/him" (Key informant interview, December, 2017).

23.5% representing 94 out of 400 respondents indicated that, the rainmakers, soothsayers and diviners execute punishment to customary law breakers. 5.0% representing 20 out of 400 participants indicated that the female leaders execute punishment to customary law breakers. The remaining 8.2% representing 33 out of the 400 respondents reported that the clan heads/family heads executes punishment to customary law breakers in the district. This is what an informant in a key informant interview has to say:

"*Our rainmakers, soothsayers, diviners and clan heads/family heads execute punishment to offenders in consultation with the chief*" (Key informant interview, December, 2017).

Table 4.23: People who execute punishment to law breakers

		Frequency	Percent
Valid	Tindana	76	19.0
	Chiefs	177	44.3
	Rainmakers, soothsayers and diviners	94	23.5
	Female leaders	20	5.0
	Clan heads/ household heads	33	8.2
	Total	400	100.0

Source: Field Survey, 2017

4.3.17 Other Person(s) Responsible for Punishing Law Breakers in the Study Area

Figures obtained from the study on identifying whether there are any other person(s) apart from those mentioned above are responsible for punishing customary law breakers in the in the Nadowli-Kaleo District are presented in Table 4.23). The study results showed that, 75.5% representing 302 respondents out of the 400 participants indicated, not applicable meaning they are not aware of any other person(s) responsible for punishing customary law breakers. The remaining 24.5% representing 98 out the 400 respondents reported that, the police execute punishment to customary law breakers in the district.

Table 4.24: Other people who execute punishment to law breakers

		Frequency	Percent
Valid	Not Applicable	302	75.5
	Police	98	24.5
	Total	400	100.0

Source: Field Survey, 2017

4.3.18 Roles of Traditional Leaders in Biodiversity Conservation

Figures obtained from the study on identifying the roles of traditional leaders on biodiversity conservation in the Nadowli-Kaleo District are presented in Table 4.24. The study results showed that, 33.5.0% representing 134 respondents out of the 400 participants indicated that, the role of the traditional leaders is to maintain law and order in the district. The traditional leaders are to make sure that they are peace and unity in the

community for people to go about their normal duties without a fear. 18.5% (177 out of 400) reported that the role of the traditional leaders is to lead by examples. A participant in focus group discussions said:

"*Our chiefs, tindanas and clan heads are to respect and obey the very customary laws that they make and should serve as a shining star for us people to emulate"* (Focus group discussions, December, 2017).

27.8% representing 111 out of 400 respondents indicated that, the role of the traditional leaders is education. The traditional leaders very often than not, offer education to the people about the history, customs and traditions of the community to the younger generation. 19.5% representing 78 out of 400participants indicated that the role of the traditional leaders is to punish offenders. This is similar to Bacho (2004), that institutions have powers to sanction or punish people who go contrary to norms and laws. A participant said in a focus group discussion:

"Our chiefs and tindanas punish law breakers to serve as a deterrent to others. In our forefather's time, people were even banished as a form of punishment" (Focus group discussions, December, 2017).

The remaining 0.7% representing 3 out of the 400 respondents reported not applicable

Table 4.25: Roles of traditional leaders in biodiversity conservation

		Frequency	Percent
Valid	Not Applicable	3	.7
	Maintain law and order	134	33.5
	Lead by example	74	18.5
	Education	111	27.8

Punishing offenders	78	19.5
Total	400	100.0

Source: Field Survey, 2017

4.3.19 Sustainability of Traditional Leaders' Ways of Conserving Biodiversity

Figures obtained from the study on identifying whether the traditional leaders way of conserving biodiversity is sustainable in the Nadowli-Kaleo District are presented in Table 4.25. The study results showed that, 86.0% representing 344 respondents out of the 400 participants indicated yes. The remaining 14.0% representing 56 out the 400 respondents reported no in the district.

Table 4.26: Responses as to whether traditional leaders' way of conserving biodiversity is sustainable

		Frequency	Percent
Valid	Yes	344	86.0
	No	56	14.0
	Total	400	100.0

Source: Field Survey, 2017

4.4 Modern Laws and customary laws on biodiversity conservation

4.4.1 Awareness of modern laws on biodiversity conservation

This section discusses the awareness of modern laws on biodiversity conservation. Figures obtained from the study on identifying the awareness of respondents on modern laws on biodiversity conservation in the Nadowli-Kaleo District are presented in Table

4.26. The study results showed that, 89.8% representing 359 respondents out of the 400 participants indicated yes meaning they are aware of modern laws on biodiversity conservation. The remaining 10.2% representing 41 out of the 400 respondents reported no, meaning they are not aware of modern laws on biodiversity conservation.

Table 4.27: Awareness of modern laws on biodiversity conservation

		Frequency	Percent
Valid	Yes	359	89.8
	No	41	10.2
	Total	400	100.0

Source: Field Survey, 2017

4.6.2 The modern Laws you are Aware of

Figures obtained from the study on identifying the modern laws that respondents are aware of in the Nadowli-Kaleo District are presented in Table 4.27. The study results showed that, 25.5. % representing 102 respondents out of the 400 participants indicated that, they are aware of one of the modern laws (wild life management policy). 26.8% (107 out of 400) reported that they are aware of wild life protection policy. Ampadu-Adjei (2002), said that in 1971, the wild life conservation delineated limitations on hunting, game licenses list of protected animals in Ghana and many more. 43.0% representing 172 out of 400 respondents indicated that they are aware of forest protection policy. This is in line MES (2002) that Efforts to conserve the country's forest and its resources date back to the 20th century, 4.3% representing 17 out of 400 participants indicated that they are aware of convention on biological diversity.

The remaining 0.4% representing 2 out the 400 respondents indicated that they are aware of the African convention on the conservation of nature and natural resources. Information gathered from focus group discussion indicated that, the people are aware of all the policies. They are aware that they are not supposed to be killing some wild animals, cutting the forest, burning the bush and forest as well as the conservation of nature and natural resources. However, they indicated that the forestry commission which is to ensure the day to day implementation of the policies are not situated in the District but is at Lawra District and the workers of the district assembly do not visit them unless there is an emergency in their communities.

Table 4.28: Modern Laws on Biodiversity Conservation

		Frequency	Percent
Valid	Wild fire management policy	102	25.5
	Wild life protection	107	26.8
	Forest protection	172	43.0
	Convention on biological diversity	17	4.3
	African convention on the conservation of nature and natural resources	2	.4
	Total	400	100.0

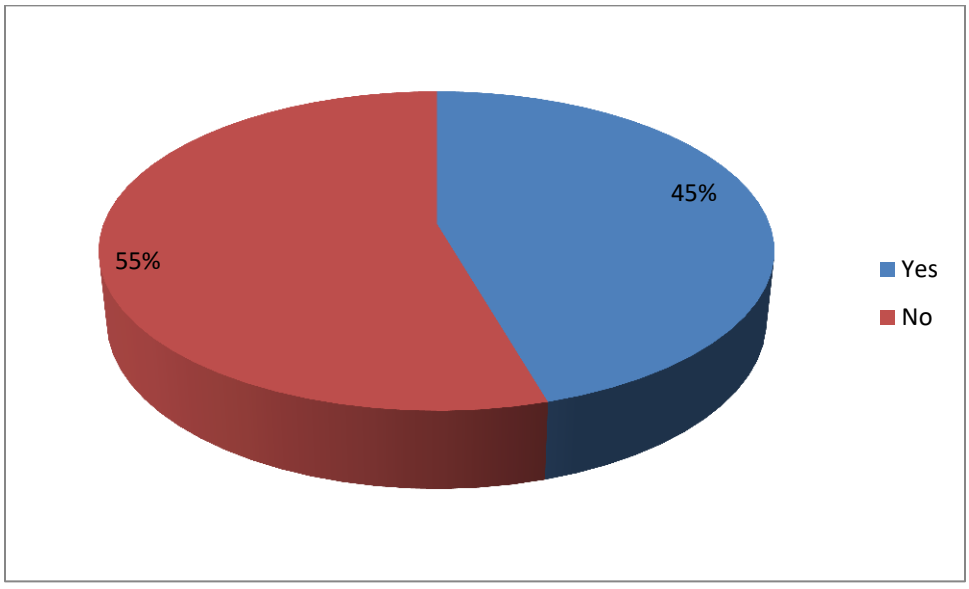
Source: Field Survey, 2017

4.6.3 Implementation of the Modern Laws in the Study Area

Figures obtained from the study on identifying whether the conventions are properly implemented in the Nadowli-Kaleo District are presented in Figure 4.11. The study results showed that, 45.5. % representing 182 respondents out of the 400 participants indicated yes. The remaining 54.5% representing 218 out the 400 respondents indicated that no meaning they are not implemented to the best. In a key informant interview with one of the traditional leaders. This is what he has to say:

"*The modern laws are not implemented to the best of our knowledge. The relevant conventional institutions do not come to us for collaborations for us at the grass root level to ensure that the conventional laws work in our communities. They only come and impose those conventions that we do not even understand on us and go away"* (Key informant interview, December, 2017).

Figure 4.10: Responses as to whether modern laws are best implemented



Source: Field Survey, 2017

4.6.4 Effectiveness of the Modern Laws in the Study Area

Figures obtained from the study on identifying the effectiveness of these modern laws in the Nadowli-Kaleo District are presented in Table 4.28. The study results showed that, 25.8% representing 103 respondents out of the 400 participants indicated that, the modern laws are very effective. 18.8% (75 out of 400) reported that the modern laws are effective. The remaining 55.4% representing 222 out the 400 respondents indicated that the modern laws are not effective. Information gathered at focus group discussions indicated that, the modern laws are not effective. This is because there are no relevant agencies and agents responsible for the implementation of the modern laws in the communities. They are at the District capital and do not visit the communities regularly. However, some people are of the view that, the modern laws are working very effectively in the District.

Table 4.29: Effectiveness of modern laws on biodiversity conservation

		Frequency	Percent
Valid	Very Effective	103	25.8
	Effective	75	18.8
	Not Effective	222	55.4
	Total	400	100.0

Source: Field Survey, 2017

4.6.5 Institutions Responsible for Implementing Conventions in the Study Area

Figures obtained from the study on identifying the institutions responsible for implementing these modern laws in the Nadowli-Kaleo District are presented in Table

4.29. The study results showed that, 29.0% representing 116 respondents out of the 400 participants indicated that, the Environmental Protection Agency (EPA) is responsible for implementing these laws. 51.3% (205 out of 400) reported that the Forestry Commission (FC) is responsible for implement these laws. The remaining 19.7% representing 79 out the 400 respondents indicated that the District Assemble is responsible for implementing these laws. A key informant interview indicated that, the district has no Environmental Protection Agency office in the District. It is the regional EPA officers that regularly visit them when the needs arise. Again, the District has no Forestry Commission office. The office is located at the Lawra District and is superseding activities in the Dstrict. This makes their work difficult as compared to if there were having such offices in the District. They indicated that the district assembly is the main institution responsible for implementing the conventions in the district.

Table 4.30: Institutions responsible for implementing biodiversity conservation

		Frequency	Percent
Valid	EPA	116	29.0
	Forestry Commission	205	51.3
	District Assembly	79	19.7
	Total	400	100.0

Source: Field Survey, 2017

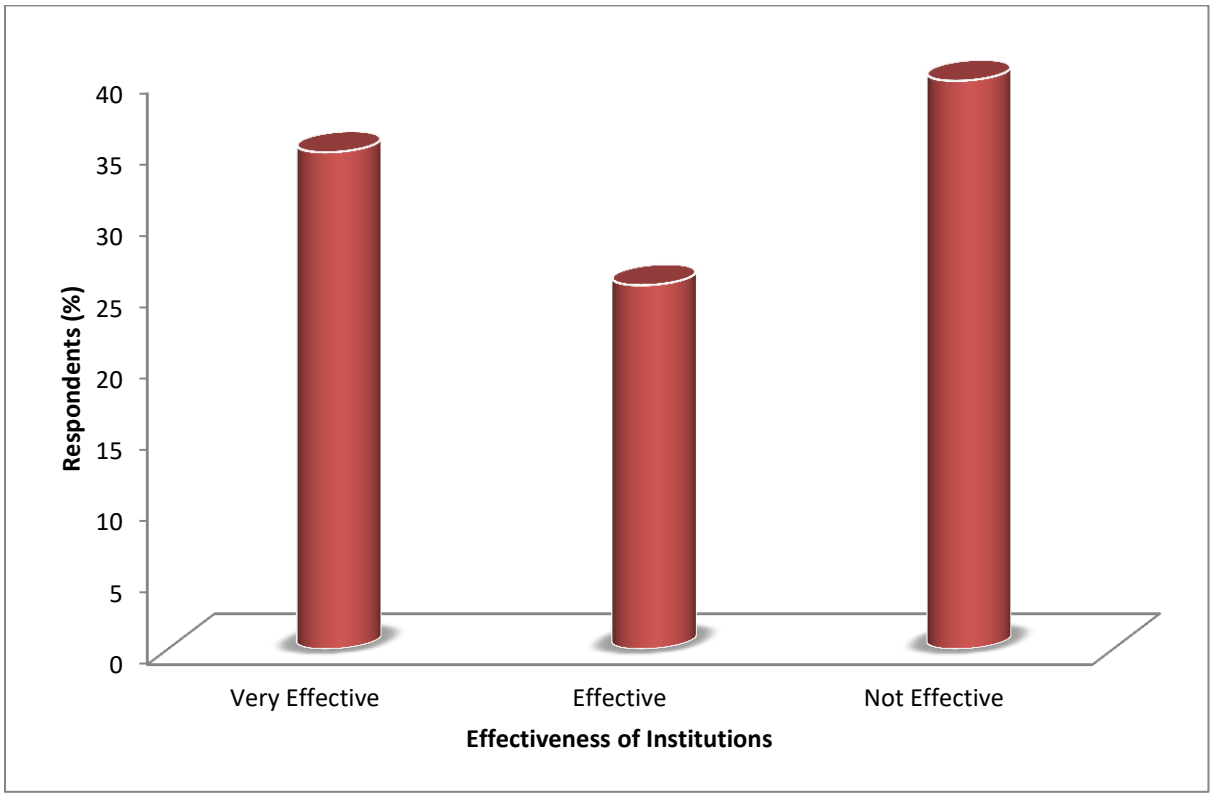
4.4.2 Effectiveness of Institutions in the Study Area

Figures obtained from the study on identifying the effectiveness of these institutions in implementing the laws in the Nadowli-Kaleo District are presented in Figure 4.12. The

study results showed that, 34.8% representing 138 respondents out of the 400 participants indicated that, the institutions are very effective in implementing these laws. 25.5% (102 out of 400) reported that the institutions are effective in implementing these laws.

The remaining 39.7% representing 159 out the 400 respondents indicated that the institutions are not effective in implementing these laws. In focus group discussions, they indicated that, because of the lack of relevant agencies and agents in the District, the laws are not best implemented.

Figure 4.11: Effectiveness of Institutions on Biodiversity Conservation



Source: Field Survey, 2017

4.4.3 Measures to Ensure Effective Integration of Customary and Modern Laws

Figures obtained from the study on identifying effective integration of customary laws and modern laws in the Nadowli-Kaleo District are presented in Table 4.30. The study

results showed that, 39.0% representing 196 respondents out of the 400 participants indicated that, education on the significance of biodiversity conservation is an effective way of integrating customary and conventional laws. 15.8% (63 out of 400) reported that offenders should be punished as a way of ensuring effective integration of customary laws and modern laws on biodiversity conservation. 4.8% representing 19 respondents out of the 400 participants indicated that, leaders being knowledgeable on the modern laws and customary laws on biodiversity conservation is an effective way of integrating customary and conventional laws. 10.8% representing 43 respondents out of the 400 participants indicated that, leaders willingness to implement laws of biodiversity conservation is an effective way of integrating customary and modern laws The remaining 19.8% representing 79 out of the 400 respondents indicated that, collaborations among institutions and traditional leaders is the effective way of integrating customary laws and conventions.

Table 4.31: Measures to ensure effective integration of customary laws with convention laws

		Frequency	Percent
Valid	Education on significance of Biodiversity conservation	196	49.0
	Offenders should be punished	63	15.8
	Leaders should be knowledgeable on the conventions and customary laws	19	4.8
	Leaders should willing to	43	10.8

implement laws		
Collaboration among Institutions and Traditional Leaders	79	19.8
Total	400	100.0

Source: Field Survey, 2017

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5 Introduction

This chapter presents the summary, conclusions and recommendations on the effects of customary laws on biodiversity conservation in the Nadowli/Kaleo District of the Upper West Region of Ghana. This study focused on customary laws and biodiversity conservation. It has attempted to find out the effects of customary laws on conserving biodiversity. This final chapter summaries the findings and makes some recommendations for policy planning within the sphere of biodiversity conservation. The aim of the study was to access the effects of customary laws on biodiversity conservation in the study area. The research was carried out using the mixed method approach (creswell and plano 2007). The sample for the study included household respondents, chiefs, elders, tindanas and women leaders. Data collection techniques that were used included questionnaires administration, key informant interviews and focused group discussion.

5.1 Summary of Major Findings

The study revealed that there are customary laws on biodiversity conservation in the Nadowli/Kaleo district of the Upper West Region. One of the participants remark that:

"*Our forefathers had customs and traditions that were aimed at protecting land, certain species of plants and animals, forest and water bodies that have played a very significant roles in their lives. They practice and protected those plants, animals and farming system that they considered very important and asked their generations to continue to do so".*

According to this participant, there are customary laws on biodiversity conservation in the study area.

The study also revealed the customary laws that are practiced in the area. Some of the customary laws were on ecosystem which included bush burning, indiscriminate cutting down of economic trees, sacred groves or forest and banned periods of hunting. The study also revealed that, there are customary laws on water bodies which included banned period of visiting the ponds, streams and rivers existed in the area. The last customary law was on herbal medicine which included prohibition of cutting down of medicinal trees and shrubs. Moreover it was revealed that, customary laws have significance on biodiversity conservation. Majority of respondents asserted that customary Laws were used to protect biodiversity even the time of their grandparents and they are still using the customary laws to protect their biodiversity in the contemporary age. They however acknowledge that, with the proliferation of Muslims and Christians in the district; they encounter difficulties in conserving biodiversity since some of the beliefs conflicts with the Muslims and Christians. The study further revealed that, there are taboos and totems that are used to conserved biodiversity in the study area. Majority of informants asserted that taboos and totems are the under pinning factors that put fear in the people not to kill some animals, cut down some trees and many more. This in fact leads to the conservation of biodiversity in the area, without taboos and totems attached to them, some species of plants and animals would have extinct long time in the community.

In line with the above, the study also revealed some of the applicable taboos and totems in the study area. They included forest and trees. It is a taboo to cut forest and some trees used as gods such as baobab and neem tree and economic trees such as dawadawa trees, shea nuts tree, mango trees and many more.

There are also totems and taboos on water bodies. People are not allowed to farm close to the ponds, streams and rivers. People are also not allowed to go fishing and swimming in ponds, streams and rivers on Fridays.

Lastly, there are norms on some wild life. Some animals and reptiles such as horse, python, crocodile, frog and loads are all considered totems in the study area. Again, it was revealed that, the taboos and totems are very effective in conserving biodiversity in the study area. An informant revealed that:

"*We have the belief that taboos can harm us and because of that, we do not go contrary to the taboos and that is what our grandfathers were practicing and handed it over to us and we will also do our best and pass it to our children*".

According to this informant, it is clear that taboos and totems in the study area are very effective in conserving biodiversity. Majority of respondents and informants are of the view that, other formal institutions responsible for conserving biodiversity are not found in the study area and for that matter are not as effective as the taboos and totems which are based on the beliefs and traditions of the study area. However, they again noted Christianity and Islam as the stumbling blocks to the taboos and totems.

Additionally, the study revealed the presence of sacred groves and shrines in the study area. Some of the sacred groves and shrines were left undisturbed. Cutting of trees and hunting were not common there. People were afraid to cut trees and hunt in the sacred groves and shrines because of the belief that they (sacred groves and shrines) will harm them if they cut trees and hunt there. This therefore promoted biodiversity conservation in the study area.

The study also revealed the role of traditional leaders on biodiversity conservation. The tindanas are the owners of the land. They (tindanas) perform sacrifices and rituals to the

gods of the land on behalf of the people. The chiefs also see to the day to day administration of their jurisdiction. They make customary laws of the area and punish people who break those laws. The rainmakers, soothsayers and diviners pour libation to invoke the gods to bring rain when the people need rain to farm and are not getting. Female leaders also known as magazias organize their colleague females and settle and mediate disputes in the study area. The last traditional leader on biodiversity conservation is the clan heads or household heads. They educate their households and clans on the customary laws of the land on biodiversity conservation.

Moreover, the study revealed that, traditional leaders encounter problems with Christians and Muslims but are effective in biodiversity conservation of the district. According to a key informant:

"*Without our traditional leaders, we will not have customs and tradition, we will not have customary laws in our land and we will not have someone who will implement them for us. All these are done by our traditional leaders".*

It can be realized from the informant that traditional leaders see to the administration of the area, pour libation, protect and preserved the customs and traditions of the area.

More so, the study reveals the practice of conventional laws on biodiversity conservation in the study area. Some of the policies and conventions they are aware are wild life management policy, wildlife protection, forest protection, convention on biological diversity and African convention on the conservation of nature and natural resources.

The study reveals that these conventional laws are not implemented and executed as expected in the study area. One of the key informants said that, the conventional laws are not implemented to the best of their knowledge, the relevant conventional institution do not come to them for collaboration. For them at the grass root level to ensure that, the

conventional laws work in their communities. They only come and impose those conventions that they do not even understand on them and go away.

5.2 Conclusion

Firstly, the socio demographic characteristics of the respondents are takening into consideration. The study shows that the least age group was 40 to 49 years and the highest was 70 years and above. This was because, in dealing with customary laws of the area, it is the elderly people who have experiential knowledge of the area. The finding also revealed males dominants in all levels of the composition of the traditional institutions except for the women leaders. Majority of the traditional leadership structures do not have women occupying positions such as chiefs, elders, tendanas and clan heads.

There are customary laws that exist in support of biodiversity conservation. The findings revealed that, there are customary laws in biodiversity conservation. The customary laws were on ecosystem, water bodies and herbal medicine. The findings revealed that these customary laws in the area were adhered to and for that matter where used in conserving biodiversity in the area.

Additionally, the findings revealed that taboos and totems are the ways that are used to conserved biodiversity. The findings also revealed that there are taboos on trees and forest and water bodies. It is a taboo to cut down economic trees such as dawadawa tree, shea nut tree, mango tree etc. It is also a taboo to farm 30m close to water bodies. Fridays are usually considered as taboo days for fishing and swimming in the ponds and rivers. Animals such as horse, crocodile, and python are all considered totems in the study area. The findings also revealed that, even though Christians and Muslims do not respect and

obey the taboos and totems, they are very significant and effective in conserving biodiversity of the area.

Also, the findings revealed that traditional leaders such as chiefs, tindanas, elders, clan heads and women leaders exist in the community and play very significant role in biodiversity conservation. The findings revealed that, the chiefs enact the customary laws of the land, punish offenders or law breakers and see to the day to day administration of the area. The tindanas are the land owners and performs sacrifices and rituals on behave of the people to the gods. The elders and the clan heads assist the chiefs in performing his duties.

Lastly, the findings revealed that conventional laws exist in the area in support of biodiversity conservation. However, the findings also revealed that, theses conventional laws and the institutions responsible for their implementations are not collaborating with the traditional leaders of the study area. The traditional leaders and respondents even explain that, some of the conventional laws are not understood by them so how can they now implement then in the grass root level. The findings also reveal that Forestry Commission and Environmental Protection Agency which are responsible for implementing the conventional laws are situated in the district.

5.3 Recommendations

Drawing from the above conclusion, the following recommendations are made.

Traditional leaders since times immemorial make customarily laws for their people through the use of religious believe moral sanction and sacred and cultural practices. These customary laws which evolved over time has proved more effects and sustainable

and the finding has also confirmed that the management of customary laws are exclusively the preserve of traditional leaders. The study therefore recommended that,

The District assembly which is part of local government and an agent of government should partner with the traditional leaders in making bye- laws that are in tuned with the customs and traditions of the people that are geared towards the protection and preservation of biodiversity. It is also recommended that the traditional leaders periodically especially in communal labours and festive periods offer education to the younger generation on the customary laws of the land. If this is effective, the customary laws will be passed on from generation to generation.

Additionally, the findings revealed that, the ways customary laws ensured biodiversity conservation is the used of taboos and totems in the district. The findings also made it clear that Christians and Muslims do not adhere to these believe. It is recommended firstly that, the traditional leaders continue to enforce the taboos and totems in the district. Again, it is recommended that the district assembly organizes a meeting for the traditional leaders and the religious leaders in the district for them to know the importance of the taboos and totems in the conservation of biodiversity.

Furthermore, in all the communities visited, they acknowledge the role of traditional leaders in biodiversity conservation. It is recommended that politicians and political leaders should not interfere in the work of the traditional leaders. Again the district assembly should work in partnership with the traditional leaders to punish offenders of the customary laws in the district. It is also recommended that, the regional house of chiefs should punish traditional leaders who are not firm, take bribes and are not fair to all manner of people in the area.

Lastly, it is recommended that, the district assembly should include traditional leaders when making bye-laws. This will give them the opportunity to share their experiential knowledge and be able to implement them at the local levels. Again at the national level, the government should include the National House of Chiefs when deliberating on policies and conventions on biodiversity conservation. The local government through the district assemblies should educate the traditional leaders on policies and conventions on biodiversity conservation that are intended to be implemented in their areas.

REFERENCES

Abbiw, D. K. (1990). *Useful Plants in Ghana*. Intermediate Publications. The Royal Botanical Garden, Kew.

Abu, A. and Millar, D. (2004), Land, Natural Resources and Spirituality; Policy Implication on Rural Livelihood in Northern Ghana, CECIK, Bolgatanga, Ghana.

Achim, S. and Gonzalo, O. (2004). Indigenous Knowledge and Natural resource Management: Local Pathways to Global Development. World Bank Report.

Adams, W. M. and Anderson, W. (1988), Irrigation before Development: Indigenous and Induced Change in Agricultural Water Management in East Africa. African Affairs, vol. 87

Adu-Gyamfi, Y. (2011). Indigenous Beliefs and Practices in Ecosystem Conservation: Response of the Church. *Scriptura* 107, pp. 145-155

Afikorah-Danquah, S. (1998). 'Local Resource Management in the Forest-Savanna Transition Zone: The case of Wenchi District, Ghana'. Report of Case Study for research on 'Environmental Entitlements: The Institutional Dynamics of Environmental Change'. Institute of Development Studies (IDS), University of Sussex.

Allen, G. M. (1972). Extinct and varnishing animals of the Western hemisphere. Cooper square publishers.

Allotey, J. A. (2007). *Status of biodiversity and impact assessment in Ghana. Environmental Protection Agency Ghana. Biodiversity and IA. Doc/ED's DOC.*

Alun, J. R. (2005). *The Secret of the Totem.* New York: Columbia University Press.

Amlalo, D. S., Atslatorme, L. D. and Flati, C. (1998). *Biodiversity conservation: Traditional knowledge and modern concepts.* Proceedings of the Third UNESCO-MAD Regional seminar on Biosphere Reserves for Biodiversity Conservation and Sustainable Development in Francophone Africa (BRAAF). Cape Coast, 9-12 march 1997.

Ampadu-Adjei O. (2002). The role of totems in the bush meat extinction prevention campaign in Ghana. Conservation international, Ghana.

Anane, M. (1997). 'Religion and Conservation in Ghana', in Alyanak, L. and A. Cruz (eds.), *Implementing Agenda 21: NGO Experiences from around the World.* New York: United Nations Non Laison Services.

Appiah-Opoku, S. and B. Hyma. (1999). 'Indigenous institutions and resource management in Ghana'. *Indigenous Knowledge and Development Monitor,* Vol. 7, Issue 3, 15-17.

Appiah-Opoku, S. and Hyma, B. (1999), Indigenous Institutions and Resource Management in Ghana: Indigenous Knowledge and Development Monitor, Vol.7: issue. 3

Appiah-Opoku, S. and Hyma, B. (1999). Indigenous Institutions and Resource Management in Ghana: Indigenous Knowledge and Development Monitor, Vol.7.

Arhin, K. (1967). 'The Structure of Greater Ashanti (1700-1824)'. *Journal of African History*, 8, 1, 65-85.

Arthin, S. (2008). *Complementing legislation: The role of cultural practices in the conservation of wild-life example from. J. Anim Law* 4:93-98.

Assimeng, M. (1999), Social Structure of Ghana. A Study in Perspective and Change. Ghana Publishing Corporation, Tema.

Attuquayefio, D. K and Wuver, A. M. (2003). A study of bush fires in a Ghanaian coastal woodland : Impact on small mammals.West.Afr.J.Appl.Ecol.4:1-11.

Attuquayefio, D. K. and Fobil J. N. (2005). *An over-view of wildlife conservation in Ghana: Challenges and prospects*. West Afr. J. appl. Ecol. 7: 1-18.

Awedora, A. K. (2002), Culture and Development in African with Special reference to Ghana. Institute of African Studies, University of Ghana, Legon, Accra.

AZTEC. (1997), Capacity Building of Traditional Institutions for the use of Indigenous Knowledge System in Natural Resource Management, Southern African Mission.

Bacho, Z. L. F. (2004), Can I Sell One of My Cows? Institutions, Assets and Gender Based Poverty. Ghana Journal of Development studies, vol 1 No 1, GILLBT Printing Press, Tamale, Ghana.

Bederman, D. J. (2010). *Custom as a Source of Law* (Cambridge: Cambridge University Press).

Beler, P., Van Drielen, M. Kankam Bo (2002*). Avifaunal collapse in West African Forest Fragment*. Conservation Biology 16(4):1097-1111.

Boaten B. A. (1997).Traditional conservation practices: Ghana's example. Paper presented at a UNESCO MAB Seminar on Biosphere Reserves for Biodiversity Conservation and Sustainable Dev't in Anglophone Africa (BRAAF) Cape Coast, Ghana.

Boaten, A. (1998). *Traditional Conservation Practices: Ghana's example*. Institute of African Studies Research Review, 14 (1) 42-51.

Boateng, A. (1998). 'Traditional conservation practices: Ghana's example'. *Institute of African Studies Research Review*, Vol. 14, No 1, 42-51.

Bonye, S. and Millar, D. (2004), Traditional Institutions: Entry Points for endogenous Development. Compass Magazine for Endogenous Development, No. 7.

Borrows, J. (2001). 'Listening for a Change: the Courts and Oral Tradition', *Osgoode Hall Law Journal*, 39 (1).

Borrows, J. (2002). *Recovering Canada: The Resurgence of Indigenous Law* (Toronto: University of Toronto Press.

Bryman, A. (2006). *Mixed methods: A four-volume set*. London: Sage.

Busia, K. A. (1951). *The Position of the Chief in the Modern Political System of Ashanti*. London, OUP.

CBD, (1992). Report on the United Nations Conference on Environment and Development (Rio de Janerio, 3-14, June, 1992.

Chacon, R. (2012). Conservation or Resource Maximization? Analysin Subsistence Hunting Among the Achuar (Shiwiar) of Ecuador. In: The Ethics of Anthropology and Amerindian Research: Reporting on Environmental Degradation and Warfare. Eds., R. Chacon and R. Mandoza. New York: Springer. Pp.311-360.

Chirayath, Leila, Caroline Sage and Michal Woolcock (2005). '*Customary Law and Policy Reform: Engaging with the Plurality of Justice Systems*, Background paper for the World Development Report 2006'. (World Bank)

Commons, J. R. (1970), the Economics of Collective Action, Madison: University of Wisconsin Press.

Conservation International Ghana (2005). *Handbook of Totems in Ghana*, Accra, Ghana, p. 36

Creswell, W. J. and Plano Clarke, V. L. (2007). *Designing and conducting mixed methods research.* Thousand Oaks, CA: Sage.

Danquah J. B. (1968). The Akan doctrine of God. Frank Cass, London.

Danso, S. K. A. and Abekoe, M. K. (2005). An overview of biodiversity conservation in Ghana: Challenges and prospects. West Afr. Journ. of App. Ecol.vol.7,

David D. (1981). The dooms day book of animals. Viking. New York.

Decher, J. (1997). Conservation, small mammals and the future of sacred groves in West Africa. Biodiver. Conserv.6:1007-1026.

Dickson, K. B. (1969). ` *Historical Geography of Ghana*, London: Cambridge University Press.

Dickson, K.B. (1969). *Historical Geography of Ghana.* London: Cambridge University Press.

DiMaggio, P.J. and Powell, W. W. (1991), the iron cage revisited: Institutional Isomorphism and collective rationality in organizational fields. The New Institutionalism in Organizational Analysis. University of Chicago Press.

Dorm-Adzobu C., Ampadu-Adjei O. and Veit P. G. (1991). Religious belief and environmental protection: The Malshegu sacred grove in northern Ghana. World resource institute, Washington DC and Nairobi. African Centre for technology studies (ACTS) press.

Dorm-Adzorbu, C. O. Ampadu-Agyei and P. G. Veit. (1991). *Religious Beliefs and Environmental Protection: The Malshegu sacred grove in Northern Ghana*. WRI Washington, DC, USA and Acts Press, Africa Centre for Technology Studies, Kenya.

Douglas, M. (1966). *Purity and Danger: An Analysis of the Concept of Pollution and Taboo*. London: Routledge & Kegan Paul.

Dove, M. R., Sajise, P. E., and Doolittle, A. A. (2005). *Conserving nature in culture: Case Studies from Southeast Asia'* New Haven, Yale University Southeast Asia Studies.

Dundes, R. Alison and Alan, D. (1994). *Folk Law: Essays in the theory and Practice of Lex Non Scirpta: Volume 1* (Madison: The University of Wisconsin Press).

Dwomoh, D. (1990). 'Forest Conservation: The contribution of sacred groves: A study of Sekyere West District, Ashanti Region'. B. A (Hons.) Dissertation, Geography Dept., University of Ghana, Legon.

Elias, Taslim and Olawale (1962). *British Colonial Law: A comparative study of the interaction between English and local laws in British dependencies* (London: Stevens).

Entsuah-Mensah, M., N.G. Willoughby and H.R. Dankwa. (1998). 'Ghana's coastal lagoon fisheries: Is traditional management sufficient?' Unpublished Manuscript submitted to *Coastal Management Journal.* Washington DC, USA.

Environmental Protection Agency, (2005a). *Third national report to the Committee for the review of the United Nations Convention to combat desertification. Ghana.*

Fairhead, J. and Leach, M. (1994). Contested forest: Modern conservation and historical land use in Guinea's Ziama Reserve. The Journal of the Royal African Society, vol. 93, no 373.

Fairhead, J. and M. Leach. (1994). 'Natural Resources Management: The Reproduction and Use of Environmental Misinformation in Guinea's Forest-savanna transition zone'. *IDS Bulletin*, Vol. 25, No. 2, 81-87.

Fairhead, J. and M. Leach. (1997). 'Culturing trees: socialized knowledge in the political ecology of Kessia and Kuranko forest islands of Guinea', in Seeland, K. (ed.),

Nature is Culture: Indigenous Knowledge and Social Cultural aspect of trees and forests in Non-European Cultures. London: Intermediate Technology Publication.

Falconer, J. (1992). 'Non-timber Forest Products in Ghana', Main Report, ODA.

Fargey, P. J. (1991). 'Assessment of the conservation status of the Buabeng Fiema Monkey Sanctuary', Report submitted to the Flora and Fuana Preservation Society.

Fisher, J. (1971).Wildlife in danger. In man's impact on the environment (T.R. Detwyler ed.), pp 625-635. Mcgraw-Hill New York.

Food and Agricultural Organization, (2000). "*The challenge of rural energy and poverty in developing countries*", World Energy Council/Food and Agriculture Organization of the United Nations, London.

Forest Services Division, (1996). *Annual report. Ministry of Lands and Forestry,* Accra, Ghana.

Frazer, J.G. (1926). *The Worship of Nature.* Volume 1. London: MacMillan and Co.

Freud, S. (2004). *Totem and taboo*. New York: George Routledgeand Sons.

Frondel, M., Christoph, M. S., & V. Colin, (2008). "*A regression on Climate Policy - The European Commission's proposal to reduce CO2 emissions from transport*" pages Ruhr Economic Papers 0044, pg. 1 – 23.

Gadgil, S. M. (2005). *Sacred groves and Sacred trees of UHara, Kannada,* New Delhi,India.

Gallai, N., Sales, J. *et al* (2009). Economic valuation of the vulnerability of world agriculture confronted with pollinator decline. *Ecological Economics* **68,** 810-821

Ghana Statistical Service, (2010). 2010 Population and Housing Census National Analytical Report.pg 355

Ghana Statistical Service, (2010). 2010 Population and Housing Census, Summary Report of Final Results

Glenn, H. P. (2000). *Legal Traditions of the World* (Oxford: Oxford University Press).

Goldman, M. (2003).*'Partitioned nature, privileged knowledge: Community-Based Conservation in Tanzania* 'Development and change, 34:833-862.

Goodin, R. E. (1996a), the Theory of Institutional Design. Cambridge University Press.

Goodin, R. E. (1996b), Designing Institutions in East European transitions: The Theory of Institutional Design. Cambridge University Press.

Gorjestani, N. (2004). Indigenous Knowledge: The Way forward. Local Pathways to Global Development. World Bank Report.

Grady, M. P. (1998). *Qualitative and Action Research; A Practitioner Hand book.* Phi Delta Kappa Educational Foundation, Bloomington, Indiana U.S.A.

Grimble, C. and Aglionby, Q. (1992), Trees and Trade-offs: A Stakeholder Approach to Natural Resource Management. Institutes for Environment and Development, UK.

Gyasi E. A. (1997). 'Background and Objectives of the Study of Production Pressure and Environmental Change in the Southern Forest-Savanna Transition Zone',

Gyasi E. A., Agyepong G. T., Ardayfio-Schandorf E., Enu-Kwesi L., Nabila J. S. and Owusu-Bennoah E**.** (1995). *Production pressure and environmental change in the forest-savanna zone of southern Ghana. Global Environmental Change***5** (4):355–366

Gyasi, E. A. (1996). 'Gyamfiase, Ghana: A Study in Threat and Counteracting Threat to Indigenous Forest Groves and Sustainable Forest Management Systems'. *Paper presented at Workshop on Contested Terrain: West African Forestry Relations,*

Landscapes and Processes. Centre of West African Studies, University of Birmingham, Egbaston, 12-13 April 1996.

Gyasi, E. A. (1997). *Background and objectives of the study of production pressure and environmental challenge in the Southern Forest-Savanna Transition Zone in Environment, Biodiversity and Agricultural Challenge in West Africa: Perspectives from Ghana*. United Nations University Press, Tokyo.

Gyasi, E. A. and J.I. Uitto (eds.), *Environment, Biodiversity and Agricultural Change in West Africa: Perspectives from Ghana*. Tokyo: United Nations University Press.

Hall, J. B. (1987). *Conservation of forest in Ghana*. Universitas 8:33-42

Haverkort, B. and Millar, D. (2004), Alternative Logic for Development Intervention CECK, Bolgatanga, Ghana.

Hawthorne, (1990).Field guide to the forest trees of Ghana. Natural resource institute, Chatham.

Hawthorne, W.D. and Abu-Juam, A. M. (1995). *Forest protection in Ghana.* IUCN/ODA, Cambridge, UK.

Hens, L. (2006). Indigenous knowledge and biodiversity conservation and management in Ghana; J. Hum. Ecol. 20(1):21-30

Hens, L., and Nath, B. (2003). *The Johannesburg Conference. Environment, Development and Sustainability* 5:7-39

Honneger, R. (1981). List of amphibians and reptiles either known or thought to have become extinct since 1600. Biol. Conserv.19 (2):141-158.

Huber, H., Hohn M. J. *et al* (2002). *Nature* **417**, 63-67

Human Rights Dialogue: Customary Law, Traditional Knowledge and Human Rights' National University of Ireland Galway, 18--19th June. (Copy on file with author)

ICHRP, (2009). 'When Legal Worlds Overlap: Human Rights, State and Non-State Law', (Versoix, Switzerland International Council on Human Rights Policy).

Impact Development Associates. (1991), Capacity Building of Traditional Institutions for the use of Indigenous Knowledge Systems in Natural Resource Management, Zimbabwe.

International Council for Bird Preservation (ICBP) (1980). Red data book of endangered birds. Smithsonian institution press, Washington, DC.

International Development Studies (IDS) (1993), Institutional Issues in natural resource management. Occasional paper No 9, Roskilde University, Denmark.

International Institute for Environment and Development (IIED) (1992). Environmental Synopsis of Ghana. Overseas Development Administration. p. 28.

International Institute for Environment and Development (IIED) (1992). Environmental synopsis of Ghana. Overseas Development Administration (ODA), London. Issues).

IUCN, (2008). Extinction threat growing for mankind's closest relatives

IUCN, (2013). IUCN red list of threatened species. Version 2013.2 (Online). Available from: Www. Iucn red list. org. Access 14 July 2017.

Johan, C., & Carl, F. (1997). The relations among threatened species: Their protection, and taboos. *Conservation Ecology* [online] **1**(1):6. Available

Karma, R. (1999), Research Methods. SAGE Publications. New Delhi, India.

Kasanga, K. (1994), Land Tenure System and Ecological Degradation in Northern Ghana: What Role for Local Authority, UST, Kumasi, Ghana

Kearns, C. (2010). Conservation of Biodiversity. Nature Education Knowledge 3(10):7

Krech, III S. (2005). Reflections on Conservation, Sustainability, and Environmentalism in Indigenous North America. Am. Anthropol. 107(1):78-86.

Lars, E. (1999), Natural Resource Management by Village Councils: Some evidence from Burkina Fasso. Occasional Paper No. 9. Roskilde, Denmark.

Leech, N. L., Barett, K. C. and Morgan, G. A. (2005). SPSS for Intermediate Statistics: Use and Interpretation. Lawrence Erlbaum Associates, London.

Lepage, D. (2014). Checklist of birds of Ghana. (Online). Avibase, the world birds'database. Available from:http:// avibase. bsceoc. org/ avibase PDF/ checklist. pdf? region+= gh and obs= no and format=2 (access 20 July 2017).

Little, P. D. (1987). Land of Risk in the Third World; Local level Perspectives; Boulder, West view Press.

Lopez-Escamez, J. A., Lopez-Nevot, A., Gamiz, M. J. and Moreno, P. M., (2005). Effectiveness of Structured Questionnaires for diagnosis. ENT Department, Almeia, Spain

Lumor, F. (2009). *Significance of animal symbolism among the Akans of Akyem Abuakwa traditional area.* Unpublished Master of Arts in Art Education submitted to Faculty of Fine Art, College of Art and Social Sciences, KNUST-Ghana

McCaskie, T. C. (1995). *State and Society in pre-colonial Ashanti.* Cambridge University Press. McLeod, M. D. 1981. *The Ashanti*. British Museum Publication Ltd.

McNeely, J. A., Gadgil, M., Leveque, C., Padock, C., and Redford, K. (1995). *Humaan influence on biodiversity. In Global biodiversity assessment.* (V. H. Heywood and R. T. Watson, ed) pp.771-821. Cambridge University Press, Cambridge.

Mensah, A. Y. Houghton, P. J. Bloodfield, S. F. Vanden, Berghe, D. A. and Vlietnick, A. J. (2000*). "Known and novel terpenes from Buddleja Globhasa displaying selective anti-fungal activity against dermatophytes"*. Journal of natural productives 83:1210-1213.

Millar, D. (2004 b), Shrines and Groves: Bio-cultural Diversity and Potential Environment Management. Communication and Media for Development, Cantonments, Accra, Ghana.

Millar, D. (2004 b), Shrines and Groves: Bio-cultural Diversity and Potential Environment Management. Communication and Media for Development, Cantonments, Accra, Ghana.

Millar, D. (2004a). Traditional African World Views from a Cosmovision Perspective. Communication and Media for Development, Cantonments, Accra, Ghana

Miller, D. C. (1991). Research Design and Social Measurement. SAGE Publication Newbury Park, California.

Miller, R. L. and Brewer, J. D. (2003).*A-Z of Social Research – Dictionary of Key Social Science,* Sage Publication, London.

Ministry of Environment and Science, (2002). *National biodiversity strategy for Ghana* .Government of Ghana, Accra.

Mohammed-Katerere, J. (2004), Participatory Natural Resource Management in the Communal Land of Zimbabwe: What Role for Customary Law? African Studies Quarterly 5 no 3; z. [online] URL: h||p: /web.ufl.edu/asq/vsi 3a7.htm

Morgan, S. (2010). 'Customary law in National and International Arbitration and Litigation Proceedings', paper presented at the *First Customary Law and*

Moulton M.P. and Sanderson, J. (1997).Wildlife issues in a changing world. St. Lucie press, Delray Beach, Florida.

National Park Service, (2010). Department of the Interior, USA. *The National Park System: Caring for the American Legacy*.

Neuman, L., and Wieg and, B., (2000). *Criminal justice research methods*. Boston; Allyn andBacon.

Ntiamoa-Baidu, Y. (1991). 'Conservation of coastal lagoons in Ghana: the traditional approach'. *Landscape and Urban Planning*,Vol. 20, 41-46. Amsterdam: Elsevier Science Publishers B.V.

Ntiamoa-Baidu, Y. (1995). '*Indigenous vs. Introduced biodiversity conservation strategies: The case of protected areas systems in Ghana'. African Biodiversity Series*, Number I, May1995, 1-11. Washington: The Biodiversity Support Program.

Ntiamoa-Baidu, Y. (1995). 'Indigenous vs. Introduced Biodiversity Conservation Strategies: The case of protected areas systems in Ghana'. *African Biodiversity Series*, Number I, May 1995, 1-11. Washington: The Biodiversity Support Program.

Ntiamoa-Baidu, Y., L. J. Gyamfi-Fenteng and D. Abbiw. (1992). 'Management strategy for Sacred Groves in Ghana', Report prepared for the World Bank and the Environmental Protection Council.

Nukunya, G. K. (2003), Tradition and Change in Ghana, an Introduction to Sociology. Ghana University Press, Accra, Ghana.

Ostrom, E. (1992), the rudiments of a theory of origins, survival and performance of common property institutions.

Owusu-Bennoah (1995). *'Production pressure and environmental change in the forest-savannaZone of southern Ghana. Global Environmental Change,* 5(4): 355-66.

Painter, .M. (1994). Situating User Based Governance: People's livelihood Strategies and Natural Resource Management in West Africa. Occasional paper No 12. IDS, Roskelde, Denmark.

Paula, D. (2004), Indigenous Knowledge Systems in sub-Saharan Africa: An Over view. Indigenous Knowledge, Local Pathway to Global Development, the World Bank, African Region.

Pillien, J. and Walpole, S. (2001). Moving from open access to extraction to new participatory levels of accountable management. Malampaya Sound, Palawan, Philippines.

Policy Research and Strategic Planning Institute, (1992): *Ghana Herbal Pharmacopoeia*, Advent Press, Osu, Accra.

Ridell, J. and Dickerman, C. (1999). Country profiles of land tenure. LTC Paper No. 127. Land Tenure, Wisconsin.

Rode M. O. and Adjei A. C (2003). Amphibians of the Togo-Volta highlands, Eastern Ghana. Salamandra, Rheinbach 39 (3/4):207-234.

Sapsford, R., and Jupp, V. (2006). *Data Collection and Analysis*, 2nd ed., Sage Publications: London.

Sarantakos, S. (2005). Social researcher (3rd ed). New York: palgrave macmilian.

Sarfo-Mensah, P., and Oduro, W. (2007). *'Traditional natural resource management practices and biodiversity conservation in Ghana: A view of local concepts and*

issues on change and sustainability.'Fondazione Eni Erico Mattei, Notu Dilavoro 90.

Sarpong, G.A. (1996). The environmental protection act: Implications for managing directors and heads of organizations. Paper presented at a seminar on environmental protection in Ghana.

Saunders, M., Lewis, P. and Thornhill, A. (1997). Research Methods for Business Students. Pearson Professional Limited, London.

Sen, D. and Grown, P. (1987), Development Crises and Alternative Visions: Third World Women Perspectives. Earthscan Publication Ltd, London.

Smith E. A., Wishnie M. (2000). Conservation and subsistence in small-scale societies. Ann. Rev. Anthropol. 29:493-524.

Sobrevila, C. (2008). *The role of indigenous peoples in biodiversity conservation.* The ord Express, Inc. Washington D. C.

Stork, N. E. and Samways, M. S. (1995). Inventorying and monitoring biodiversity in Global Biodiversity Assessment (V. H. Heywood, ed.), pp.453-544.Cambridge University press, Cambridge.

Thomas W. H. (2003). One last chance: Tapping indigenous knowledge to produce sustainable conservation policies. Futures 35:989-995.

Thomsen, J.T. (1994). Improve Natural Resource Management. The Role of the State verses that of the Community. IDS, Occasional paper No 12.Roskilde University, Denmark.

Trochim, W. M. (2001). *The research methods knowledge base*, 2nd edition. Atomic Dog Publishing. Available online: http://www. socialresearchmethods.net/kb/.

Turvey, S .T., Barrett, L. A., Hao, Y. J., Zhang, X. Q., Wang, X. Y., Huang, Y. D., Zhou, K. Y., Hart, T. and Wang, D. (2010). *Rapidly shifting baselines in Yangtze fishing communities and local memory of extinct species*. Conservation Biology, 24:778-787.

Tutu, K. A. Ntiamoah-Baidu, Y. and Asuming-Brempong, S. (1993). *The economics of living with wildlife in Ghana.* Report prepared for the World Bank, Environment Division, pp. 85.

UDS/CARE, (2004), the Chief, the Forester and Fireman; Proceeding on Bushfire Workshop, GILLBT, Tamale, Ghana.

United Nations, (2012). Handbook on Population Census Methods (Series F, No. 5)

UNPFII, (2006). 'Report of the International Technical Workshop on Indigenous Traditional Knowledge', (New York).

UNPFII, (2010). 'Preliminary Study Shows 'Doctrine of Discovery' Legal Construct Historical Root for Ongoing Violations of Indigenous Peoples' Rights', HR/5019(Economic and Social Council Permanent forum on Indigenous

Usher P. J. (2000).Traditional ecological knowledge in environmental assessment and management. Arctic 53(2):183-193.

Vivian, J. M. (1991). *'Greening at the grassroots: People's Participation in Sustainable Development'. UNRISD Discussion Paper* 22. Geneva, Switzerland.

Vordzogbe V. V., Attuquayefio, D. K., Gbogbo, F. (2005). The floral and mammals of the moist semi-deciduous forest zone in the Sefwi-Wiawso District of the Western Region, Ghana. West. Afr.J.Appl.Ecol.19:119-137.

Wanjui, J. (2013). Biodiversity Conservation Needs and Method to Conserve the Biological Diversity. J Biodivers Endanger Species 1:113. doi:10.4172/2332-2543.1000113

Warren, D. M. (1992), Strengthening Indigenous Nigerian Organizations and Associations for Rural Development. Occasional paper No 1. Roskilde University, Denmark.

Weckstein, J. D., Marks, B. D., Moyle, R.G., Johnson, K.P., Meyer, M. J., Braimah, J., Opong J., Amponsah, J. (2009). Birds recorded from surveys in Ghana's Central and Brong-Ahafo regions.Malimbus.31:28-46.

Wiafe, E. D. and Adjei, D. (2013). Species richness, diversity and distribution of amphibians along elevational gradient on mountain Afadjato, Ghana. Eur. J .For. Sw 1(2):68-76.

Wildfire Management Policy, (2005). Ministry of Lands and Forestry, Ghana.

Williamson, O. E. (1999), the Economic Institutions of Capitalism: Firms, Markets, Relational Contracting. New York: Free Press.

Wilson, D. E. (1992). *The diversity of life* .Belknap, Cambridge, Massachusetts.

Woodman, G. R. (2007). 'Customary Legal Norms', in David S. Clark (ed.), *Encyclopedia of Law & Society*, 379.

World Bank, (2006). 'World Development Report: Equity and Development', (New York: World Bank and Oxford University Press).

World Bank. (1997), Taking Action to Reduce Poverty in Sub-Saharan Africa. World Bank Publication.

Yin, R. K. (1993). Case Study Research. Design and Methods. Beverly Hill: SAG.

APPENDICES

UNIVERSITY FOR DEVELOPMENT STUDIES, WA

GRADUATE SCHOOL

Dear respondent(s),

This questionnaire is part of a survey being conducted in partial fulfillment for the award of MPhil, Environment and Resource Management from the University for Development Studies on effects of customary laws on biodiversity conservation. This information is purely for academic purpose and therefore its confidentiality is highly guaranteed. You are therefore kindly requested to provide accurate answer to the ensuring questions. Your co-operation and support will be appreciated

PART ONE: DEMOGRAPHIC DATA

1. Please, indicate the name of your community ……..
2. Indicate the traditional council of which your community belongs to

   …….....
3. Gender. Male [ ] Female [ ]
4. Age range. 40-49 [ ] 50-59 [ ] 60-69 [ ] d. 70 and above
5. Highest Educational Qualification. None [ ] Basic [ ] Secondary [ ] Diploma/HND [ ] University degree [ ]
6. Occupation. Famer [ ] Teacher [ ] Nurse/Doctor [ ] Security Forces [ ] If others please, specify ……..
7. Religion. Traditionalist [ ] Christianity [ ] Islam [ ]

Part Two: Customary Laws and Practices

8. Are they customary laws on biodiversity in your area? Yes [ ] No [ ]
9. What customary law (s) are practiced in your area? Please tick the applicable law practiced.

Customary Law	Examples of customary laws practiced	Please Tick if applicable
Ecosystem	Bush burning	
	Indiscriminate cutting down of economic trees	
	Sacred groves or forest	
	Banned period of hunting	
Water Farming	Banned periods of fishing	
	Prohibited days for visiting ponds, rivers and streams (shrine)	
	People not allowed to farm close to rivers, ponds and streams (shrine)	
Herbal medicines	Prohibition of cutting medicinal trees and shrubs	

10. How significant are these customary laws in ensuring biodiversity conservation?

Very High [ ] High [ ] Low [ ] Very Low [ ]

11. How effective are these customary laws on biodiversity conservation?

Very effective [ ] effective [ ] Not effective [ ]

12. Please, specify if any customary law (s) are practiced in your area not listed above

……

……

……

Part Three: Ways of customary laws and practices in biodiversity conservation.

13. Are there taboos and prohibitions on biodiversity in your area? Yes [ ]No [ ]

14. Tick the applicable taboos in your area

Taboos on	**Please Tick those applicable ( )**
Forest and Trees	
Water bodies	
Wild life (animals, snakes and birds)	

15. If any other taboo (s) are not listed, please specify them.

……

……..

……

16. How effective are these taboos in your area? Very effective [ ]

effective [ ] Not effective [ ]

17. How significant are these taboos in ensuring biodiversity conservation?

Very High [ ] High [ ] Low [ ] Very Low [ ]

18. Are there totems observed in your area on biodiversity? Yes [ ] No [ ]

19. Tick the applicable totems in your area

Totems observed on	**Please Tick those applicable ( )**
Animals (donkey, porcupine, hedgehog)	
Birds (dove, chicken, etc.)	
Sea life (Fish, crocodile, frog, toad)	

20. Mention any other totem not listed above

……

……

21. How effective are these totems in your area? Very effective [ ]

effective [ ] Not effective [ ]

22. How significant are these totems in ensuring biodiversity conservation?

Very High [ ] High [ ] Low [ ] Very Low [ ]

23. Do you have sacred groves and shrines in your area? Yes [ ] No [ ]

24. Are these sacred places respected? Yes [ ] No [ ]

25. Do you practice land tenure systems in your area? Yes [ ] No [ ]

26. How is land owned in your area? Extended family property [ ] Private property [ ]

Part Four: Role of traditional leadership on biodiversity conservation

27. Please tick applicable traditional institutions in biodiversity conservation

Traditional leadership	Please tick those applicable
Tindana	
Chiefs	
Rainmakers, soothsayers and diviners	
Female leaders	
Clan heads/ household heads	

28. Mention any other traditional leaders not listed above

…….

…….

……

29. How effective are these traditional leaders in ensuring biodiversity conservation in your area? Very effective [ ] Effective [ ] Not effective [ ]

30. How significant are these traditional leaders in ensuring biodiversity

conservation? Very High [ ] High [ ] Low [ ] Very Low [ ]

31. Are people punished when they break these customary laws on biodiversity?

Yes [ ] No [ ]

32. Who execute these punishments to law breakers? Please tick those applicable.

Traditional leadership	Please tick those applicable
Tindana	
Chiefs	
Rainmakers, soothsayers and diviners	
Female leaders	
Clan heads/ household heads	

33. Please are they any other person(s) who are responsible for punishing law breakers that is not mentioned above? Please list these people.

……

……

In your opinion, what are the roles of traditional leaders in biodiversity conservation

……

……

34. Do you think the traditionalleaders' ways of conserving biodiversity are sustainable? Yes [ ] No [ ]

Part Five: How modern laws can complement customary laws on biodiversity conservation

35. Are you aware of modern laws on biodiversity conservation?

Yes [ ] No [ ]

36. Please tick the modern laws you are aware of in the table below

Modern Laws	**Please Tick**
Wild fire management policy	
Wild life protection	
Forest protection	
Convention on biological diversity	
African convention on the conservation of nature and natural resources	

37. Are these modern laws implemented to the best of your knowledge? Yes [ ]

No [ ]

38. If yes, how effective are these modern laws? Very effective [ ] Effective [ ]

Not effective [ ]

39. Which of these institutions are responsible for implementing these modern laws?

Institution	Tick most appropriate
Environment Protection Agency	
Forestry Commission	
District Assembly	

40. How effective are these modern laws? Very effective [ ] Effective [ ]

Not effective [ ]

41. In your opinion, what should be done to ensure effective integration of customary

and modern laws

……

……

THANK YOU FOR YOUR TIME

UNIVERSITY FOR DEVELOPMENT STUDIES, WA

GRADUATE SCHOOL

INTERVIEW GUIDE FOR FOCUS GROUP DISCUSSIONS

(TO BE ADMINISTERED TO ELDERS OF THE COMMUNITY)

1. Are they customary laws on biodiversity in your area?
2. What types of customary laws exist here in relation to biodiversity conservation?
3. How are these customary laws on biodiversity conservation practiced?
4. How significant are these customary laws in ensuring biodiversity conservation?
5. How effective are these customary laws on biodiversity conservation?
6. Are there taboos and prohibitions on biodiversity in your area?
7. If yes mention them.
8. How effective are these taboos in your area?
9. Are there totems observed in your area on biodiversity?
10. If yes mention them.
11. Mention the traditional institutions involved in biodiversity conservation.
12. How effective are these traditional leaders in ensuring biodiversity conservation in your area?
13. Are people punished when they break these customary laws on biodiversity?
14. Who execute these punishments to law breakers?
15. Are you aware of modern laws on biodiversity conservation?
16. If yes mention them.
17. Which institutions are responsible for implementing these modern laws?
18. How effective are these v laws?

THANK YOU FOR YOUR TIME

UNIVERSITY FOR DEVELOPMENT STUDIES, WA

GRADUATE SCHOOL

KEY INFORMANT INTERVIEW GUIDE

This questionnaire is part of a survey being conducted in partial fulfillment for the award of MPhil, Environment and Resource Management from the University for Development Studies on effects of customary laws on biodiversity conservation. This information is purely for academic purpose and therefore its confidentiality is highly guaranteed. You are therefore kindly requested to provide accurate answer to the ensuring questions. Your co-operation and support will be appreciated

I. Guide for chiefs interview

1. Are they customary laws on biodiversity in your area? Yes [ ] No [ ]
2. If yes what are the types of customary laws on biodiversity conservation.
3. How are these customary laws on biodiversity conservation practiced?
4. How significant are these customary laws in ensuring biodiversity conservation?
5. How effective are these customary laws on biodiversity conservation?
6. Are there taboos and prohibitions on biodiversity in your area? Yes [ ] No [ ]
7. If yes mention them.
8. Mention the traditional institutions involved in biodiversity conservation.
9. How effective are these traditional leaders in ensuring biodiversity conservation in your area?
10. Are people punished when they break these customary laws on biodiversity?
11. Who execute these punishments to law breakers?
12. Are you aware of modern laws on biodiversity conservation? Yes [ ] No [ ]

13. If yes mention them.

14. Which institutions are responsible for implementing these modern laws?

15. How effective are these modern laws?

II. Guide for tindanas interviews

1. Are they customary laws on biodiversity in your area? Yes [ ] No [ ]
2. If yes what are the types of customary laws on biodiversity conservation.
3. How are these customary laws on biodiversity conservation practiced?
4. What role does the tindana's play in biodiversity conservation
5. Are there taboos and prohibitions on biodiversity in your area? Yes [ ] No [ ]
6. If yes mention them.
7. Mention the traditional institutions involved in biodiversity conservation.
8. What challenges do the tindana face in biodiversity conservation?
9. Are people punished when they break these customary laws on biodiversity?
10. Who execute these punishments to law breakers?
11. Are you aware of modern laws on biodiversity conservation? Yes [ ] No [ ]
12. If yes mention them.
13. Which institutions are responsible for implementing these modern laws?
14. How effective are these modern laws?

III. Guide for women leaders interview

1. Are they customary laws on biodiversity in your area? Yes [ ] No [ ]
2. If yes what are the types of customary laws on biodiversity conservation.
3. What role do women leaders play in biodiversity conservation?
4. Are people punished when they break these customary laws on biodiversity?
5. Who execute these punishments to law breakers?

6. Are you aware of modern laws on biodiversity conservation? Yes [ ] No [ ]
7. If yes mention them.
8. Are these modern laws working effectively?

THANK YOU FOR YOUR TIME