

**EFFORTS OF RURAL COMMUNITIES IN COMBATING DROUGHT
AND DESERTIFICATION IN THE LA WRA DISTRICT, GHANA**

BY

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UNIVERSITY FOR DEVELOPMENT STUDIES

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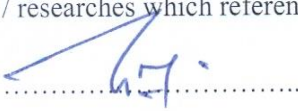
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**A DISSERTATION SUBMITTED TO THE DEPARTMENT OF PLANNING AND
MANAGEMENT, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE
AWARD OF THE MASTER OF SCIENCE DEGREE IN DEVELOPMENT
MANAGEMENT**



DECLARATION

I declare that this dissertation is the true research work carried out within the guidelines for the award of Master of Science in Development Management. I duly acknowledge all works / researches which references are made to. Any other error in this work is attributable to me.



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I declare that this work was under my supervision and the student has followed the guidelines and procedures for the presentation of the research work.



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DEDICATION

To my wife Ms Dzigbodi Adzo Doke and my two daughters, Miss Kimberly Dzigzor Nkegbe and Miss Kayce Kekeli Nkegbe.



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I am grateful to Dr. M. K. Nkrumah, Department of Environment and Resource Studies — University for Development Studies, Wa Campus for his dedication, valuable advice and encouragement.

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ACRONYMS

CEMC	Community Environmental Management Committee
DEP	District Environmental Profile
DSDA II	Danish Support to District Assemblies Phase II
EPA	Environmental Protection Agency
FAO	Food and Agriculture Organization
FSD	Forestry Service Division
GEMP	Ghana Environmental Management Project
GES	Ghana Education Service
GNFS	Ghana National Fire Service
GO	Governmental Organization
GS S	Ghana Statistics Service
LWMP	Land and Water Management Project
MOFA	Ministry of Food and Agriculture
NADMO	National Disaster Management Organization
NAP	National Action Program to Combat Desertification and Drought
NEAP	National Environmental Action Plan
NGO	Non-Governmental Organization
REP	Regional Environmental Profile
SARI	Savanna Agricultural Research Institute
SDA	Seventh Day Adventist Church
UNCCDD	United Nations Convention to Combat Desertification and Drought
UNCB	United Nations Convention on Biodiversity
UNCOD	United Nations Conference on Desertification
UNEP	United Nations Environmental program
UNFCCC	United Nations Framework Convention on Climate Change



ABSTRACT

The desertification that is taking place in Ghana has many adverse effects on rural livelihoods. As a result, rural populations suffer lower crop and livestock production which further deepens their poverty. The study sought to bring to bear rural communities' efforts in combating drought and desertification in the Lawra District

The collection of data from participants for the study was done in focus groups. Also selecting the Communities and participants for the focus groups, the researcher employed the purposive and simple random sampling techniques.

Findings of the study revealed that rural communities in the Lawra District are engaged in a wide range of local initiatives such as non-burning experiment, creation of community reserves, composting, enactment of local laws, stone lining, bonding and mulching among others towards combating drought and desertification. However, information on communities' efforts towards combating drought and desertification is challenged by inadequate documentation on its activities. The researcher recommends in this study that for the efforts of rural communities in combating drought and desertification be known to the outside world, there should be adequate and proper documentation at the Lawra District Assembly for easy referrals



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CHAPTER ONE

BACKGROUND OF THE STUDY

1.1 Introduction

Drought and desertification are at the core of serious challenges and threats facing sustainable development in Africa. These problems have far reaching adverse impacts on human health, food security, economic activity, physical infrastructure, natural resources, the environment, and, national and global security (ECA, 2007).

Desertification has long been recognized as a major environmental problem with an adverse impact on the livelihoods of people in the affected areas of the world (EPA, 2002: 1). The global concern about the scourge of desertification led the United Nations to organize extensive studies and consultations at the global, regional and local levels involving scientists, policy and decision makers and experts from research and development institutions and other organizations from all over the world (UNDP, 1991) as in (EPA, 2002: 1). These initiatives further culminated in the organization of the United Nations Conference on Desertification (UNCOD) in 1997 in Nairobi, Kenya.

The best estimate at present is that 61% of the world's drylands is decertified to some extent. An estimated 6-7 million hectares of agricultural lands are now made unproductive each year because of erosion-more than twice the rate in the past three centuries. Water logging, salinity and alkalinity reduce the productivity of an additional 1.5 million hectares each year (WRI/IIED/UNEP, 1988) as in (Nsiah-Gyabaah, 1994).

Africa is especially susceptible to land degradation and bears the greatest impact of drought and desertification. It is estimated that two-thirds of African land is already degraded to some degree and land degradation affects at least 485 million people or sixty-five percent of the entire African population.

Desertification, especially around the Sahara, has been pointed out as one of the potent symbols in Africa of the global environment crisis. Climate change is set



to increase the area's susceptibility to drought, land degradation and desertification in the region. Under a range of climate scenarios, it is projected that there will be an increase of 5-8% of arid and semi-Arid lands in Africa (ECA, 2007).

Estimates from individual countries report increasing areas affected by, or prone to desertification. It is estimated that 35 percent of the land area (about 83,489km² or 49 out of the 138 districts) of Ghana is prone to desertification, with the Upper East and the eastern part of the Northern Region facing the greatest hazards (EPA, 2002).

Indeed, a recent assessment indicates that the land area prone to desertification in the country has almost doubled during recent times. Desertification is said to be creeping in at an estimated 20,000 hectares per year, with its attendant destruction of farmlands and livelihoods in the country (ECA, 2007).

Ghana is vulnerable to several kinds of desertification. Soil erosion by surface runoff is widespread and causes the greatest threat in the Guinea and Sudan savanna zones in the North of the country, with Upper East Region being the worst affected (EPA, 2002: 66). Some 70% of Ghana is subject to moderate to severe sheet or gully-erosion, with about 40% of this area being in the savanna zones (FAO, 2004).

Inappropriate mechanization of agriculture in the 1960s also caused loss of topsoil and compaction of lower horizons in some areas. Elsewhere, iron-pan or plinthite formation is a major cause of land degradation, being caused in turn by practices like deforestation, overgrazing and bush burning (EPA, 2004:10). An estimated 72,000ha of forest land is lost to agriculture each year through practices such as bush fire, fuel-wood cutting, wasteful logging, charcoal production and overgrazing (Boadu, nd: 21) cited in (Turner and Thiam, 2005).

Soil chemical degradation ranks second to soil erosion. Loss of nutrients, including organic matter is the contributor to chemical soil degradation. In Ghana, projected nutrient depletion rates for the year 2000 were given as 35kg K ha (source). The extent of nutrient depletion in Ghana is more pronounced in the Sudan and Coastal Savanna zones where soil organic matter content is low with





nitrogen and phosphorus being the most deficient nutrients (EPA, 2002:15). Localized water logging is experienced every rainy season. This is mainly due to shallow soils, high rainfall intensities and poor surface drainage.

The desertification that is taking place in Ghana has many adverse effects on rural livelihoods, and is putting increasing pressure on urban areas too, as people migrate there from the countryside. Rural populations suffer lower crop and livestock productivity as a result of desertification, which deepens their poverty. Malnutrition among children aged under five in communities with severely degraded soils increased from about 50% in 1986 to 70% in 1990 (EPA, 2002: 76).

Overall, soil degradation is estimated to cause productivity losses of 2.9% per year in all forms of agriculture except cocoa, which suffers a loss of 2.1% (Alfsen et al, 1997), quoted in (EPA, 2004: 77). Bojo (1996) as in (EPA, 2002: 77) estimated that, the gross annual economic loss due to erosion was between 2% and 5% of Ghana's Agricultural Gross Domestic Product.

Ghana has since 1996 ratified the United Nations Convention to Combat Desertification and Drought and set in motion an action plan to solicit international support in order to find a lasting solution to the problem. In line with the provisions of the global desertification convention, Ghana prepared a National Action program (NAP) to combat drought and desertification in 2002 (EPA, 2002).

The Lawra District, under the Upper West Region of Ghana, is predominantly agrarian. How the people of Lawra manage to survive under drought and desertification and the strategies they adopt would be the focus of this study.

1.2 Problem Statement

Desertification in Africa is a major cause and consequence of poverty and resource depletion, which threaten economic growth. In many African countries poverty and desertification are expected to rise during the twenty first century (Conserve Africa, 2006) as in ECA, 2007 given that most governments are unable to increase expenditure on economic and agricultural production to drive

rural and urban economic development. This situation will increase the over dependence of the poor on the natural environment, and this will exacerbate desertification and poverty (ECA, 2007).

Ghana's environment especially the Northern savannah and woodlands are being degraded at an increasing rate (UNDP/UNSO, 1995). The degradation of the environment constitutes a serious threat to Ghana's productive base, food sufficiency, social welfare and the sustainable development of rural areas.

"Ghana's environment is suffering the effects of dramatic changes; its forests have been degraded into savanna and the savanna areas are fast turning into deserts. The invasion of desert through over cultivation, forest clearing, and overgrazing has been worsened by extreme changes in climate of West Africa since the recent severe persistent droughts. Vegetation has become so impoverished that it is difficult for the forests to recuperate even with the onset of rains. At the current rate of deforestation, about two-thirds of the country will soon experience severe food shortages and serious environmental resource degradation. The most affected areas are the Northern and Coastal grasslands" (Dankelmann and Davidson, 1988: 80) as in (Nsiah-Gyabaah, 1994).

For millions in the country, hopes of getting out of poverty therefore hinge on efforts at regional, national and global levels to prioritize the provision of support and the implementation of strategies for desertification control and coping with drought.

According to (Korem, 1985), Northern Savannah is said to have been affected by destructive activities of humans, these include tree harvesting/logging, charcoal production and over grazing. However, bushfires remain the dominant factor responsible for the destruction of the Northern Guinea Savannah Ecosystem (Nsiah-Gyabaah, 1994). Rose-Innes (1963) indicated that widespread areas of the savannah in the northern sector of Ghana are fire pro-climaxes and that the development of the climatic climax vegetation has been disturbed.

In the Lawra district, bush burning has become an entrenched annual phenomenon (EPA, 1997). Common reasons given for burning include: easy access to Shea trees, rapid regeneration of pasture for use as feed or fodder and



hunting for honey and game. The resultant landscape from these activities leaves much to be desired. The vegetative cover is removed and the soil degraded. What remains an issue is the extent to which bushfires are set intentionally. It is apparent that in the Lawra District, land degradation is accelerating together with climate variability, a trend that is leading to the degradation and aridity of the place.

Desertification is therefore, expected to result in considerable water and other resource shortages, loss of species, deteriorating soil conditions, losses in agricultural productivity, changes in weather patterns, crop and livestock pest outbreaks and the escalation of infrastructure costs.

Rural communities try to adapt through conduct of environmental enhancement activities to the aforementioned adverse environmental change. However, it is necessary to examine the effectiveness of such strategies particularly as they relate to biophysical, human livelihoods, and above all the welfare of the most dwellers of rural communities.

Furthermore, considering the many possible future scenarios, what matters is the ability to manage the uncertainty, especially, in rural communities who rely on set times to plant, sow and harvest. Perhaps more importantly, there is the need to study the opportunities that are there at the community level that can counteract such uncertainties. Communities have embarked on practical environmental enhancement activities to combat drought and desertification. However, there is lack of information on efforts of rural people in adopting innovative conservation techniques in combating desertification. Traditionally, research related to the environment has had the tendency to concentrate on the physical environmental characteristics with minimal reference to the socio-cultural beliefs and practices of the local people who may directly be responsible for the influence and changes occurring in the environment (Benneh, 1997) cited in (Doke, 2005).

Also, people are concerned about environmental problems and their causes without identifying and appreciating efforts of these local communities in promoting prudent environmental management. Therefore, the problem this study intends to investigate is the lack of information on efforts of rural communities' in



combating drought and desertification in the Lawra District. It is hoped that through this study, rural communities' efforts in the management of environmental resources towards combating drought and desertification can be identified, elucidated and documented.

1.3 Research Questions

This study seeks to answer the following questions.

1.3.1 Main question

What efforts are being made by rural communities to combat drought and desertification in the Lawra District?

1.3.2 Sub questions

- i. What local initiatives are adopted by rural communities to combat drought and desertification in the Lawra District?
- ii. What are the contributions of government and non-governmental organizations towards combating drought and desertification in Lawra District?
- iii. Do attitudes or beliefs in any way inhibit efforts towards combating drought and desertification in Lawra District?
- iv. What sustainable and conservation methods should be adopted towards combating drought and desertification?

1.4 Research Objectives

The study also seeks to achieve the following objectives.

1.4.1 Main objective

The main objective of this study is to find out the efforts being made by rural communities towards combating drought and desertification in Lawra District.



1.4.2 Sub objective

- i. To find out local initiatives adopted by rural communities to combat drought and desertification in Lawra District.
- ii. To examine the contributions of government and non-governmental organizations towards combating drought and desertification in Lawra District.
- iii. To find out whether community/people attitude or beliefs in any way inhibit efforts towards combating drought and desertification in Lawra District.
- iv. To find out what sustainable and conservation methods should be adopted towards combating drought and desertification.

1.5 Significance of the Study

Desertification is a topical issue and has gripped many stakeholders in their quest to promote development. The confusion surrounding desertification makes the status, risk and severity of desertification intrinsically difficult to determine and map out unless detailed information is available (Lovett, 1973; UNCOD 1977; Chartres, 1982; Fitzpatrick, 1982) as in (Nsiah-Gyabaah, 1994).

In this light, the study is intended to bring to bear existing efforts made by rural communities towards combating drought and desertification in the Lawra District. The study will enumerate existing efforts and their coping strategies towards combating drought and desertification.

Furthermore, the knowledge and understanding of rural communities' efforts in combating drought and desertification can be incorporated into modern, scientific land management through participatory approaches to sustainable resource utilization. Such rural communities' efforts in natural resource - use can provide valuable insights in management, regeneration, conservation and sustainable use of land resources.



Finally, even though the findings from the study may not be the panacea for combating drought and desertification in the Lawra District, it can be a reference point for other researchers interested in this area of study to stimulate further debate towards finding pragmatic solutions to combating drought and desertification.

1.6 Scope of Study

This study focuses on environmental enhancement activities of rural communities in the Lawra District from the perspective of community members.

1.7 Definition of Terms

Desertification

The formal definition of desertification is "land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities" (UNCCD, 1997). Others relevant definitions are presented in Box 1.

Desertification control

The term refers to an "activity involving the integrated development of land in arid, semi-arid and dry sub-humid zones with the objective of attaining sustainable development, aimed at preventing and/or reducing land degradation, repairing partially degraded land, and at restoring decertified lands" (FAO, 2004).

Drought

Drought is a major factor which causes or enhances desertification. It is a natural climatic phenomenon that occurs when rainfall is significantly below normal recorded levels for a long time. When land use systems are not adjusted to these climatic variations desertification is the result (EPA, 2002).

Climate change

The United Nations Framework Convention on Climate Change (UNFCCC) defines Climate change as a meteorological deviation — which is attributed



directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. (EPA, 2008:173).

Land conservation

Conservation is defined here to mean the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generation while maintaining its potential to meet the needs and aspirations of future generations. Thus conservation is positive and embraces preservation, maintenance, sustainable utilization, restoration and enhancement of the natural environment (IUCN-UNEP-WWF, 1980).

Land degradation

Means the reduction or loss, in arid, semi- arid and dry sub-humid areas, of the biological or economic productivity and complexity of rain fed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from human activities and habitation patterns, such as;

- Soil erosion caused by wind and/or water;
- Deterioration of the physical, chemical and the biological or economic properties of soil and
- Long term loss of natural vegetation.

Combating desertification

It includes activities which are part of the integrated development of land in the arid, semi-arid and dry sub-humid areas for sustainable development which are aimed at;

- Prevention and/or reduction of land degradation
- Rehabilitation of partly degraded land; and
- Reclamation of decertified land



1.8 The Study Area

The Lawra District is one of the nine Districts that make up the Upper West Region. It lies in the north-western corner of the Upper West Region of Ghana between Latitudes 2° 25" W and 2°45"W and Longitudes 10°20"N and 11°00"N. The total area of the District is 1, 051.2 km². This constitutes about 5.7% of the Region's total area, which is estimated at 18,476 square kilometers (DEP, 2006).

The 2000 National Population and Housing Census results put the District's Population at 87,525. This is about 15.2% of the Region's total population of 576,583. This comprises 40,804 males and 46,723 females representing 47% and 53% respectively and the sex ratio is 87.3 males to 100 females.

However, an update of the District Database conducted in April 2002 sponsored by Danish Government under the Danish Support to District Assemblies Phase II program (DSDA II) gave a figure of 97,544 (49,532 or 50.78% males and 48,012 or 49.22% females) as the District population. This figure nearly corroborates the figure of 95,080 given by the Ghana Statistical Service in the year 2000 as the total population of the District (PHC, 2000 and GSS, 2000).

The most predominant tribe in the district is the Dagaaba, with a few dialectical variations. However, there are other minor settlers' tribes and these are Wala, Moshie, Grune, (who have settled along the banks of the Black Volta). These tribes co-exist peacefully and inter-marry.

The District experiences the tropical continental' climate with a mean annual temperature ranging between 27° C and 36°C. This rainfall regime is generally unreliable both in its timing and duration. From November to January the district experiences the Harmattan — the cold, dry North-East Trade winds from the Sahara Desert. The Mean Annual Rainfall ranges between 1,016mm and 1270mm and occurs between April to October with maximum occurrence in August and September.



The rainfall pattern and reliability is difficult for farmers to predict for any cropping season. The mean annual temperature ranges between 25°C — 34°C. March is the hottest month and January the coldest in the year.

Even though the Lawra Forest District has a total of 3,152.2 hectares of forest reserves, the natural environment of the district has witnessed all kinds of degradation over the years to the extent that the vegetative cover has dwindled and soils have become poor. This makes the whole of Lawra District a fragile ecosystem. Widespread bushfires are annual rituals in almost all the communities of the district. Other causes of environmental degradation include indiscriminate tree felling for fuel wood (the major source of energy), inappropriate farming practices, soil erosion, over grazing, sand, gravel and stone winning.

Table 1.1: Coverage of Forest Reserves in Lawra Forestry District

Name /Location of Forest Reserve	Area (Km ²)	Total Perimeter Km ²	Type of Reserve
Bangwong Bawa	64.71	43.46	Production/Protection
Lawra Station plantation	1.27	7.67	Production/Research
NandomLambussie plantation	1.88	7.67	Production/Protection

Source: DEP, 2006



Table 1.2: Sacred Groves in Lawra District

Name of Sacred Grove	Location
Birifo-Baa	Birifo-Baa
YikpeeVill	YikpeVill
KuowobMwine	Kuowob
EremonKokola	Eremon
TovuoriSobaal	Tovuori
YikpeeTigbe	Nikpee
Kol-borgnuorFaal Tang	Kol-borgnuou
TampieTanglee	Tampie



Source: DEP, 2006

A number of measures have been taken to resuscitate the environment. These include among others sensitization of the people and tree planting to improve on the environment. Since 2001, the EPA, the Forest Service Division in collaboration with the National Disaster Management Organization (NADMO), Ministry of Food and Agriculture (MOFA) and the District Assembly have produced over 80.000 seedlings for supply to forest reserves, communities, individuals and schools for planting and nurturing. Notable among them are Goziri, Kuselle, Tanchara, Kalsagri and Kunyukuo. Other communities are emulating the good example of these communities and progressively the menace of bush fires would be minimized.

A soil improvement program has been initiated as part of the overall land management in the District. An amount of G1403, 000, 00 was spent by the Lawra District Assembly to support farmers to undertake leguminous crops cultivation. The first year has been a success story and it is intended to sustain the program during the Medium Term (DEP, 2006).

Development problems affecting sound environmental management in the District include poor staffing, inadequate budgetary allocation for various environmentally related projects among others.

1.8.1 Implications

Given the area of the Lawra District as 1,051.2 square kilometers and a population size of 87,525, the District's population density is about 83 persons per square kilometer. This indicates that there is high population pressure on natural resources, particularly land for agricultural production and, this is likely to exacerbate current threats of drought and desertification in the District.

The Population Growth Rate of the District is 1.7%. This is below the national Growth Rate of 2.7%. The relatively low rate of growth of the population which is attributed to seasonal out migration has serious consequences on the implementation of development projects since the District experiences shortage of unskilled labour during the said period.

The existence of Sacred Groves and the substantial coverage of forest reserves in the Lawra District put the District in a good position to put in place pragmatic efforts towards combating drought and desertification.

1.9 Limitations of the Study

This study is limited in the following ways;

Geographical Coverage: This research study was undertaken in the Lawra District of the Upper West Region of Ghana. The rest of the eight administrative districts in the region where drought and desertification enhancement activities are taking place were left out. By that, the case of the Lawra District alone cannot be used to mean the whole region's situation.

Scope: The study was also focused on the efforts of rural communities in the Lawra District towards combating drought and desertification from the perspective of community members who are actively engaged in drought and desertification enhancement activities. Here again, other stakeholders such as Environmental Protection Agency, District Assembly and other organizations



supporting rural communities to combat drought and desertification were not contacted in this study. There could have been a more comprehensive view on drought and desertification enhancement activities if all stakeholders were consulted.

1.10 Chapter Organization

This study report is put into five chapters and organized as follows;

Chapter One consists of an introduction to the study, problem statement, research questions, research objectives, significance of the study, scope of the study, definition of terms, study area, implications, limitations and chapter organization.

Chapter Two looks at literature that has been reviewed. Literature review was guided by the objectives of this study.

Chapter Three deals with methodology of the study. Under the chapter, literature was reviewed on all methods employed. Also research methods and tools employed in carrying out the study were discussed under the chapter.

Chapter Four presents analyzed data. Here, data collected for the study were presented and analyzed under the chapter.

Chapter Five contains discussions on analyzed data, study findings, conclusion and recommendations.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter would look at key concepts such as drought and desertification and issues like local strategies and sustainable ways of combating drought and desertification. This chapter would first of all tackle drought and desertification which are important to the study before moving to the local strategies and sustainable ways of managing drought and desertification.

2.2 Drought

Drought is a major factor which causes or enhances desertification. The major droughts of 1968-73, 1982-85 and 1990-92, caused serious hydrological imbalances that adversely affected vegetation and crops. The results were shortages in food production, famine and a general decline in human livelihood. A major problem worth recognizing is that each drought cycle exacerbates the vulnerability of the affected zone to desertification.

There is little empirical data to link the occurrence of drought to human activities. It has however been suggested that through its adverse effect on vegetation and surface conditions in the affected areas, drought becomes a self-enhancing phenomenon. The implication, as pointed out by Nicholson (1983), is that land use activities that degrade the vegetation may have the same effect. (Gyampoh (1986) pointed out that although drought is a climatic event, ecological changes have interacted with the abuse of the land and its vegetation by man and livestock to accelerate drought and its attendant desertification in the Sudan and Guinea savanna zones of Ghana maintains that man's activities that pollute the air such as extensive bush fires and smoke, or overgrazing that promotes wind storms can result in the increased dryness of a region by suppressing the movement of moisture-laden winds bringing in the early rains (Bryson, 1971) as in (EPA, 2002).



Although there is no international consensus on the extent of human-induced climatic change, despite numerous global studies (Houghton et al., 1992) there is a general agreement that human activities can change the climate (Liniger, 1995) as in (EPA, 2002).

In general, drought is said to be an extended period that is a season, a year, or several years of deficient rainfall relative to the statistical multi-year average for a region. This deficiency results in a water shortage for some activity, group, or environmental sector (ECA, 2007).

The underlying cause of most droughts can be related to changing weather patterns manifested through the excessive buildup of heat on the earth's surface, meteorological changes which result in a reduction of rainfall, and reduced cloud cover, all of which results in greater evaporation rates. The resultant effects of drought are exacerbated by human activities such as deforestation, overgrazing and poor cropping methods, which reduce water retention of the soil and improper soil conservation techniques, which lead to soil degradation (ECA, 2007).



2.3 Desertification

Globally about 5.2 billion ha constituting 39.7% of the total 13 billion ha terrestrial area of the earth is under the threat of desertification. The problem is more acute in Africa with about 46% of its total area affected by desertification processes. The percentage of Africa lands vulnerable to low, moderate, high and very high desertification is estimated as at 14.18, 15.19, 10.78 and 4.92 respectively (Reich et al, 2001).

In Ghana, although land degradation is an on-going process in all parts of the country at variable scales and intensities, it is only the degradation in those climatic zones where the ratio of annual precipitation to potential evaporation (aridity index) is in the range or 0.05 and 0.65 that can be referred to as desertification (CCD, 1997).

These zones consist of the arid, semi-arid and dry sub-humid areas. The agro-ecologies within these climatic zones are: The Sudan, Guinea and coastal

Savannas with their respective aridity index of 0.60 and 0.54. (The Region within these agro-ecological zones is Upper East, Upper West, Northern, Greater Accra, Central and Volta).

The percentage of total land area of Ghana estimated to be prone to desertification has been given as 35 (about 83489 km²) with the Upper East and Eastern part of Northern Region (78718 km² or 335 of total land area of the country) facing the most hazard. The recent assessment by Reich et al, 2001 indicates that the latter figure has almost doubled in recent times. The authors gave the percentage total land area in Ghana vulnerable to low, moderate, high and very high desertification as 7.47, 48.78, 15.15 and 1.04 respectively. The corresponding land areas in km² are 17000, 112000, 34000 and 2000, totaling 165000 km².

Desertification according to (ECA, 2007) is a process of land degradation in arid, semi-arid and dry sub-humid areas, resulting from various factors, including climatic variations and human activities. Desertification is caused by multiple direct and indirect factors. It occurs because dry land ecosystems are extremely vulnerable to over-exploitation and inappropriate land use that result in underdevelopment of economies and an entrenched poverty among the affected population.

Whereas over cultivation, inappropriate agricultural practices, overgrazing and deforestation have been previously identified as the major causes of land degradation and desertification, it is in fact a result of much deeper underlying forces of socio-economic nature, such as poverty and total dependency on natural resources for survival by the poor. It is also true to reiterate that desertification problems are best understood within the dictates of disparities of income and access to or ownership of resources (ECA, 2007).

2.4 Traditional/Local Adaptive Strategies to cope with Drought and Desertification

The impact of environmental degradation and desertification on the local population is crop failure and famine, shortage of water, soil erosion, shortage of pasture for livestock and prolonged drought.





Environmental degradation results in ecological, economic and social losses. By this, there is total agreement throughout the world that any further environmental degradation should be effectively and completely checked (Pandey, 1996). Several studies point to a plethora of adaptive mechanisms which reveal that farmers and herders are changing environmental pressures. Bush fallowing, schemes of grazing, ways of life and techniques of exploitation afford almost complete protection against soil erosion, soil fertility loss and contribute to conservation of nature in fragile ecosystems (Allan 1965; Toupet 1975) as in Nsiah-Gyabaah, (1994).

Subsistence farmers and pastoralists are therefore expert practitioners of their respective modes of livelihood, and are particularly sensitive to the ecological systems of which they are a part (Hjort 1976; Raikes 1981; Richards 1983) as in Nsiah-Gyabaah, (1994).

The importance of ensuring an adequate understanding of the local adaptive mechanisms as a first step towards evolving an effective development program was echoed by (Feacham, 1977) when he noted that environmental problems are caused by rural land use and knowledge about how rural people respond to the problems relevant for the economic development of Africa. Moreover, since rural people cause degradation, it is they who can contribute to its solution.

Projects dealing with the conservation and management of lands and forests emphasize highly technical and costly activities. Moreover, these schemes promote farming technologies and practices without first taking careful steps to promote community cooperation or to strengthen local organization; and that this does not foster their long-term sustainability (Abebrese, 2003).

Today, traditionally protected forests that are sacred groves serve in preserving concentrations of biodiversity and provide many additional benefits such as reservoirs of wild plants and animals (Ntiamoah, 1995) and influence climate (Pereira et al, 1990). Most of the local adaptive strategies for coping with the drought, environmental degradation and desertification are mainly low-cost

innovations which are relatively simple to adopt and do not depend on imported technology or inputs.

These strategies appeal to farmers and pastoralists because they address the short-term problems of rural agricultural production. Although the benefits of these strategies are being eroded by widespread poverty and increasing human and livestock populations most of these strategies would continue to be the only viable alternatives capable of sustaining agriculture and maintaining ecological balance without external assistance.

The promotion and integration of local adaptive strategies onto bureaucratically initiated and controlled projects would make them acceptable to rural farmers and contribute to finding effective and lasting solutions to environmental degradation and accelerated desertification.

In Northern Ghana, farmers maintain and manage different tree species on croplands. The species usually maintained include dawadawa (*Parkia biglobosa*), *Faidherbia albida* and Shea nut (*Vitellaria paradoxa*). Inter-cropping on arable lands of rhea nuts, dawadawa is common in all regions of Northern Ghana. These two tree species are generally not cut and used as a regular source of fuel wood or other timber products; they therefore form the common species on farm land and fallow land. They are selectively preserved by almost all farmers in the community.

They provide revenue and food products at the time of extreme food scarcity (March to July) each year. The percentage retention of indigenous trees on their farms, during land preparation (clearance of vegetation at the time of establishing the farm), are as follows: - 100% of Shea (*Vitellaria paradoxa* Gaertn.) trees were retained followed by 85% of dawadawa (*Parkia filicoides*), 75% of neem trees (*Azadirachta indica*), and 65% of mango (*Mangifera indica*) (EPA-UWR, 2002).

2.5 Sustainable Management and Conservation of Natural Resources

In order to sustain high agricultural production and ensure food security and enhanced livelihoods, whilst at the same time maintaining the integrity of the ecosystem, the natural resources need to be properly managed and conserved.



It is however recognized that most efforts at improved management of natural resources have centered on government and NGO-led programs to protect forest reserves and promote tree planting. Most of these programs have been operating independently at the expense of effective community participation and the needs and priorities of the local people (EPA, 2002). However, available evidence indicates that a participatory approach to community mobilization in natural resource management and conservation is the only sustainable strategy. It is against this background of community participation, taking the lead role in the management of their natural resources and promoting ownership in the long term that the National Action program for sustaining the management and conservation of natural resources in the desertification prone zone in the country was proposed in 2002.

The Action program, although conceived to operate in an integrated manner, have for purposes of convenience been categorized into the following areas;

- Land use and Soil Management
- Management of Vegetative cover
- Wildlife and Biodiversity Management
- Water Resources Management
- Rural Infrastructure Development
- Energy Resources Management
- Improvement of Socio-economic Environment for Poverty Reduction

The Ghana National Land Policy recognizes the role of the community in ensuring sustainable land use in consultations with custodians. Shrines, sacred groves and other categories of land use derived from or determined by customary practice under the policy will be treated as having protected status after their boundaries have been delineated (ML&F, 1999).

Group formation is recommended by Millar et al., 1998 and these groups mobilize communities to manage their natural resources, share information and serve as pressure groups to protect the environment. Considering that most economic activities in Ghana are land-based, community participation in all activities designed to combat drought and desertification is critical to the achievement of the desired impact.

Woodlot production and alley farming are the main formal agro forestry technologies being encouraged in Northern Ghana by NGOs, donors, governmental organizations and extension services. The planting of village woodlots for fuel wood production is largely carried out by community groups often related to influential NGOs and Church Organizations such as the Seventh Day Adventists (SDA), 31st December Women's Movement, and Environmental Protection Agency (EPA) quoted in EPA, 2002.

The Environmental Protection Agency (EPA) has carried out a number of projects aimed at protecting the environment, in collaboration with Co-operative Integrated Project on Savanna Ecosystems in Ghana CIPSEG.

Table 2.1 Projects established by EPA in collaboration with CIPSEG

Project	Number of Hectares
Woodlots established around Sacred Groves	16.4
Agro forestry Project	96.8
Multipurpose woodlots	12.8
Fodder banks	17.6

Source: EPA Annual Report, 1996.

2.6 Summary

The Literature review chapter highlighted the core concepts and issues underpinning the study. Concepts such as drought and desertification were



captured under the chapter. Issues on local strategies and sustainable ways of managing drought and desertification were also a major part of this chapter.

The methodology part of the study would form the main focus of the next chapter.



3.1 Introduction

This chapter is devoted to the study design, methods and tools used in carrying out the study.

3.2 Study Design

The study is a qualitative assessment of the efforts of vulnerable communities in combating drought and desertification from the view point of community members in the Lawra District. The researcher collected qualitative information through focus group discussions. Information was collected at a point in time, analyzed and presented to give a clear picture of efforts of rural communities in combating drought and desertification in the Lawra District.

3.3 Research Approach

Research methodology is an important component of any study and provides the framework upon which the whole process is depended on (Brown, 1996). Hence, it is vital that the methodology is sound and conducted thoroughly to efficiently produce accurate and precise data in other to achieve the research goals and objectives.

This section therefore, provided the framework upon which the research goals and objectives were achieved. The author gave an-in-depth explanation of the research approach and process, methods of data collection, sampling procedure, size and methods, background of study area and scope, and data analysis.

Increasingly, the choice of a suitable research methodology is guided by the theoretical underpinning of the study goal and objectives, the nature of the research problem, how the data would be analyzed, interpreted and presented as well as the scope of the study.

Therefore, the choice of this particular research approach depended on a number of factors such as the purpose of research, its specific objectives, practicability



and validity, available financial resources, the skills of the lead researcher in data analysis and interpretation and the social organization.

The study combined both qualitative and quantitative approaches in data collection and analysis. Most methodological commentaries (Strauss and Corbin, 1990, Brannen 1992, Brown 1996, Twumasi, 2001) seem to agree so far, two distinct approaches (qualitative and quantitative) can be said to exist but the most important difference is the way in which each tradition treats data analysis.

The central issue that faces social science research is the choice of the appropriate research approach and method to investigate the specific problem (Bacho,2001). This goes to support the view that social issues are varied phenomenon and difficult to capture for investigation hence the combination of both qualitative and quantitative approaches in this study.

3.4 Sampling

In research the rationale is to make generalization or to draw inferences based on samples, about the parameters of population from which the samples are taken (Yin, 1993).

Miller (1991) concurred that the researcher needs to select only few items from the universe for the study purpose. The size of a sample should neither be excessively large, nor too small. This however, according to Karma (1999) should be at the discretion of the researcher. While deciding on the size of a sample, the researcher must determine the desired precision and also an acceptable confidence level for the estimates (Saunders et. al, 1997).

3.4.1 Sample Size

The choice of a sample size for this study was influenced by the following factors.

- The size of population



- The specific population parameters of interest (farmers and traditional authorities)
- The cost involved in undertaking this study

For this study, two main sample techniques namely probability and non-probability sampling techniques were adopted and applied to arrive at the participants for the focus group.

3.4.2 Probability Sampling

Probability sampling, also known as "random sampling" or 'chance sampling gives every item in the universe an equal chance of inclusion in the sample. In probability sampling, each and every unit within the population is given an equal chance of being selected (Twumasi, 2001: 18).

3.4.2.1 Simple Random Sampling

The basic assumption underlying simple random sampling is that the elements or the individuals in the population are judged to be homogeneous (Twumasi, 2001:21).



The simple random sampling technique was used to select some community members into the focus groups.

For each of the four communities purposefully selected, three separate focus group discussions namely; men, women and leadership group discussions were held. In each focus group, ten community members formed the discussion group.

3.4.3 Non Probability Sampling

The method means that the selected sample is not representative of the population because the units in the population are not given the chance to be included in the same sample. The procedure does not call for systematic sampling design. The researcher decides to take what he thinks is the representative unit of the group (Twumasi, 2001).

3.4.3.1 Purposive Sampling

As the name implies the researcher adhering to the objectives of the study, selects respondents who can answer his research questions. With good calculation and a relevant research strategy, he can pick the respondents he wants to be included in his sample (Twumasi, 2001).

In the light of the above, purposive sampling was used because; the author was dealing with community members in the Lawra District engaged in intensive practical environmental enhancement activities towards combating drought and desertification.

3.5 Data Collection Approach

It is also necessary to use more than one method to collect data. Using various suitable methods to collect data will help the researcher to evaluate his data source and to detect inconsistent answers (Twumasi, 2001).

It is however, important to note that the selection of a particular approach to collect data must be decided upon in the light of one's problem. In selecting a method for data collection, the socio-economic demographic characteristics of the study population play an important role.

The study therefore resorted to the following tools of data collection; interviews, observation, focus group discussions, questionnaires and review of secondary information.

3.5.1 Observation

Observation is one way to collect primary data. Observation is a purposeful, systematic and selective way of watching and listening to an interaction or phenomenon as it takes place (Twumasi, 2001). The researcher employed this method to get an insight into practical environmental enhancement activities in the four purposefully selected communities in the Lawra District.



3.5.2 Questionnaire

It is a written list of questions, the answers to which are recorded by respondents. The respondent therefore read the questions, interprets what is expected and then writes down the answers. Saunders et al, (1997) argued that the choice of questionnaire is influenced by a variety of factors namely;

- Characteristics of reaching a particular person as respondent.
- Size of sample you require for your analysis, taking into account the likely response rate
- Type of questions you need to ask to collect data
- Number of questions you need to ask to collect your data

The choice of using the questionnaire tool was to guide the researcher and research assistants in their discussions with community members.

3.5.3 Focus Group Discussions

The technique is used frequently in market-oriented research studies. In a focus group, about 6 to 10 people who appear knowledgeable about the topic are brought together to engage them in a guided discussion. The participants in a focus group discussion are not chosen on the basis of probability selection; rather it is based on non-probabilistic purposive sampling (Twumasi, 2001).

In employing this method, the researcher randomly selected in each focus group ten community members who are actively engaged in environmental enhancement activities and considered knowledgeable in local initiatives adopted towards combating drought and desertification. In all the four communities, twelve focus group discussions were held. Indicating that, with ten participants in each focus group, a total of 120 participants took part in the discussions.

3.5.4 Secondary Data

Slewart and Kamins (1993) as cited in Saunders et al, (1997) argued that in using secondary data, you are at an advantage compared to another researcher using primary data because since the data already exists, you can evaluate them prior to



use. In that case, earlier works done which provides the required information on the subject matter were reviewed.

3.6 Data Analysis

Karma (1999) referred to data analysis as the computation of certain measures along with searching for patterns of relationship that exist among data-groups.

In analyzing data in general, Yin (1993) also agrees that a number of closely related operations are performed with the purpose of summarizing the data collected and organizing them in such a manner that they answer the research question. Analysis of data collected from the field for this study was descriptively done.

3.7 Summary

The chapter indicates all the study tools and methods that were employed to gather data from respondents. Also it tackles how respondents were randomly selected into the focus groups.

Study tools and methods that were used include; observation, focus group discussions, questionnaires and review of literature and Simple random and purposive sampling methods.

The main focus of the next chapter would be on data presentation and analysis.



CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.0 Introduction

This chapter deals with the presentation and analysis of data. The research tools and methods employed in gathering data and selecting communities and participants for the study were observation, questionnaires, focus group discussions, literature review, and simple random and purposive sampling methods.

4.1 Socio-demographic Characteristics of Respondents

Four communities namely Nandom Tanchara, Kussele, Goziri and Kanpuo in the Lawra District where efforts to combat drought and desertification are intense were purposefully selected for the survey. In each community, three separate focus groups for men, women and leadership groups were convened.

This indicates that, for the four communities, a total of twelve focus groups were convened. Each of the 12 focus groups comprised of ten community members representing the men, women and leadership groups. Therefore, 120 respondents from the 4 communities took part in the discussions. They were of ages between 15 years and 70 years. They were very active in the various discussions and this was a true reflection of their involvement efforts to combat drought and desertification at the rural community level.

The age and sex distribution of respondents are shown in tables 4.1, 4.2, 4.



Table 4.1: Age Distribution of Men Focus Group

Age	Frequency	Percent
15 — 30	26	65
31 — 50	14	35
51+	0	0
Total	40	100

Source: Field Survey, 2009

The men focus group discussions were conducted for four groups thus one for each community. Respondents for these groups were between the ages of 15-50 years, indicating a fairly representation of the youth and middle age in the groups. This is because age may influence issues bordering on efforts to combat drought and desertification in the communities. Table 4.1 above also indicates that, 26 respondents representing 65% of respondents under men groups were within the ages of 15-30years. Fourteen respondents representing 35% of male respondents were within the ages of 31-50 years. This goes further to show the youth dominance in the men focus groups.

Table 4.2: Age Distribution of Women Focus Group

Age	Frequency	Percent
15 — 30	18	45
31 — 50	22	55
51+	0	0
Total	40	100

Source: Field Survey, 2009

From table 4.2, female respondents are within the age brackets of 15-50 years. Eighteen respondents representing 45% of the women groups were within the



ages of 15-30years. Twenty-two female respondents representing 55% of total female respondents were also found to be within the age brackets, 31-50 years. Again, female respondents were said to be within the youth and middle age brackets and that the age difference of respondents could play a major influence on efforts of rural communities towards combating drought and desertification.

Table 4.3: Age Distribution of Leadership Focus Groups

Ages	Frequency	Percent
15 — 30	0	0
31 —50	0	0
51+	40	100
Total	40	100

Source: Field Survey, 2009



Table 4.3 shows the age distribution of leadership groups in the selected four communities under the Lawra District. It shows clearly that, all respondents under the leadership groups were within the age brackets of 51+, hence considered elderly. The essence of contacting such group was to get their views on local laws and ways put in place to check community people from indiscriminate felling of trees and bush burning among others since the power to enact such laws are vested in them.

Table 4.4 Sex Distribution of Respondents

Frequency	Percent
80	66.7
40	33.3
120	100

Source: This Survey, 2009

Table 4.4 shows the sex distribution of respondents. Out of 120 respondents, eighty, representing 66% were male respondents with the remaining forty representing 33.3% as female respondents. This also shows that, there were more male respondents than that of their female counterparts in that exactly twice of female respondents were male respondents.

Table 4.5: Occupational status of Respondents

Occupation	Frequency	Percent
Fanning	110	91.
Shea butter extraction	4	3.3
Livestock	4	3.3
Dawadawa processing	2	1.7
Total	120	100

Source: This Survey, 2009

The above occupational status of respondents indicates that, respondents were engaged in a wide spread of economic activities for their livelihoods. One hundred and ten respondents representing 91.7% of total respondents were said to be actively engaged in farming as their source of livelihood. Majority of respondents engaged in farming came from the male groups of respondents. Four respondents representing 3.3% of total respondents and said to be from the female group were engaged in Shea butter extraction. Another four respondents representing 3.3% of total respondents were engaged in livestock rearing. Majority of persons found in this occupation were from the leadership groups who were elderly and considered not strong to farm. The remaining two respondents from the female group representing 1.7% of total respondents were engaged in dawadawa processing.



Table 4.6: Education level of respondents

Level of Education	Frequency	Percent
No formal education	80	66.7
Basic education	20	16.7
Secondary	18	15
Vocational	0	0
Tertiary	2	1.67
Others	0	0
Total	120	100

Source: This Survey, 2009

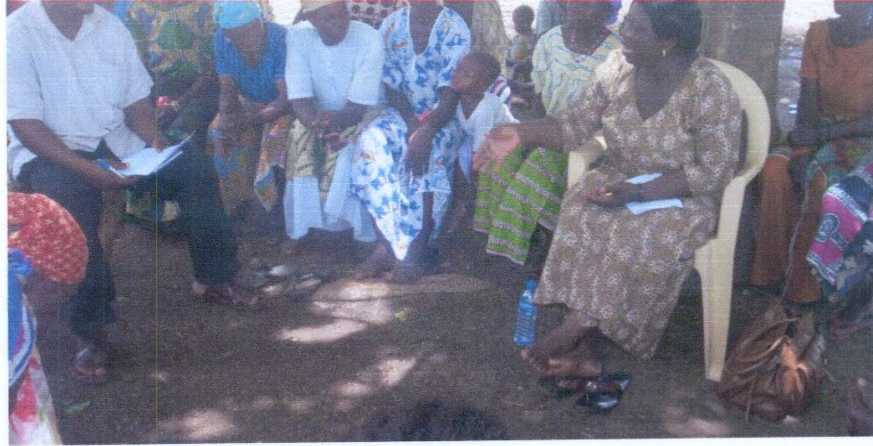
Table 4.6 indicates the educational status of respondents. It shows that eighty respondents representing 66.7% of total respondents had no formal education. All female and leadership respondents fell within this category. Twenty respondents representing 16.7% of total respondents had some form of basic education. Respondents who fell within this category were from the male group. Eighteen respondents representing 15% of total respondents also had some form of secondary education. Again, persons came from the male group. Two respondents representing 1.671% of total respondents were at the Wa Polytechnic. Respondents again came from the male groups. The above information revealed that, majority of respondents were illiterates and therefore had no formal education.

4.2 Local Efforts Adopted by Rural Communities to Combat Drought and Desertification

This section required that focus groups comprising men, women and leadership groups come up with some of the local initiatives community members are engaged into wads combating drought and desertification. The initiatives



presented below are some local ways community members use towards combating drought and desertification in Nandom Tanchara, Kussele, Goziri, and Kanpuo communities in the Lawra District.



4.2.1 Non-burning Experiment

This initiative as its name suggest, involves no bush burning in completely degraded environments throughout the year whether in land preparation prior to the cropping season or after harvesting. This allows the vegetation and the stubble remaining after harvesting to dry completely that eventually will decompose to release nutrients to the new crops. Nkegbe, A. 2005 cited in Turner and Thiam, 2005 indicated that soil moisture levels have increased and overall soil ecology has improved considerably resulting in an increased soil microbial acutely with an increased in soil organic matter due to the improved soil ecology and absence of fire in non-burning communities. All the four communities namely Nandom Tanchera, Kussele, Goziri and Kanpuo are actively engaged in this non-burning initiative towards combating drought and desertification.

This initiative also allows the vegetation and the stubble remaining after harvesting to dry completely. This eventually will decompose to release the nutrients to the new crop. Other mechanisms under this initiative which include the establishment of green belts and creation of natural regeneration sites are adopted by communities with improved vegetation to serve as practical demonstration sites.

According to Dawoe et al 2004, the Non-burning experiment also called Zero burning (Proka) helps to avoid danger of bushfire, reduces soil erosion; preserves soil life and regulates soil temperature. Land preparation under this experiment involves clearing the undergrowth 2-3 months before the rains if land has to be cleared of forest vegetation and trees, or one month before if shrubs are to be cleared. All trees that may hinder crop production are felled and weeds are allowed to dry, after which they may be beaten down with cutlass or stick.



4.2.2 Creation of Community Reserves

This initiative is yet another strategy adopted by the communities towards combating drought and desertification. All the four communities where the research was conducted were said to have adopted this initiative as an effort towards combating drought and desertification.

The initiative ensures that communities set aside a large part of land which is protected from all forms of farming activities that involve cutting down trees and burning. Communities involved also form committees (CEMCs) to ensure environmental laws are enforced to protect the forest reserve from the activities of people. Fire breaks are cleared around such community reserves to prevent bushfires.



Plate 4.3: Kanpuo Community Forest Reserve

4.2.3 Composting

Communities contacted revealed that composting is also adopted as a local initiative to combat drought and desertification. This involves the gathering of crop residues and animal droppings in pits to decompose and applied to crop fields to increase their organic matter content and nitrogen for the improvement of soil fertility. By this initiative, heavy reliance on chemical manure is minimized.



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Plate 4.4: A decomposed manure heap at Nandom Tanchara



Plate 5.5: Improved soil fertility and crop yield improvement at Nandom Tanchara as a result of the application of organic manure on farmlands.

Communities are also into the enactment and enforcement of local laws to protect the environment from being degraded. These laws are enacted by the local authorities of the communities to deter community people from burning and

cutting down trees. These laws also spell out penalties for offenders thereby serving as a deterrent.

According to Turner and Thiam, 2005, with the authority of the Chief, the Community Environmental Management Committee (CEMC) lays down regulations or bye laws to control natural resource use and punish abuses such as the setting of fires or the unauthorized felling of trees, harvesting of plant products or even failing to extinguish a fire is also an offence regardless of who started it.

4.2.5 Taboos

This strategy is still used by rural communities to protect certain sacred areas from being invaded by human activities. By this initiative, community people are aware of the repercussions involved in carrying out any human activity in the restricted areas. These laws are used to protect economic trees such as Dawadawa and Shea nut trees.

4.2.6 Local Silos

Another strategy adapted locally to combat drought and desertification is the building of local silos for storage of farm produce. Since farmers cannot predict the next rainfall season, this initiative is normally adopted as a coping strategy to guarantee availability of some food for their families during the next season.

4.2.7 Stone Lining and Bonding

This strategy which is a land and water management practice is adopted by rural communities to check the flow of water on their farm lands in order to prevent soil erosion. There is substantial surface runoff during the rainy season in Nandom Tanchara and Kusselle. Stone lining and bunds that capture runoff significantly contribute in increased yields of crops. The central idea was to alleviate farmer poverty by using these land and water management techniques to make better use of high surface runoff





Plate 4.6: Nandom Tanchara farmers inspecting a newly Constructed stone lining on a Farm Land at Nandom Tanchara



4.2.8 Boundary Planting

Communities contacted in the Lawra District were also said to be actively engaged in this initiative as a way to combat drought and desertification. The initiative involves planting trees, shrubs and grasses to define boundaries or spaces dividing separate land-use units. It is mainly used along boundaries of farms, home compounds, pastures or scattered cropland. It is preferred to use tree species that provide useful products and additional income while at the same time delineating the boundaries. Normally trees like mangoes, cassia siamen, and mahogany among others are used for boundary planting

4.2.9 Mulching

Another initiative community contacted were said to be engaged is mulching. By their understanding, mulching is the act of covering the surface of the soil with crop residues, straws or leaves. To them, mulching is an important technique for improving soil microclimate, enhancing soil life, structure and fertility; conserving soil moisture, reducing weed growth, preventing damage by impact from solar radiation and rainfall. Mulching also improves water infiltration, reduces crust formation, improves soil organic matter and ensures better utilization of nutrients from chemical fertilizer. This initiative is further reiterated

in Dawoe et al., (2004) as a way rural communities combat drought and desertification in their various localities.

4.2.10 Contour Farming

Contour farming is another farming initiative adopted by communities that were contacted. Under this initiative, food crops are grown in alleys formed by hedgerows of either trees or shrubs preferably leguminous species or barriers of stones, debris, crop residues among others, placed along the contours to check erosion and improve water infiltration. According to Bonsu, 1981 as in EPA, 2002 this practice in Northern Region is formed to reduce soil loss by 5.5% to 10.4% in comparison with a bare plot.

4.2.11 Sub Catchment Area Management of the Black Volta River

The people of Nandom Tanchara as part of efforts to combat drought and desertification have adopted a sub-catchment area management of the Black Volta River. This was done in collaboration with eleven (11) communities namely; Gengenkpe, Sonne, Saabaar, Venner, Borkyii, Dabaateng, Namwin, Ketuo, Guri, Tampele and Tantuo.

According to them, agricultural activities and harvesting of fuel wood near the Black Volta River, combined with climatic variability resulted in the increase in soil erosion the silting and drying up of the river faster than what is normally expected. According to these communities, there was an increased incidence of floods and the destruction of farm produce.

However, since the creation of the four (4) kilometer stretch sub-catchment area protection of the Black Volta River five years ago, there is enough vegetative cover increasing the river's capacity to hold water all year round. This has also prevented the reoccurrence of such adverse impacts such as flooding. According to NandomTanchara and Kusselle communities, the idea is becoming a huge potential for eco-tourism. Since March, 2009, the community and other adjoining communities spotted twenty-eight elephants on different occasions as they migrate from Burkina Faso.





Plate 4.7: Riparian vegetation along the Banks of the Black Volta River near Nandom Tanchara.

4.2.12 Animal Traction

Animal traction is considered by the farmers as another way of combating drought and desertification. This is because it does not have some of the negative effects associated with tractor use like soil compaction and erosion. Nkegbe, (2005) cited in Turner and Thiam, 2005 indicates farmers are well aware of the use and importance of animal traction.



4.2.13 Agroforestry

Agroforestry is another important integrated land use management system used by farmers in the Lawra District where trees and shrubs are deliberately cultivated on the same piece of land as crops and/or livestock. It improves farm production at small farm level and at the same time reverses the trend of land degradation and eventually combating drought a desertification.

According to Egger and Martens, 1987 cited in EPA 2002, Agro forestry places special emphasis on the long-term sustainability and the avoidance of irreversible damage to the environment.

4.2.14 Bush Trees

NandomTanchara, Kusselle, Goziri and Kanpuo have adopted traditional agro forestry practices whereby economically valuable plant species such as the Shea (*Vitellari paradoxa*) and dawadawa (*Parkia biglobosa*) are promoted to grow through natural regeneration. These indigenous plants adapt to local conditions such as drought and wildfires. Dawadawa for instance is nitrogen fixing leguminous plant which facilitates soil fertility improvement. The adoption of degradation.

Plates 8 and 9

Indicate protection given to indigenous plant species at the Kusselle Community



Plate 4.8: Dawadawa (*Parkia biglobosa*)



Plate 4.9: Shea (*Vitellari paradoxa*)



4.2.15 Tree Planting

Trees are deliberately planted and most of which are not indigenous. Grafted mangoes (*Mangifera indica*) akee apple (*Blighia sapida*) teak (*Tectonya grandis*), Accasia (*Acacia siemen*), Albizia (*Albizia Labek*) and Leucenia. Though these trees are planted as an environment improvement measure, grafted mangoes are largely transplanted in view of their economic value. Albizia, Lebbek and leucaena are nitrogen fixing leguminous species that are transplanted on farm lands to improve soil fertility.



Plate 4.10: Woodlot at Kanpuo (acacia tree species)

4.3 Contribution of government and Non-Government Organizations towards combating drought and desertification

The study under this section solicited the views of respondents on the awareness of community people about the contributions of government and nongovernmental organizations towards combating drought and desertification. Respondents agreed here that indeed some support was coming from government and some non-governmental organizations. The tables below show some government organizations and non-governmental organizations respondents identified as contributing and giving support to rural communities to help combat drought and desertification.



Table 4.7: Contributions of Government Agencies

Name of Government Agency	Type of Support
Environmental Protection Agency (EPA)	<ul style="list-style-type: none"> • Environmental education • Tree planting • Promoting the establishment of woodlots • Formation of Community Environmental Management Committees (CEMCs) • Promoting stone lining • Reclamation of burrowed pits • Promoting alternative livelihood support programs such as Guinea fowl production, small ruminants
Ministry of Food and Agriculture (MOFA)	<ul style="list-style-type: none"> • Environmental awareness programs • Tree planting • Production and provision of leguminous seeds • Provision of extension services • Crop production and animal husbandry
Meteorological Agency	<ul style="list-style-type: none"> • Awareness on climate change • Provide early warnings on rainfall
Ghana National Fire Service (GNFS)	<ul style="list-style-type: none"> • Training and education of fire volunteers in communities to fight bush fires
Savanna Agricultural Research	<ul style="list-style-type: none"> • promote the dissemination of drought





Institute (SARI)	<p>resistant crops</p> <ul style="list-style-type: none"> • Provide training on new copping techniques
Ghana Education Service (GES)	<ul style="list-style-type: none"> • Provide non-formal education for adults to improve their literacy.
Forestry Services Division	<ul style="list-style-type: none"> • Environmental awareness • Training in tree management and nursery raising • Agro forestry • Creation of community nursery
Lawra District Assembly	<ul style="list-style-type: none"> • Enact bye laws on environment • Provide the infrastructure and services needed to enhance food security and reduce poverty

Source: Field Survey, 2009

Table 4.7 shows some government organizations actively supporting communities in the District to help fight drought and desertification. Government agencies and departments identified by respondents were EPA, MOFA, Meteorological Agency, GNFS, GES, Forestry, Lawra District Assembly and SARI. These organizations in one way or the other were said to be providing some form of support as shown above. In most of the cases, these organizations complemented each other's roles in efforts to combat drought and desertification. EPA was however identified by respondents as very active in the fight to end drought and desertification in the District.

Table 4.8: Contribution of Non-Governmental Organization

Name of Organization	Type of Support
Nandom Agric Project	<ul style="list-style-type: none"> • Train farmers on improved agricultural practices • Promote the planting of economic trees • Tree planting • Promoting the establishment of nurseries
Land Care Ghana	<ul style="list-style-type: none"> • Promote agro forestry • Promote land and water management techniques-stone lining, • Alternative livelihood support • Promoting the protection of the sub-catchment area of the Black Volta River • Promote composting in each household • Strengthening community Environmental Management Committees (CEMCs)
Oxfam GB	<ul style="list-style-type: none"> • Tree planting • Women empowerment • Introduction of improved agricultural technologies

Source: Field Survey, 2009

From table 4.8, it is clear that respondents identified the Nandom Agric Project, Land Care and Oxfam GB as active non-governmental organizations that have provided some support to communities in the Lawra District to control drought



and desertification. Respondents however maintained that Oxfam GB that was very supportive to rural communities had folded up their support. Also support from Land Care and Nandom Agric Project to communities had reduced drastically because of funding. However, Land Care Ghana is now the only NGO supporting the Nandom Tanchara community in combating drought and desertification.

4.4 Effects of Community Attitude/Beliefs on Efforts Towards Combating Drought and Desertification

Responses were taken from respondents on whether the attitudes of community people themselves were militating against efforts towards combating drought and desertification. The table below indicates the opinions of respondents.

Table 4.9: Effects of Community Beliefs on Efforts to Combat Drought and Desertification

Response	Frequency	Percent
Yes	120	100
No	0	0
Total	120	100

Source: Field Survey, 2009

Respondents agreed from table 4.9 that, the attitudes or beliefs of community members were inhibiting efforts towards combating drought and desertification. Some of the concerns raised include the following;

Some community members still held the belief that burning the bush before the next farming season makes it faster and paves the way for new grass to grow for their livestock to feed on.

It was also generally agreed by respondents that, taboos that existed for the protection of sacred groves were now being thrown away. They went further to add that virtually all sacred groves in the area had dwindled in size since all protected areas were encroached upon by community members for farming



purposes. Respondents were of the view that the relics of these sacred groves could serve as entry points for the promotion of natural resource conservation.

Furthermore, community members' belief of burning around the Shea trees to make the trees produce more was yet another issue identified to be thwarting efforts towards combating drought and desertification. However, respondents mentioned that, burning around Shea trees at all times rather had devastating effects on the productivity of the trees and even the young plants thereby reducing numbers of Shea trees. This is because most of these fires are uncontrolled and assume wild and devastating proportions.

4.5 Sustainable and Conservation Methods Towards Combating Drought and Desertification

The author under this component solicited the views of respondents on sustainable and conservation methods that they as community people adopt towards combating drought and desertification. The views of respondents are reorganized under the following headings;

4.5.1 Group Formation

Formation of Community Environmental Management Committees (CEMCs): The Community Environmental Management Committees mobilize community people to carry out environmental enhancement activities that combat drought and desertification. The committee ensures that, environmental laws and regulations are enforced and responsible for the day to day monitoring of forest reserves to make sure community people do not encroach on the protected area. The CEMCs are locally represented including people from the different social and geographical sections of the two communities. The total size of CEMCs range from 9 to 15 members.

4.5.2 Land and water Management Techniques

Techniques here include stone lining, bonding, crop rotation, contour earth mounds and multiple cropping. The adoption of stone lining and bonding have proved to be very sustainable since it can last for ages.



4.5.3 Promotion of Organic Farming

This method according to respondents involves composting, green manuring and animal traction method largely depends on the availability of animal droppings. Since majority of community people are also into livestock rearing, it makes it easy to get the droppings for the composting. For the green manuring, the availability of nitrogen fixing crops in the community makes it sustainable since materials can readily be sourced.

4.5.4 Adoption of Drought Resistant and early maturing Crop

The adoption of drought resistant crops makes farmers to record minimal losses during the period of drought. By this, crops that can withstand the harsh conditions of drought are being promoted. Farmers are therefore encouraged to use such crops since the next farming season cannot be predicted.

With the introduction of early maturing and drought-tolerant cultivars of cereals, yields of cereals are likely to increase with improved organic fertilizer use from composting and effective soil and water conservation practices in Nandom Tanchara and Kanpuo. Maize, millet, sorghum among others are the drought resistant and early maturing crops being used by farmers in the two communities. The only way for farmers to survive during periods of drought and guarantee some level of food security is by the adoption of drought tolerant crops.

4.5.5 Alternative Livelihood Support Programs

By this initiative, community people depend on other livelihood activities rather than depending on only the natural environment for their daily needs. Alternative livelihood support programs here include but not limited to shea butter processing small ruminants' production and guinea fowl production. Adoption of such programs lead to the reduction in total dependence on the environment where tree felling and bush burning will decrease tremendously.

Provision of support for rural communities in the affected areas to engage in nonagricultural and off-farm enterprises could reduce the pressure on the fragile land resources with a consequent reduction in land degradation whilst enhancing the



income of rural households (EPA, 2002). This is one of the surest ways of combating drought and desertification.

According to EPA, 2002, this initiative provides support for community people to engage in income generating activities that reduce pressure on the fragile land resources.

4.6 Summary

This data presentation and analysis chapter consists of data on the socio-demographic characteristics of respondents. It also presents analyzed data on some local initiatives adopted by rural communities in combating drought and desertification, the contributions of government and non-governmental organizations towards combating drought and desertification, the effects of community attitudes or beliefs on efforts to combat drought and desertification and the sustainable and conservation methods towards combating drought and desertification.

The focus of the next chapter would be discussions on analyzed data, findings, conclusion and recommendations.



CHAPTER FIVE

DISCUSSIONS, FINDING, CONCLUSION AND RECOMMENDATION

5.1 Discussions

5.1.1 Socio-demographic Characteristic of Respondents

The socio-demographic characteristics of respondents touched on the age and sex distribution of respondents, occupational status of respondents and the educational level of respondents. The age distribution of respondents shows that respondents were between the ages 15-51 and above. The sex distribution of respondents also revealed that, out of a total number of 120 respondents, eighty, representing 66%, were male respondents and the remaining forty representing 33.3% were female respondents. This therefore indicates that there were more male respondents than their female counterparts.

The occupational status of respondents also revealed that respondents were found to be engaged in a wide spread of economic activities including farming, shea butter extraction, livestock rearing and dawadawa processing. However, majority of the respondents were said to be engaged in farming as their main sources of livelihood. The educational level of respondents shows that forty respondents had some form of formal education and the remaining eighty respondents who are also the majority had no formal education.

5.1.2 Local Initiatives Adopted by Rural Communities

Respondents Contacted revealed that rural communities in the Lawra District were practicing local ways of combating drought and desertification. The most common local initiatives communities were found engaged in include; a non-burning experiment which involves no bush burning in completely degraded environments throughout the year; the setting aside of a large parcel of land which is protected from all forms of farming activities that involve cutting down of trees and burning; composting which involves the use of animal droppings to prepare compost for the improvement of soil fertility; enactment and enforcement of local laws to protect the environment from being degraded, taboos to protect



sacred areas from being invaded by human activities, local silos for storage of farm produce, stone lining and bonding to check the flow of water on farm lands, and covering boundary surface of the soil with crop residue, straws or leaves. They also adopt traditional agroforestry practices whereby economically valuable plant species like shea and dawadawa are promoted to grow through natural regeneration.

5.1.3 Contribution of Governmental and Non-Governmental Organizations

Respondents agreed here that some support was coming from government and non-governmental organizations towards combating drought and desertification in the Lawra District. They further indicated that, the Environmental Protection Agency (EPA), Ministry of Food and Agriculture (MOFA), Meteorological Agency, Ghana Education Service (GES), Forestry, Ghana National Fire Service (GNFS) and Savanna Agricultural Research Institute (SARI) were the main government Institutions providing support in various kinds to assist rural communities in combating drought and desertification in the district. According to respondents, EPA and MOFA were the most active bodies among the government institutions contributing mostly in efforts to combat drought and desertification in the District. Nandom Agricultural Project, Land Care Ghana and Oxfam GB were among non-governmental Organizations giving support in various forms to rural communities towards fighting drought and desertification. Respondents also mentioned that support from the said non-governmental organizations was however dwindling and that Oxfam GB, which assisted rural communities to fight drought and desertification had folded up and was no longer providing such support.

5.1.4 Effect of Communities Attitude/Beliefs on Efforts to Combat Drought and Desertification

Respondents on the whole agreed that the attitude or beliefs of Community people indeed were inhibiting efforts of rural communities towards combating drought and desertification in the District. Some concerns raised include but not limited to; some community people still holding the belief that burning the bush before the next farming season paves the way for new grass to grow for them



livestock to feed, taboos that existed for the protection of sacred areas are gradually facing out for most people no longer obey them, and the belief that burning around the shea trees would make the trees produce more fruits.

5.1.5 Sustainable and Conservation Methods towards Combating Drought and Desertification

Respondents contacted for their responses on the sustainable and conservation methods rural communities adopt in the Lawra District towards combating drought and desertification yielded results. It was revealed that rural communities in the Lawra District were said to be engaged in several sustainable and conservation methods of combating drought and desertification. Among the common sustainable and conservation methods rural communities were found to be engaged in are; group formation to make sure environmental laws and regulations are enforced, land and water management techniques such as stone lining and bonding, crop rotation and multiple cropping, promotion of organic farming which involves composting, green manuring and animal traction, adoption of drought resistant and early maturing crops and alternative livelihood support programmers where community people depend on other livelihood activities rather than depending on only the natural environment for their daily needs.

5.2 Findings

The study revealed that, rural communities in the Lawra District notably Nandom Tanchara, Kusselle, Goziri and Kanpuo are engaged in a wide range of local initiatives to combat drought and desertification. Among the effective local initiatives that rural communities are engaged in to combat drought and desertification include; non-burning experiment, creation of community reserves, composting, enactment and enforcement of local laws and building of local silos, tree planting, agro forestry, bush trees, animal traction, mulching, contour farming, boundary planting, stone lining and bonding.

It is also revealed in the study that, the government of Ghana through certain agencies and departments and some non-governmental organizations are providing support in various forms to rural communities in the Lawra District to





combat drought and desertification. It further revealed that, EPA, MOFA, Meteorological Agency, GNFS, and SARI were the agencies and departments said to be providing support to rural communities in the District. Also, nongovernmental Organizations such as the Nandom Agricultural Project, Land Care Ghana and Oxfam GB for some time now have provided support in various forms towards combating drought and desertification in rural communities in the district. The effort of non-governmental organizations was however dwindling.

The study further revealed that the attitude or beliefs of community people are militating against efforts of rural communities to combat drought and desertification the attitude or belief of burning the bush before the next farming season to pave the way for new grass and, burning around the shea trees with the belief that the trees would produce more are some of the issues highlighted as impeding efforts of rural communities to combat drought and desertification.

Again, the study revealed that rural communities in the Lawra District are engaged in sustainable and conservation methods of combating drought and desertification. Some of the main sustainable and conservation methods rural communities are engaged in include; group formation, land and water management techniques, promotion of Organic Farming, adoption of drought resistant crops and alternative livelihood support programs.

5.3 Conclusion

Ghana is vulnerable to several kinds of desertification. Soil erosion by surface runoff is widespread and causes the greatest threat in the Guinea and Sudan Savanna zones in the country with the three northern regions as the worst affected areas (EPA, 2002).

In the Lawra District, rural communities have adopted a wide range of local initiatives such as non-burning, creation of community reserves, composting, enactment of local laws, taboos, local silos, stone lining and bonding, boundary planting, mulching, contour farming, sub-catchment area management of the Black Volta, animal traction, agro forestry and, protection of bush trees towards combating drought and desertification. However, the availability of information on these initiatives to the outside world is challenged by the inadequate

documentation of information on rural communities' efforts to combat drought and desertification in the District.

It is important to note that, for vulnerable communities' efforts in combating drought and desertification to attract a lot of interest and support from government and development partners alike, there is the need for well-coordinated and documented information on the activities of rural communities to adapt to climate variability and change.

5.4 Recommendations

From the findings presented, the following recommendations are proposed by the researcher to strengthen the operations of rural communities in combating drought and desertification in the Lawra District.

For rural communities to be discouraged from undertaking activities that have negative impact on the environment, the provision of alternative livelihood support programs to communities is critical in that pressure can be taken off the environment where we can have a shift from total dependence on the environment to a point where communities can undertake other self-help livelihood activities.

The author recommends in this study that, there is the need to infuse the existing vast but untapped traditional knowledge at the local level into the initiatives currently adopted by rural communities in order to make them more sustainable.

Again, there should be adequate and proper documentation on efforts of rural communities to combat drought and desertification for easy referrals.

Furthermore, education on the need to stop bush burning, and encourage local initiatives to combat drought and desertification should be intensified. Enforcement of local laws to protect the environment should be encouraged and a reward system for communities engaged in activities to combat drought and desertification put in place to motivate them. By so doing, a lot more communities would come on board the program.



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Assessment of Flora Diversity in Complex Agricultural Landscapes: Acts Botanica Yunnica



APPENDIX

**UNIVERSITY FOR DEVELOPMENT STUDIES FACULTY OF PLANNING
AND LAND MANAGEMENT GRADUATE SCHOOL - WA**

TOPIC

**EFFORTS OF RURAL COMMUNITIES IN COMBATING DROUGHT AND
DESERTIFICATION IN THE LAWRA DISTRICT, GHANA**

QUESTIONNAIRE TOOL FOR FOCUS GROUPS

PREAMBLE

This study is aimed at finding out the efforts of rural communities in combating drought and desertification in the Lawra District of Ghana.

The study is also carried out in partial fulfillment for the award of an MSc degree in Development Management at the University for Development Studies.

It is important to note here that any information, when provided, would remain confidential and would be used for academic purpose.

Thank you for accepting to participate in this study.



PART I

PERSONAL INFORMATION

NOTE: Multiple answers are allowed Tick in the spaces provided [√]

1 . N a m e o f f o c u s g r o u p

Sex: 1. Male [] 2. Female [] 3. Mixed []

Age: 1. 15 - 30 [] 2. 31 - 50 [] 3. 51 and above []

2 . Religion: 1. Christian [] 2. Muslim [] 3. Traditionalist []
4. Others, Specify

3 . Ethnicity: 1. Dagaaba [] 2. Sissala [] 3. Wala []
4. Others, Specify

4 . Education: 1. No formal Education [] 2. Basic education []
3. Secondary [] 4. Vocational / Technical [] 5. Tertiary []
6. Others, Specify

5 . Occupation: 1. Farming [] 2. Shea butter processing []
3. Livestock rearing [] 4. Dawadawa processing [] 5. Others, Specify

6 . Average monthly income: 1. Below GHC10 [] 2. GHC11 -
GHC 50 [] 3. GHC 51 - GHC100 [] 4. Above GHC 100 []

UNIVERSITY FOR DEVELOPMENT STUDIES



PART II

EFFORTS OF RURAL COMMUNITIES IN COMBATING DROUGHT AND DESERTIFICATION

7 . Is your Community engaged in any efforts to Combat drought and?
desertification. 1. Yes [] 2. No []

If Yes go to question 10, If no go to question 11

Name of Non-Governmental Organizations (NGOs)	Type of support

13. Do Community people attitudes or beliefs inhibit your community's efforts to Combat drought and desertification. 1. Yes 2. No



If Yes go to question 14, If no go to question 15

14. Indicate the various forms / ways by which attitudes or beliefs inhibit your community's efforts to Combat drought and desertification.

.....

.....

.....

15. Are Methods / initiatives adopted by your community to Combat drought and desertification. 1. Yes 2. No

If Yes go to question 16

16. What other sustainable methods / initiatives should your community adopt to Combat drought and desertification?

.....

.....
.....

17. Are you satisfied with the existing / current strategies used by your community to combat drought and desertification? 1 Yes [] 2 No []

18. If Yes, what can be done to sustain these initiatives

.....
.....

19. If No, what is making them not effective and what do you propose to make them effective?

.....
.....
.....

Additional information can be provided here.



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.....
.....
.....
.....
.....

Thank you for your responses.

Map of Lawra District showing the Study Communities

