ENVIRONMENTAL DEGRADATION AND POVERTY IN THE WEST GONJA DISTRICT OF THE NORTHERN REGION

B Y

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ENVIRONMENTAL DEGRADATION AND POVERTY IN THE WEST GONJA DISTRICT OF THE NORTHERN REGION

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A DISSERTATION SUBMITTED TO THE DEPARTMENT OF PLANNING AND MANAGEMENT, IN PARTIAL FULFILLMENT FOR THE AWARD OF A 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 late father, C. K. Mumuni, my mother, Mary Yirifereh and my children Phidelis, Flora and Marvin.

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LIST OF ACRONYMS

ACO		Alien Compliance Order
CCD		Convention to Combat Desertification
CPE		Centrally Planned Economies
CSIR	-	Centre for Scientific and Industrial Research
CSOs		Civil Society Organizations
DA		District Assembly
DC		Developing Countries
DSO		District Sanitation Officer
EPA		Environmental Protection Agency
EPC		Environmental Protection Council
FAO	-	Food and Agriculture Organization
FCUBE		Free Compulsory Universal Basic Education
FGDs		Focus Group Discussions
GAST		Ghana Association of Science Teachers
GCCIVAA		Ghana Climate Change Impacts Vulnerability and Adaptation
GDP		Gross Domestic Product
GEAP		Ghana Environmental Action Plan
GLASOD	-	Global Land Assessment of Degradation
GNDPC		Ghana National Development Planning Commission
HDI		Human Development Index
HH		Household
HPI	-	Human Poverty Index
LPG		Liquefied Petroleum Gas
MOFA		Ministry of Food and Agriculture
NAPCDD		National Action Plan to Combat Drought and Desertification
NEAP		National Environmental Action Plan
NGOs		Non-Governmental Organizations
NIA		National Income Accounting
PCB		Poly Chlorination Biphenyl
PPP		Purchasing Power Parity
PRA		Participatory Rural Approach

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Map 1: Map of Ghana showing regions and districts

Map 2: Map of West Gonja District

ABSTRACT

This study set of to examine poverty and environmental degradation in the West Gonja District of the Northern Region.

In all, a total of 130 respondents from six communities were interviewed to solicit information. The main tools used for soliciting information included: questionnaire, key informant interview, focus group discussions, observation and secondary data sources. The study employed the SPSS for data analysis.

The perception of the level of poverty within the district was very high rating 87 per cent. The major indicators of poverty among other variables included: lack of three square meals a day, high illiteracy rate, high morbidity rate, inadequate health service provision, high rate of unemployment, inadequate capital for investment and inadequate provision of potable water.

The perception of the level of degradation in the district was also very high rating (78%).Reasons assigned for the degradation of the environment include: unemployment, inability to afford other sources of domestic fuels and general ignorance. The main indicators of degradation in the district included: poor crop yield, drying up of surface water bodies, loss of biomass and reduction in rainfall.

The study makes the following recommendations to institutions to help check the incidence of poverty and environmental degradation in the district;
Poverty Reduction: the repackaging of agriculture to take a modern phase, the creation of agro-based-rural industries, provision of credit facilities and the development of an educational packaged that is vocationally and technically oriented.

Reducing Environmental Degradation: the study calls for an agricultural development that must include Agro forestry as a key component. The Taungya System variant of Agro forestry is prescribed. The formation of school based environmental clubs, sponsoring educational programmes in the form of radio discussions, TV talk shows and news bulletin on the environment. The enforcement of environmental bye-laws, creating many protected areas and finally, making environmental management a 'people-led pillar'.

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CHAPTER ONE

1.0 BACKGROUND TO THE STUDY

Since the last four decades, there has been a growing interest in the environment, especially the damage being done to the environment in Europe, North America and other parts of the world. This may have fluctuated in its intensity, as other issues have also gained importance, but those fluctuations, have been around an upward trend. The process of European integration and the growth of international trade have brought the transnational nature of the environmental problems to the forefront. The depletion of the ozone layer and global warming, are the result of not one country or one company's action but of many. There is a need for the individual to re-evaluate his or her consumption patterns (NDPC, 1996). Environmental issues have been a major concern in the world. The increase global concern over the environment stems first, from the various scientific, practical and visible evidences of recent times in the human environment. The environment has undergone transformation and degradation through various forms of human developmental actions and activities (Agbesinyale, 1992).

As a result of all the negative impacts being inflected on the environment, for example the depletion of the ozone layer, deforestation, air and land pollution, soil erosion, desertification, sand winning and gold mining, there has been the emergence of various environmental concern groups such as Mantenso Friends of the Earth, Green the Earth, Rural Innovations for Sustainable Environment and Nyankanba Escapement Conservation. These environmental concerns and the Environmental Protection Agency (EPA), acts as a kind of advocacy and pressure groups on environmental issues.

The environment constitutes the natural domain of all development activities and hence it is not possible to compartmentalize environmental issues. Increasing evidence especially in Africa points to excessive demands being made on the limited resources and the over-stretching of carrying capacities of fragile ecosystems (Diaw, 1989). In perceiving the natural resource base and the environment as very crucial for growth and development, it is important that

environmental concerns be accorded the necessary popularity that is needed and must be embraces by all. Factors like poverty and ignorance that are core causes of most environmental problems in Africa and Ghana in particular must be addressed by all stakeholders. The most unfortunate situation, however, is that while this new thinking has become the hallmark of almost all spatial and physical developmental activities in the advanced countries, it is yet to reach such a level of consideration and popularity in most developing countries (Diaw, 1989).

People have long recognized that environment is of critical importance as a source of material inputs to economic activities, but are less aware that the environment also plays an essential role as a receptacle for society's unwanted by-products. The production sector, which consists of mines and factories, extract materials from the environment and process the raw materials into goods. Transportation and distribution networks move and store the finished products before they reach the point of consumption. The environment provides the material inputs needed to sustain economic activity and carries away the waste generated by it (Minks, 1993).

Environmental issues cut across race, class and spatial regions and since it is not possible to compartmentalize them, this research sought to look at the influence of poverty and environmental degradation in the West Gonja District of Northern Region. The study area lies within the Guinea savannah wood land. The national profile on the state of poverty in Ghana, the Ghana Poverty Reduction Strategy II (2003 — 2005), indicates that between 1999 and 2000 the Upper East Region had nine (9) out of ten (10) inhabitants being poor, the Upper West Region had eight (8) out ten (10) inhabitants being poor while the Northern Region had seven (7) out ten (10) inhabitants being poor.

The Ghana Statistical Service (GSS, 2000), attests that the population of West Gonja as at 20000 stood at 76702. Damongo as the District Capital, the town and its environs has experienced rapid growth in its population. Unfortunately, there has not been a corresponding increase in job opportunities to meet the job requirements of the youth. Thus the result of high population growth with its attendant lack of jobs have made the youth to resort to various practices,

including bush burning, chain saw operation, improper agricultural practice, sand winning among others as a means of livelihood and survival. These practices however, seem to have a negative toll on the environment.

This study attempts to analyze poverty and environmental degradation in West Gonja District and suggest some workable solutions in order to sustain and manage the fragile environment.

1.1 STATEMENT OF THE PROBLEM

Despite the various efforts, made by the public and private sector organizations, as well as international organizations such as United Nations Organization among others to combat acts that degrade the environment as well as manage the natural resources of most communities, seemed to have achieved little in this direction. What is even worrying is the drawing up of programmes, policies and projects to this effect. To ensure the legality of the operation of such projects, programmes and policies, laws and legislations are usually passed to legalize institutions as well prescribe punishment for offenders who abuse the environment.

Studies conducted on Ghana's environment especially the northern savannah woodlands, (UNDP/UNSO, 1985), cited in Nsiah-Gyabaah (1994: 9), and noted that the area was being degraded at an increasing rate. (C.S.I.R, 1974, and Justice and Hiernaux, 1996) cited in (Nsiah-Gyabaah, 1994: 9), equally observed that there is little understanding of the complex processes, temporal variations of the scale of degradation or the long term cost/benefits ecological destruction. It is interesting to note that public, private and international organizations in most cases did not look at only environmental degradation as an issue in isolation; they equally looked at poverty. Typical examples are the Free Compulsory Universal Basic Education (FCUBE) programme adopted by Ghana in 1987, the National / District Wide Health Insurance Scheme adopted in 2003, the Rural Electrification Project in 1980s, Ghana Poverty Reduction Strategy I and II among others are indicators of attempts made to reduce poverty. To this end, evidence has shown that the problems of poverty and the degradation of the environment remains a concern for all. Todaro and Smith (2006: 220 — 29), argued that women, children and minority groups make up a substantial proportion of the world's poor. They further contend that, the poor are generally located in rural areas and are

primarily engaged in agricultural and related activities that has an effect on the environment. National Action Programme to Combat Drought and Desertification (2002: 56) postulates that, poverty is the main underlying socio-economic cause of land degradation. It often limits the farmer's ability to invest and adopt sustainable measures of protecting the environment. The document further contends that the poor particularly women often lack access to land and therefore depend on the most fragile areas and resources. Ghana Climate Change Impact Vulnerability and Adaptation Assessment (2008: 175), also establishes that the link between poverty and how it influence the environment. According to the literature, poor people are sometimes compelled to exploit their immediate environment in order to survive. Perhaps this has informed the various human activities such as: crop cultivation and livestock rearing, charcoal burning, sand winning, gold mining, quarrying, lumbering, fishing, fuel wood harvesting among others as means of livelihood and survival that degrade the environment. Despite these human induce factors, Nsiah-Gyabaah (1994: 29), argues that, natural degradation processes such as floods, fires among others are substantial contributors to the process. The problem that engages the attention of this study is the establishment of the linkage between poverty and environmental degradation and how the two variables mutually reinforce each other. Judging from the above statement the questions that come to mind and need answers are:

1.2 RESEARCH QUESTIONS

1.2.1 Main Research Question

Has poverty any influence on environmental degradation?

1.2.2 Sub Research Questions

1. What are the causes of environmental degradation in the West Gonja District?
2. Do people of the West Gonja District perceive environmental degradation as an effect and cause of poverty?
3. What links exist between poverty and environmental degradation?
4. What roles do stakeholders play in addressing the issues of poverty and environmental degradation in the West Gonja District?

5. How can poverty and environmental degradation be reduced in the West Gonja District?

1.3 RESEARCH OBJECTIVES

1.3.1 Main Research Objective

The main research objective is to examine the influence of poverty on environmental degradation.

1.3.2 Sub Research Objectives

1. Identify the causes of environmental degradation in the West Gonja District.
2. Find out people's perception of environmental degradation as a cause and effect of poverty.
3. Examine the link between poverty and environmental degradation.
4. Assess the role played by stakeholders in reducing poverty and environmental degradation in the West Gonja District.
5. Make recommendations for reducing poverty and environmental degradation in the West Gonja District.

1.4 RELEVANCE OF THE RESEARCH

The importance of research is as follows: firstly, the study would provide baseline information about the West Gonja District and specifically serve as a source of social, economic and ecological knowledge. These would be vital for resource planning and management in the fragile savannah ecosystem.

Secondly, its relevance is expected to be derived from the integration of social and economic perspectives to environmental studies and to suggest guidelines of action to controlling environmental degradation and poverty eradication in West Gonja District. The target audience of this final report includes the sections dealing with policy recommendations and development interventions such as Town and Village Development Committees (TVDC), Project Planners, Decentralized Government Ministries and Department, the District Assembly and Donor Agencies. It is hoped that the information that is contained in this final report would justify the allocation of adequate resources to environmental

protection and resource conservation groups by government and Non-Governmental Organizations (NGOs) interested in rural development.

1.5 SCOPE OF THE STUDY

The study covered six (6) villages divided into two major clusters: population above 1000 (zone 1) population below 1000 (zone 2). The study focused on poverty and environmental degradation in the selected communities.

1.6 ORGANIZATION OF THE STUDY

The study is organized into five chapters. Chapter one covered the background of the study, problem statement, research questions, research objectives and relevance of the study. Chapter two looked at various literature related to the topic of study. Chapter three deals with the various methodologies employed for the study. Chapter four is concerned with data analysis and presentation. Finally, chapter five is concerned with the summary, major findings, conclusion and recommendation of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 INTRODUCTION

This chapter reviews relevant literature that relates to poverty and the environment.

2.1 THE ENVIRONMENT

Environment according to Encyclopaedia Encarta, (2007), means all the external factors affecting an organism. These factors may be (biotic factors) or non-living variable (abiotic factors). The GAST (1992), makes a further breakdown of the biotic and abiotic environmental factors. According to the GAST, the biotic factors comprises of flora and fauna (plants and animals). While the abiotic variables, has to deal with the various climatic and weather conditions such as rainfall, temperature, sunshine, humidity, wind (speed and direction), ocean current among others. Other variables include the various gaseous circles such as the nitrogen, carbon, phosphorous and the like.

2.2 ENVIRONMENTAL DEGRADATION

Despite the various concerns raised over the years on environmental degradation and the possible consequences, threats and effects it poses on the ecology little seemed to be achieved in this direction (FAO/ UNDP, 1981).

The concept or the term environmental degradation appears as an umbrella terminology used in the description of various environmental variables, such as land degradation, drought, aridity, desertification among others. Campbell (1984) noted that authorities in the field of environmental studies and the sciences have not been able to strike consensus on the definition of the term. This he argued that the problem came about as a result of the individual's background and the interest of governments. Thus, there exist several meanings or definitions of the concept. This situation has therefore subjected the concept to an elastic interpretation based on each author's angle of thought.

Despite the fact that, a consensus has not been reached by the various authorities, however, some interpretation and definitions have been adopted for use. In very simple terms or in ordinary English language usage, the tern degradation means deterioration, that is a reduction in the potency of an object (quantity or quality). The term was adopted by environmentalists and other scientists, to mean, the lost in value of the natural or physical environment. Fisher and Peterson (1977), made an observation that the environment provides certain resources and opportunities for human survival, these include; food, energy and other material input, purifying agents, macro climate and other services for human welfare. When these are over stretched by way of excessive harvest, degradation takes place. Diaw (1989) agrees with Fisher and Peterson. According to Diaw, there is increasing evidence pointing to Africa indicating that degradation is a cause of excessive demand on her natural resources, leading to depletion of these resources.

Warren et al., (1988), contend that degradation is the loss of the resilience of the environment; they however restricted their argument to dry lands. To them when land under a particular land use system fails to withstand stress or recover from shock, then degradation has taken place. According to them degradation of the environment means damaged resilience. Dregne (1977) and Tolba (1986), viewed degradation of the environment as the failure of the environment to perform its functions. The functions perform by the environment include, the provision of material inputs, a purifier, a recycler among others. Minks (1993), agrees with Dregen and Tolba, but observed that the environment, functioned as a receptacle for society's unwanted by-products, it provides materials inputs needed to sustain economic activities and the provision of routes or distribution networks for goods and service produced in the factories or extracted from the land.

2.3 FORMS OF DEGRADATION PROCSSES

Nsiah-Gyabaah (1994: 29), noted that, degradation took two main forms namely: natural and human induced forms. The natural induced form, make use of natural agents such as floods, fire, earthquakes, volcanic eruptions including any activities that can cause natural earth movement.

The human induced form is catalyzed by human activities that have a negative toll on the environment. These activities include deforestation, sand winning and cultivation of crops among others. He however, acknowledges the fact that both naturally induced and the human induced forms of degradation have their own checks or restoration process. He summarizes the processes of land degradation as follows, in the following equation.

LD / D = (NDP $_1$ + NDP2 + . . . DPn + HDP $_1$ + . . . HDPn) — (NRP $_1$ + NRP$_2$ +… NRPn + HMS$_1$ + HMS$_2$ + . . . HMSn)

LD/D = Land Degradation/Desertification

NDP = Natural Degradation Processes (e.g. floods, fire, etc).

HDP = Human Degradation Processes (e.g. deforestation)

NRP=Natural Restoration Processes (e.g. nutrient recycling)

HMS = Human Management Systems (e.g. reforestation)

Source: Kwasi Nsiah-Gyabaah, (1994: 29)

From the above, the author explains that degradation is caused by both natural and human induced factors. He also acknowledges that both the natural and human induced processes of environmental degradation can be checked.

2.4 TYPES OF ENVIRONMENTAL DEGRADATION

As discussed earlier, authorities in the study of environmental science seemed not to have reached a consensus on the term degradation. This has given rise to various definitions and types of degradation, including;

Desertification: Kassas, (1970), argues that desertification means desert encroachment and desert expansion or desert creep. The phenomena, also refers to the progression from an arid facie to hyper arid facie due to human activities and climatic conditions. (Groove, 1973 and Grainger, 1990), acknowledge that desertification is associated with degradation of lands in dry land areas. UNCCD (1997) defines desertification as land degradation in arid, semi-arid and dry sub-

humid areas resulting from various factors, including climatic variations and human activities.

Aridity index is the ratio of the mean annual precipitation **(P)** to the mean annual evapotranspiration (PE). Aridity index is used in the categorization of the arid regions. The Convention to Combat Desertification (CCD, 1997), considers arid, semi arid and dry lands with aridity indices, ranging from 0.050 — 0.065. Ghana's agro-ecological zones which fall within this aridity range are the Sudan, Guinea and Coastal Savannah zones. The regions within this agro-ecological zone are the Upper East, Upper West, Northern, Greater Accra, Central and Volta regions.

Table 2.1: Classification of regions of the world based on aridity index

Climatic Zone	**P/PE Ratio/Index**	**Percentage of Area Covered**
Hyper-arid	< 0.05	7.5
Arid	0.05 — 0.20	12.5
Semi-arid	0.21 — 0.50	**17.5**
Dry Sub-humid	0.51 — 0.65	9.9
Humid	> 0.65	39.2
Cold	> 0.65	13.6

Source: WMD-UNEP REPORT (1996) Interactions of Desertification and Climate.

2.5 FACTORS LEADING TO DESERTIFICATION

According to the National Action Programme to Combat Drought and Desertification (2000), desertification in Ghana is caused by two main variables: these are bio-physical (natural), and socioeconomic (human). The natural factors that lead to desertification include soil erosion, relief and other climatic factors. The biophysical factors are aided by the following conditions: extreme soil texture, inherent low soil fertility, salt intrusion, uneven spatial and temporal distribution of rainfall and drought. The socio-economic (human), consists of factors such as population pressure, unsustainable cultivation practices, deforestation, overgrazing, bush fires, improper use of agro-chemical, mining, soil nutrient depletion (nutrient uptake) without replenishment among others.

2.6 IMPACT OF DESERTIFICATION IN GHANA

According to Carter and Dale, (1974), cited in Nsiah-Gyabaah (1994:31), the problem of desertification, is not restricted to only the Sahelian and Sub Saharan Africa alone. The issue is of a global nature and consequently the effect can also be of a global nature. According to NAPCDD (2000), the effects of desertification can be viewed in a twofold theory: the environmental impact and the socio-economic impact. On the impacts the document attests that desertification presents significant adverse impact on natural resources and the environment. The document noted that the phenomenon reduces soil productive, reduces crop yield, makes lands barren, reduces quantity and quality of vegetation cover, reduces land resilience to natural climatic variability and increases off site damage. On the socio-economic impact of desertification, the document, argues that, the phenomena, increase scarcity of forest products, famine and malnutrition, increased migration and social cost, low incomes and increased poverty consequently, the net effect will be an increased cost to notional economy. On the issue of famine and malnutrition, Nsiah-Gyabaah (1994: 163), noted that the people of the Upper West Region of Ghana relied on the forest (wild), for food substitutes as a coping strategy in times of rain/crop failure for survival.

2.7 WATER POLLUTION (AQUA DEGRADATION)

Harts (2008), in his contribution to Microsoft Encarta, noted that the pollution of rivers and streams with chemical contaminants has become one of the most critical environmental problems of the century. He observed that chemical pollutants entering rivers and streams can be classified according to their nature and sources: Point pollution and Non-Point pollution. Point pollution, he said involves pollution from a single concentrated source that can be identified, such sources include outfalls, pipes from factories or refineries. On the non point pollution he argued that, it involves pollution from dispersed sources that cannot be precisely identified. Mink (1993), in analyzing the role of the environment, observed that the environment served as a critical source of materials input to economic activities. He however, acknowledged that people were less aware of

the role of the environment play as a receptacle of the unwanted by-products of society.

Minks was pointing to the fact that, aqua system constitutes a receptacle that receives the by-products of society's economic activities. The constant disposal of these by-products into the aqua systems, he noted that at a future date, will exceed their carrying capacities of water bodies, consequently causing their degradation.

2.8 MAJOR TYPES OF WATER / AQUA POLLUTIONS

Due the multisource nature of water and nature of human economic activities, water or aqua pollutants cannot be restricted to one source.

Harts (2008) acknowledges that major aqua/water pollutants can be classified into chemical and physical materials that degrade water quality. The other pollutants can be classified into eight categories each presenting its own set of hazards.

2.8.1 Petroleum Products

A major source of water pollution is from petroleum product. Harts (2008) noted that petroleum products get into water mainly by means of accidental spills from ships, tanker trucks, pipelines and leakages from underground tanks. Most petroleum products are poisonous and therefore have the tendency of damaging aqua life by way of extinction of most species. Some of the chemical that are contained in spilled oil include poly chlorinated biphenyl's (P.C.Bs), it is however important to note that oil spillage is not a common phenomena in Ghana now.

2.8.2 Pest and Disease Control Pollution

GEAP (1994), noted that each year over two million tonnes of pesticide products are scattered over the environment in an attempt to control pest and disease. Two thirds are used in the Western Industrialized Countries (WICs), 11 percent in the Centrally Planned Economies (CPEs) and the remaining 20 percent in the Developing Countries (DCs). These chemicals Harts (2008), noted that, they are used to kill unwanted animals and plants (pests), he however acknowledges that,

these chemicals may be carried by rain water / runoff into streams especially if these substances are applied too lavishly. Some of these chemicals that are biodegradable will quickly decay into harmless substances. The non biodegradable type remains dangerous for a long time and could destroy aqua life or causes the extinction of some selected species of plants and animals in water bodies. He noted that many drinking water supplies are contaminated with pesticides from widespread agricultural use of chemicals. It is on record that more than 14 million Americans drink water contaminated with pesticides, (EPA, 2008). According to EPA, USA cited in Encarta (2008), 10 percent of wells in the USA contain chemicals.

2.8.3 Disposal of Industrial and Mining Wastes

One major source of water pollution that leads to serious aqua degradation is disposal of waste from the industrial sector into water bodies without treatment. According to Mensah (1976), the major industries in Ghana that discharges effluent into nation's water bodies include: the breweries, textiles, mining, chemical, and plastic and rubber industries. Mensah (1976), surveyed major industries in Ghana to find out the types and quantities of effluent discharged by these industries. Table 2.2 illustrates some selected industries and their effluent discharge levels.

Table 2.2 Selected Industries and their Discharge Levels

Industry	**Effluent/Month**
Accra Brewery	25×10^6
Akosombo Textiles	120×10^6
Gold mining	713×10^6
Rubber	9×10^6

Source: Mensah (1976); Water Quality and Pollution Survey of Inland and Coastal Water in Ghana

Ghana Environmental Action Plan (1994: 226) noted that as of now some industries are discharging effluent into water bodies thus creating serious pollution problems. For example the document, noted that Achimota Brewery discharge into Onyinasa and Odan rivers at levels not accepted, these eventually

enter the Korle Lagoon. The level of mine effluent discharges in the form of arsenic cyanide effluent in water bodies is said to above what is permissible for human health.

2.8.4 Agricultural Activities and Water Pollution

Clearer and Schreiber (1994), noted that water body pollution, siltation and subsequent drying up of surface water systems or bodies is a function of some cultural practices associated with agricultural production in Saharan Africa. They noted that farmers deplete soil nutrients, leading to soil organic matter loss, thus leading to diminish water retention by soil which gives way to water erosion. The net effect of soil erosion is the carriage of loosed soil particles via water courses. This eventually leads to the pollution of water bodies and finally, siltation and consequently the drying up of water bodies. They also acknowledged that, bush burring and overgrazing are some of the active variables that enhance erosion activities, (both water and wind erosion).

Falkenman (1991), commenting on water resource depletion and degradation in Sub Saharan Africa (SSA), noted that Mauritania, Niger, Somalia, Kenya, Burundi, Rwanda, Malawi, Zimbabwe, Namibia and Lesotho will face sever water shortage by the turn of the century. He equally observed that by 2025 eleven more countries will join the list, including; Senegal, the Gambia, Burkina Faso, Togo, Benin, Nigeria, Uganda, Tanzania, Mauritius and Mozambique.

He argued that, poor environmental management and need for agricultural land for crop production will be the brain behind this state of affairs.

2.8.5 Atmospheric Pollution / Degradation

Atmospheric pollution in Ghana is mostly associated with Ghana's derive to industrialize and modernize. According to Ghana Environmental Action Plan (1994), activities that result in atmospheric pollution are mainly from combustion processes. Emission of pollutants are mostly estimated from fuel usage and by emission factors. The others atmospheric pollutants take the form of dust, smoke, odour, nuisance gases among others. These gases as well as particles contain varying degrees/amounts of pollutants such as: sulphur oxide, nitrogen (N2) and carbon dioxide (CO2) and some hydrocarbons, which pollutes the environment.

2.9 POVERTY

The multidimensional nature of the concept poverty, makes it difficult for authorities in the study of the social science to reach a consensus as to what should be generally accepted as poverty. Therefore various definitions, conceptualization and interpretations of the phenomenon have been coined by various authorities linked to their background and based on their angle of thought. Despite the lack of a generally accepted definition for the phenomenon, some authority definitions and interpretations have been adopted and accepted as working definition for the concept.

2.9.1 Some Definitions of the Concept Poverty

According to the Human Development index Report (1987), poverty means the denial of opportunities and choices most basic to human development for leading a long, health, creative life and to enjoy a decent standard of living. This means freedom, dignity, self respect and respect for others.

A critical look at the above interpretation and conception of the phenomenon, it means, poverty will exist when there are no avenues for self advancement, the lack of or absence of facilities that will provide quality health care, high standard of living, the lack of freedom among others. The definition did not clearly state what kinds of opportunities are needed to eliminate poverty. The definition failed to acknowledge that a high standard of living is a product of output. Thus a decent standard of living must be tied up to increase production (output), all things being equal. The Encyclopaedia Britannica (2000), views poverty as the absence or the lack of means to satisfy a person's basic needs. These needs include: nutritional requirements, housing, clothing and other essentials of life. A critical look at the Encyclopaedia's definition and interpretation of the concept, the source look was silent, as to what constitutes basic nutritional requirement, adequate housing among others. The document therefore gives room for the manipulations of the concept to meet varying situations and space globally.

Poverty, according to NPRSP (2000), means deprivation, vulnerability and isolation. The document further argues that poverty is the absence or denial of life sustaining necessities such as shelter, clothing and the lack of basic social

services such as education, health care and other infrastructural facilities such as roads, water among others

The National Development Planning Commission (1996) argues that poverty means any income level less than two thirds of the average GDP (Gross Domestic Production per capital). The document attests that 36 percent of the country's population lives in poverty. Also 80 percent of the total population live in rural areas. The use of national income data by the NDPC as a basis for the determination of poverty could be misleading and could produce an inaccurate "picture" of the phenomenon. This is because of problems associated with National Income Accounting (NIA), identified by (Amanfo, 1994). He noted poor record keeping, double counting, transferred payment among others as variables that can influence national income figures. The observation made by the document that about 80% of the country's population is located in rural areas, is in line with the observation made by Todaro and Smith (2006). The authors observed that, the poor are located in rural areas and are generally engaged in agriculture and related activities. They added that the poor are mostly women, children and minority groups.

Sinha (2000), viewed poverty, as a certain situation in which a person or a household does not possess adequate means to acquire basic minimum standard of living. According to Sinha in the identification of such groups, social scientists interpretation of poverty is based on the cost of a diet which provides the basic minimum nutritional requirement for the maintenance of the body.

2.9.2 Types of Poverty

According to Reardon and Vostin (1995), the phenomenon poverty exists in two categories investment and welfare poverty.

Investment Poverty: The authors' argued that it occurs when an individual or a household finds it difficult to make a minimum investment in resource improvement, to enhance or maintain the quality and quantity of resource base with the aim to forestall or reverse resources degradation. This definition or type of poverty is in line with the (NAP, 2000), interpretation of linkage between poverty and degradation of the environment. According to the NAP, poverty is

the socio-economic cause of environmental degradation. The document argued that the poor are aware of the damage been done, however, they lack resources to forestall degradation.

Welfare Poverty: On the issue of welfare poverty, the authors argued that the phenomenon exist when an individual or household lacks the ability to purchase the minimum diet or calorie intake in sufficient quantities. They however argued that the diet should be related to a specific or a known regional space or location.

A critical study of the postulations of the authors raises some interesting concerns. The tagging or limiting diet to a known location makes it difficult to compare poverty using diet since each region, has its own diet. Therefore international comparison will be impossible. On the issue of investment poverty, just investing to check degradation cannot be said to adequate. Population growth should be checked instead, since population explosion will call for the consumption of more resource exploitation which will consequently degrade the environment.

1.9.3 Measurement of Poverty

According to Sinha (2000), the measurement of the phenomenon poverty, can be done in three (3) ways. These include:

Absolute Poverty: This is measured in terms of a minimum income needed to procure a balance diet for the maintenance of basic metabolism and for maintaining an average activity rate for earning a living. He however, argues that some allowance is made for non food expenditure. On the estimation of relative poverty the consumption basket include: items that are commonly used in a particular society. The estimation of the basic needs roughly follows the same method. A careful look at absolute poverty in this context seems to be in line with the postulation of Reardon and Vostin (1995), in their interpretation of welfare as a type of poverty.

Human Development Index (HDI): Sinha argues that its measurement contain three (3) basic variables: life expectancy, educational attainment (adult literacy combined with primary, secondary and tertiary enrolment) and real GDP per capital **(PPP$).**

Human Poverty Index (HPI): This concentrates on human deprivation. In estimating HPI in addition to the three elements of HDI, the percentage of people without access to safe water, the percentage without health care services and the percentage of moderately and severely malnourished children under five (5) are also added. See Append D and E (pages 111— 113).

2.9.4 Perspective of Poverty

There are three (3) main perceptive of poverty identified by Sinha (2000). These include:

Income Perspective: According to the income perspective, he argues that a `person, is poor if and only if his/her income level is below the define poverty line . . .' after the cut-off poverty line is defined in terms of having enough income for a specific amount of food.

Basic Needs Perspective: Here, poverty is argued out as any situation that leads to deprivation of material requirements for a minimally acceptable fulfilment of human needs. These include food, thus the concept of deprivation goes beyond the lack of private income such as basic health care and education and essential services that have to be provided by the community to prevent people from falling into poverty. It also recognizes the need for employment and participation.

Capability Perspective: This perspective of poverty represents the absence of some basic capabilities to function — a person lacking the opportunity(s) to achieve some minimally acceptable levels of these functioning is said to be poor. The functioning in this analysis can vary from such physical ones such as being nourished, being adequately clothed and sheltered and avoiding morbidity to more complex social achievement such as partaking in the life of the community.

The capability perspective serves as a reconciliation point on the notion of absolute and relative poverty. Since relative deprivation in income and commodities can lead to absolute decline in minimum capabilities.

2.9.5 Poverty in Ghana

The concept poverty seems to be an age long phenomenon and in the last two decades Donors Agencies, the Government, Non-Governmental Organizations (NGOs), individuals and the academia among others, have stood up to fight it. Matowu et al., (1992: 59), argue that decentralization may determine the extent to which government can reach and help the poor to improve upon their living conditions. This means that deepening decentralization can help curb poverty.

2.9.6 Poverty Situation in Ghana

The Ghana Poverty Reduction Strategy III (2000), 2003 — 2006, commenting on the poverty profile of Ghana indicated that between 1999/2000 the Upper East Region had nine (9) out of ten (10) inhabitants being poor. The Upper West Region had eight (8) out of ten (10) inhabitants being. Northern Region had seven (7) out of ten (10) inhabitants being poor. Brong-Ahafo Region recorded five (5) out of ten (10) inhabitants being poor. Ashanti and Greater Accra Region had two (2) and one (1) out of ten (10) as being poor respectively. Eastern Region had four (4) out of ten (10) inhabitants being poor. Central Region had five (5) out of ten (10) inhabitants being poor and Volta Region had four (4) out of ten (10) inhabitants being poor.

Ghana Climate Change Impact Vulnerability and Adaption and Assessment (GCCIVAA, 2000: 187), summarizes the poverty levels in some selected regions of Ghana as follows in table 2.3.

Table 2.3: The Distribution of Poverty by Regions in Percentages

Region	**Percentage (%)**
Upper East	88
Upper West	84
Northern	69
Central	48
Eastern	44
Volta	38

Source: GCCCIVAA, (2000: 187)

According to the Ghana Statistical Service (GSS, 2007), poverty in Ghana has remained disproportionately a rural phenomenon. The document contents that 86 percent of Ghana's population is living below the poverty line and are located in rural areas. The observation made by (GSS, 2007), is in line with the observations made by Todaro and Smith (2006). The authors observed that, generally the poor, worldwide are usually located in rural areas and are basically engaged in agriculture and related activities.

2.9.7 Distribution of Poverty in Ghana

According to GSS (2007), the distribution of population living below the poverty line ranges between 1 percent in the Urban Coastal and 50 percent in the Rural Savannah. The contribution of Rural Savannah to total poverty in Ghana has consistently being on an increase. In 199/92 Rural Savannah's contribution to Ghana's total poverty stood at 33 percent. It drifted further to 37 percent in 1998 / 99 and by the close of 2005/06 had hit a height of 50 percentage point. By the dictates of the 2005/06 rate, it implies that half of the Ghanaian populations living below the poverty line are located in Rural Savannah (the three Northern Regions), the rationale being that most residents in eh area, are predominantly engage in agriculture and related activities. The area is also said to have about 80 percent rural population.

The case of Rural Forest is the reserve of Rural Savannah. In 1991/92, the contribution of Rural Forest's to Ghana's national poverty stood at 35 percentage point. It declined to 30 percentage points. Economic analysts speculate that that the recent boom in the cocoa sector, might have contributed to this state of affairs.

Table 2.4: Poverty Incidence by Locality, 1991/92, 1998/99 and 2005/06 (in percent)

	Poverty line = 3,708,900 cedis		Poverty line = 2,884,700 cedis	
	Poverty incidence	Contribution to total poverty	Poverty incidence	Contribution to total poverty
1991/92				
Accra (GAMA)	32.1	3.7	11.3	2.5
Urban Coastal	28.3	4.7	14.2	3.4
Urban Forest	25.8	5.5	12.9	3.9
Urban Savannah	37.5	3.9	32.8	12.7
Rural Coastal	52.5	14.4	45.9	37.3
Rural Forest	61.6	35.6	45.9	37.3
Rural Savannah	73.0	32.6	57.5	36.3
Urban	27.7	17.8	15.1	13.7
Rural	63.6	82.2	47.2	86.3
All Ghana	51.7	100.00	36.5	100.00
1998/99				
Accra (GAMA)	4.4	1.3	1.9	0.8
Urban Coastal	31.0	4.6	19.0	4.2
Urban Forest	18.2	5.4	10.9	4.8
Urban Savannah	43.0	5.2	27.1	4.9
Rural Coastal	45.6	16.7	28.5	15.3
Rural Forest	38.0	30.1	21.1	24.6
Rural Savannah	70.0	36.6	59.3	45.5
Urban	19.4	16.6	11.6	14.6
Rural	49.5	83.4	34.6	85.5
All Ghana	39.5	100.0	26.8	100.0
2005/06				
Accra (GAMA)	10.6	4.4	5.4	3.5
Urban Coastal	5.5	1.1	2.0	0.6

Urban Forest	6.9	5.2	2.9	2.3
Urban Savannah	27.6	9.2	18.3	5.5
Rural Coastal	24.0	5.2	14.6	6.9
Rural Forest	27.7	9.2	11.5	6.9
Rural Savannah	60.1	49.3	45.5	58.7
Urban	10.8	14.3	5.7	11.9
Rural	39.2	85.7	25.6	81.1
All Ghana	28.5	100.0	18.2	100.00

Source: Ghana Statistical Service (2007)

From table 2.4 it is clear that the national poverty level of 51.7 recorded in 1991/92 drifted downward to 39.5 in 1998/9, a seven year period. This implies a decrease in the national poverty level by 12.2. The poverty level of the nation further drifted from 39.5 in the year 1998/99 to 28.5 indicating a further decrease by 11.0, also another seven year period. This gives an average rate of 11.6 decreases in the national poverty for every seven years. If this is true, the remaining national poverty level of 28.5 should be cleared within the next 21 years from 2006.

During the same periods under review, urban poverty moved from 27.7 to 19.4 showing a decrease of 8.3 and by the close of 2005/06 it further drifted to10.8. By implication, urban poverty is expected to score zero point by the close of the next seven years that is 2013.

For the case of rural poverty, the phenomenon moved from 63.6 to 49.5 showing a decrease of 14.0 in 1998/99. The phenomenon further reduced 39.2 in 2005/06 showing another decrease of 10.3, thus if the phenomenon will continue to reduce at the rate of 10.0 within every seven years, rural poverty is expected to reduce to zero within twenty eight from the year 2006. This implies that rural poverty will be eradicated completely by the close of the year 2034.

In summary, Ghana's national poverty is expected to be eradicated in 2027, urban poverty by 2013 and rural poverty 2034.

2.10 CONCERNS ABOUT POVERTY AND THE ENVIRONMENT

The link between poverty and environmental degradation is often mentioned in the sustainable development debate but seldom systematically employed (Lele, 1991; Reardon and Vostin, 1995). The literature that treats the link usually focuses on the "vicious circle" between poverty and degradation, which is a Malthusian conceptualization, where farmers are pushed by population increase and poverty, extend cropping into marginal lands thereby degrading them. The latter reduces yields which further impoverish farmers (Mink, 1993). Thus poverty is both a cause and an effete of environmental degradation. Jasairi, cited in Sachs (1994: 291), maintains that "the rural poor are caught in self destruction trap in which their immediate survival depends on over exploitation of fragile lands". This can be only be addressed by implementing poverty alleviation programmes.

Reports have shown that, developing countries are the home of the world's poor who in their struggle to survive through increase production of food and exports —which are mainly primary products, minerals and timber, end up destroying their surroundings by cutting down trees, overworking the soil, overgrazing rangelands and over-fishing. Ironically, people efforts to escape form poverty also damage the environment.

One of the policy concerns raised by NPC (1969) is the misuse, overuse and pollution of the environment in addition to that of over exploitation as a challenge facing our country. It considers such phenomena to be very serious for a developing country like Ghana where low level of technological development makes it difficult to assess or monitor the nature and extent of damage caused to the environment. The policy also noted that the continued degradation of the soil, water, forest and the ecosystem generally, is constantly undermining the nation's sustainable food production and to ensure adequate health standards and sustainable development.

The Global Land Assessment of Degradation (GLASOD) noted that about 50 percent of the world's forest cover has been depleted. Of the 50 percent, 18 percent is at the stage of total degradation. Oldeman et al., (1990), equally

observed that 3.2 billion hectares of the world's arable land, is under cultivation, of this, 38 percent is completely degraded.

Global environmental concerns were first discussed in 1960s and subsequently, followed by many others including; the 1972 Stockholm Conference on the Human Environment. This was followed by the creation of the World Commission on the Environment and Development in 1983. The Commission, also known as the Brundtland Commission came out with its report "Our Common Future" in 1987, which warned of growing threat to the earth from pervasive poverty, environmental degradation, disease and pollution

Curtis and Magnar (2002), attest that many people in the 1960s around the world began to face critical environment issues in their communities, forest were being destroyed by acid rain, rivers poisoned beyond use by industrial wastes, cities choked by pollutants from automobiles and industry. Rural farmers hit by famine and once rich resource of reserves wearing thin. Scientists began to speak out about global interconnectedness of these problems and they warned that human were quickly becoming victims of their own success to an extent that we now had the ability to entirely despoil the earth that sustains us. Similarly, in Curtis and Magnar (2002), the Royal Society of London and the USA National Academic of Science — two of the world's most prominent scientific bodies issued a joint declaration calling for action. In the declaration they said, "The future of our planet is in a balance, sustainable development can be achieved, but only if irreversible degradation of the environment can be halted in time. The next thirty (30) years can be crucial". The scientific warnings have continued to grow in severity and urgency, but progress on making change since the Stockholm conference has remained painstakingly slower. And now, new international challenges, terrorist attacks, military responses and mounting tension around the world have threatened to side track the building of momentum to address chronic environmental problems.

According to the World Bank (1992), Russia alone has 22 percent of the World's forest rendering their forest management of enormous global relevance. However, many governments have to struggle with the legacy of industrial pollution and nuclear waste. Air pollution in the industrial area of Central Europe

and former Soviet Union was widespread. Throughout the region, water pollution and poor sanitation affected the lives of millions of people; Russia now faces a potentially disastrous situation with the severe deterioration of its oil pipelines. For the Central Asian countries, water resource management is a prime concern. Rainfall is scarce in the region and cultivation is impossible without irrigation. Under the Soviet Union, the area under cultivation was doubled, drastically reducing the flow of the Amu Darya and Syr Darya into the Aral Sea. While irrigation agriculture and cotton exports provided livelihood for people in the Aral Sea Basin, the large-scale diversion created an ecological and human disaster. Increasingly saline soils reduced agriculture productivity resulting in some of the worst poverty in the region. The Asia-Pacific region also encompasses three of the largest and most populous countries in the world (China, India and Indonesia). Although it accounts for only 23 percent of the world's total land area, about 58 percent of the world's population live in the Asia-Pacific regions (ESCAP, 1992; 1995a). The economies of this region have experienced high growth rate in the recent past and 1994 the average Gross Domestic Product (GDP) growth rate was 8.2 percent (ADB, 1995a). Despite this rapid rate of economic growth, poverty persists. Of the world's 1.2 billion people who live in absolute poverty (that is with a per capita income of less than one US dollar per day), over two-thirds reside in this region (ADB, 1994a). Rapid population growth is exerting pressure on the environment and on the natural resource of the region (World Bank, 1992).

Ex-President J. J. Rawlings expressed concern about the environmental problems in their various forms and how they manifest themselves in the different part of the country. In the Upper West and Upper East Regions, he argued that, "the problem was that of desertification, accentuated by the annual bush fire ritual as well as cutting down of the few trees we have left for ourselves as wood fuel" (Cited in Atongi, 2000: 9).

Again in October, 1995, President J. J. Rawlings issued a letter to all Districts Assemblies and the environmental concerns. He stated that, "we are fortunate to be blessed with a country like Ghana with its tropical forest, fertile land, precious minerals, rivers and several hundred miles of beautiful coastline washed by the Atlantic Ocean which abounds in rich fishing ground. All these resources are for

our use and the sustenance of future generations. But all these are being destroyed. We see bare hills, where not too many years ago, there were forest and woodland. Bags of charcoal made from indiscriminately felled trees are stacked by roadside for sale. Rivers and dams are silted up. Uncontrolled sand and stone winning erodes our beaches and leave gaping holes in the once rich farmlands. Timber trucks can be seen carrying undersized trees and logs with no property marks of the products of illegal felling" (Cited in Atongi, 2000: 10).

Similarly, the Ex-President of the Republic of Ghana, John Agyekum Kuffour challenged Ghanaians to individually and collectively tackle the problem of poor environmental sanitation and personal hygiene to promote good health. He stated, "Individually and collectively, we can do something about these problems without external intervention" (Daily Graphic, 2005: 1).

2.11 FACTORS THREATENING THE ENVIRONMENT

Human population growth is at the root of virtually all of the world's environmental problems. According to Zimmerman (2004), the United Nations predicts that the word's population will increase from 6.23 billion people in 2000 to 9.3 billion in 2050. The UN estimates that the population will stabilize at more than 11 billion in 2200. As the number of people increase, overcrowding generates pollution, which destroys more habitants and uses up additional natural resource.

Although rates of population increase are now much slower in the developed world than in the developing world, it would be mistake to assume that population growth is primarily a problem of developing countries. In fact, because larger amount of resource per person are used in developed nation, each individual from the developed world has a much greater environment impact than a person from a developing country (Zimmerman, 1994). Conservation strategies that would not significantly alter lifestyles, but would greatly lessen environmental impact are essential in the developed world. In the developing world, the most important factors necessary to lower population growth rates have fallen in developing areas where several social conditions exist. In these areas, literacy rates have increase and women received economic status equal to that of men, enabling women to hold jobs and own property.

In addition, birth control information in these areas is more widely available, and women are free to make their own reproductive decisions. Like the glass panes in a greenhouse, certain gases in the earth's atmosphere permit the sun's radiation to heat earth. At the same time these gases retard the escape into space of the infrared energy thus remaining on earth. This process is referred to as the greenhouse effect. These gases are primarily carbon dioxide, methane, nitrogen oxide and water vapour, which insulate earth's surface helping to maintain warm temperatures. Without these gases, the earth would be frozen planet with an average temperature of 18°C (about 0°F), instead of a comfortable 15°C (59°F). If the concentration of these gases rises, they trap more heat within the atmosphere, causing worldwide temperature to rise (Encarta Encyclopaedia, 2004).

Within the last century, the amount of carbon dioxide in the atmosphere has increased dramatically, largely because people burn vast amounts of fossil fuels, coal and petroleum and its derivatives. Average global temperatures also have increased by about 0.6 degrees Celsius (1 degree Fahrenheit), within the past century. Atmospheric scientists have found that at least half of that temperature increase can be attributed to human activity. They predict that unless dramatic actions are taken, global temperature will continue to rise by 1.4 to 5.8 degree Celsius (2.5 to 10.4 degrees Fahrenheit) over the next century. Although such an increase, may not seem like a great difference. During the last ice age the global temperature was only 2.2 degrees Celsius (4 degrees Fahrenheit) cooler than it is presently (Encarta Encyclopaedia, 2003). The consequences of such a modest increase in temperature may be devastating.

Already scientists have detected a 40 percent reduction in the average thickness of Arctic ice. Other problems that may develop include a rise in sea levels that will completely inundate a number of low-lying island nations and flood many coastal cities, such as New York and Miami. Many plant and animal species will probably be driven and the frequency of severe hurricanes and drought will likely increase. In the 1970s, scientist discovered that chlorofluorocarbons (CFCs) —chemicals used in refrigeration, air condition systems, cleaning solvents, and aerosol sprays destroy the ozone layer. CFCs release chlorine into the atmosphere, chlorine, in turn breaks down ozone molecules. Because chlorine is

not affected by its interaction with ozone, each chlorine molecule has the ability to destroy a large amount of ozone for an extended period of time.

The consequences of continued depletion of the ozone layer would be dramatic. Increased ultraviolet radiation would lead to a growing number of skin cancers and cataracts and also reduce the ability of immune system to respond to infection. Additionally, growing of the world's oceanic plankton, the base of most marine food chains, would decline. Plankton contains photosynthetic organisms that break down carbon dioxide. If plankton population decline, it may lead to increase carbon dioxide levels in the atmosphere and result in global warming.

Recent studies suggest that global warming in turn may increase the amount of ozone destroyed. Even if the manufacture of CFCs is immediately banned, the chlorine already released into the atmosphere will continue to destroy the ozone layer for many decades (Encarta Encyclopaedia, 2003).

In 1987, an international pact called the Montreal Protocol on substances that depleted the ozone layer set specific target for all nations to achieve in order to reduce emissions of chemicals responsible for the destruction of the ozone layer. Many people had hoped that this treaty would cause ozone loss to its peak and begin to decline by the year 2000. In the year 2000, the hole in the ozone layer over Antarctica was the largest ever recorded. The hole in the following year was slightly smaller, leading some to believe that the depletion of ozone had stabilised. Even if the most stringent prohibition against CFCs are implemented, however, scientist expect that it will take at least 50 more years for the hole over Antarctica to close completely.

Plant and animal species are dying out at an unprecedented rate. Estimates range from 4,000 to as many as 50,000 species per year become extinct. If the world's rain forests continue to be cut down at the current rate, they may completely disappear by the year 2030. In addition, if the world's population continues to grow at its present rate and puts more pressure on these habitats, they might all be destroyed sooner (Zimmerman, 2004).

A significant portion of industry and transportation burns fossil fuels, such as gasoline. When these fuels burn, chemicals and particles matter are released into the atmosphere. Although a vast number of substances contribute to air pollution, the most common air pollutants contain carbon, sulphur and nitrogen. Smog usually found in urban areas with large members of automobiles, forms when nitrogen oxides react with hydrocarbons in the air to produce aldelydes and keytones. Smog could cause serious health problems.

Acid rain forms sulphur dioxide and nitrogen oxide transform into sulphuric acid and nitric acid in the atmosphere and come back to earth as precipitation. Acid rain has made numerous lakes so acidic that they no longer support fish population. Acid rain is also responsible for the decline of many forest ecosystems worldwide, including Germany's Black Forest and forests throughout the Eastern United States (Encarta Encyclopaedia, 2004). Estimates suggest that nearly 1.5 billion people worldwide lack safe drinking water and that at least 5 million deaths per year can be attributed to water borne diseases (Zimmerman, 2004).

Water pollution may come from point source or non-point source. Point source discharge pollutants from specific location, such as factory sewage treatment plants and oil tanks. Technology exists to monitor and regulate point source of pollution. Although in some areas this occurs only sporadically. Pollution from non-point source occurs when rainfall or snowmelt move over through the ground. As the rn runoff moves, it picks up and carries away pollutants, such as pesticides and fertilizers, depositing the pollutants into lakes, rivers, wetlands, coastal waters, and even underground source of drinking water. Pollutants arising from non-point source account for the majority of the contaminants in streams and lakes. With almost 80 percent of the planet covered by oceans, people have long acted as if those bodies of water could serve as a limitless dumping ground for waste (Encarta Encyclopaedia, 2004).

However, raw sewage, garbage, and oil spills have begun to overwhelm the diluting capabilities of the oceans and most coastal water is now polluted, threatening marine wildlife. Beaches around the world close regularly, often because the surrounding waters contain high levels of bacteria from sewage

disposal. Water that collects beneath the ground is called ground water. Worldwide, ground water is 40 times more abundant than fresh water in streams and lakes (Zimmerman, 2003) in the United State approximately half the drinking water comes from ground water. Although ground water is a renewable resource, reserve replenishment is relatively slower presently. Ground water in the United State is withdrawn approximately four times faster than it is naturally replaced. The Ogallala Aquifer, a huge underground reservoir stretching under eight of the Great Plains, it drawn down at rates exceeding 100 times the replacement rate. Agricultural practices depending on this resource of water need to change within a generation in order to save this ground water source (Zimmerman, 2004).

In addition to ground water depletion, scientists are worried about groundwater contamination, which arises from leaking underground storage tanks, poorly designed industrial waste ponds, and seepage from the deep-well injection of hazardous waste, usable groundwater is contaminated, and in some areas as much as 75 percent is contaminated. The United States Environmental Protection Agency (EPA), reports that about 37 percent of the country's lakes and estuaries, 36 percent of its rivers are too polluted for basic uses such as: fishing or swimming during all or part of the year (Microsoft Corporation, 1993). In Ghana, examples are the Korle Lagoon, Fosu Lagoon, Chemu Lagoon and Subin River in Kumasi.

A handful of countries produce a portion of their electricity using nuclear energy. But many people oppose nuclear energy because; an accident can cause massive devastation. The 1986 accident at the Chernobyl nuclear power plant in the Ukraine scattered radioactive contamination over a large part of Europe. Approximately 200,000 people were evacuated and human health has been dramatically affected. Studies in 1999 found that the rate of thyroid cancer in young Ukrainian children was ten times higher than was than normal prior to the accident. One reasonable solution is to combine conservation strategies with the increased use of solar energy. The price of solar energy relative to traditional fuels has steadily dropped. And if environmental cancers were factored into the cost, solar power would already be significant cheaper (Encarta Encyclopaedia, 2004).

Ghana's principal environmental problems are pollution, deforestation, soil and coastal erosion, sand winning, gold and bush fires. Pollution is largely caused by mines and manufacturing industries, as well as by motor vehicles. Deforestation is due to unsustainable method of timber extraction, shifting cultivation and collection of fuel wood and fodder. Coastal erosion is mainly due to natural cause but is made worse by such practices as sand winning. Inefficient waste management is the result of insufficient facilities and unsanitary practices (NDPC, 1997).

According to Mensah (1997), sand winning is a type of open cast mining that provides materials for the construction sector in Ghana. The construction sector in Ghana relies heavily on coastal sand and pebbles in building the houses, bridges and roads; its contribution to Ghana's industrial output has increased from 17.4 percent in 1986 to 20.8 percent in 1993. However, the process of sand winning has accelerated coastal environmental degradation to alarming rate in many areas. The effects of urbanization and the concentration of industrial and commercial activities along the coast and riverside have resulted in an unprecedented exploitation of coastal resources such as sand, mangrove forest estuaries and seas grass beds. The consequences are: erosion, forest loss and pollution by industrial municipal and agricultural waste (Hinrichson, 1990).

Mensah (1997), outlined some of the factors responsible for uncontrollable sand winning as: limited employment opportunities, high profit accruing to contractors, easy access to coastal land and low environmental concerns. He further recommended the following as measures to curb the problem.

- Increasing employment opportunities;
- Use of gabion groyness and rubber mould revetment and vegetation stabilization;
- Research into alternative input source;
- Increasing environmental awareness;
- Intensification of population control programmes; and
- Encouraging participation in community based activities.

Bush fires are generally caused by hunters, palm wine collectors and herdsmen Gboloo and Telly (2000), noted that even though many people are now aware of the negative effects of bush fires in causing land degradation and destruction of vegetation cover of the land, no serious intervention measures have been put in place on a sustainable basis to arrest them. Anane (1994) indicated the following causes of bushfires in the northern part of Ghana:

- Game — people burning to trap animals;
- Herdsmen — burning dry grass so that fresh grass will germinate for their animals;
- Control — villagers to scare reptiles and also to prevent accidental burning of houses during the dry season;
- Accidental — smokers throwing away pieces of unquenched cigarettes and hunters making fire to either cook or warm themselves; and
- Socio-cultural — festivals like fire festival

The problems facing the environment are vast and diverse. Global warming, the depletion of the ozone layer in the atmosphere and destruction of the world's rain forest are just some of the problems that many scientist believe will reach proportions in the coming decades. All of these problems will be directly affected by the size of the human population (Zimmerman, 2003).

2.12 EFFORTS TO PROTECT THE ENVIRONMENT

Most scientists agree that if pollution and other environmental degradation continue at their present rates, the result will be irreversible damage to the ecological cycles and balance in nature upon which all depends. Scientists warn that fundamental and perhaps drastic changes in human behaviour will be required to avert an ecological crisis. To safeguard the environment that is essential to life, human must learn that the earth does not have infinite resources. Earth's limited resources must be conserved and where possible, reused. Furthermore, humans must devise new strategies that march environmental progress with economic growth. The future growth of developing nations depends upon the development of sustainable conservation methods that protect the environment while also meeting the basic needs of citizens.

The EAP was comprehensive but very little was accomplished in real terms due to budgetary constraints, insufficient logistics, inadequate and qualified staff and lack of political will (Nkum Associates, 1993).

The Environmental Protection Agency is the main body responsible for the formulation and enforcement of environmental laws in the country. An act of Parliament in 1994, Act 490 established the EPA. Some of its functions include:

- To coordinate the activities of bodies concerned with the technical or practical aspect of the environment and serve as a channel of communication between such bodies and the ministry;
- To issue environmental permits and pollution abatement notices for controlling the volume, type, constituents and effects of waste discharges, emissions, deposits or other sources of pollutants and substance, which are hazardous or potentially dangerous to the quality of environment or any segment of the environment;
- To initiate and pursue formal and non-formal education programmes for the creation of public awareness of the environment and social life of the country;
- To impose and collect environmental protection levies in accordance with this Act or regulations made under this act. The District and Municipal assemblies are also agencies responsible for the management of the environment at their levels. They have a number of bye-laws that seek to protect the environment in the various districts in a country. For instance, there are bye-laws that stipulate the methods of waste disposal in the Districts and Municipalities. Waste containers are place at vantage points in sections of the Municipalities and Districts to collect waste [Local Government Act of 1993, Act 462 Article subsection 3 (e)].

The town and country planning operate under the Town and Country Planning Ordinance of 1945 (Cap 48). The ordinance was passed in 1945 to provide the mechanism to visually articulate the vision of reproducing western type cities in Ghana. The contribution of the Town and Country Planning in the protection of the environment cannot be over emphasized. It is required to see to the proper planning of buildings in cities and rural areas, demarcate lands for sanitation

purposes and protect wetlands by advising prospective buyers of land and landowners regarding the problems they would face if a building is cited in a wetland.

2.14 RELATIONSHIP BETWEEN POVERTY AND ENVIRONMENT

Poverty and environment degradation are mutually reinforcing. Poor people are both agents and victims of environmental degradation. Low incomes force poor people to increase their use of natural resources in order to survive. Some of the activities they engage in include: deforestation for charcoal burning, bushfires with intention of looking for game, sand winning, bad farming practices, illegal gold mining, improper disposal of refuse, pollution of water sources to catch fish for sale and stone quarrying, which in turn impoverish the natural resource base. This encourages the poor to join others for whom short-term exploitation takes priority over long-term protection of the environment. Such a trend appears to challenge the otherwise plausible feedback relationship between poverty and the environment. For example, higher incomes can be used for capital investments that increase pressure on the natural resources. This arrangement, however, does not negate the fact that poor people exploit natural resources for survival. Lele (1988) argues that environmental degradation is very often caused by poverty, because the poor have to option but to exploit resources for short-term survival. The interlinked nature of most environmental problems is such that environmental degradation is often caused by poverty. Since the poor have no option but to exploit the resources for their short term survival. The interlinked nature of most environmental problems is such that environmental degradation affects everybody, although poorer individuals and nations may suffer more and sooner than richer ones (Lele, 1988). Complex linkages exist between poverty and the environment. Environmental and natural resources assets are factor of production. The economies of developing countries depend on the exploitation of natural resources and the livelihood of the population depend directly and indirectly on the exploitation of natural resources, especially soil, water, animals and fisheries.

Poverty is both a cause and effect on natural resource depletion and environmental degradation. Poverty is a state of human well-being, which is highly dependent on ecosystem, which provides benefits as food and water. Human beings modify the ecosystem through exploitation or utilization of ecosystem services. Ecosystems are affected by activities such as fishing, fresh water use and agriculture. Ecosystems also depend on fundamental environmental cycles such as the continuous circulation of water, carbon and nutrients. Human activities have modified these cycles through increased freshwater use, carbon dioxide emissions and fertilizer use. This in turn affects the ability of the ecosystem by humans.

The modification of the ecosystem by humans to obtain value often has negative effects on other components of the ecosystem and results in trade-offs. For example, increased food production tends to bring about reduction in biodiversity. There are natural or human-induced factors that change ecosystem. These are drivers, which are either direct or indirect.

2.15 CONCEPTUALIZING POVERTY-ENVIRONMENTAL LINKS

The concept of sustainable development came unto the world agenda through the World Commission on Environment and Development, whose report was published in 1987. Essentially the document set in process an examination of the links between environment and development and this was pivotal, in that it considered social issues to be central to the effective management of the environment (Brocklesby and Hinshelwood, 2001). Until then the standard environmental agenda was concerned primarily with the biophysical processes, conservation and protection of natural resources.

The Earth Summit held in 1987, also lunched the Agenda 21, a Global Action Plan (GAP), which was based on the principles of sustainable development and integration of economic, social and environmental objectives. It places particular emphasis on the importance of participation and plans based on local priorities and local involvement. The sustainable development agenda since 1980 has progressed into current developmental approaches, such as the Sustainable Livelihood Approach (SLA), which acknowledges the complex relationship that exist between the environment and development which is an off shoot of poverty.

One key achievements of the United Nations Earth Summit of 1992, was the international recognition that global poverty and environmental concerns are closely linked and cannot be dealt with as separate variables. The Earth Summit of 1992 acknowledged that there is a complex relationship between the two available. It was admitted that the examination of the two (2) variables is no mean task. This was attributed to the fact that both variables are wide in scope and perspectives, to an extent that authorities in both study fields, have since not reached a consensus on concepts. However Markandya and Galarraga, (1999) note "it is important to recognize the paucity of information on the linkage between poverty and environmental policies" and how this limits policy formulation.

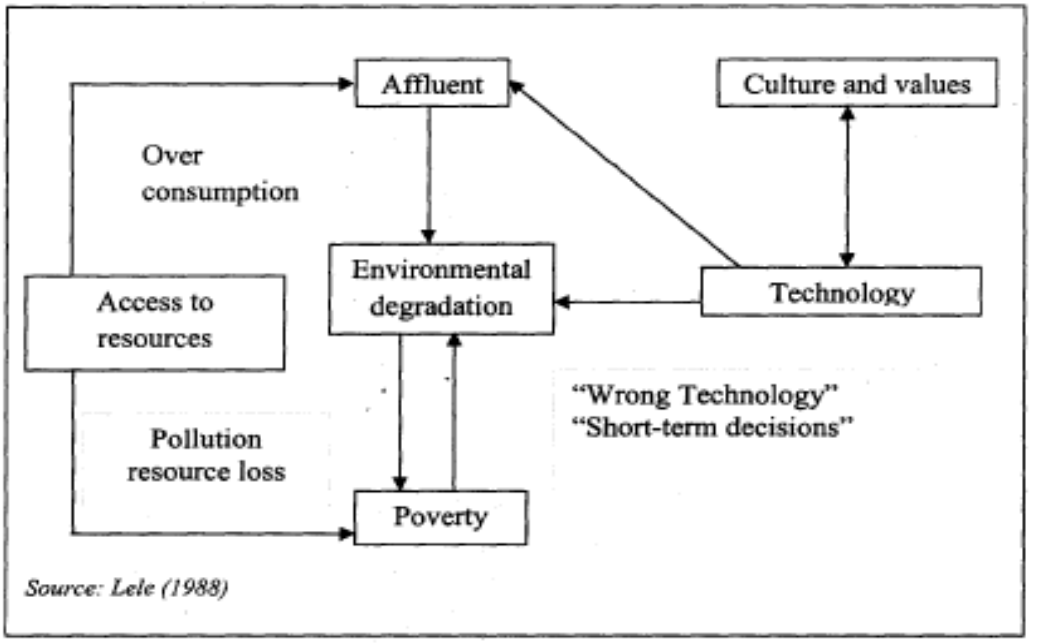
(Neefges, 2000 and Mearns, 1996) identifies seven myths and misconceptions about poverty and environment as follow:

- Poverty and population growth causes environmental degradation;
- Equity, participation and environmental sustainability go hand in hand;
- Nature seeks balance;
- High-inputs framing is the only way to avoid a global food crisis;
- Urbanization and urban consumption are the biggest environmental threat;
- Poverty eradication first before environmental improvement; and
- Poor people are too poor invest in the environment

2.16 CONCEPTUAL FRAMEWORKS

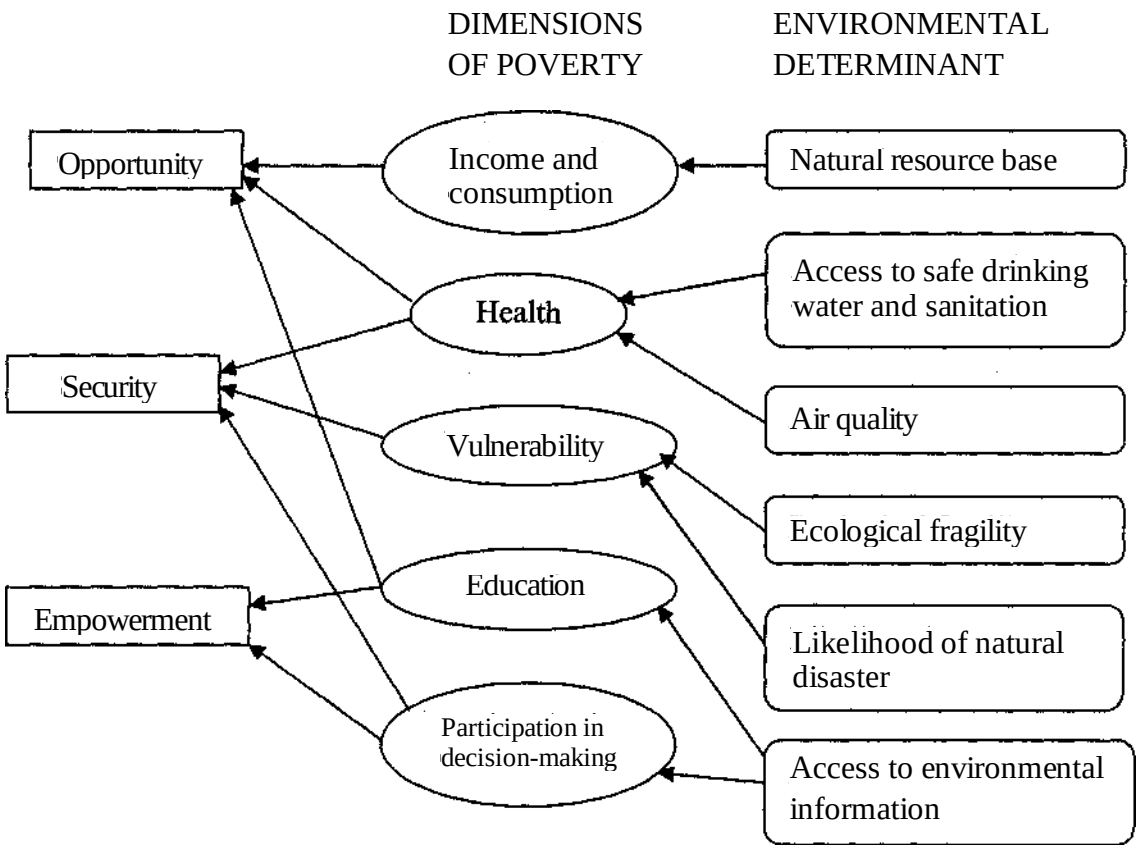
The conceptual frameworks for this study are associated with the analysis made by Lele (1988), where the author established a relationship between poverty and environmental degradation. Lele (1988), tilted the framework; a more realistic representation of poverty and environmental degradation problem shown in figure 2.1 below.

Figure 2.1: Poverty and Environmental Degradation Problem



The figure 2.1 above explains flow access to resources can lead to affluence, environmental degradation and poverty. Environmental degradation and poverty are the results of the wrongful use of technology and abuse of cultural values. The figure further explains the two way relationship between environmental degradation and poverty, based on pollution and resources loss as well as, short-term decisions made by the poor to over exploit resources to meet their demands thus leading to continuous environmental degradation.

Figure 2.2: Environmental-Poverty Linkages



Source: Bucknail, J., Kraus, C., & Pillai, P, "Poverty & Environment" Environmental Strategy Paper, World Bank, Environmental Department, Washington D.C.

Figure 2.2 reveals that poverty is multidimensional and has links with the various components of environment. The inferences that can be made are that it is crucial to consider the multidimensional traits of poverty and its environmental relationship at the fore of devising strategies for poverty reduction.

In the above diagram the authors identified three (3), broad areas that support human existence and these include: opportunities, security and empowerment (see figure 2.2).

The authors equally identify some dimensions of poverty to include: income and consumption, health, vulnerability, education and participation in decision making. Finally, they identified six (6) environmental determinants including: natural resource base, access to safe drinking water and sanitation, air quality,

ecological fragility, likelihood of natural disasters and access to environmental information.

In trying to establish the linkages between poverty and environment, the authors argued that, natural resources base can create income as well as consumption for people and this subsequently leads to opportunity creation. They further observed that, access to safe water and sanitation as well as quality of air, leads to good health which provides both opportunity and security. Ecological fragility leads to vulnerability which is an off shoot of poverty. This consequently raises security concerns of the people.

The likelihood of occurrence of natural disasters equally raises the question of vulnerability which equally has some security implications.

Access to environmental information treats two major dimensions of poverty; it brings about education and awareness creation and participation in decision making. The net effect of having access to environmental information is: education and participation in decision making both leading to empowerment. Participation leads to security and finally but not the least, access to environmental information leads to education and consequently opportunity.

These frameworks helped the study to examine the link between poverty and the environmental degradation in the West Gonja District.

The next chapter looks at the various methodologies and tools used for the study. It also looked at the district profile of the study area.

CHAPTER THREE

RESEARCH METHODOLOGY AND BACKGROUND OF WEST GONJA DISTRICT

3.0 INTRODUCTION

Farber (2001), cited in Sarantakos (2004), commenting on the concept of methodology argued that methodology, originates from philosophical stance which provides the arena in which the logic and structure of a research are embedded and guides the process of research. The choice of the research methodology was guided by the theoretical interpretations of the research problem.

This chapter provides a logical framework that guided data collection. Other areas of critical concern in this chapter include: the research approach and sampling procedures adopted. Data analysis, interpretation and presentation are the concluding parts of this chapter.

3.1 RESEARCH DESIGN

Fowler (1988), as cited in Creswell (1994), defined a study design as that which provides a qualitative or numerical description of some fractions of the same population. For any investigation, the selection of an appropriate research design is crucial in enabling the researcher to arrive at valid findings. Hence the research design adopted for this study was the qualitative and quantitative research survey design. Yin (1993) and Brown (1996) both argued that the survey research design caters for both large and small populations to discover relative incidence, distribution and he interrelationship between variables. They further argued that it relies upon the questioning of a selective group (sample) of the universe and analysing data in other to give the same characteristics.

Brown (1996), assigns reasons and points out the advantages in using this research design to include: the collection of large amounts of data is quick and cheap, the design can also be used to obtain information in retrospect; generalization of data to the universe is possible, it is also possible to make comparisons of individuals and the assessment of relationships between and

among variables. He finally concluded that the research design; make it possible for the collection of data from a large cross section of respondents which would have being difficult to solicit. It is in the light of the above that the survey method or the research design was used to conduct this study. It is important to acknowledge that the survey approach uses the following tools to collect data, interview guides and questionnaires.

3.2 SAMPLE METHODS

The main sampling technique used in this study included: probability and non-probability sampling techniques.

3.2.1 Probability Sampling

This sampling technique also known as random sampling or chance sampling, gives every item in the universe an equal chance of inclusion in the sample. Examples of probability sampling include random and cluster sampling. The rationale behind the use of this technique in the study sample include: it ensured that the law of statistical regularity which states "if on average the sample chosen is a random one, the sample will have the same composition and characteristics as the universe" (Yin, 1993). On the contrary, Bernard (1990) noted that is often impossible to do strict probability sampling in the field. He argued that other alternatives are appropriate under different situations.

3.2.2 Non-Probability Sampling

This sampling technique is also known as deliberate sampling "purposive sampling" or "judgmental sampling" (Bernard, 1990). This sampling procedure was adopted and used. The sampling technique however does not offer any bases for estimating the probability that each item in the population is being included in the sample. (Bernard, 1990 and Yin, 1993), noted that this sampling procedure allows the researcher to purposively choose a particular unit of the universe to constitute the sample on the basis that the small mass that they select out of the huge one are typical or representative of the whole. In this technique, the judgement of the researcher is very vital and important.

Doorewaard and Vershuren (1999) contended that the importance of adopting this research sampling technique, by researchers is the relative advantage it has in respect to time and money. They further argue that this technique is usually important, when the primary interest of the researcher or the study lies in the understanding of both the qualitative and quantitative dimensions of the problem or research theme. For instance, an attempt to ascertain variables like how often, to what degree, a particular attribute or characteristics is distributed (Bernard, 1990).

3.3 SAMPLE FRAME

According to Sarantakos (2004), a sample frame means a list containing all members of the target population from which a sample is drawn. The sample frame for the study consisted of twenty towns and villages identified by the West Gonja District Assembly as major settlements. Table 3.1 describes the sample frame adopted for the study.

Table 3.1: Age and Sex Distribution of Population of Largest 20 Settlements in West Gonja District

	Settlement / Locality	Male	Female	Total Population	Projected Population for 2008
i	Damongo	5712	5546	11258	13521
ii	Daboya	2183	2377	4560	4847
iii	Lingbinsi	1646	1701	3347	4020
iv	Larabanga	1508	1524	3032	3642
v	Mankarigu	1264	1229	2493	2994
vi	Lukula	1006	98	1984	2303
vii	Busunu	925	959	1844	2219
viii	Yagbun	857	834	1691	2031
ix	Singa	712	767	1479	1776
x	Achubunyor	596	596	1192	1432
xi	Kotito No. 3	621	499	1120	1434
xii	Jonokponto	574	480	1054	1266

3.4 Sampling Procedure

As noted earlier, three sampling techniques were employed for this study. Three include cluster, purposive and simple random sampling.

3.4.1 Cluster Sampling

This technique was used to divide the sample frame comprising the twenty (20) major localities within the district into 2 major clusters. The criterion for the cluster was based on the population size of the communities. Cluster one (1) consist of communities with population size above 1000. Cluster two (2), comprised all communities with population size below 1000. Cluster one (1) was tagged densely populated communities and cluster two (2) was tagged less dense populated communities. Table 3.2 illustrates the clusters. The rationale behind this clustering was to ensure that both small and large communities were included in the sample for the study.

Table 3.2: Cluster of Communities and their Populations above and below 1000

Population above 1000 (cluster 1)	Total population	Population below 1000 (cluster 2)	Total population
1. Achubunyo	1192	1. Mempeasam	872
2. Busunu	1844	2. Disa	921
3. Canteen	2250	3. Sankpala	798
4. Daboya	5460	4. Murugu	829
5. Damongo	11258	5. Tari No. 1	798

6. Jonokponto	1054	6. Gbasumkpa	816
7. Kotito No. 3	1120		
8. Larabanga	3032		
9. Lingbinsi	3347		
10. Lukula	1944		
11. Mankarigu	2493		
12. Singa	1476		
13. Tari No. 2	1552		
14. Yagbum	1691		

Source: West Gonja District Profile, 2005

3.4.2 Simple Random Sampling

This sampling technique was used to sample three (3) communities out of 14 communities in cluster one (1), (communities with population size above 1000) and two (2) communities out of 6 from cluster two (2) (communities with population size below 1000), for the study. The lottery method was then used to sample these communities. The purpose of these techniques was to facilitate data collection, reduce cost in relation to time, money and energy in surveying the entire West Gonja District.

Larabanga, Busunu, Achubunyor, Murugu and Gbasumkpa No. 1 were sampled via the simple random technique. However, Mole was purposively sampled for the study because of its role in the conservation and preservation of certain flora and fauna species.

Table 3.3: Sample Communities for the Study

Community	Cluster	Male Population	Female Population	Total Population	Sampled Population
Larabanga	1	1508	1524	3032	47
Busunu	1	925	959	1844	29
Achubunyor	1	596	596	1192	19
Murugu	2	424	420	829	13
Gbasumkpa No. 1	2	414	402	816	14
Mole	Purposive	278	283	561	9
Total	6	1445	1484	8274	130

Source: Field Survey, 2009

Table 3.3 gives a detailed description of each community sampled for the study in relation to its population, sex and sampled population that was interviewed.

3.5 Sample Population for Interview

Kramer and Thierman (1987), cited in Sarantakos (2004), noted that the question about appropriate sample in social research is given attention by researchers of all school of thought. Sarantakos (2004) however observed that the focus of relevant estimations varies significantly with some showing interest in pure quality, others in quantity while other express interest in both quality and quantity. Judging from this, a wise rule established in this case is the sample must be "as large as necessary, and as small as possible".

Sarantakos (2004: 170 - 171), noted that the estimation of sample size for any study can be based on statistical or non-statistical estimation. Under the non statistical estimation he argued that researchers (qualitative or quantitative), do not employ and logical thinking or calculations to arrive at sample size estimates. He however, cautioned that the selection of a sample size should be based on the following: the underlying research methodology, the nature of the study object, available time and resources, homogeneity of the target population, accuracy, the nature of data required, purpose of the study, and nature of the study and

response rate among others. He concluded by adding that large samples do not always guarantee a higher degree of precision, validity and success in general.

Based on the above stated reasons, the study employed the non-statistical estimation method. This ensured the selection of a manageable sample that saved time and resources in surveying the district. The sample size was distributed among the six communities in proportional manner with reference to population size of each community (See Appendix F).

3.6 UNIT OF INTERVIEW

The household (HH), was the unit for interview. People eligible for eh interview in a household included: household heads, spouses or caretaker/relatives, household units were interviewed (randomly or purposively) (see Appendix B).

The selection of the household as the unit for interview made targeted respondents to be easily identified for the interview. Multiple interviews within one household were therefore avoided.

However, there were more difficulties in ascertaining the actual number of children and dependents. This was because of the communities' interpretation of relationships which in most instance described clans and not families. This problem was solved by just explaining to the respondents to consider biological children and relatives that they take care of. Another problems encountered was the issue of age, because some of the people interviewed did not know their dates of birth. Ages were therefore estimated by using popular events such as: Independence year of Ghana, the enforcement of the Alien Compliance Order (ACO) of 1972, the 1982 famine in Ghana among others.

This was combined with PRA tools. Here as part of the study, discussions were engaged with identified groups of women and men, to solicit their views and opinions on the study topic. Six focus group discussions were organized one in each community.

Key informant interviews were conducted to collect information from government, quasi governmental and Non-Governmental agencies within the

district which have something to do with poverty, environment or both. A total of ten (10) organization were sampled for this study, including Environmental Protection Agency, Ministry of Food and Agriculture, Forestry Commission, Department of Game and Wildlife and Non-Governmental Organizations (Mantenso Friends of the Earth and Arocha International) just to mention a few in the district.

A total of one hundred and thirty (130) respondents and ten (10) key informants were interviewed. Six (6) focus group discussions were held one (1) in each community to solicit information on the study.

3.7 METHODS OF DATA COLLECTION

According to Miller (1991), there are two major methods used in the collection of data in social science research. These he said include primary and secondary data sources. Before a defunct stance is taken as which method to be used in data gathering the following are critical variables that must be considered;

i. The nature of the study;
ii. The purpose of the study;
iii. The resources available relative to finance and time ;and
iv. The level of skills / capacity of the research or the study team.

Also, in the selection of any method of data collection, the following variables should be noted: the social, economic and demographic exhibits of the sampled population should be a great concern. For some unknown reasons, respondents may not find a particular method comfortable or compatible and therefore will find it difficult to express their opinions in questionnaires or focus group discussion. Glady (1988), noted that in a researcher's choice of a method of data collection, the research, must consider in his mind, the type of people he is going to deal with, the nature of their social situation, the mode of the social environment, the psyche of the people among others.

Given this background, the study employed various data collection methods in soliciting information from the sampled population. Data was therefore solicited through the use of both primary and secondary data tools.

- Primary data: This was solicited through key informant interviews, observations, household questionnaires and focus group discussion.
- Secondary data: This was collected through documentary sources such as: books, journals, magazines, internet and other works related to the study.

Details on how each data collection method was employed in the solicitation of information are disused as follows:

3.7.1 Key Informant Interview

Sarantakos (2004), noted that interviewing or verbal questioning is one of the most common methods of data collection. He observed that interviews and questionnaires make up the survey method. Karma (1996), noted that interview is any person to person interaction between two or more individuals with a specific purpose in mind. Sarantakos (2004: 269), noted that interview can be structured or unstructured. The key informant interviews were used to collect information from heads of institution: governmental, quasi governmental and non government organizations, including EPA, DA, MOFA, among others. (See appendix A). This method was used to ensure that people with in-depth knowledge on the research topic contributed and made inputs to the study.

3.7.2 Focused Group Discussion

This data collection method collects information from group of people. A framework was developed known as the interview or focus group discussion guide. The guide was used to guide the interview process. The rationale for the use of method is to enable the researcher collectively engage with groups of participants during which questions were formulated and asked spontaneously as the interview progressed. This method allowed participants to freely express their opinions. Yin (1993), argued that a good interview is one in which the interviewee(s) take control over the interview situation and talks freely. Berger et al. (1989), noted that the success of focus group discussion is tied up to two variables; the interviewer and the group. Mahr (1995), equally share the same opinion. Sarantakos (2004), however observed some weaknesses this approach to include: the tendency of group participants to hide their feeling, data recording

and translation could be problematic and dominance of discussion by a few members of the group among others.

To overcome these problem enumerated by Sarantakos, participants were urged to contribute to discussions by way of seeking their opinions on particular issues. The issue of dominance by a few participants ensured that each person in the group had a number of points to raise and to allow others too, to do same.

The discussions made participants to contribute to issues, since they had the free will to express themselves. They gave examples and discussed issues into details, facial expressions, voice levels, gestures among others showed the intensity of some issues such as poverty (See Appendix C).

3.7.3 Questionnaire

Is a written list of question that is used to collect information from respondents. The respondents therefore read or listen to the questions, interpret what is expected of them and then write down or give answers. The questionnaire approach was adopted and used in collecting data from sampled population. Saunders et al., (1997), argued that the choice of using a questionnaire is influence by a variety of factors listed as follow:

- Characteristics of the respondents from which you wish to collect data;
- Importance of reaching a particular person as respondents;
- Importance of respondents answers not being contaminated or distorted;
- Size of sample require for the study and analysis, taking into account the likely response rate;
- Types of questions needed to asked to collect data; and
- Number of questions needed to be asked to collect data.

In the light of the above my choice of using the questionnaire is based on the fact that the target respondents were scattered over the geographical area. Questionnaire also made possible for the entire sampled size to be covered. Codification of work is also made easier since limited multiple answers were given. The few open-end questions were used to solicit in-depth information from respondents (See Appendix B).

3.7.4 Observation

Karma (1999), defined observation as a purposeful, systematic and selective way of watching and listening to an interaction or phenomenon as it takes place without asking the respondent questions. He noted that basic condition necessary for successful observation should include: learning about interaction, functions and behaviours in a group setting among others. This is more so relevant, in situations where accurate information cannot be elicited by questioning. This approach was relevant in obtaining data / information during preliminary visits to obtain information on the geo-physical setting, location of degraded sites/areas and identification of relevant institutions among others concerned with poverty and environmental degradation, as well as the observation of the natural environment. The observation was however, non-participant as participant observation requires that the researcher lives with and participant in the daily activities of the under investigation over a period of time.

3.7.5 Secondary Data

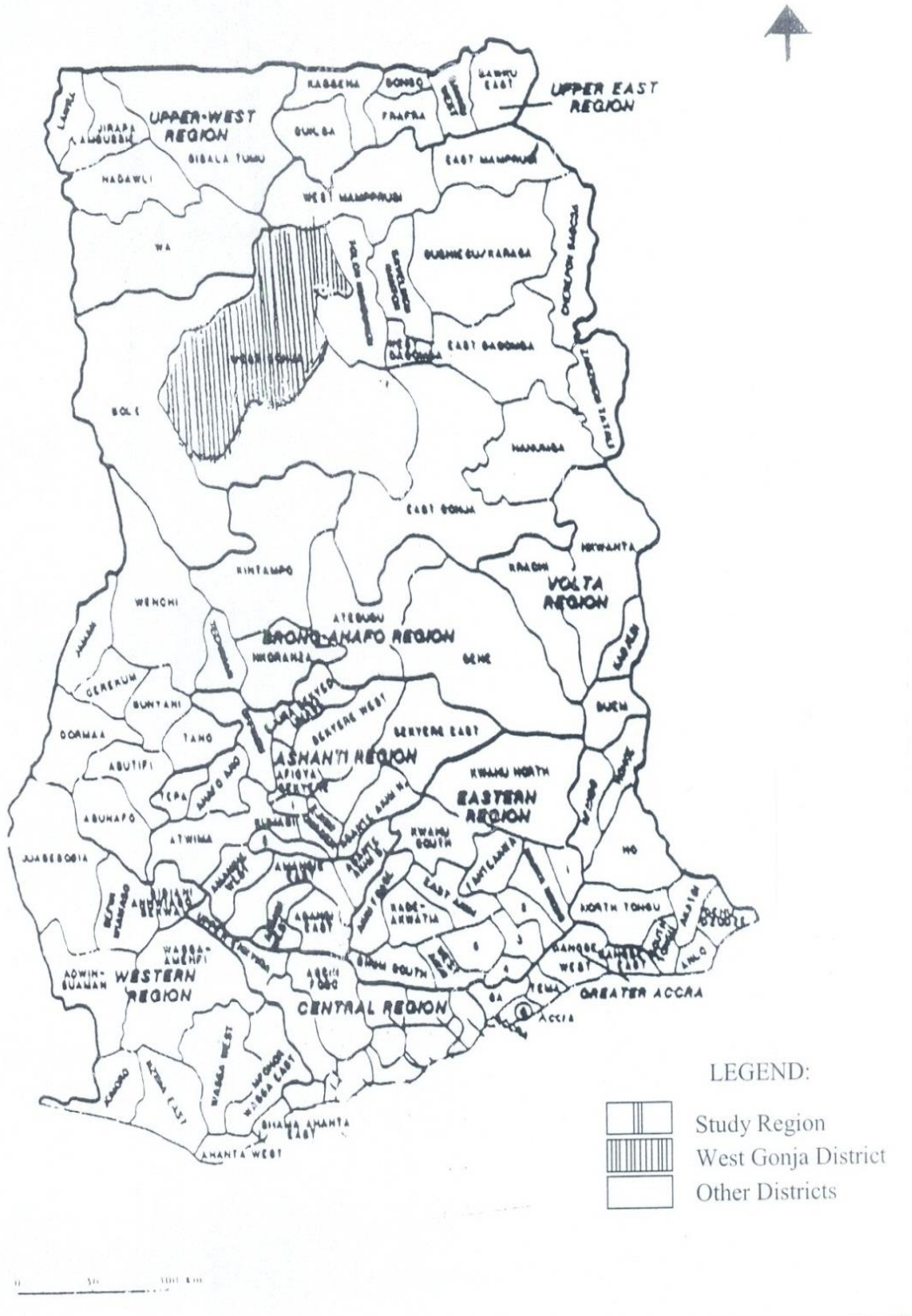
Stewart and Kamins (1993), noted that in using secondary data you are at an advantage compared to another researcher using primary data because the data already exist, you can evaluate them prior to use. They further argued that the time you spent evaluating potential secondary data sources, is time well spent, as rejecting unsuitable data earlier can save much wastage time later. In the light of this earlier work done, that provides the required information on the subject matter reviewed. Hence, a major source included documentary review. Documentary review was used as a means of obtaining information from magazines, books, journals and the internet among others on the research topic/theme. Aside this, information was sort from government agencies and nongovernmental organizations that are linked to the subject matter.

The information obtained from the secondary data sources was used in the assessments of trends in variable such as: degradation, poverty levels and trends, educational attainments and health care provision, employment and other social characteristics of the study communities.

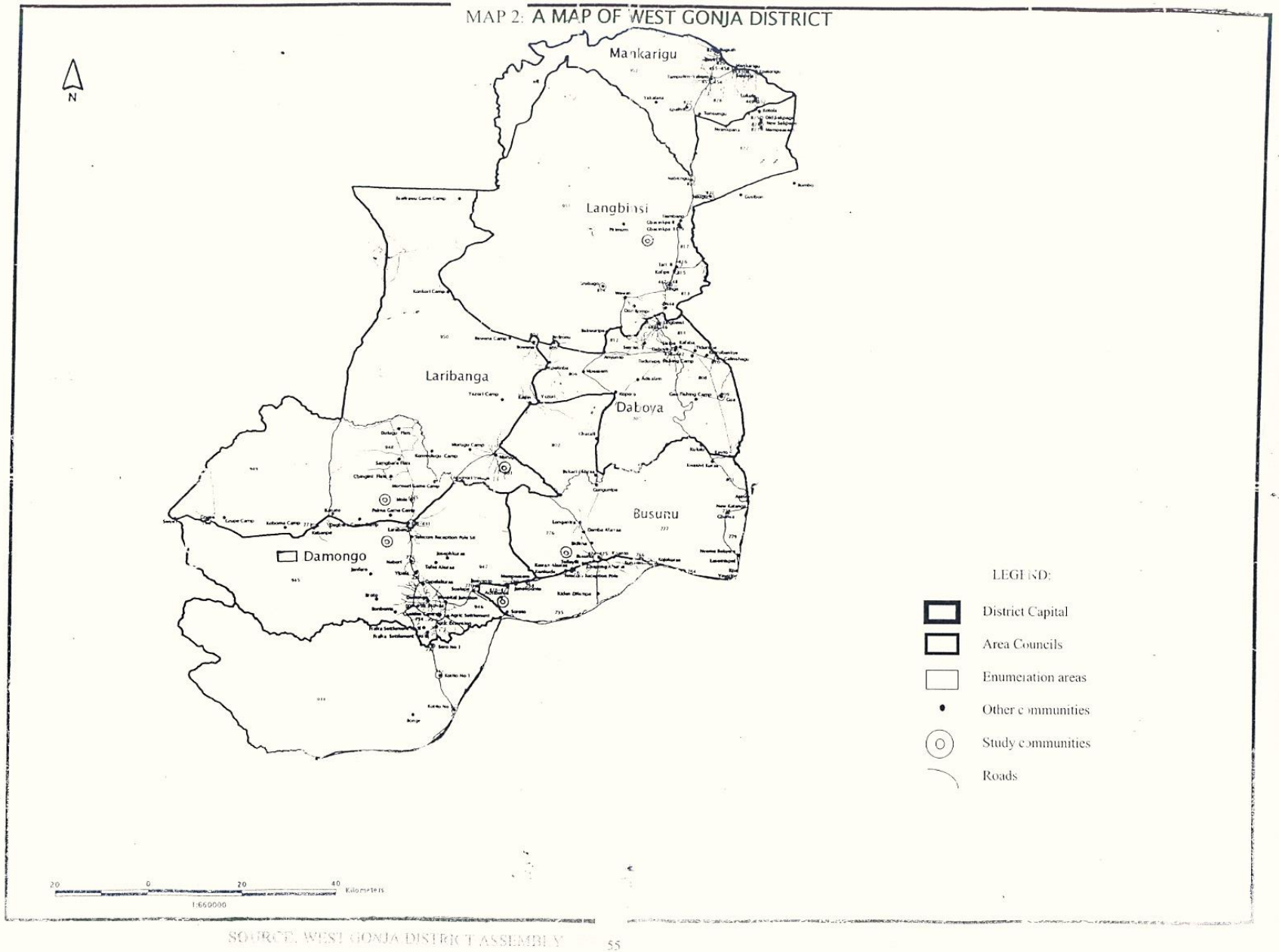
3.8 DATA ANALYSIS

After collecting the data, both qualitative and quantitative techniques, editing and coding was done before presentation. In the presentation of the data, descriptive statistics such as frequencies, percentage and content analysis were used since the research did not involve complex statistical data. Data was analysed using the Statistical Package for Social Sciences (SPSS), and both primary and secondary data gathered complemented each other in the analysis. The data was arranged under the key variable of analysis in chapter four.

Map 1 :Map of Ghana Showing Regions and Districts



MAP 2: A MAP OF WEST GONJA DISTRICT



SOURCE: WEST GONJA DISTRICT ASSEMBLY

3.9 BACKGROUND OF WEST GONJA DISTRICT

3.9.1 Location and size

West Gonja District is location in the Northern Region of Ghana. It lies on longitude 1°5¹ and 2° 58¹ west and Latitude 8° 32¹ and 10° 2' North, it shares boundaries to the south with Central Gonja District, Bole and Sawla-Tuna-Kalba Districts in the West, Wa East District in the North-west, West Mamprusi District in the North and Tolon Kumbungu District in the East. (See maps 1 and 2).

The district has total land area of 8,352sq.km; this represents about 12% of the total land area of the region. The Mole National Park and Kenikeni Forest Reserves occupy 3899 sq Km indicating 30% of the land area of the district.

3.9.2 Relief and Drainage

The topography of the area is generally undulating with altitude between 150 — 200 meters above sea level. The only high land is the Damongo Escarpment, located north of the District capital. There are a few outcrops of weathered rocks around Daboya.

The Mole River from the northern boundary joins the White Volta East of Damongo and this joins the Black Volta around Tuluwe in the Central Gonja District. The White Volta River also passes through the eastern boundary of the district.

3.9.3 Climate

Temperatures are generally high with the maximum occurring in the dry season, between March/April and are lowest between December/January. The mean monthly temperature is 27°C. The dry season is characterized by the harmattan wind, which is dry, dusty and cold in the morning and very hot at noon. During the harmattan, evapotranspiration is very high causing soil moisture loss.

The area experiences single maxima rainfall with the average annual precipitation being 1144mm. The rainfall pattern is erratic, beginning in late April to late October. The peak of the rainfall is in June/July with prolonged dry spell in

August. The rains are stormy and torrential up to 300mm per hour. Erosion and floods are common in the district due to the nature of the rains.

3.9.4 Soil

The District is situated in an old geological area. The rocks are mainly of voltain formation with isolated Cambrian rocks which contain valuable minerals such as gold. There are mudstones and sandstones in the Alluvial Damongo formations. The extreme western part of Damongo is composed of granites materials of low fertility. Rich alluvial sandy deposits occur around Damongo and the Kenikeni Forest Reserves.

The soil around Mankarigu, Kotito and Lingbinsi are said to be fertile and suitable for cereals, legumes and root crops, including livestock production. Underground water potentials are limited due to the Voltain formation.

3.9.5 Vegetation

The natural vegetation is Guinea Savanna. The vegetative cover of the district is dictated by the soil types and human activities, such as shifting cultivation, slash and burn method of land preparation. The major tree species in the district include: shea, dawadawa, baobab, acacia, nim and a few ebony tree. The trees are scattered except in most valleys where isolated woodland or forest are fund. Most trees are deciduous shedding their leaves during the dry season in order to conserve water.

3.9.6 Game Reserves and Tourist Sites

The district has two reserves and these are the Mole National Part Kenikeni Forest. Both reserves have a rich array of flora and fauna. The Mole National Park which is located about 30km west of Damongo is the largest in the country and one of the best managed game and wildlife parks not only in Ghana but Africa, south of the Sahara desert. The park covers an estimated a land area of about 5500 hectares and is a major tourist attraction in the North. In the year 2004, 100,427 tourists (both Ghanaians and foreigners) visited the park.

Other minor forest reserves are: Damongo escarpment located north of Damongo (39.3km^2), Nyangbon, located south east of Damongo (4.66km^2) and Bombir after the Damongo Hospital towards Kotito No. 1 (1.47 km^2).

3.9.7 Population Size

According to the 2000 Population and Housing Census the district population is 76,702 which give a density of 8.3 persons per sq km. The population density is below the regional density 25.9 persons per sq km. The district's population growth rate 3.1% is higher than the national (2.7%) and the region 2.8 respectively.

3.9.8 Age and Sex Composition

The sex ratio is 103 males to 100 females. This is due to the fact that females are more mobile and migrate outside the district than their males counterparts. Another factor is that there is enough arable land for the men who are mainly farmers. Urban population decreased from 18% in 1984 to 14.5% in 2000 (2000 Population Census Report). This was perhaps due to the ethnic conflicts in 1990 and 1996 respectively. The war between the Gonja and Nawuris on the one hand and the Dagombas and Kokombas on the other hand resulted in the devastation of several settlements and the exodus of thousands of people outside the district and region.

The population of the district is concentrated in a few accessible areas. The age structure is typical of developing countries with over 50% between 15 — 60 years of age. Age-sex structure also follows the national and regional patterns.

The preceding chapter looks at analysis and presentation of data on the topic of study. Data is presented in tables using percentages and frequencies. Also trend analysis was employed as a complement to the explanations.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.0 INTRODUCTION

The analysis and presentation of data is guided by research questions posed and the objectives set out for the study. This chapter therefore looks at the following thematic areas: the characteristics of the respondents, the nature of environmental degradation, the relationship between human activities and environmental degradation, the perception of poverty and the link between poverty and environmental degradation and the roles played by stakeholders (Governments, Non-Governmental Organizations, Civil Society Groups), among others in addressing the issue of poverty and environmental degradation.

4.1 CHARACTERISTICS OF RESPONDENTS

In analyzing the characteristics of the sampled population, the following variables were used: sex, age, occupation, and number of children, number of dependents, marital status, educational backgrounds, and employment status among others.

4.1.1 Sex of Respondents

This was necessary and captured in the study because population of the district is made up of both males and females, both sexes are contributors to various economic activities within the district. Also, the issue of poverty and environmental degradation affects both.

Out of the total of 130 respondents, 99 of them were males, representing 68.57 percent and the female respondents 41 representing 31.53 percent as indicated in table 4.1.

Table 4.1: Percentage Distribution of Respondents by Sex

Sex	**Frequency**	**Percentage (%)**
Male	99	68.57
Female	41	31.53
Total	**130**	**100.00**

Source: Field Survey, 2009

Notes: The study communities included Larabanga, Busunu, Achubunyor, Murugu, Gbasumkpa and Mole.

The huge disparity between the male and female respondents indicates that the West Gonja District is a typical patrilineal society which portrays a characteristic of male dominance.

This is confirmed by the Population and Housing Census Report (2000), which indicates that in the West Gonja District only 16.1 percent of the household heads are females. A critical look at the figure from the document and findings made by the study indicates that female headed household have appreciated more than 100 percent.

4.1.2 Age of Respondents

This variable was considered very important for the study because, it ensured that only persons within the economically active ages were included in the study. This is because, it is those who are actively involved in productive activities that can provide adequate information on the research topic. This variable was also useful because it is an important determinant of employment, unemployment and underemployment levels.

Table 4.2: Percentage Distribution of Respondents by Age

Age (years)	Frequency	Percentage (%)
10 — 20	9	7.00
21 — 30	41	32.00
31 — 40	18	14.00
41 — 50	50	38.00
51— 60	7	5.00
61+	5	4.00
Total	**130**	**100.00**

Source: Field Survey, 2009

Table 4.2 depicts the age structure of the respondents. The age group 10 — 20 recorded a total of 9%, 21 — 30 recorded 41 respondents representing 32% of the sample. The age group 31 — 40 recorded a percentage of 50 respondents representing 38 percent. The year group 51 — 60 and 60+ recorded 5 and 4 percentage points respectively.

An examination of the age structure reveals that, the West Gonja District has a huge labour force. This is because the age bracket 21 — 30 recorded 32 percent, 31 — 40, 14 percent and 41 — 50 recording 38 percent. By implication the labour force of the district stands at 84 percent. It must be however be admitted that the study targeted heads of families and their spouses or elder members of the family. This study results are therefore at complete variance with figures contained in the 2000 Population and Housing Census (GSS, 2005), which indicates that the dependency ratio of the district, stand at 51.7 percent composed of the age groups (60^+ and 0 — 14) respectively.

The findings however, seem to agree with the dependency percentage for the 60^+ which reads 4.1 percent and 4.0 percent for the study.

4.1.3 Educational Background of Respondents

The study took into account the educational status of the respondents. This was an important variable because ones level of education could be critical factor in the perception of issues. Educational level could therefore help in an individual perception of poverty-environmental linkages.

Table 4.3: Percentage Distribution of Respondents by Educational Level

Educational level	Frequency	Percentage (%)
Tertiary	16	12.00
Post Senior High	20	15.00
Senior High School	18	14.00
Middle / JHS	14	11.00
Primary	22	17.00
No schooling	37	29.00
Others	3	2.00
Total	**130**	**100.00**

Source: Field Survey, 2009

Notes: Others include Arabic, Ghanaian language scholars etc

Table 4.3 indicates the educational structure of the district as follows: tertiary educational attainment recorded 16 respondents, representing 12 percent, Post

Senior High School Education stood at 15 percent. Senior High School recorded 14 percent, middle / Junior High School had 11 percent. Primary school attainment stood at 17 percent while others and on schooling scored 2 percent and 29 percent respectively

The 2000 Population and Housing Census (GSS, 2004: 34), puts tertiary educational attainment at 5.1 percent, post secondary school attainment stood at 5.4 percent, Senior High School attainment stood at 11.3 percent. The document further argues that Middle / Junior High School attainment in the district stands at 22.0 percent while Primary School education stood at 48.7 percent.

Comparison between the study results and the Population and Housing Census document shows some disagreements. On tertiary education, the study reveals that a 12 percent point whiles PHC puts forward a 5.8 percentage point, this portrays a 6.2 percent improvement in tertiary education. Post Senior High School appreciated by 9.6 percent, moving from 5.4 percent to 15 percent as uncovered by the study. Senior High School educational attainment rose from 11.3 percent to 14 percent indicating, a 2.7 percent increase. Middle / Junior High School recorded a depreciation of 11 percent. Primary education recorded a marked depreciation of 31.7 percent moving from a height of 48.7 percent to 17 percent as uncovered by the study.

4.1.4 Marital Status of Respondents

This variable was relevant to the study because, the study centred on the family unit. Marriage is one of the methods or means by which the African family is created. Marriage also comes along with some responsibilities. The family pressure on the respondent can force the individual to undertake activities or some activities to earn income to enable them purchase basic necessities such as food, clothing, shelter, education, medical services among others.

Table 4.4: Marital Status of Respondents

Marital status	Frequency	Percentage (%)
Married	116	89.00
Single	3	2.00
Widowed	7	6.00
Divorced	4	2.00
Separated	-	-
Others	1	1.00
Total	**130**	**100.00**

Source: Field Survey, 2009

Data obtained from the study indicates that 89 percent of the respondents representing 116, of the sampled population were married. The implication here is that respondents had a correspondent responsibility of taking care of their family(s). This could therefore force them to till the land, burn and hunt, produce charcoal, fish, win sand, mine, cut trees among others to survive.

According to the Population and Housing Census Report (2000), the West Gonja District had 57.1 percent of residents in marital relations. This contravenes the findings made by the study which indicates that 89 percent of the population are in marital relations.

A critical look at table 4.4 creates an impression that, marriages within the West Gonja District are stable. This can be deduced from the fact that out of the sample of 130 picked for the study, 89% of the sampled population were seriously engaged in marriages. Only 2 percent were single, 7 percent widowed, 2 percent divorced, 0 (zero) percent separated and 1 percent came under other reasons.

The stable marriages could have come about as a result of the rural nature of the communities selected for the study. In the rural areas, there are various taboos on marriage which make marriages stable. Also, all the citizens of each community are related in one way of the other. Marriages were also seen as being able because of role of each party played in the sustenance of the family as far as the family economy is concerned. In addition, marriage in the rural

setting is aimed at bringing forth children to help in peasant agricultural production.

4.1.5 Occupation, Number of Children and Dependents of Respondents

These three variables are very relevant to the study because one occupation determines his / her income level. The number of children and dependents on the other hand influences one's expenditure levels. Between the two variables, income and expenditure determine income surplus or deficits which in the long-run determine the level of savings and investment. This subsequently determines one's poverty level (high, moderate or low).

The tables below give details of the structure of employment by sectors, the numbers of children and the number of dependents by respondents.

Table 4.5(a): Occupation Distribution of Respondents

Occupation	Frequency	Percentage (%)
Agriculture and related activities	82	63.00
Charcoal burning / lumbering	26	20.00
Sand winning / gold mining	3	2.00
Trading	9	7.00
Others	10	8.00
Total	**130**	**100.00**

Source: Field Survey, 2009

Table 4.5(b): Number of Children by Respondents

No. Of children	Frequency	Percentage (%)
1— 5	29	22.00
6 — 10	69	53.00
11 — 16	25	43.00
None	7	3.00
Total	**130**	**100.00**

Source: Field Survey, 2009

Table 4.5(c): Number of Dependents by Respondents

No. Of dependents	Frequency	Percentage (%)
1 — 5	28	22.00
6 — 10	42	32.00
11 — 16	56	43.00
None	4	3.00
Total	**130**	**100.00**

Source: Field Survey, 2009

From table 4.5(a), 82 respondents representing 63 percent of the total sample were engaged in agriculture and related activities, 26 respondents representing 20 percent were engaged in charcoal production and lumbering, sand winning and gold mining had 2 respondents representing 3 percent. According to NDPC (1997) all the above mentioned occupations have a negative toll on the environment because these activities exploit from nature without any effort of replacing the resources.

It was observed from the study, that the number of dependents of the respondents adds pressure and responsibilities to families, especially those within the agricultural sector and charcoal production. To provide for the needs of the entire family they exploit the environment to their own advantage without taking any initiative to replenish the resources exploited. To buttress this fact, (NAPCDD, 2000), noted that the poor are so poor that they cannot invest in the maintenance of the environment. It was however, generally observed that respondents with dependents within the age group 6 — 10 and 11 — 16 were within the occupation of agriculture and related activities. This clearly establishes a link between occupation and the number of dependents.

The issue of respondent's number of dependents was also closely associated with respondents within the agricultural and related activities occupation. The agricultural sector recorded most of the dependents within the groups 6 — 10 and 11 — 16. The rationale for large number of dependents within the agricultural and related activities occupation could be due to the need for more farm hands to provide labour for increase agricultural output at the peasant level. Also

associated with this, is the polygamous system of marriage and the traditional inheritance system being practised within most the communities.

The issue of large number of dependents signifies that fact that stakeholders within the West Gonja District, charged with the responsibility of carrying out family planning, need to intensify their activities within the rural areas of the district to control births.

4.2 THE NATURE AND INDICATORS OF POVERTY

The nature and phases of the concept of poverty makes it difficult for a single definition to be passed for it. Dale et al., (1985), viewed the concept as the lack of means to satisfy a person's basic needs for nutrition, housing, clothing and other essentials of life. According to Reardon and Vostin (1995), the phenomenon poverty exists in two categories, these they identified as: investment and welfare poverty. Sinha (2000), looked at poverty to be a situation in which a household lacks the resources to provide for its basic diet.

It should however, be acknowledged that the concept poverty travels beyond the areas identified by the above authorities. The concept manifests itself in various forms and these forms can be considered as indicators or phases of poverty. The areas considered for analysis in this study include: general perception of the concept and some indicators of poverty within the West Gonja District. The specific indicators identified with reference to the study are: food and nutrition, education, health and economy.

4.2.1 Respondents Perception of Poverty

Questions were posed to respondents to find out their general perception of the existence of the variable poverty within the West Gonja District. Respondents were also quizzed to rank their perception of poverty in terms of levels. Generally, respondents agreed that poverty was real in the district and existed amongst them.

Table 4.6: Respondents Perception Levels of Poverty in the West Gonja District

Poverty Perception Levels	Frequency	Percentage (%)
Very high	78	60.00
High	35	27.00
Moderate	20	18.00
Low	7	5.00
Total	**130**	**100.00**

Source: Field Survey, 2009

The analysis above shows the existence and perception levels in the West Gonja District as revealed in the table 4.6. A combination of perceptions levels (very high and high), indicated that at least 87 percent of the respondents agreed that poverty actually exist. 5 percent agreed that poverty exist but said it was very low and could not feel' any impact while 18 percent carried the view that poverty was moderate. A critical look at those who perceived poverty to be very high and high respectively (60 and 27 percent), of respondents means that general poverty levels in the district is 87 percent. From the study it is clear that poverty levels within the district exceeded the regional poverty level. According to the 2000 Population and Housing Census, it indicates that 70 percent of the entire northern region is poor. Judging from the above, the implication is that poverty levels at the West Gonja District is in excess of 17 percent of Northern Region.

Table 4.7: Some Indicators of Poverty in the West Gonja District

Table 4.7(a): Indicators of Food and Nutrition

	Indicators	Frequency	Percentage (%)
Food and Nutrition	Malnutrition	40	31.00
	Under feeding	9	7.00
	Lack of 3 meals	81	62.00
	Total	**130**	**100.00**

Table 4.7(b): Indicators of Education

	Indicators	Frequency	Percentage (%)
Education	High illiteracy rate	81	67.00
	High dropout rate	23	18.00
	Inadequate school facilities	20	15.00
	Total	**130**	**100.00**

Table 4.7(c): Indicators of Health

	Indicators	Frequency	Percentage (%)
Health	High rate of morbidity	60	46.00
	High rate of mortality	8	6.00
	Inadequate health services	62	48.00
	Total	**130**	**100.00**

Table 4.7(d): Economic Indicators

	Indicators	Frequency	Percentage (%)
Economic	High rate of unemployment	58	45.00
	Inadequate employment	15	11.00
	Lack of investment capital	57	44.00
	Total	**130**	**100.00**

Table 4.7(e): Indicators of infrastructure

	Indicators	Frequency	Percentage (%)
Infrastructure	Inadequate potable water	83	64.00
	Inadequate motorable roads	34	26.00
	Inadequate electricity supply	13	10.00
	Total	**130**	**100.00**

Source: Field Survey, 2009

*Five broad areas were used to assess the indicators of poverty within the district. These indicators included: food and nutrition, education, health, macro-economic and infrastructure.

4.2.2 Food and Nutrition

Under this area, three main variables were used: malnutrition, under feeding and lack of three square meals a day. 31 percent of the respondents agreed that malnutrition was a serious indicator of poverty. 7 percent also carried the view that under feeding was a serious indicator of poverty while 62 percent representing 81 respondents held the view that inability to afford three square meals a day is a serious indicator of poverty within the study area. The revelation made by the study is in consonance with Sinha (2000) and Dale et al., (4995), both authors shared the view that a situation in which a household is not able to purchase a minimum food requirements within a certain geographical region, signifies poverty.

4.2.3 Education

Under this area, the following indicators were identified and used. These included: high illiteracy rate, high school dropout rate and inadequate school facilities. 87 respondents representing 67 percent of the total sample, identified high illiteracy rate as an indicator of poverty, 18 percent of respondents viewed high school dropout rate as indicator of poverty, while 15 percent shared the opinion that poverty means inadequate school facilities. An observation of this statistic implies that the core indicator of poverty within the West Gonja District, with respect to education is high illiteracy rate. The 2000 Population and Housing Census (GSS, 2008), put illiteracy level of the West Gonja District at 75.9 percent while a breakdown shows that male illiteracy rate is 73.2 percent and female 78.7 percent. A close look at the difference between the sexes, the illiteracy rate is higher, that is 5.5 percent among the females in excess of their male counterparts.

At a Focus Group Discussion (FGD), it was uncovered that since the implementation of the FCUBE programme in 1987, the implementation of the school feeding programme and the capitation grants in recent times, there has

been some improvement in enrolment at the basic levels with some special emphasis on the girl-child education. This fact is confirmed by a statistic from the 2000 PHC (GSS, 2000), which indicates that the educational attainment within the district, currently stands as follow: pre-school 2.7 percent, primary school 48.7 percent, JSS/middle school 22 percent, secondary / SSS 11.3 percent, vocational / technical / commercial 4.1 percent, post secondary 5.4 percent and tertiary 5.8 percent. The 48.7 percent enrolment figures chalked by the primary sector clearly indicate that at a future date, the illiteracy level of 75.9 percent will be reduced.

4.2.4 Health

Under the area of health, three basic elements were considered, including high rate of morbidity, high rate of mortality and inadequate health facilities. 60 respondents representing 46 percent agreed with the view that high morbidity rate is an indicator of poverty, 8 percent viewed morality as an indicator of poverty while 48 percent representing 62 respondents viewed inadequate health service provision as an indicator of poverty. From the study, it is clearly demonstrated that 60 and 62 respondents argued that morbidity and inadequate health services provision are all serious indicators of poverty respectively. GSS (2005), indicates that 12.5 percent of the citizens have access to health services within a kilometre range of 1 — 5, 20 percent had access to medical facilities within a distant of 6 — 10 kilometres, 11.1 percent could access health services within 11 — 15 kilometres, and 10.6 percent of the population needs to travel between 16 — 20 kilometres to access healthcare. 1.8 percent makes a distance between 21 — 25 kilometres to access healthcare, while 6.5 percent has to journey between 26 and 30 kilometres for their health needs. A total of 27.4 percent has to make a 31 or more kilometres before having access to medical services. In summary, a total of 12.5 percent have access to medical facilities if the approval distance accepted by Ministry of Health and Ghana Health Service is 1 — 5 kilometres. It therefore implies that 87.5 percent of the citizens of the district still lack adequate access to medical facilities. And if this is the picture, Dale et al., (1995), are right to describe poverty as a situation whereby an individual cannot have easy access to some social facilities including health.

4.2.5 Macro-Economic Indicators

Using economic factors as measurement of poverty, three indicators were used. These included: high rate of unemployment, inadequate employment and lack of investment capital. 58 respondents representing 45 percent of samples went along with the view that high rate of unemployment is an indicator of poverty. 12 percent of respondents saw inadequate (underemployment), as an indicator of poverty. 47 respondents representing 43 percent held the view that lack of investment capital indicates poverty. This is in consonance with the observations made by the 2000 PHC (GSS, 2005).

4.3 ACTIVITIES LINKED TO POVERTY AND ENVIRONMENTAL DEGRADATION IN WEST GONJA DISTRICT

According to NPRP (2000), poverty means deprivation, vulnerability and isolation. It is the absence or denial of personal life sustaining necessities including food, shelter, clothing and lack of access to basic social services such as: education, health and social infrastructure. Sinha (2000), however, limited poverty to inability to acquire basic food or diet for a family. A critical look at the above definitions show that the NPRP interpretation of poverty should be accepted for this study since poverty is not only limited to inability to acquire food but means more than that. From the study, it was established that poverty is a state of being which makes the individual highly dependent on the ecosystem (environment), which provides the needs for the individual.

The study revealed that (40), respondents representing 31 percent of the total sample, agreed with the view that tree felling is an activity linked to poverty and environmental degradation, 30 percent of the respondents had the opinion that bush burning for game was an activity linked to degradation and poverty. Indiscriminate waste disposal and poisoning of water bodies for fish both had 8 percent each as activities linked to poverty and degradation, while 23 percent agreed with overgrazing as an activity linked to poverty and degradation.

Table 4.8: Activities Linked to Poverty and Environmental Degradation

Activity	Frequency	Percentage (%)
Felling of trees	40	31.00
Bush burning for game	39	30.00
Indiscriminate waste disposal	10	8.00
Poisoning of water for fish	11	8.00
Overgrazing	30	23.00
Others	-	-
Total	**130**	**100.00**

Source: Field Survey, 2009

A critical look at the various activities that degradation the environment as a result of poverty, equally have a link with agricultural activities, meaning that they all exploit from nature without any effort to replenish the resources so exploited. The NDPC (2003), observed that food crops farmers have the highest incidence of poverty, the document noted that 59 percent of food crop farmers are poor. The Malthusian theory of "vicious cycle" between poverty and degradation further explains the link. The farmers are pushed by population growth and its subsequent responsibilities on the family to cultivate on marginal lands, thereby degrading them. Minks (1993), noted that cultivation on marginal lands reduces yields which further make the farmers poorer.

At a focus group discussion, it was revealed that the illiterate population, within the district are those engaged in agriculture but due to the seasonal nature of the farming they engage in other activities such as lumbering, charcoal burning, fishing among others as a means of earning supplementary income which degrades the environment.

4.4 REASONS FOR ENVIRONMENTAL DEGRADATION IN WEST GONJA DISTRICT

Table 4.9: Reason for Environmental Degradation in West Gonja District

Reasons	Frequency	Percentage (%)
Inability to afford other sources of domestic fuels	60	46.00
Limited employment opportunities	30	23.00
Lack of sanitary infrastructure	13	10.00
General ignorance	27	21.00
Inadequate funds	-	-
Inadequate interventionist activities	-	-
Other	-	-
Total	**130**	**100.00**

Source: Field Survey, 2009

The reasons for which people in the West Gonja District degrade the environment include: inability to afford other sources of domestic fuels, 46 percent representing 60 respondents shared this view. 23 percent representing 30 respondents agreed with the view that limited employments opportunities is the rationale for degradation. 13 percent and 27 percent of the respondents respectively, agreed with lack of sanitary infrastructure and general ignorance as the causes for environmental degradation.

At a focus group discussion, it was revealed that the only way residents obtain energy for domestic purposes were through fuel wood harvest and charcoal. This is consonance with the revelation made by Population and Housing Census (GSS, 2005), which indicates that 92.7 percent of residents of the West Gonja District, depend on fuel wood and charcoal for domestic purposes. The residents also complained bf high cost and unavailability of LPG and solar equipment.

The lack of social infrastructure, general ignorance and inadequate interventionist activities are very important variables that need serious attention to ensure a sound and health environment.

4.5 THE NATURE OF ENVIRONMENTAL DEGRADATION

According to Diaw (1989), the environment constitutes the natural domain of all developmental activities and therefore it is not possible to compartmentalize environmental issues. Implied in this is the fact that one activity by a known geographical area may have its effects shared by all. Increasing evidence, pointing to Africa, indicates that there is excessive demand on the natural resources, leading to the overstretching of the carrying capacity of the fragile ecosystem. The nature of the problem of degradation varies from one geographical area to another.

This research looks at the nature of environmental degradation within the territorial and spatial region of the West Gonja District. The study looks at the following areas for analysis and interpretation.

- Perception of environmental degradation;
- Indicators of environmental degradation; and
- Good environmental and sanitation practices within the district among others.

Table 4.10: Respondents Perception of Environmental Degradation in the West Gonja District

Perception	**Frequency**	**Percentage (%)**
Yes	96	74.00
No	10	8.00
Don't know	24	18.00
Total	**130**	**100.00**

Source: Field Survey, 2009

From table 4.10, 96 respondents representing 74 percent held the view that the environment within the West Gonja District was being degraded. 18 percent of the respondents did not actually know the degradation status of the environment of the West Gonja District. 8 percent of the respondents however agreed that there is no environmental degradation at all.

74 percent of the respondents agreed that degradation of the environment within the district is real and adduced the following reasons: poor crop yields, drying up of surface water bodies, lost of forest, reduced rainfall among others. At a focus group discussion, it was also confirmed that degradation, was actually an issue confronting the district. The high perception of environmental degradation by respondents and as revealed by the focus group discussion has a correlation with the nature of employment within the district. According to the 2000 Population and Housing Census (GSS, 2005), 81.5 percent of the inhabitants of the district are engaged in agriculture and related activities. Unfortunately, all these activities basically exploit and destroy the environment.

4.6 INDICATORS OF ENVIRONMENTAL DEGRADATION IN THE WEST GONJA DISTRICT

Table 4.11: Indicators of Environmental Degradation by Respondents

Indicators	Frequency	Percentage (%)
Unhygienic sanitation	20	15.00
Widespread desertification	21	16.00
Water and air pollution	15	12.00
Soil erosion	70	53.00
Extinction of plants and animals	7	5.00
Total	**130**	**100.00**

Source: Field Survey. 2009

From table 4.11, it is evident that 20 respondents representing 15 percent were of the view that unhygienic sanitation is an indicator of environmental degradation. A total number of 21 respondents representing 16 of the sample also, in their submission agreed that widespread desertification is an indicator of degradation. Water and air pollution was considered by 15 respondents representing 12 percent. 53 percent carried the view that soil erosion is a serious indicator of environmental degradation. The extinction of some floral and faunal species was considered by 5 percent of respondents as an indicator of degradation.

A critical look at the indicators of environmental degradation revealed that land degradation tops all with 53 percent of respondents. Nsiah-Gyabaah (1994: 29), looks at the concept of degradation in two folds as natural and human induced forms. During the field study, it was observed that both forms of degradation were present within the district. For instance: floods, bush burning, erosion were

prevalent as naturally induced causes of desertification. Sand winning, deforestation and cultivation among others were also observed as being the cause of human induced degradation processes of environment. (GSS, 2005), noted that 81.5 percent of the population in West Gonja District engaged in agriculture and related activities which makes the district highly dependant on land for cultivation. It was observed that agricultural activities pose a lot of threat to the development of biomass, since each time crop cultivation comes with felling of trees, bush burning, among others. Akinsami (1987), noted that the burning done each year leads to the extinction of soil living microbial that are of significance to soil formation processes. Soil structure and texture is lost leading to degradation.

4.7 RELATIONSHIP BETWEEN HUMAN ACTIVITIES AND ENVIRONMENTAL DEGRADATION

Nsiah-Gyabaah (1994), noted that there are two processes of environmental degradation namely, natural and human induced forms. In the human induced environmental degradation, he identified activities such as: deforestation, sand winning, gold mining, crop cultivation among others.

This section of the study solicited from the respondents the activities that have negative environmental consequences within the West Gonja District. The study looked at the following activities: agriculture and related activities, charcoal production and lumbering, sand winning and gold mining, trading and others.

Table 4.12: Activities that Degrade the Environment of West Gonja District

Activity	Frequency	Percentage (%)
Agriculture and related activities	60	46.00
Charcoal burning/lumbering	41	31.00
Sand winning/gold mining	19	15.00
Trading	8	6.00
Others	2	2.00
Total	**130**	**100.00**

Source: Field Survey, 2009

From table 4.12, was revealed that agriculture and related activities constitute the biggest threat to the environment. 60 respondents representing 46 percent held

this view. Charcoal production was seen by 31 percent of respondents as being a threat to the environment. 15 percent agreed with the view that sand winning and gold mining, affects the environment. For trading and others, 6 percent and 2 percent respectively viewed that as having negative impact on the environment.

Darkelman and Davidson (1998: 10), observed that the invasion of deserts through over cultivation, forest clearing and overgrazing has worsened changes in the climate of West Africa since the recent severe persistent droughts. They equally noted that, vegetation has become so impoverished that it is difficult for the forest to regenerate. The observation made by the authors, with reference to over cultivation and overgrazing, leading to desertification is in line with observation made by respondents who argued that agriculture and related activities, are responsible for the degradation of the environment in the West Gonja District.

The 2000 Population and Housing Census (GSS, 2005: 58), noted that the main fuel for cooking constituted wood and 90.8 percent of the inhabitants used wood. The document equally noted that 5.9 percent of the inhabitants used charcoal. By implication 96.7 percent of the inhabitants depend on the forest for cooking. This could have serious implication for the vegetation of the district. At a focus group discussion, it was revealed that the activities in table 4.12 were the main causes of bush fires, deforestation, air pollution, water pollution, indiscriminate refuse / waste disposal, destruction of the landscape and the exploitation of the wildlife in the West Gonja district. These activities, Nadakavukaren (1990), noted could pose serious problems within the near future.

4.8 CULTURE AND TECHNOLOGICAL CAUSES OF POVERTY AND ENVIRONMENTAL DEGRADATION

It is common knowledge that, the use of simple farm tools such as hoes and cutlasses can only be used for peasant or subsistence production. Under subsistence production, the farmer can only produce enough to feed the family and little for the market. This makes the farmer poor throughout the year. This causes the farmers to undertake other related activities such as fuel wood harvesting, charcoal burning, hunting, and fishing among others which depletes the environment of its resources. As noted, by Lele (1988), environmental

degradation is often cause by the poor because they have no alternative but to exploit from the environment for their short term survival. Zimmerman (2004), noted that cultural practices such as group hunting or individual hunting destroys the environment and also gets some animal species extinct.

In addition, the environment is further degradation through bad cultural methods of farming including: slash and burn method. Soil living microbial and flora that aid organic matter decomposition and also protect the soil from erosion activities, are also destroyed. The implication is exposure of topsoil to erosion and other forms of degradation.

Technological, the improper use of machines by farmers on the land further impoverishes the land. Also, non observance of strip cropping, contour bounds, terracing among others on sloppy lands encourage soil erosion. In addition, the use of chemicals in the form of fertilizers, weedicides, pesticides, herbicides among others also degrade the farmlands, despite the fact that they are not often used by peasant farmers in larger quantities. Akinsami (1998), observed that the over application of chemicals with the aim of improving soil fertility leads to situation, known as soil acidity which aids desertification (degradation).

Culturally, Telly (2000), observed that despite the fact that many people are aware of the negative effects of bushfires in causing land degradation and destruction of vegetation cover, no serious interventional measures have ever been put in place on sustainable basis to arrest the situation.

Table 4.13: Cultural and Technological Causes of Poverty and Environmental Degradation

Causes	Poverty	Environmental Degradation
Culture	• The use of outmoded agricultural implements like the hoe and cutlass • The dependence on the household or family as a source of farm labour • Belief in gods, ancestors and	• Hunting in groups • Bad agricultural methods farming • Celebration of some traditional festivals such as: fire festival

	other spiritual forces as sources of wealth	
Technology	• The use of expensive agricultural machinery such as: combined harvesters, tractors and other earth moving machines • Inaccessible farm machinery • Excessive exploitation of resources to point of extinction	• Excessive use of chemicals — weedicides, pesticides, fertilizers among others • The use of heavy agricultural machinery in crop production, sand winning, gold mining among others

Source: Field Survey, 2009

4.9 THE EXTENT OF HUMAN ACTIVITIES ON ENVIRONMENTAL DEGRADATION IN WEST GONJA DISTRICT

In order to measure the level of the impact of the activities of humans on the environment, the study, solicited from respondents their views on the level of human activities on the environment. The rationale behind this was to enable the study identify measures aimed at stopping or minimising the human activities, that impact negatively on the environment in the West Gonja District.

Table 4.14: Level of Human Activities on the Environment of West Gonja District

Extend of Human Activities on the Environment	**Grade**	**Frequency**	**Percentage (%)**
Very high	4	113	87.00
Moderate	3	12	9.00
Low	2	3	2.00
Very low	1	2	2.00
Total		**130**	**100.00**

Source; Field Survey, 2009

From table 4.14, 113 respondents representing 87 percent of the total sample for the study, had the perception that environmental degradation via human activities was very high. 9 percent agreed with the view that human activities had a

moderate impact on the environment, while less than 5 percent rated human activities to be low or very low on the environment.

As established by the 2000 Population and Housing Census, the major economic activity for the entire northern region is agriculture, animal husbandry, forestry and related activities. This sector employs about 71.2 percent on the regional scale and 81.5 percent for the West Gonja District. Given this fact, it is undoubted that the environment within the district will face high rate of degradation. Clearer and Schreiber (1994), observed that water body pollution, siltation and subsequent drying up of surface water systems or bodies is a function of some cultural practices associated with agricultural production in Sub-Saharan Africa. They further argued that farmers deplete soil nutrients leading to soil organic loss, leading to diminishing soil-water retention which gives way to water erosion. The net effect is soil degradation.

4.10 RELATIONSHIP BETWEEN POVERTY AND ENVIRONMENTAL DEGRADATION

A critical observation and analysis of the concept of degradation portrays a generic picture. The rationale being that, the environment is composed of several spheres: hydrosphere (aqua environment), biosphere (floral and faunal environment), atmosphere (gaseous environment) and lithosphere (solid environment). When any of these environmental spheres fail to function, degradation can simply be said to have occurred. Due to the elastic nature of the term environmental degradation, an aspect of degradation (land degradation), will be adopted for this study. According to Warren and Agnew (1988), the term land degradation means the loss of resilience in dry land or the inability of land under a particular land use system to withstand or recover from shocks. It must however, be stated that land degradation spans from resilience to damage.

Poverty and environmental degradation are mutually complementary, each reinforcing the other. In summary, one can simply say that the poor are both agents and victims of environmental degradation as observed by Lele (1988).

Judging from the above, this part of the study tries to establish the link between poverty and environmental degradation within the West Gonja District.

Information gathered from respondents revealed that there is a relation between poverty and degradation. 90 percent of the respondents admitted to this fact. 10 percent of the respondents could not see the linkages. The proportion that argue that poverty and degradation are the opposite sides of the same coin, argue that the poor are generally engaged in activities such as: crop cultivation, animal rearing, fishing, mining, sand winning, charcoal burning among others that extracts from nature to meet their social, economic and cultural needs. The rationale being that they have no choice or alternative employment avenues. Nsiah-Gyabaah (1994: 163), observed that the people of the Upper West Region of Ghana relied on the forest (wild), for food substitutes as a coping strategy in time of rain / crop failure for survival. This is in consensus with the earlier observation made by Lele (1988), that the poor are both agents and victims of degradation. He however, argued that the degradation and its effects should not be perceived as variables associated with the poor only. He noted that issues about the environment, does not exclude anyone but added that, the poor suffer in the short run while the rich suffer the effects in the long run.

4.11 THE ROLE OF INSTITUTIONS IN ADDRESSING POVERTY AND ENVIRONMENTAL DEGRADATION IN THE WEST GONJA DISTRICT

The study made conscious effort to solicit from respondents, if they had knowledge of the existence of organizations within the West Gonja District with the primary responsibility of addressing the issues of poverty, environmental degradation or both.

The major institutions are Environmental Protection Agency, District Assembly, Environmental Non-Governmental Organizations, Department of Town and Country Planning and the Survey Department.

Table 4.15: Respondents Awareness of Major Institutions in Poverty and Environmental Related Matters

Institutions	Frequency	Percentage (%)
Environmental Protection Agency	12	9.00
West Gonja District Assembly	40	31.00
Environmental NGOs	68	52.00
Department of Town and Country Planning	8	6.00
Survey Department	2	2.00
Total	**130**	**100.00**

Source: Field Survey, 2009

From the table 4.15, 12 respondents representing 9 percent of the sample are aware of EPA as an agency, responsible for environmental protection. 31 percent of the respondents saw the District Assembly as an agency that helps in the protection of the environment as well as alleviating poverty of the people, within the district. The following were identified by respondents as the roles played by the District Assembly: waste management system that ensures weeding, collection, transportation and disposal of filth in collaboration with ZoomLion (ZL), educating the general public on the hazards and effects of environmental degradation, allocation of poverty alleviation funds for undertaking environmental friendly investment such as: gari processing, soap making, pito brewing, shea butter processing among others and encouraging afforestation programmes.

At a focus group discussion, it was revealed that in September 2009, the District Assembly embarked on an exercise that led to the seizure of several bags of charcoal in the district.

From table 4.15, 68 respondents representing 52 percent of the total sample expressed knowledge of the existence of poverty and environmental NGOs in the district. Some of the environmental and poverty related NGOPs in the district include: Mantenso Friends of the Earth, Arocha International, and Nyankamba Escarpment among others.

The following were identified, during a focus group discussion with women at Murugu as the roles played by environmental and poverty related NGOs in the district:

- Collaborating with governmental environmental agencies such as Department of Game and Wildlife, Department of Forestry and District Assembly in enforcing laws on the environment;
- Creating public education and awareness on environmental issues such as bush burning, water pollution and soil erosion;
- Formulating and implementing afforestation and conservation programmes with the citizens;
- Partnering with District Assembly and other developmental partners to fund poverty alleviating programmes; and
- Building the capacities of citizens to undertake alternative livelihood programmes or activities that create jobs, but friendly and sound to the environment.

At the FGD, participants acknowledged the invaluable role institutions play is addressing the issues of poverty and environmental degradation. They indicated categorically that, without the intervention of those stakeholders, poverty and degradation issues would have been serious. It was exposed that activities of Town and Country Planning and the Department of Survey did not have their activities having any impact on their poverty or environmental degradation.

The efforts of traditional authorities in checking environmental degradation were widely acknowledged by participants. They admitted that the chiefs used their traditional authority to enforce laws at the local community levels. They added that most policies on environmental protection that were successfully usually had the support of the chiefs.

The study went further to find out the cooperation levels with the citizenry when stakeholders on environment and poverty related issues come out with policy programmes and projects for implementation. The study revealed that sometimes cooperation is not always good enough, especially when the issues involved are about conservation, preservation and protection. The rationale being that, they

may only be able to survive by exploiting from the environmental resources that is sustainable.

During an interview with the West Gonja District Sanitation Officer (DSO) he revealed the following bye-laws:

1. Permission shall be sought from the District Assembly, Forestry Commission or other para-environmental agencies in writing before cutting down any economic tree;
2. Trees that are cut must be replaced with the same or similar species at the exact spot that cutting was done;
3. Refuse must be disposed at places or areas allocated for such purposes by the assembly;
4. Removal of overgrown weeds, rubbish and other waste around or within premises; and
5. The disposal of waste or other materials which may cause chocking of drains or water passage must be avoided by all persons.

It was observed that despite these good environmental bye-laws made by the district assembly, there is a problem of enforcement. Enough education and creating public awareness should be carried out.

The last chapter is the concluding part of this research work which precedes chapter four. If focuses on summary, conclusion and recommendations to the various institutions, including: Government, NGOs, Civil Society Groups and all other stakeholders concerned with the reduction of poverty and environmental degradation in the West Gonja District. This chapter therefore provides suggested programmes for implementation.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 INTRODUCTION

This chapter presents the summary, conclusion and recommendations of the study. The recommendations closely looked at how poverty and environmental degradation within West Gonja District can all be minimized to create an atmosphere in which development can be sustainable.

5.1 SUMMARY OF THE STUDY

The study examined the relationship between poverty and environmental degradation in the West Gonja District of the Northern Region of Ghana. Six (6), communities were sampled out from twenty (20) major communities in the district. The sampled communities included: Achubunyor Busunu, Murugu Larabanga, Gbasumkpa No. 1 and Mole. Busunu, Larabanga and Achubunyor represents, communities with population size above 1000 (cluster one). Whiles Murugu and Gbasumkpa No. 1, were sampled out to represent communities with population size below 1000 (cluster two). Mole, however, was sampled out purposively because of its role in the conservation and protection of some flora and fauna species within its spatial confines.

The sample population for the study was therefore based on the clustering of the communities in two categories; population size above 1000 and those below 100. A multi-stage sampling technique, comprising: simple random, purposive and accidental sampling techniques were used. One hundred and thirty (130), respondents were sampled for the study. Focus group discussions were organized, one in each of the six (6) communities to solicit some qualitative data to complement the quantitative data generated be the use of questionnaires and key information interviews. Descriptive statistics such as frequencies, percentages, and content and trend analysis were employed for analysis of data.

5.2 MAJOR FINDINGS OF THE STUDY

5.2.1 Perception of the Level of Poverty in the West Gonja District

- 87 percent of the respondents perceived poverty to be high in the district. This exceeds the entire Northern Regional poverty level which stands at 70 percent according to the 2000 Population and Housing Census Report (Ghana Statistical Service, 2005). This means that poverty in the West Gonja District is in excess of the region by 17 percent.
- Indicators of poverty in the West Gonja District. The study grouped the indictors of poverty in the district under the following headings:
  a) Food and Nutrition: Under this group of poverty indicators, 62 percent of the respondents were of the view that the core indicator of poverty is the inability to provide three (3) square meals.
  b) Education: Under education, 67 percent of the respondents shared the opinion that high illiteracy was a core indicator of poverty.
  c) Health: Under the health category, 46 percent of the respondents observed that high rate of morbidity are a core indicator of poverty while 48 percent viewed inadequate provision of health services as an indicator.
  d) Economic: 45 percent of respondents viewed high unemployment rate under the macroeconomic indicators as a major cause of poverty while 43 percent viewed lack of capital for investment as core cause of poverty
  e) Infrastructure: 64 percent of respondent agreed with inadequate potable water provision as a core indicator of poverty under this category.

  In summary, lack of three (3) square meals a day, high illiteracy rate, morbidity, inadequate health services provisions, high rate of unemployment, lack of capital investment, and potable water are the major indicators of poverty in the West Gonja District.

5.2.2 Perception of the level of environmental degradation in the West Gonja District.

- 78 percent of respondents held the view that the environment within the West Gonja District is being degraded. Reasons assigned for the degradation of the environment include: poor crop yield, drying up of some surface water bodies, lost of forest and reduced rainfall among others.
- 53 percent of respondents identified soil erosion as a major indicator of degradation of the environment in the West Gonja District.
- 15 and 16 percent of the respondents respectively, viewed widespread desertification and unhygienic sanitation as indicators of degradation.
- Agriculture and related activities was viewed by 46 percent of the respondents, as major activities that degrade the environment. 31 percent of respondents agreed with the view that charcoal burning and lumbering were the main activities that degrade the environment. In sum 77 percent of the human activities affects the district environment and are mainly related to agriculture, charcoal burning and lumbering. The study also uncovered that 87 percent of all degradation activities were human induced. This implies that the natural degradation constitutes only 13 percent.
- 67 percent of the respondents agreed that, the rationale behind the degradation of the environment was due to limited employment opportunities within the others sectors. And that the agricultural sector and other primary sectors, extract directly from the environment. Also, inability to access other sources of domestic fuel has made many people to resort to the environment for fuel wood as a source of domestic energy within the district. The 2000 Population and Housing Census Report (Ghana Statistical Service, 2005), indicates that 92.7 percent of the inhabitants of the district depend on the wild for energy. By implication only 7.3 percent of energy used in the district comprises other sources; such as petroleum products, solar among others.
- 90 percent of respondents admitted to the fact that there is relationship between poverty and environmental degradation. The respondents

agreed that, the poor, generally depends on the environment to meet their social and economic needs. Some of the activities the poor engage in that destroy the environment include fishing, hunting, fetching of fuel wood, and charcoal burning. Agricultural activities also contribute significantly to the depletion of soil nutrients, destruction of vegetation and a subsequent exposure of topsail to erosion activities. It was further discovered that due to the high poverty level people could not invest in the maintenance of the environment; thus making the poor both agents and victims of poverty and environmental degradation.

5.2.3 The role of institutions in addressing poverty and environmental degradation in west Gonja district

- Respondents acknowledged the activities of some institutions in addressing poverty and environmental degradation within the West Gonja District. The stakeholders identified included: Environmental Protection Agency (EPA), the West Gonja District Assembly (WGDA), Department of Town and Country Planning, Department of Game and Wildlife, environmental NGOs such as: Arocha International, Mantenso Friends of the Earth and Nyankamba Escarpment were also identified.
- It was revealed that these institutions played several roles including: public education on sound environmental practices, prevention of unfriendly environmental human activities, protection and preservation of wildlife, implementation of afforestation programmes, implementation and support for alternative livelihood programmes and the provision of poverty alleviation funds.

5.3 CONCLUSION

Human activities such as charcoal burning, food crop cultivation, hunting, trading among others are the causes of destruction of the environment. This is because these activities are carried out in an unsustainable manner. It was further observed that the activities such as bushfires, deforestation, and extraction of some animal and plant species as well as the destruction of the topography also degrade the land within the district. The poverty situation within the district cannot be left unmentioned. The cause of poverty within the district was

identified as: low income base, low productivity, negative cultural practices and ideals, low level of education among others. These have made citizens to depend on the environment for its resources by way of cultivating extensively on lands as well as the use of marginal lands. Others attendant activities here included: cutting of trees for fuel wood, charcoal production among other to earn a living.

5.3 RECOMMENDATIONS

The study therefore make the following recommendations to Government, Non-Governmental Organization, Civil Society Organizations, individuals and any other stakeholders interested in reducing poverty, environmental degradation or both, to consider the following for implementation.

5.3.1 Poverty Reduction Strategies in the West Gonja District

- The development of agriculture. This should look at key areas such as the provision of agricultural equipment, agricultural inputs such as fertilizers, improved seeds, weedicides, and pesticides among others. The Ministry of Food and Agriculture and the District Assembly should collaborate in this direction.
- There must be a deliberate policy to create farm settlements schemes with the provision of facilities such as electricity, water and motorable roads that can serve communities all year round. This will aid the cultivation of the vast expanse of arable land within the district. A multi-sectoral approach is needed. These include the Ministry of Works and Housing and Water Resources, Department of Feeder Roads, Ministry of Food and Agriculture and Ministry of Energy. The district assembly is required to play the role of a coordinating agency in this direction.
- The creation of markets that will absorb farm outputs with ease thus the farmers business should be to produce and not to produce and seek market opportunities by themselves. The creation of rural-agro-based-industries to add value to some of the raw materials produced by farmers. Gari processing, shea butter extraction, pito brewing, preparation and vending of local foods among others are recommended. The Ministry of Trade and Industry, Department of Rural Enterprise Development, NGOs and the District Assembly needs to collaborate to purse this agenda.

- The provision of credit facilities by independent banking or micro-finance institutions to all individuals, businesses or groups who wish to undertake some economic activities. However, interest rates on such credits should be low to curb loan / credit defaults. The District Assembly should liaise with financial institutions such as Snap Aba Trust, Bayport Financial Services, Pro-Credit Financial Services and Agricultural Development Bank to grant short and medium term loans.
- The District Assembly, Ghana Education Service, religious groups and all who are concerned with education should campaign seriously for post Junior High School Vocational and Technical Education. This would readily provide graduates with employable skills and also self employment.

5.4.2 Strategies for Reducing Environmental Degradation in the West Gonja District

- Agroforestry should be part of the agricultural strategy for the district. The Taungya System, a variant of agro-forestry should be adopted for implementation. A strong collaboration between environmental NGOs such as Arocha International, Mantenso Friends of the Earth, EPA, Ministry of Food and Agriculture as well as the District Assembly is required to achieve this.
- All educational institutions Primary School, Junior High School, Senior High School among others in the district should be encouraged to form clubs aimed at protecting the environment. The clubs should be supported with seeds and seedlings with other logistics to plant in some degraded areas. Department of Forestry, EPA, Ghana Education Service as well as the District Assembly should work hand in hand to realise this dream.
- The district assembly in collaboration with other environmental stakeholders should support and sponsor educational programmes on the environment. News bulletin, radio and television talk show should focused on the causes of degradation, dangers of degradation and the links that exist between poverty and environmental degradation among others.

- The district assembly in collaboration with concerned environmental agencies such the EPA, Department of Game and Wildlife, Department of Forestry, the Ghana Police Service as well as environmental Non-Governmental Organizations in the district should enforce environmental bye-laws. People who violate these laws, should be severely dealt with to serve as deterrent to potential culprits.
- There should be an award scheme to reward communities which practice sound environmental principles, such as organization of periodic communal labour and cleaning, avoidance of bush burning, minimisation of charcoal production, the avoidance of the use of chemicals in fishing among others.
- Forest and vegetation around some communities that still exhibit the natural characteristics should be given a further boost by including them in the Mole National Park protection and ecotourism areas.
- The district Assembly in collaboration with the business community in the West Gonja District should consider it as a matter of agency to seek permits for the establishment of LPG stations within the district. This is to reduce the deforestation going on in the district.
- Finally, but not the least the management of the environment and its resources should be made a "people led pillar". Thus the people should be seen leading the process whilst the other stakeholders play the role of facilitators.

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APPENDIX A

INTERVIEW SCHEDULE FOR KEY INFORMANTS

This interview schedule has been designed to collection information on poverty and Environmental Degradation in the West Gonja District of the Northern Region. The sole purpose of the study is to write a dissertation to the University for Development Studies in partial fulfilment for the award of a Master of Science Degree in Development Management. Your cooperation as a respondent is highly solicited in making this research a success.

SECTION 1: IDENTIFICATION

Form number							
Respondent (head = 1, Assistant head = 2, Others officials = 3							
	Rural [ ]				Urban [ ]		
Name of community	Code						
Larabanga	1 [ ]						
Busunu	2 [ ]						
Achubunyor	3 [ ]						
Murugu	4 [ ]						
Gbasumkpa No. 1	5 [ ]						
Mole	6 [ ]						
Damongo	7 [ ]						
District of study	West Gonja District						
Region	Northern Region						
Date of interview							
Enumerator's name							
Results of interview	1. Complete						
	2. Incomplete not available						
	3. Incomplete refuse						
	4. Others (specify)						
Edited by supervisor Name .....Date							

SECTION A: BACKGROUND OF RESPONDENTS

1. Type of key informant
   a. Assembly official [ ]
   b. MOFA [ ]
   c. EPA [ ]
   d. NGO official [ ]
   e. Department of Forestry [ ]
   f. Department of Game and Wildlife [ ]
   g. Others (specify) .....
2. Sex
   a. Male [ ]
   b. Female [ ]
3. Age .....
4. Position in your institution .....
5. Marital status
   a. Single [ ]
   b. Married [ ]
   c. Widow/widower [ ]
   d. Separated [ ]
   e. Others (specify) .....
6. Educational background
   a. Primary school [ ]
   b. Middle / JHS [ ]
   c. Senior High School [ ]
   d. Post Senior High [ ]
   e. Tertiary [ ]
   f. Others (specify) .....

SECTION B

RESPONDENTS PERCEPTION ABOUT POVERTY, ENVIRONMENTAL DEGRADATION AND INSTITUTIONS IN THE WEST GONJA DISTRICT

7. What are some of the environmental problems your outfit faces in the district
   a. Unhygienic sanitation [ ]
   b. Widespread desertification [ ]
   c. Water / air pollution [ ]
   d. Soil erosion [ ]
   e. Extinction of plants / animals species [ ]
8. What are the causes of these environmental problems
   a. Charcoal burning [ ]
   b. Lumbering [ ]
   c. Hunting / fishing [ ]

c. General ignorance [ ]
d. Other (specify).....

12. Mention the institutions that manage the environment and poverty related issues in the district?
    a. Environmental Protection Agency [ ]
    b. The District Assembly [ ]
    c. Environmental NGOs [ ]
    d. Other (specify).....
13. Are they active?
    a. Yes [ ]
    b. No [ ]
14. Give reasons for your answer

.....

.....

.....

15. Which of the causes of poverty and environmental degradation are culture and technology related

Factors / causes	Poverty	Environmental degradation
Culture	1. Use of outmoded tools [ ] 2. High dependency on relations [ ] 3. Inheritance system [ ]	1. Group hunting [ ] 2. Farming methods [ ] 3. Fire festivals [ ]
Technology	1. Bad use of machines [ ] 2. Inappropriate use of chemicals [ ] 3. Neglect of some good cultural values [ ]	1. Use of heavy chemicals in farming [ ] 2. Manufacture of heavy duty machines [ ] 3. Industrial activities [ ]

Others (specify)		

16. What can be done to improve management of environmental and poverty issues.
    a. Public education on the hazards of environmental degradation [ ]
    b. Implementation of poverty alleviation programmes [ ]
    c. Direct involvement in environmental preservation [ ]
    d. Prevention and control of environmentally bad human activities [ ]
    e. Others (specify).....

17. Any other concerns
    .....
    .....
    .....

APPENDIX B

INTERVIEW SCHEDULE FOR COMMUNITY MEMBERS

This schedule has been structured to collect information on poverty and environmental degradation in the West Gonja District of the Northern Region. The sole purpose of the study is to write a dissertation to the University for Development Studies in partial fulfilment for the award of a Master of Science Degree in Development Management. Your cooperation as a respondent is highly solicited in making this research a success.

SECTION 1: IDENTIFICATION

Form number							
Respondent (head = 1, Assistant head = 2, Others officials = 3							
	Rural [ ]			Urban [ ]			
Name of community	Code						
Larabanga Busunu Achubunyor Murugu Gbasumkpa No. 1 Mole	1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 [ ] 6 [ ]						
District of study	West Gonja District						
Region	Northern Region						
Date of interview							
Enumerator's name							
Results of interview	5. Complete						
	6. Incomplete not available						
	7. Incomplete refuse						
	8. Others (specify)						
Edited by supervisor Name .....Date							

SECTION A: BACKGROUND OF RESPONDENTS

1. Sex
   a. Male [ ]
   b. Female [ ]
2. Age .....
3. Occupation
   a. Agricultural activities [ ]
   b. Charcoal burning / lumbering [ ]
   c. Sand winning / gold mining [ ]

b. Middle / JHS [ ]
c. Senior High School [ ]
d. Post Senior High [ ]
e. Tertiary [ ]
f. Others (specify) .....

SECTION B

NATURE OF ENVIRONMENTAL DEGRADATION IN THE WEST GONJA DISTRICT: TYPES AND CAUSES

8. Do you agree with the view that environmental condition of West Gonja District is being degraded?
   a. Yes [ ]
   b. No [ ]
   c. Don't know [ ]
9. If yes, give reasons for your answer
   .....
   .....
   .....
10. What are some of the indicators of environmental degradation in West Gonja District? (you may tick more than one)
    a. Unhygienic sanitation [ ]
    b. Widespread desertification [ ]
    c. Water / air pollution [ ]
    d. Soil erosion [ ]
    e. Extinction of plants / animals species [ ]
    f. Others (specify) .....
11. Are there any good environmental and sanitation practices by the local inhabitants of West Gonja District?
    a. Yes [ ]
    b. No [ ]

12. If yes, give three examples to support your answer in question 11 above and if no, skip to question 13.
    a. .....
    b. .....
    c. .....

SECTION C

RELATIONSHIP BETWEEN HUMAN ACTIVITIES AND ENVIRONMENTAL DEGRADATION

13. Which among these activities have negative effects on the environment of the West Gonja District (you may tick more than one)
    a. Agricultural activities [ ]
    b. Charcoal burning / lumbering [ ]
    c. Sand winning / gold mining [ ]
    d. Trading [ ]
    e. Others (specify) .....
14. Which of these activities in question 13 above causes the following
    a. Bush burning .....
    b. Deforestation .....
    c. Air pollution .....
    d. Water pollution .....
    e. Indiscriminate refuse / waste disposal .....
    f. Destruction of landscape .....
    g. Exploitation of wildlife .....
15. To what extent are human activities causing or have caused environmental degradation in West Gonja District?
    a. Very high [ ]
    b. Moderate [ ]
    c. Low [ ]
    d. Very low [ ]

SECTION D

NATURE AND INDICATORS OF POVERTY IN WEST GONJA DISTRICT

16. Do you think that poverty is an existing condition in West Gonja District?
    a. Yes [ ]
    b. No [ ]
17. If yes, what is the extent of poverty in West Gonja District? And if no skip to number question 18
    a. Very high [ ]
    b. Moderate [ ]
    c. Low [ ]
    d. Very low [ ]

d. Others (specify).....

20. Health
    a. High rate of morbidity [ ]
    b. High rate of mortality [ ]
    c. Inadequate health services [ ]
    d. Others (specify).....

21. Economic
    a. High rate of unemployment [ ]
    b. Inadequate employment [ ]
    c. Inadequate access to investment capital [ ]
    d. Others (specify).....

22. Infrastructure
    a. Inadequate potable water supply [ ]
    b. Inadequate electricity supply [ ]
    c. Inadequate motorable roads [ ]

d. Others (specify).....

SECTION E

RELATIONSHIP BETWEEN POVERTY AND ENVIRONMENTAL DEGRADATION IN WEST GONJA DISTRICT

23. Do you think there is a link between poverty and environmental degradation?
    a. Yes [ ]
    b. No [ ]

24. Give reasons for your answer
    .....
    .....
    .....

25. What typical activities are linked to poverty and environmental degradation
    a. Felling of trees [ ]

b. Bush burning for game / hunting [ ]
c. Indiscriminate waste disposal [ ]
d. Poisoning of water for fish [ ]
e. Overgrazing [ ]
f. Others (specify) .....

26. Identify the cultural and technology related causes of poverty and environmental degradation in the West Gonja District

Factors	Poverty	Environmental degradation
Culture		
Technology		
Others (specify)		

27. What reasons account for the relationship between poverty and the activities mentioned in question 26 above?

a. Inability to afford other sources of domestic fuel [ ]
b. Difficulty in obtaining employment opportunities [ ]
c. Lack of social infrastructure like public toilets and waste disposal facilities [ ]
d. General ignorance [ ]
e. Inadequate funds [ ]
f. Inadequate interventionist activities [ ]
g. Others (specify) .....

e. Survey Department

29. Which of the following are the roles of West Gonja District Assembly
    a. Public education on the hazards of environmental degradation [ ]
    b. Direct involvement in environmental conservation, Preservation and protection [ ]
    c. Allocation of poverty alleviation fund for investment In environmentally friendly economic activities [ ]
    d. Others (specify).....

30. Which of the following are the identified roles of the Environmental Protection Agency in the district?
    a. Public education and environmental practices [ ]
    b. Formulation and implementation of bye-laws on the Environment [ ]
    c. Prevention and control of environmentally bad human activities [ ]
    d. Protection, conservation and perseveration of wildlife

31. Do the people of West Gonja District co-operate with the Assembly and the Environmental Protection Agency in their efforts to reduce environmental degradation?
    a. Yes [ ]
    b. Bo [ ]

32. What do the people themselves do to reduce environmental degradation?
    a. Avoidance of cultural practices that degrade the environment [ ]
    b. Obedience of bye-laws on environment and sanitation [ ]
    c. Formation of youth clubs on environmental protection [ ]
    d. Good sanitation practices [ ]

SECTION G

RECOMMENDATIONS ON THE REDUCTION OF POVERTY AND ENVIRONMENTAL DEGRADATION

33. Suggest five important measures to deal with poverty in the West Gonja District

a. .....
b. .....
c. .....
d. .....
e. .....

34. Suggest five important measures to deal with environmental degradation in the West Gonja District

a. .....
b. .....
c. .....
d. .....
e. .....

APPENDIX C

INTERVIEW GUIDE FOR FOCUS GROUP DISCUSSION

INTRODUCTION

Greet participants and as well exchange pleasantries. And then introduce the research theme / topic for discussion. It should be made clear to all participants that all answers offered are right; this means that there are no wrong answers as far as the discussions are concerned. Everyone has the free will to speak his or her mind. Make special emphasis on the fact that their thoughts, opinions, views as well as perceptions on the theme under this discussion will be considered paramount and pivotal.

Introduce the team members to the participants; let participants be aware of the rationale behind any electronic gadget such as tape recorder, video recorder and the like.

Participants should also be reminded of the fact that where necessary they can make recommendations and suggestions on the theme under discussion.

We shall commerce our discussion by talking about poverty and environmental degradation in the West Gonja District: issues to be looked at include: the concept of poverty, the indicators of poverty and perception of poverty; the concept of environment, environmental degradation, the types of environmental degradation, in what way do poverty influence environmental degradation and many other issues that fall within the scope of the research theme / topic

Community Problems

We are going to identify and discuss problems that you citizens of the West Gonja District face. Mention some of the key problems that face citizens within the district. Probe further if poverty and environmental related issues are not mentioned among the problems enumerated

1. Poverty in the West Gonja district
   - What do you understand by the concept poverty?
   - Does poverty exist in the West Gonja District at all? If yes
   - What are some of the indicators of poverty? Probe further to solicit the causes of poverty
   - What is your perception about poverty in the West Gonja District
2. Environmental degradation in West Gonja district
   - Do you think the environment in West Gonja District is being degraded? If yes
   - Identity some major factors that are responsible for the degradation of the environment
   - What are the types of environmental degradation? Probe to solicit the cause of each type identified above

- In what way does technology and the culture of the people in West Gonja District lead to degradation of the environment

3. Poverty environmental linkages
   - Do you think there is any linkage between poverty and environmental degradation? If yes
   - How does poverty influence environmental degradation
4. Institutions working to reduce poverty and environmental degradation in the West Gonja district
   - Are there any institutions in the district working to reduce poverty and or environmental degradation? If yes
   - Mention some of them
   - What role(s) do they play aimed at reducing poverty or environmental degradation? Probe to find out the effectiveness of those institutions
5. Responsibility of citizens to both poverty and environmental degradation problems in the West Gonja District
   - What extend do you think you are personally or collectively liable for the level of poverty and environmental degradation in the West Gonja District? If personally or collectively liable
   - What measures do you recommend in dealing with the situation as a therapy for the reduction of the levels of poverty and environmental degradation in the West Gonja District
   - Do you think the above measures recommended will take sound environmental practices into consideration

APPENDIX D

Poverty indices in Sub-Saharan Countries (1989-94)

Countries	Population In poverty (based on $ a day in PPP $) percent	Population in Poverty based On National Poverty Line (percent)	Human Development Index (HDI)	Population in poverty based On Human Poverty Index (HPI) in percent
Angola	-	-	0.335	-
Benin	-	33	0.368	-
Botswana	-	-	0.673	22.9
Burkina Faso	-	-	0.582	-
Burundi	-	-	-	49.0
Cape Verde	-	-	0.457	-
Cameroon	-	-	0.468	31.4
Chad	-	-	0.288	-
C. A. Republic	-	-	0.355	41.7
Congo	-	-	0.500	29.1
Cote D' Ivoire	18	-	0.368	-
Djibouti	-	-	0.319	-
Eritrea	-	-	0.269	-
Ethiopia	34	-	0.244	56.2
Gabon	-	-	0.562	-
Gambia	-	64	0.281	-
Ghana	-	31	0.468	32.6
Guinea	26	-	0.271	50.0
Guinea-Bissau	87	49	0.291	43.6
Kenya	50	37	0.463	-
Lesotho	50	26	0.457	22.5
Madagascar	72	59	0.350	49.5
Malawi	-	-	0.320	48.7
Mali	-	-	0.229	56.2
Mauritania	31	57	0.355	47.1
Mauritius	-	-	0.831	12.5
Mozambique	-	-	0.247	50.1

Namibia	-	-	0.570	45.1
Niger	61	-	0.206	66.0
Nigeria	29	21	0.398	41.6
Rwanda	46	53	0.187	37.9
Sao Tome Principe	-	-	0.534	-
Senegal	-	-	0.326	48.7
Sierra Leone	-	75	0.175	59.2
South Africa	24	-	0.716	-
Sudan	-	-	0.337	42.2
Swaziland	-	-	0.582	-
Tanzania	16	-	0.357	39.7
Togo	-	17	0.365	39.3
Uganda	50	55	-	41.3
Zaire	-	-	0.468	31.4
Zambia	85	86	0.369	-
Zimbabwe	41	26	0.513	17.3
Brazil	29	17	0.781	-
China	29	11	0.626	17.5
India	53	-	0.446	36.7

Source: UNDP, Human Development Report, 1997

APPENDIX E

The Indicators of Inequality of Income and Consumption, 1980s and 1990s

Countries	Percentage Share of Income Lowest 10 percent (A)	Percent share of Income of Highest 10 Percent (B)	Income of the Highest as a Multiple of the Lowest B/A	Gini-Coefficient
Cote D'Ivoire	2.8	28.5	10.2	0.37
Ethiopia	-	-	-	0.44
Ghana	3.4	27.3	8.9	0.34
Guinea	0.9	31.7	35.2	0.47
Guinea-Bissau	0.5	42.4	84.8	0.56
Kenya	1.2	47.7	39.8	0.58
Lesotho	0.9	43.4	48.2	0.56
Madagascar	2.3	34.9	15.2	0.43
Mauritania	0.7	30.4	43.4	0.42
Niger	3.0	29.3	9.8	0.36
Nigeria	1.3	31.3	24.0	0.45
Rwanda	4.2	24.2	5.8	0.29
Senegal	1.4	42.8	30.6	0.54
South Africa	1.4	47.5	33.9	0.58
Tanzania	2.9	30.2	10.4	0.38
Uganda	3.0	33.4	11.1	0.4
Zambia	1.5	31.3	20.8	0.46
Zimbabwe	1.8	46.9	26.1	0.57
Brazil	0.7	54.3	73.3	0.63
China	2.2	30.9	14.0	0.42
India	3.7	28.8	7.8	0.36

Source: World Bank Development Report, 1997

APPENDIX F

MATHEMATICAL FORMULAE FOR SAMPLE DISTRIBUTION

Mathematically, the proportion for each sample community was obtained by the formulae $\frac{x}{\sum fx}\ x\ k$

$\sum$fx = The total population of all sampled communities

x = Population of each community sampled

k = Sampled size picked (130)

(Turkson, 1995).