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DISTRIBUTION OF AGRICULTURAL LAND USE AND ITS IMPLICATION FOR DEVELOPMENT: THE CASE OF CENTRAL GONJA DISTRICT IN THE MID-VOLTA BASIN OF GHANA

BY

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DECLARATION

I hereby declare that this submission is my own work towards the MSc. Development Policy and Planning Programme and that to the best of my knowledge, it contains no material previously published by another person or material which has been accepted for the award of any other degree of this university except where due acknowledgement has been made in the text.

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ABSTRACT

The activities of Fulani pastoralist and bio fuel producers in Africa are increasingly raising concerns about their effects on the agricultural land use resources of the countries involved. In recent times, the Northern parts of the Mid-Volta Basin in Ghana, has been experiencing an influx of nomadic herdsmen and increasing demands for large tracts of land for bio fuel production. These key resource users' activities in the district are raising concerns with the local population for these resources. The phenomenon is not only creating tension in the district but also leading to intense struggle over the agricultural land resources that these communities have been endowed with.

The aim of the research was to examine the possible implication(s) for the distribution of agricultural land use and the development of the district. A case study approach was adopted in this study. Simple random and purposive sampling methods were used to select 102 respondents in two communities namely Yapei and Kusawgu and some staffs from the District Assembly.

Data was collected mainly from agricultural land users and the District Assembly using interviews, observations and focus group discussions. The research revealed that, arable lands were the most used resource as it was being used by 55.9 percent of the respondents with the majority being food crop farmers. The study also disclosed that, non-enforcement of agreements by the chiefs was the major source of challenge for agricultural land use in the district as land was being allocated to non-indigenes by the chiefs based on certain agreements which were not properly enforced.

The study also realized, from the respondents that climate change impacted greatly on the availability of resources. About 71 percent of respondents alluded to the fact that climate change impacted on resource availability.

The study therefore recommended among others that, policies should be formulated to address the primary drivers that are emerging as a result of the distribution of agricultural land use. These drivers include population growth, dietary preferences and protected areas. It was important to note that distribution of agricultural land in itself was not a driver affecting food and farming in the future but had the potential to influence other drivers. Hence policies need to be formulated to address the primary drivers of the distribution of agricultural land use.

Also the study called for national framework to integrate the various uses of land to help resolve inevitable conflicts. National plans could integrate a diversity of land uses and work with land owners and land users to provide a range of desired outcomes.

Finally the study recommended that technologies for increasing productivity of agricultural land was very necessary in improving the infertility of arable lands caused by the over grazing of cattle. Hence if farmers were supported with modern methods for growing their crops they would be able to grow more to feed themselves and earn extra income for the development of the district.

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CGEHU	Central Gonja Environmental Health Unit
CHIPS	Community-based Health Planning and Services
DADU	District Agricultural Development Unit
DED	District Education Development
ECAPAPA	Eastern and Central Africa Programme for Agriculture Policy Analysis
ECOWAS	Economic Community Of West African States
EHU	Environmental Health Unit
FCUBE	Free Compulsory Universal Basic Education
GES	Ghana Education Service
IEA	International Energy Agency
KVIP	Kumasi Ventilated Improved Pit
KNUST	Kwame Nkrumah University of Science and Technology
UNICEF	United Nations Children's Education Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs

CHAPTER ONE: INTRODUCTION

1.1 Background of Study

A number of phenomenal changes are occurring in Ghana. Not only is the political transformation radical, but also the economic scene is rife. These changes are gradually turning Ghana into an attractive destination for a host of activities.

Over the past years some of the districts located within the Mid-Volta Basin such as parts of the East Gonja, Central Gonja and West Gonja districts have experienced periods of drought and flood thereby creating uncertainties about the weather (UNOCHA, 2007). This phenomenon of climate variability has created anxiety among the local population and has led to increased pressure on the resources of the area.

The Mid Volta Basin, comprising the East Gonja, Central Gonja , Nkoranza North, Kintampo North, Kete Krachi and West Gonja districts are areas that share the Volta river and are noted for their rich fertile soils, abundant water supply and wooded savanna grass land making it an ideal ecological zone for intensive agricultural production. These features place the area in a competitive position for crop and livestock production with the sparse population providing ideal condition for large scale commercial agriculture. The damming of the then Volta river at Akosombo also led to the creation of a vast lake that is serving as a major inland fishing hub in the country.

On account of these factors, a system of land use has emerged within the area leading to the evolution of the production of various root crops and cereals as well as a formidable fishing vocation that has attracted scores of ethnic groups from as far as Battor in the Volta district and Axim and Saltpond in the Central district (Geker 1999; Tonah 2005). The area therefore has a very cosmopolitan population. Within this same area there have emerged some of the

very important market centers such as Yeji, Buipe, Mpaha and Nkoranza where a lot of the produce are sold and transported to various parts of the country.

The system of land holding in the area is mainly communal with the lands being held by traditional rulers as trustees for their people. Acquisition of land by non-natives has been essentially liberal, giving room for the local communities to accommodate non-natives most of who have lived in harmony and have "fused" into the native communities. The Chiefs are the custodians of the ancestral lands for their subjects. These leaders also have control over the ponds and other water bodies over which they exercise ownership rights as chiefs and from which they extract benefits to support their positions as chiefs.

In recent times however a new phenomenon is emerging with the influx of nomadic herdsmen and the growing demand for large tracts of land for bio fuel production. The situation has become more pronounced in the Northern parts of the Mid-Volta which has the lowest population density in the country, of about 8.3 persons per square kilometers (Ghana Statistical Service, 2012). The drying up of some river beds and the decreasing stocks of fish in some rivers in the country has also led to an influx of other fishing communities that is, the Battor and Fantis from Southern Ghana migrating into the area (Geker 1999; Tonah 2005). Over time this new phenomenon has found expression in the growing competition with the influx of alien nomadic herdsmen mainly from the Sahel districts of West Africa and the increasing demand for large tracts of land mainly for bio fuel production. The local population now, has to resist from this new phenomenon unleashed by the demands of these new entrants into the land resource users.

This new phenomenon appears to have taken the communities by surprise. They appear to be unable to adjust effectively to the new situation and indications are that the traditional leadership appears to have developed strong alliance with the herdsmen and the modern

commercial enterprises on account of various reasons; such as material benefits that can be readily extracted from the new entrants as well as the loss of labour support customarily given by natives who are now by themselves finding life difficult.

Meanwhile, ownership of large agricultural lands is not a common phenomenon to the natives of these areas as most of them own small farms, often cultivating on arable lands about three hectares. Traditional authorities who hold these lands in trust for their people appear not to be abreast with the current trends in land acquisition worldwide, a phenomenon that is sweeping across the world and has often been described as 'land grabbing' (Daniel and Mittal 2009).

The key players on this scene today are the local native population who believe that the land is theirs and that they have an inherent right to its use and that their chiefs are accountable to them over the management of such lands, the fishing groups who have developed a symbiotic relationship with the native population, the nomadic herdsmen who have built strong alliances with local chiefs and opinion leaders as a way of guaranteeing their rights to graze on the land and the bio fuel producers who require large tracts of land to realize their investment ambitions. This phenomenon is not only creating tensions in the communities but also leading to intense struggle over the natural land resource that these communities have been endowed with.

Similar situations have occurred in other areas and these are worth consideration for lessons. The Tana delta Basin of Kenya is one example of the type of intense competition between similar land users that have led to conflicts and contradictions even in development practice (Kagwanja, et al, 2003). Similarly within the Niger Belt in Mali as well as in the Senegambia district such phenomena have occurred.

These situations therefore call for critical study if the dynamics involved are to be better understood and taken on board in crafting out any district development policy, hence this research.

1.2 Problem Statement

The Central Gonja district lies within the tropical continental zone of Ghana. The area has a considerably low population density of about 8.3 persons per square kilometers, with an unevenly distributed annual rainfall pattern which is limited to six months in a year from May to October. The area like the rest of the Mid-Volta Basin is endowed with rich resources such as fertile lands and water resources giving it rich vegetation. The vegetation is Guinea savannah characterized by tall grasses such as elephant grass and interspersed with drought resistant trees such as shea, mango, and baobab trees. These have attracted various economic activities in the area.

The native people are predominantly peasant farmers and fishermen, who depend directly on the rich soils and the water of the river for their daily bread. They use the abundant fertile lands to cultivate food and tree crops such as maize, rice, groundnuts, yam, millet and mango mainly at a subsistence level. Some rear livestock such as cattle, sheep, goats and poultry production which includes local poultry, ducks and guinea fowls. Fishing is also another economic activity which is carried out mostly on the White and Black Volta rivers and their tributaries across the district.

In recent times new key players have emerged in the area to increase the demand for agricultural land use. These key players are the Fulani nomads, the fishing groups, and the bio fuel producers whose activities are raising demands for land use within the district.

The district over the past years has played host to a large number of nomadic herdsmen from the Sahel districts of West Africa namely Mali, Burkina Faso and Niger. These Fulani

nomads immigrate to Ghana as a result of the frustration (due to, among several factors dry climate conditions and pressure from their governments on regulations to limit cost of animal rearing) which they have been unable to bear in their own respective countries (Boutrais, 1986). During the 1960s and 1970s the drought that hit the Sahelian district and the consequent deterioration in land, soil and the harsh environmental conditions partly accounted for the exodus of Fulani pastoralist from the Sahel districts.

Newly arrived pastoralist found conditions in the Guinea Savanna more favorable for cattle herding. Pasture was more readily available, rainfall was reliable and consequently crop harvests were better. The low population density and initial hospitality of the host population also attracted these pastoralists to settle in the Savannah zone (Boutrais 1986, Franz 1975). They immigrate in large numbers into the district hoping for survival at all cost and exert increasing pressure on the limited resources such as land and water. The nomadic herdsmen are believed to have built strong alliances with local chiefs and opinion leaders as a way of guaranteeing their rights to graze on the land uncontrollably. This they do by way of using their economic powers, thus creating a wedge between the traditional leaders and their subjects.

At first these Fulani herdsmen were received by the local population who felt obliged to accept them as a sort of humanitarian gesture. This situation was therefore seen initially as a temporary measure and that as soon as the situation improved these herdsmen will return to their home. In recent years, it now appears that these nomads have come to stay resulting in high demand for land and other scarce resources which is gradually depleting the environment and consequently leading to a threat to their food security. Their determination to survive in these relatively harmonious communities will not make them succumb to the tension posed by their hosting communities to eliminate them. They strategize in all ways

possible to hold onto their 'livelihoods', a situation that angers the indigenous people the more and which stir up conflicts between these nomads and the local communities.

As a result of the global food crisis in 2007and 2008, many food importing and developed countries, developed strategic ways of protecting themselves from the crisis in diverse ways. In order to outwit the open world market and to secure sources of imports from African countries, they invest in large tracts of land in rural communities for not only food but also fuel, thus increasing demand for land in these areas (Cotula et al 2008). Most of the lands that have been acquired are veritable sources of livelihoods for the poor and vulnerable rural groups. This widespread phenomenon has put lands in the Central Gonja district under severe threat which will ultimately affect not only food production but also the incomes from crops on such lands. This has raised some concerns among the rural people over their land resources.

There have been several reports from this area about the acquisition of lands running into several thousands of hectares apparently to produce such crops as Jatropha, sugar cane and in some cases food crops. These demands for agricultural land use in the district are competing with the activities of the natives in the area (Nyari, 2008). This action by the modern commercial farm enterprises has therefore increased competition over land use between them, and the local communities which is eventually stirring up conflict in the area.

Most of the local people now have to vie for land with these strangers for their livelihood. These bio fuel producers' interest in exploiting the potential of the land and resources are more and more coming into direct struggle with the local population, to whom such resources belong. The current demand for large-scale land acquisitions is seen as a threat to the affected areas. They pose a threat to the land rights of the poor, particularly to customary and

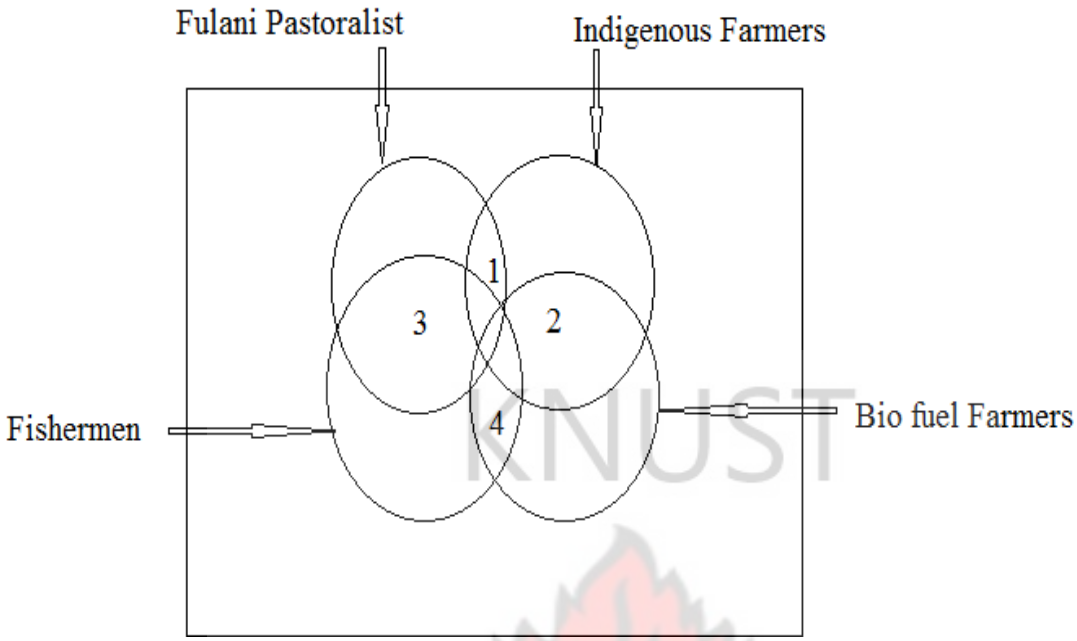
common-property rights-holders, to the food security of the host communities, and to the environment. There is therefore a growing anxiety among the people who see this situation as conscious efforts by their traditional leadership to undermine and destroy their livelihoods.

In addition, the influx of other fishing communities into the area as a result of decreasing stock of fish from their places of origin in the country is also being threatened by the activities of the Fulani nomads. These fishing communities who also migrated into the communities have developed a symbiotic relationship between them and the native population but unfortunately, as a result of the emergence of the activities of the Fulani herdsmen, their livelihood in the communities are also being threatened. This is manifested in the decreasing fish stock as the various ponds which served as a spawning ground are destroyed gradually by the cattle.

This is raising tension on the use of land in the community. It is also worth noting that the communities depend first on the rivers for fishing but in the dry seasons they also have the benefits of the fields which the chiefs make available to them. They therefore fish on the ponds during the dry season. Meanwhile, the Fulani herdsmen also depend on the ponds during the dry season for the survival of their cattle. The Fulani's cattle over utilize the ponds and in the process they destroy the breeding fish in the pond. Consequently these fishing groups are then denied the opportunity of fishing from the ponds, and this is a potential risk for conflicts in the very near future.

The local population thus sees the three potential sources of threats from these key players with their different demands for land use in the district as potential breeding grounds for tension and conflict.

Figure 1.1: Relationship Between Key Resource Users' Activities



Source: Field Survey, 2012.

Figure 1.1 shows the various key resource users and how their activities interrelate with one another. The section labeled 1 show the relationship between the Fulani pastoralist and the indigenous farmers, where they both need the same resource (arable land).

In addition, the section labeled 2show the relationship between the indigenous farmer and the bio fuel farmers; requiring the same resource (arable land).

Also, section 3 shows the relationship between the fishermen and the Fulani pastoralist. These groups of people's activities affect each other in terms of the water resources which they both depend on.

The section labeled 4 shows the relationship between the bio fuel farmers and the fishermen. Although the effects of the activities between the fishermen and bio fuel have not been established yet, it is a potential ground for tension in the near future.

In every respect, most heterogeneous communities evolving from the cohabitation of the local population, the nomadic families, the fishing groups and the bio fuel producers will find it very difficult to develop peacefully to be unable to put most of the resources available into judicious use.

This research therefore aims at examining the possible implications for the distribution of agricultural land use and the development of the district.

1.3 Research Questions

From the background, the phenomenon is worth studying in order to gain a good understanding of emerging issues and their implications for regional development. The gap in the knowledge of the possible effects of the distribution of agricultural land use emanating from the activities of the various key players in the district could be filled by finding answers to the following research questions;

1. What are the resource needs of each category of users in the district and how are the needs of each category of user affected by the needs of the other users?
2. What is the nature of the distribution arising from the varying demands of each user and how do these demands manifest themselves on the scene in the district?
3. How do the activities of the key resource players influence development issues in the district?
4. What are the measures put in place by the traditional authorities and District Assembly to address the distribution of agricultural land use?

1.4 Objectives of the Study

The main objective of the research was to rigorously examine the distribution of agricultural land use and its implication (s) for the development of the Central Gonja District. Other specific objectives included the following;

1. To determine the resource needs of each category of users in the district and to ascertain how the resource needs of each category is affected by the needs of the other users.
2. To ascertain the nature of the distribution arising from the varying demands of each user and how these distributions manifest themselves in the district.
3. To ascertain how the activities of the key resource players influence development issues such as poverty reduction in the district.
4. To examine the measures put in place by the traditional authorities and District Assembly to address the distribution of agricultural land use?

1.5 Justification of the Study

The Mid-Volta Basin specifically the Central Gonja District, is endowed with a lot of resources such as fertile soil, abundant water and many others. Unfortunately, the increasing pressure and the distribution of resources such as water, grass, fish and food crops reflected by the desperate quest for lands by the Fulani herdsmen, bio fuel producers and the fishermen in the district have led to the struggle over the resources in the community. These key resource users activities are gradually depleting the natural grass land. The rationale of this research was therefore to examine the distribution of agricultural land use and its possible implications for the development of the district. It is important to note that the findings would be useful to the District Assembly, Ministry of Food and Agriculture, Non Governmental

Organizations and the general public to ensure that the distribution of resources does not degenerate into conflict.

1.6 Scope of the Research

The study area was the Central Gonja district and covered the communities within the district. The time frame for the research was from December 2011 to June 2012.

In terms of content, the research focused on the activities of the native population, the Fulani herdsmen, the bio fuel farmers and the fishermen that triggered the competition for land use in the area.

Some relevant definitions of land use, as well as theories emanating from resource use that are related to the study area were reviewed. The target population of this research included native peasant farmers, Fulani nomads, land owners, opinion leaders and fishermen in the district.

1.7 Organization of the Study

The research report is divided into five main chapters to keep together relevant information and for that matter easy reading. The first chapter gave an insight into the research. It dealt with the research background, objectives, research questions, justification, methodology, scope and limitation of the study. The second chapter touched on the literature review about the concept of conflict, land use conflict, conflict theories such as common pool resources and tragedy of the common and other literature that underpinned the research. The third chapter discussed the research methodology, the methods of data collection and sampling. The profile of the study area was also briefly discussed in the third chapter. Chapter four contained the presentations, analysis and discussion of the data collected. The analyses were

carried out using graphs, charts and other software such as Statistical Package for Social Scientist (SPSS) and EXCEL. Chapter five, which was the final chapter comprised of the summary of key findings, recommendations and conclusions.

1.8 Limitations of Study

During the course of carrying out this research, a number of challenges were encountered but conscious efforts were made to control their adverse effects on the results of the research. First of all, financial constraint was a major challenge encountered. The entire study was funded through the researchers own resources. Secretarial services, procurement of research materials and transportation to research communities were all provided by the researcher. This challenge was managed by an effective mobilization of personal resources with some financial support from family members.

Secondly, language barrier with respect to the Fulani herdsmen was another limitation encountered by the researcher. Most of the Fulani herdsmen in the district could neither speak the local dialect nor English language; hence some people from the communities who understood the dialect of the Fulani herdsmen were contracted to help translate the conversation between the herdsmen and the researcher.

Finally limitation that was encountered was the location of the itinerary herdsmen. These herdsmen had no permanent location and for that matter efforts to reach them was unfruitful. However, efforts were made to contact those herdsmen within the communities.

CHAPTER TWO: THE DYNAMICS OF CONFLICT OVER RESOURCES

2.1 Introduction

The previous chapter gave an insight into the phenomenon that emerged among certain key resource users which has given rise to the distribution of agricultural land use in the Central Gonja District. This chapter discusses the literature related to the research under investigation. It is aimed at reviewing the critical aspects of the research including substantive findings as well as theoretical contributions to the knowledge about dynamics of agricultural land use and conflict. Conflict is emphasized here because, when distribution of agricultural land use is not effectively carried out can easily degenerate into conflict. The chapter reviews secondary materials of earlier works in relation to the distribution of agricultural land use and how it can lead to levels of conflict.

2.2 Conflict

Conflict is said to be a difficult term to define. It can only be better understood when it is placed within a particular context. This has given rise to different views about what a conflict situation is or is not.

According to Boulding (1963:5) conflict "is a situation of competition in which the parties are aware of the incompatibility of potential future positions and in which each party wishes to occupy a position that is incompatible with the wishes of the other." Boulding's definition explains the fact that, conflict may result from intentional interaction among two or more parties in a competitive setting. These parties are conscious of their actions because they aim at achieving their interest irrespective of the other party's interest. It refers to an unconcealed behaviour by both parties. Deutsch (1973:10), is of the view that competition implies a situation where independent parties take opposing position such that the probability of goal attainment for one decreases as the probability for the other increases.

The Heidelberg Institute for International Conflict Research (HIIK, 2005: 2) explains conflict as " the clashing of interests (positional differences) on national values of some duration and magnitude between at least two parties (organized groups, states, groups of states, organizations) that are determined to pursue their interests and win their cases.'' This definition establishes the fact that, conflict takes place between organized groups on national values within a period of time depending on the intensity of their differences.

Sandole (1998) also defines conflict as "… a situation in which at least two parties, or their representatives, attempt to pursue their perceptions of mutually incompatible goals by physically damaging or destroying the property and high-value symbols of one another (e.g., religious shrines, national monuments); and/or psychologically or physically injuring, destroying, or otherwise forcibly eliminating one another." Sandole talks about violent conflict when parties go beyond seeking to attain their goals peacefully, and try to dominate, damage or destroy the opposing parties' ability to pursue their own interests. For Davies (1973: 251) the existence of frustration of substantive (physical, social-affectional, self-esteem, and self-actualization) or implemental needs (security, knowledge, and power) is the essential condition for one non-violent conflict to escalate to violence: "Violence as a response is produced when certain innate needs or demands are deeply frustrated." In political conflict analysis the use of force, physical damages and human casualties are the characteristics of a violent conflict.

An assessment of the above definitions suggest that conflict takes place between two or more parties in respect of the struggle for scarce resources or disagreement over resources or uneven display of power by the parties involved. Conflict is seen as a social phenomenon that can result in instantaneous or gradual changes that create diverging interest and needs. This implies that conflicts are inevitable in man's environment and hence they occur in situations where actors have incompatible goals.

For the purpose of this research conflict can be defined as a situation which occurs when competing groups' objectives and needs clash, leading to the buildup of frustration and aggression. In this case, the activities of the key resource users (the Fulani nomads, fishermen, and the bio fuel producers) who are in competition over land resources within the communities in the district for some time now have built up frustration which is now being exhibited. As these frustrations buildup and lead to clashes between various resource users, their frequency tend to upset the equilibrium of the community and thus become a social problem.

However it is important to recognize that not all conflict is bad. The end result could be positive or negative depending upon how those involved choose to approach it. Conflict is always difficult to manage but if properly managed it can lead to growth and change which is good. It is important to note that nobody likes pain but pain wakes one up and tells one when to react just like conflict. Some level of conflict is actually desirable because it strengthens people's commitment to group goals. This in turn promotes challenge and increases group efforts. This type of conflict is necessary. Its end result becomes positive when it is peacefully engaged. When conflict is approached peacefully it improves the quality of decisions among groups. It stimulates involvement in the discussions and fosters new ideas, alternatives and solutions.

Besides these advantages conflicts can have some negative effects in district development projects by way of creating destructive and uncontrollable environment, ineffective working groups which will in turn cause productivity to suffer and reduce the exchange of ideas and information development which will diminish trust and support. Therefore it is necessary to ensure that appropriate conflict management techniques are adopted to resolve conflicts in the society.

2.2.1 Factors Driving Conflict

Conflicts occur due to economic, environmental, legal, political and social factors both the micro (case-specific) or macro (national) level (ECAPAPA, 2007). For the purpose of this study emphasis was placed on environmental factors. These factors influence how conflicts emerge and are manifested but above all how they are managed. These factors influence the actors and resources and in turn the stakes and therefore help determine the appropriate approach or tools for conflict management.

The economic causes of resource conflicts include the economic status of the parties in conflict, the value associated with access to or use of the resource, and the monetary value associated with its products and services (Castro and Nielsen, 2003).

With regards to environmental conditions, it requires information on resource availability, quality, ownership, potential use and alternatives for agricultural and institutional management. The environmental context also includes information on human and institutional capacity to manage, monitor and implement plans on the use of these resources. Information on resource quality, quantity and possible uses helps to identify the potential users and the dynamics between the parties in conflict (Castro and Nielsen 2003).

Also with regards to social factors, communities are differentiated into groups: women, men, youth, elderly, marginalized, landless, landowners, etc. This social setting recognizes the relationship between different individuals, groups, communities or institutions and the values they place on resource management and use. Social setting helps understand the actors and their perspectives. There are several interesting social dynamics in resource management. For example, the marginalized groups are given scant if any recognition and their interests and constraints are seldom considered when decisions are made at the community level (Kameri-Mbote, 2006).

The political context includes the political structure of government institutions and decision-making process, information on political boundaries and the dynamics between and within committees, departments and ministries and how activities within affect resource conflict. At the local level, political structures include both formal and informal institutions. Decisions made within the political context influence rules and regulations through which resource management processes are institutionalized. Therefore, the political stake usually relates to decision-making power (Homer Dixon, 1999).

The legal context includes traditional, national and international policies, laws, rules and conventions. Customary practices tend to evolve on a need basis and there is no guarantee that they are equitable. While formal legal systems standardize processes and in principle guarantee fair and equitable treatment, in practice they could lead to injustice because they do not recognize customary practices. Non- recognition of customary practices in the formal legal system thus leads to contradictions between formal recognized lands and customary laws.

2.3 Conflict Theories

There is a large volume of literature written about the nature of conflict. For the purpose of this study the legitimate or otherwise causes of conflict will be looked at from the point of view of some themes and school of thought on conflict theories.

2.3.1 The Theory of Common Pool Resources

Common Pool Resources have been defined as resources available to anyone, making them difficult to protect and easy to deplete (McKean, 2000). Majority of common pool resources have a defined set of users and a management system in place. In most cases these resources are only open to those having historical rights through kinship or community membership and they are generally protective of these resources (Dasgupta, 1996).

Common pool resources are natural or man-made resources used simultaneously or sequentially by members of a community or a group of communities. These include uncultivable fields, fallow fields, crop residues, forests, inland waterways, seasonal ponds and low-lying wetlands which provide a range of social and economic benefits for a wide variety of users. However, poor definition and enforcement of the institutional arrangements governing the use of these resources sometimes lead to social conflicts and resource degradation.

According to Williams et al, (1995), Common Pool Resources share two important characteristics. The first characteristics is the difficulty of exclusion arising from several factors including the cost of parceling or fencing a resource and the cost of designing and enforcing property rights to control access to the resource. For example the resource units such as bundles of firewood or fodder that one user extracts from a common pool resource are not available to others. Each user is thus capable of subtracting from the benefits that others derive from the common pool resource. The defining feature of a Common Pool Resource is that anyone within a group of people may use and abandon it without any individual ever being able to appropriate or gain exclusive control over it. In other words, they are resources over which no social unit (individual, family, and company) has exclusive rights of ownership or of use.

As a result of these characteristics, common pool resources are potentially subjected to over-exploitation, depletion or degradation. A broad challenge in the management of common pool resources is how to co-ordinate use by individuals as population grows in order to prevent over-exploitation. Climatic and economic changes are also threats to the existence and long-term sustainability of Common Pool Resources in the district. The increasing drought and population pressure has resulted in substantial shifts in land use and put stress on Common Pool Resources as well.

One very important function of common pool resources is the fact that they provide food, fuel, fodder, herbs, construction materials and income to rural and urban dwellers. In the semi arid West African district which is a dry zone for example, with low annual rainfall, the products obtained from Common Pool Resources such as fodder and herbs have been critical elements in the livelihood and survival of many rural communities, particularly in times of drought (Bernus, 1988).

The collection of leaves, fruits and twigs from forests has long been a method of assuring household subsistence during droughts and in resolving imbalances in the diets of rural households. The sale of products - stimulant leaves, fruits, fodder, and firewood - collected from CPRs provide an important contribution to household income.

In the Northern district of Ghana, Common Pool Resources such as water and grass land are the main sources of fodder and water for livestock. The spatial dispersion of common pool grazing resources and the temporal fluctuations in their availability make them an important resource for livestock production in the district. During the rainy season, pastoralists move animals away from the cultivated zones to take advantage of the flush of high quality forage produced by annual grasses on rangelands and to prevent damage to food crops. At this time, animals make use of water available from surface ponds. During the dry season, animals are moved back to the cultivated zone to graze crop residues on harvested fields. As the dry season progresses further, the vegetation on fallow fields is used as temporary pasture. This seasonal and alternating use of Common Pool Resources by pastoralists is not an isolated example. The White Volta Lake found at the district is traditionally used by fishermen in and around the community during the flood season and by pastoralists and farmers in the dry season.

The seasonal use of Common Pool Resources also creates opportunities for mutually beneficial exchange relationships between various user groups. The exchanges of grain, crop residue and water owned by farmers for the manure produced by pastoralists' livestock have linked crop and livestock production for many years in the Sahel and served to increase land productivity (Williams et al, 1995).

With respect to access, control and use rights, Common Pool Resources are held under a variety of property-rights regimes, including state property, communal property, private property and open-access (non-property) regimes. Few Common Pool Resources can be easily classified under a property-rights regime. Examples include forests, lakes and river banks which are often considered as state property and are administered through specialized government agencies. For many other Common Pool Resources a neat classification is not possible. Furthermore, a given resource may produce flows that are subject to two different property regimes seasonally or over the long term. For instance, in areas of low population pressure, fields that are cultivated by individual households often revert to communal use after grain harvest or when they are left in fallow so that crop residues and natural vegetation on these fields can be freely grazed by the entire village herders or collected by those households who need them. This serves to mitigate inequality in land ownership and access to feeds in many villages. Over-exploitation occurs when the management system breaks down allowing free riders to ignore the rights of other individuals.

In conclusion Common Pool Resources provide diminished benefits to everyone if each individual pursues his or her own self-interest. The value of a common-pool resource can be reduced through overuse because the supply of the resource is not unlimited, and using more than can be replenished can result in scarcity. Overuse of a common pool resource can lead to the tragedy of the commons problem.

2.3.2 The Concept of Tragedy of the Common

The concept of "the tragedy of the commons" is important for understanding environmental degradation. The term 'the tragedy of the commons' was first introduced by Garrett Hardin (1968) in an important article in Science. Hardin envisioned a pasture 'open to all' in which each herder received large benefits from selling his or her own animals while facing only small costs of overgrazing.

In this context if a person puts more cattle into the pasture opened to all, the amount of pasture which the cattle consume will be less than what was consumed at the initial stage and if before there was no more than a sufficiency of pasture, he reaps no benefits from the additional cattle; in other words, what is gained in one way is being lost in another. When more herders put more cattle on the common, the food which they consume will be less than what is shared between all the cattle, as well as that of others. When this continues for a while, then diminishing returns sets in. In an enclosed pasture, there is a point of saturation, beyond which no prudent man will add to his stock.

People in rural communities in Ghana depend directly upon resources for a large part of their livelihood. These resources are in open access to all, the dwellers of the community have to decide whether or not they should 'enter' and start exploiting these resources. Their choice is based on the benefit they derive from the resource. In spite of their choices and rate of exploration, little effort is put in place to check the rate at which these people use the resource which eventually leads to over exploitation and environmental degradation. This concept can be manifested in the rate of exploitation by the three key resource users in the district on the limited resources. The relevance of this concept to the research was to bring to light how our limited resources are being exploited and the devastating nature of our environment and how measures can be put in place to regulate the situation.

The tragedy of the commons develops in the following way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long desired goal of social stability becomes a desire. At this point, the inherent logic of the commons remorselessly generates tragedy.

As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks: 'What is the utility to me of adding one more animal to my herd?'. This utility has one negative and one positive component. The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly an additional benefit. The negative component is a function of the additional overgrazing created by one more animal. Since however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision-making herdsman is only a fraction of one. Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd and so on. This is the conclusion reached by each and every rational herdsman sharing a common resource. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a common brings ruin to all (Hardin, 1968: 20).

2.4 Land Use Conflict

A theoretical perspective on land use conflict offered valuable insights into this research. Conflict over land uses occurs between or within stakeholder groups. Therefore, they can be characterized as social conflicts, that is, they are common disputes over interests, hierarchies, or norms. The term conflict used in this research refers to social relationships and processes in which two or more individuals or groups can be distinguished by their different interests in problem-solving activities. Land Use Conflict typically occurs at the intersection of different land uses, for example agricultural land/rural development, remnant native forest/Grazing Livestock etc.

This conflict has some inherent characteristics that make them difficult to deal with. First of all, land-use decisions involve complex natural systems and processes, long time scales, and uncertainty. Land-use decisions are often felt on the districtal and local levels, which encompass heterogeneous political, cultural, and societal systems. These are often influenced by superdistrictal forces like globalization and broader societal trends, for example, demographic changes, and may substantially differ in their local institutional contexts. Owing to the multiple functions of rural areas and the diverse actors involved, such as farmers, nature conservationists, tourists, and inhabitants, collisions between human demands and the capacity of rural areas to satisfy them are becoming daily events (Brouwer &Van der Heide, 2009). Since the different uses are highly integrated with one another, actors often cannot reduce their activities relating to a single use without consequences for the others. The relevance of this concept to the research was to help carve out clearly the major problem facing the district by the invasion of these new key resource users (the Fulani herdsmen, the bio fuel producers and the fishermen).

2.5 Conflict over Resources

According to the Eastern and Central Africa Programme for Agricultural Policy Analysis, (ECAPAPA, 2007), there are four situations that lead to conflicts over resources. These factors overlap and are interrelated but can be generalized as follows.

The first cause of resources conflict is the fact that resources are not found in isolation; they are set in an environment or interconnected space where actions by an individual or group in one place may generate effects elsewhere. For instance, deforestation of a districtal forest is likely to affect the health of an entire watershed system below it, therefore disrupting the livelihood of those relying on the watershed for irrigation and other uses. "Protecting" that forest under a conservation programme can similarly influence the way the river system functions for upstream and downstream communities.

Also another cause of resource conflict stated by ECAPAPA (2007), is the scarce nature of resources. Resources are increasingly becoming scarce due to rapid changes in the environment, increasing demand and their unequal distribution. Whether it is increased human population or land tenure laws that lead to over-exploitation, ecosystems are being abused, their resources depleted and many are losing their natural ability to renew over time and provide for other species.

In addition, local, districtal, national, transnational and increasingly, global actors (governments, non-governmental and inter-governmental organizations, private sector) all have interests in and influence ecosystems and resources. These resources are found in a shared social space where complex and unequal relations are established by a wide range of these social actors. These groups are rarely homogenous in their interests, needs or powers which easily result in conflict.

Homer-Dixon and Blitt (1998), in ECAPAPA (2007) claimed that, people use resources in different ways. Symbolic association to the physical environment is important to subsistent cultures, and for that matter when the surroundings deteriorate the very stability of these societies is threatened, which can result in conflict.

2.6 History of Fulani

The history of the Fulani emerged as far back as the 8th and 11th century AD, which begun with the Berber people of North Africa. As the Berbers migrated down from North Africa and mixed with the people in the Senegal district of West Africa the Fulani people came into existence. Over a thousand year period from AD 900- 1900, they spread out over most of West Africa and even into some areas of Central Africa. As they migrated eastward they came into contact with different African tribes. Along the way many Fulani completely or partially abandoned their traditional nomadic life in favor of a sedentary existence in towns or on farms among the conquered peoples. The nomadic Fulani continued eastward in search of the best grazing land for cattle. Their lives revolved around and were dedicated to their herds. The more cattle a man owned, the more respect he was given.

The Fulani are usually very easy to recognize. They are taller, slimmer and lighter skinned than many other Africans. The Fulani men are often seen wearing a solid color of shirt and pants, long cloth wrapped around their faces, carrying their walking sticks across their shoulders with their arms resting on top of the sticks. Often the men have markings on their faces and/or foreheads. They receive these markings from birth. The females likewise are graceful. They are usually seen carrying their milk products stacked in tiers on their heads in calabash bowls. Their hair is long and mostly braided into five long braids that either hang from their heads or sometimes are looped on the sides. It is usually common for a girl to have coins attached to their braids. Some of these coins are very old and have been passed down in

the family. The women enjoy wearing many bracelets on their wrists. Like the men the women have markings on their faces around their eyes and mouths that they were given as children.

In terms of their economic background, the Fulani have long been in the cattle business. For centuries to be a Fulani meant to be a cattle owner. Due to the increasing hardships; famine, drought and poverty many Fulani's no longer own cattle. For a majority, they still own at least a small number of animals such as cows, sheep or goats. Often times those that do not own any animals will hire themselves out to herd for others. Today some estimate as many as 18 million Fulani people stretching across the countries of West Africa. They remain to be the largest groups of nomadic people in the world.

2.7 Bio fuel Production in Ghana

According to the International Energy Agency (IEA, 2004), bio fuels are transportation fuels derived from biological (agricultural) sources such as cereals, grains, sugar crops and other starches that can fairly easily be fermented to produce ethanol. This is used either as a motor fuel in pure form or as a blending component in gasoline as ethanol or after being converted to ethy-tertiary-butyl-ether (ETBE).

In 2005, BioDiesel Ltd. and BioFuel Ltd., were originally established with a wholly owned subsidiary created in Ghana called BioFuel Africa Ltd. Thereafter, BioDiesel Norge AS was established in 2006 to handle planned downstream biodiesel sales in Norway. Further, BioFuel AS was established when Norfuel AS (today Perennial Bioenergy AS) entered as shareholder in 2007. The funding provided by Norfuel enabled the company to secure land, develop a test farm and carry out early-stage project development for large-scale farming.

In March 13, 2009 BioFuel AS filed for bankruptcy. Two of the original founders of the Biofuel group: Mr. Arne Helvig and Mr. Steinar Kolnes purchased all the debt from the

liquidator and took over the Ghana operations. The company now operates exclusively as Solar Harvest AS, Norwegian-based parent company to its operating arm in Ghana called BioFuel Africa Ltd.

From its inception, the company began to acquire large tracts of land in Ghana suitable for the cultivation and production of jatropha crude oil. In addition to securing land, the company focused its efforts on research and development into cultivation of the jatropha plant, mechanization of the harvesting process and training of agricultural workers. At its test farm near Ghana's largest port in Tema, BioFuel Africa explores various plant varieties, cultivation and harvesting techniques, fertilizers, and pest and disease prevention methods along with training practices.

BioFuel Africa was the first company in Ghana to receive approval from the country's Environmental Protection Agency (EPA) for a jatropha oil plantation near Tamale. In order to achieve this approval, the company outlined extensive social responsibility and environmental protection initiatives that are still underway.

Shortly after receiving EPA approval, large-scale farming in Tamale began, with a focus on ensuring that existing plantation areas were efficiently and effectively managed, positive relationships with communities, tribes and governmental organizations were cultivated, and sustainable business practices were put in place to secure rapid expansion during 2009 and beyond.

Several foreign companies have invested in Jatropha projects and are currently setting up plantations. Some are already harvesting. This is because in Ghana there is a very favorable climatic condition for Jatropha development. The plant grows throughout the country without being cultivated. Nevertheless, Jatropha oil is not being sold yet. At the moment, Jatropha

seeds are being collected from non cultivated Jatropha trees. Experts estimate that large scale Jatropha plantations will soon be vitally important to Ghana.

CHAPTER THREE: RESEARCH METHODOLOGY AND THE CURRENT PROFILE OF THE STUDY DISTRICT

3.1 Introduction

This chapter first discusses the research methodology adopted in the research. This includes the research approach, sources of data, the methods of data collection, and sampling procedure of the research. The chapter also discussed the organizational profile of Central Gonja District which is the study district.

3.2 Research Methodology

The selection of a research method is very important for a valid and reliable conclusion about a phenomenon to be carried out. This is because a good research method affects what can be said about the causes and factors influencing a phenomenon under investigation.

A case study approach was adopted for the research in the Central Gonja District, which focused on the activities of the Fulani herdsmen, bio fuel farmers, the fishermen, the local indigenous farmers and the institutional capacity of the District Assembly to manage the distribute of agricultural land use among these groups of people.

According to Yin (2003) a case study is defined as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context" and to Eisenhardt, (1989) "the underlying notion of a case study is that it focuses upon understanding in breadth and depth the specific situation or phenomenon to be studied within its context". This therefore allowed the researcher to understand the context of the phenomenon under study from the people concerned for the purpose of validating a proposition.

For the above reasons, a case study approach was adopted which provided a meaningful and accurate picture of events with regards to the distribution of agricultural land use in the

Central Gonja District. This method helped to explain people's perception and behavior on the basis of the data collected at a point in time.

3.2.1 Research Design

Sparrow (1988) defined research design as a plan for conducting research which usually includes specification of elements to be examined and the procedure to be used. A good research design is very important to help answer the research questions that guide the study.

The afore-mentioned objectives of the research in chapter one were achieved by using a cross sectional study also known as a survey research design. This was the best research design for the study because it helped describe the pattern of relationship before an attempt was made to establish causal relationship. Survey research design also entailed collecting data and analyzing them.

3.3 Data Requirement and their Sources

The main sources of data for the research were collected from secondary and primary sources.

3.3.1 Secondary Data

Secondary data from books, articles and the District Assembly profile were collected and analysed. Publications related to the emergence of the Fulani nomads, 'land grabbers' and the fishermen in the communities were also collected and carefully analysed. In addition, relevant data on the population of the District, the destruction of a number of farmlands and other resources by Fulani herders and bio fuel farmer's activities in the District were collected from relevant bodies such as the District Planning and Coordinating Unit specifically the District Agricultural Development Unit (DADU) of Ministry of Food and Agriculture and analysed.

3.3.2 Primary Data

Primary data was collected from the farmers and fishermen associations in the district, the Fulani herdsmen, the chiefs and the District Assembly specifically from DADU. Data collected was analysed and carefully interpreted.

3.4 Unit of Enquiry

Data was collected from two communities in the District based on the fact that these two communities had a cosmopolitan population comprising of Fulani nomads, fishermen, bio fuel farmers and the indigenous farmers. The unit of enquiry were the farmers association, fishermen's associations, Fulani herdsmen, bio fuel farmers, the District Planning and Coordinating Unit (DPCU) and the DADU.

3.5 Methods of Data Collection and Instruments

To maintain the integrity of any research, accurate data collection methods and appropriate data collection instruments are important in reducing the likelihood of errors occurring. The methods of collecting data for this research involved the application of both open ended and close ended questions developed by the researcher. An interview guide was prepared and carried out by direct administration of the questions to a sample of the indigenous farmers, Fulani herdsmen, fishermen, bio fuel farmers in the communities and some staffs from the District Assembly.

This instrument was very suitable to adopt because in the course of the interview, the interviewer had the opportunity to adjust the sequence of the questions asked and also added questions based on the context of the participants' responses.

According to Fontana and Frey (2005), interviews are widely used tools to access people's experiences and their inner perceptions, attitudes and feelings of reality. A structured interview is an interview that has a set of predefined questions where questions would be

asked in the same order for all respondents. This standardization is intended to minimize the effects of the instrument and the interviewer on the research results.

Minichiello et al. (1990) defined unstructured interviews as interviews in which neither the question nor the answer categories are predetermined. Instead, they rely on social interaction between the researcher and the informant. This method was supplemented by other methods such as observation, focus group discussions and personal interviews.

According to Marshall and Rossman (1989) "observation is the systematic description of events, behaviours, and artifacts in the social setting chosen for study." Observation usually is a way of gathering data by watching behaviour, events, or noting physical characteristics in their natural setting. This method allowed the researcher to watch peoples' behaviours and interactions directly and also observed the rate of devastation caused by the activities of these key resource users on the natural environment.

This method of data collection also enhanced triangulation, which involves the combination of two or more methods such as questionnaire and observation. The reason for choosing this method was that the flaws of one method were often the strengths of another method and so by combining methods, the strengths and weaknesses of the various methods were complemented and supplemented. For instance, the use of observation helped to capture useful situations such as the natural settings of respondents, thereby adding merit of crosschecking on the facts that were compiled through the other methods.

3.6 Sampling Techniques

Due to time limitation and financial constrains the research adopted the multi-stage approach which entails a combination of relevant sampling methods; purposive and simple random.

Purposive sampling was used to select the Central Gonja district from the 20 districts in the Northern district. Central Gonja district was chosen because the researcher comes from the

district and has an insight about the ongoing activities in the district. Also, it is part of the areas in which the Fulani pastoralist and the bio fuel producers find very favourable to cattle rearing and land acquisition.

Furthermore based on the activities of the farmers, Fulani nomads, bio fuel producers and the fishermen in the district, purposive sampling was used to select two communities in the district where these groups and their activities were predominant. Two communities were selected out of the 15 major settlements in the district as a result of financial constraint and time.

In addition, purposive sampling was used to select the traditional rulers of the two communities and the district director and district planner in charge of DADU and DPCU respectively. The chief of Yapei and Kusawgu communities, were purposively chosen and interviewed. Again, the director of the DADU and the district planner were also purposively selected and interviewed. These people were purposively selected due to the role they play in the distribution of resources in the district.

3.6.1 Sample Frame and Sample Size Determination

The study obtained a total sample frame of 596 agricultural land users from the two selected communities in the district. These agricultural land users were made up of food crop farmers, bio fuel farmers, fishermen and Fulani nomads. The sample frame was obtained through a compilation of the names of the total number of food crop farmers, bio fuel farmers, fishermen and Fulani nomads from the two selected communities in the district.

There are usually two methods of determining the sample size; the use of the mathematical model designed by Miller and Brewer (2003) or the intuitive method which is based on experience and knowledge of the researcher. In this case the mathematical method was used to determine the sample size. The formula which is given by; $n = \frac{N}{1+N(\propto)^2}$. Where ***N*** is the

sample frame of the study area and **α** is the margin of error of 0.09 with confidence level of 91% and ***n*** is the sample size.

By substituting 596 agricultural land users and 0.09 margin of error into the formula: $\boldsymbol{n = \frac{596}{1+596(0.09)^2}}$, $\boldsymbol{n = \frac{596}{5.8276}}$, $\boldsymbol{n = 102.2719473}$ **hence:** $\boldsymbol{n = 102}$. Therefore the overall sample size for the survey of land users was 102 but since the target groups were into various sections, proportional sampling based on the sample population was used to further disaggregate the actual proportion of people surveyed within each section.

Table 3.1 shows the proportional distribution of the sample size that was surveyed from the two communities. Since the total population of each target group varied from the other, in order to ensure that target groups got a fair distribution of the sample size, the overall sample size of 102 was proportionately distributed among the selected target groups as indicated in table 3.1.

Farmers associations in the two communities formed the largest group to be sampled with a sample size of 39 and 24 percent in Yapei and Kusawgu respectively. Yapei one of the study communities in the district had eight farmers associations in the community with a total population of 234 farmers. Out of the total population of 234 farmers in the association, 40 farmers were interviewed representing 39 percent of the total sample size of 102. These 40 farmers were randomly selected by dividing the total number of farmers in the community (234) by the total population of agricultural land users (596), multiplied by the overall sample size of 102.

Also in Yapei there were five fishermen's associations in the community with a total population of 118 fishermen. Out of the 118 fishermen, 20 fishermen were interviewed representing 20 percent of the total sample size of 102.

In addition there were eight bio fuel farmers in the community. Out of the eight bio fuel farmers, two were interviewed. These two bio fuel farmers represented two percent of the total sample size of 102.

There were 27 recognized Fulani families in the community that were herdsmen. Out of these 27 Fulani families, five of the herdsmen were interviewed representing five percent of the total sample size. The five were chosen by dividing the total number of Fulani families (27) in Yapei by the total population of agricultural land users that is 596 multiplied by the overall sample size of 102.

Furthermore, Kusawgu which was the second study area had six farmers associations with a total population of 141 farmers in the association. Out of these 141 farmers, 24 farmers were interviewed representing 23 percent of the total sample size of 102.

Also in Kusawgu, there were two fishermen's associations with a population of 13 fishermen. Out of these 13 fishermen, two fishermen were interviewed from the association representing two percent of the overall sample size of 102. There were 30 bio fuel farmers in the community. Out of these 30, five bio fuel farmers were interviewed. These five bio fuel farmers represented five percent of the total sample size of 102. Finally there were 25 recognized Fulani families in the community that were mainly herdsmen. Out of these 25 Fulani families, four of the Fulani herdsmen were interviewed representing four percent of the total sample size.

The number of people selected to be interviewed from each target group was derived at by dividing the population of each target group by the overall sample frame population (596) and multiplied by the overall sample size of 102. With respect to the number of people surveyed from the various groups, simple random sampling technique specifically the lottery method was used to select the sampling units by listing all the members in each group

according to their names alphabetically and selecting the nth number using the table of random figures.

Table 3.1 Sample Size and Share Distribution Among the Various Target Groups.

Communities	**Target groups**	**Number of people in target group**	**Number of people to be surveyed from target group**	**Percentage of sample share**
Yapei	Food crop farmers association	234	40	39
	Fishermen's association	118	20	20
	Bio fuel farmers	8	2	2
	Fulani herdsmen	27	5	5
Kusawgu	Food crop farmers association	141	24	23
	Fishermen's association	13	2	2
	Bio fuel farmers	30	5	5
	Fulani herdsmen	25	4	4
Total		**596**	**102**	**100**

3.6.2 Purposive Sampling

Data gathering is crucial in research, as the data is meant to contribute to a better understanding of a theoretical framework (Bernard, 2002). Purposive sampling technique is a type of non-probability sampling that is most effective when one needs to study a certain cultural domain with knowledgeable experts within. Purposive sampling technique also called judgmental sampling is the deliberate choice of an informant due to the qualities the informant possesses. It is a nonrandom technique that does not need underlying theories or a set number of informants. Simply put, the researcher decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of their knowledge or experience (Bernard, 2002; Lewis & Sheppard, 2006). A purposive sample is a sample selected in a deliberative and non-random fashion to achieve a certain goal.

In this research, purposive sampling was used to first select one district from the 20 districts in the Northern district. Two communities in the district were purposively selected based on the presence of the four key resource users (the Fulani nomads, the bio fuel farmers, fishermen and the indigenous farmers) in the district. Not all the communities in the district had the existence of all these four key resource users hence a criteria was adopted to select two communities based on the presence of all these four key resource users.

Finally purposive sampling was used to select two traditional leaders from the two communities, the district director in charge of DADU and the district planner at the DPCU.

3.6.3 Simple Random Sampling

This is the type of technique that gives every unit an equal and none zero chance of being selected. The lottery method specifically was used to select the sampling units for interview. The lottery method was carried out by listing all the names of the farmers and fishermen alphabetically and the house numbers of the Fulani herdsmen in each community and also numbering all the people to be surveyed in each target group on pieces of papers. The numbers on the pieces of papers were then put in a lottery box and shuffled. After the shuffling of the numbers in the lottery box, based on the number of people in each target group to be surveyed, the researcher then randomly picked the numbers from the box till it got to the total number of people to be surveyed.

3.7 Data Analysis

The data was analyzed using both descriptive and quantitative approaches. In terms of data processing, a number of techniques were used. Data obtained were edited, coded and tabulated. The completed questionnaires were edited for consistency. This was done with the aim of detecting and eliminating error to ensure a clean and reliable data. Coding was also done by classifying questions into meaningful categories in order to bring out essential

patterns to inform the research questions posed. The descriptive nature of the study was carried out by using descriptive statistical tools necessary in the data analysis. The data was put into tables of frequencies and percentages and interpreted. Some data was presented in tabular form to facilitate easy understanding. Statistical methods such as frequency distribution tables, elaborations and cross-tabulations with the aid of computer software such as Statistical Package for Social Scientist (SPSS) were used to explore the competition for agricultural land use in the two communities in the Central Gonja district.

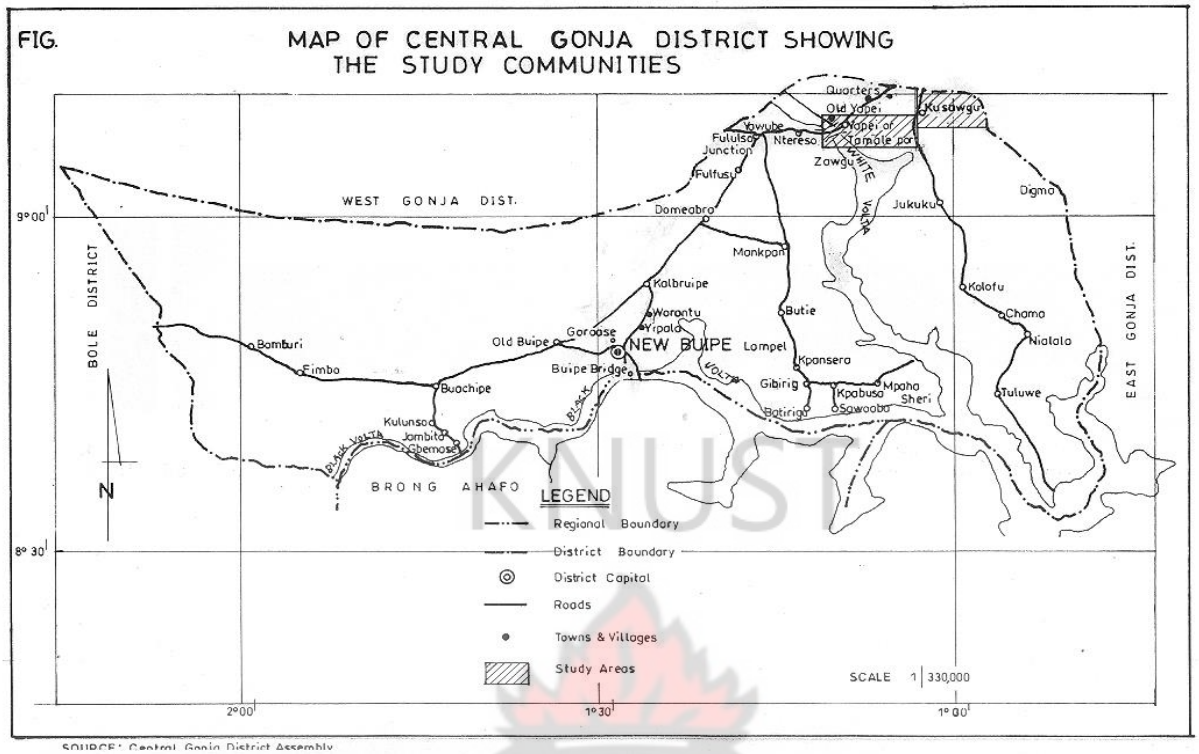
3.8 The Profile of the Central Gonja District

The profile of the Central Gonja district describes the situation of the district as at December 2011 to June 2012. It examines the physical and natural environmental situation, the social situation, cultural situation, governance and economic situation of the district.

3.8.1 Location and Size

The Central Gonja District is one of the districts in the Northern district that was created in 2004. The district is young but with vast resources. The District is located at the South Western part of the Northern district of Ghana. The district has Buipe as its capital and lies within longitude 1˚5'and 2˚ 58' West and latitude 8˚32'and 10˚2' North. The district shares boundaries with the Kintampo District of the Brong Ahafo district to the South, the West Gonja District to the West, Tamale Metropolis to the North, the Tolon-Kumbungu District to the North West and the East Gonja District to the East. The district is strategically located because it links the Northern Districts to the rest of the Southern Districts. The District covers approximately 8,353km² which represent 12% of the total land area of the Northern district.

Figure 3.1: Map of Central Gonja District



Sources: Adopted from the district profile, 2004.

Figure 3.1 shows a map of the Central Gonja District with the shaded portion on the map representing the study areas of the district. The areas are Yapei and Kusawgu. The Central Gonja District is located at the South Western part of the Northern district of Ghana. The district shares boundaries with the Kintampo District of the Brong Ahafo district to the South, the West Gonja District to the West, Tamale Metropolis to the North, the Tolon-Kumbungu District to the North West and the East Gonja District to the East. There are close to 256 settlements in the district with eight area councils and one urban settlement.

Figure 3.2: Map of Ghana Showing the Location of Central Gonja District

Sources: Adopted from the district profile, 2004.

The coloured portion on the map of Ghana painted green in figure 3.2 shows the location of Central Gonja District in Ghana.

3.8.2 Relief and Vegetation

The topography is generally undulating with an altitude of between 150-200 meters above sea level. The Black and White Volta lakes both run through the district. The confluence of the Black and White Volta Rivers is at Sheri which is a potential site for tourist attraction. Both the Black and White Volta which drains the district have good potential for small-scale irrigation schemes along their valleys. They also provide good waterways from Buipe and

Yapei respectively to Akosombo via the Volta Lake in Yeji. There is an inland harbour at Buipe on the Black Volta. These rivers have good potentials for fishing in the District.

3.8.3 Climate and Temperature

The Central Gonja District lies within the Tropical Continental Zone. Annual rainfall is unevenly distributed and limited to six months from May to October. Mean annual rainfall ranges between 1000 – 1500mm with its peak in September. It has a slightly longer rainy season than the rest of the Northern District. Relative humidity is between 70% and 90% during the long dry season causing dry skin and cracked lips to human beings.

Temperatures are generally high and exhibit seasonal variations. The district has a mean annual temperature of 35% with the maximum temperature of about 40^0C usually recorded around March – April. Temperatures are lowest, on average 22%**,** between November and January due to the influence of the North -easterly winds otherwise known as harmattan.

The district experiences the North East Trade Winds popularly known as the Harmattan Winds from the months of November-January which are characterised by cold nights and dry winds during the day time. The rains begin around May and end in October. The rainfall is seasonal and is characterized by a single maximum. The mean annual rainfall is about 1144mm. The rainfall pattern is erratic, beginning in late April to late October. June, July and August generally record the highest rainfall and also the greatest number of rainy days. The rainfall is characterized by thunder storms or sharp showers. Erosion and floods are common due to the torrential nature of the rains. The irregular distribution and short duration of the rainfall are a great limitation to crops and vegetative growth. Single crop production is the norm due to the rainfall pattern.

3.8.4 Soil and Vegetation

The district is situated in an old geological area. The rocks are mainly of the Voltain formation with isolated Cambrian rocks which contain valuable minerals such as gold and diamond. Limestone occurs between the lower and middle Voltain formation around Buipe, the capital of the District. Generally, the soils in the District are fertile for Agriculture purposes. The natural vegetation is Guinea Savannah. Its richness is however determined by the soil types. The large mass of grass land is dissected by human activities such as shifting cultivation, slash and burn methods of land preparation for farming and housing. The major tree species are sheanut, dawadawa, baobab, acacia, nim and some ebony. These trees are scattered except in most valleys where isolated wood –land are found. Most trees are deciduous, shedding their leaves during the dry season in order to conserve water. Most grass which grows during the rainy season may reach 2.7m. This indicates that the area is suitable for crops such as millet, sorghum, maize and groundnuts.

Yam is also cultivated in the District especially around Mpaha Area. The original vegetation in major settlements such as Buipe, Yapei, Mpaha and Kusawgu has been destroyed by human activities. Bush fires, charcoal burning and fetching of firewood in particular have reached alarming proportions which must therefore be checked to avoid environmental problems in future. The only forest reserve the District is endowed with is the Yakumbo Forest Reserve. This forest is located at the western part of the District capital. It has an area of about 1200 hectares It has a potential of producing durable wood for construction and energy.

There is massive depletion of the districts forest cover due to fuel wood cutting and charcoal burning. The shifting cultivation system of farming is also a very big cause of the depletion

of the forest coupled with the annual ritual of bush fires. The rate of forest depletion is estimated at 3% annually.

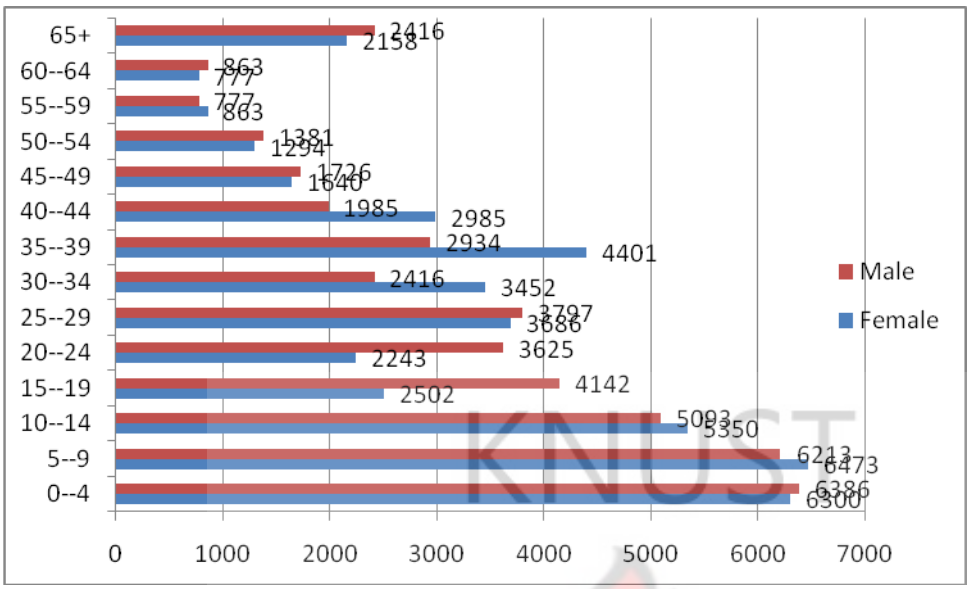
3.9 Demographic Characteristics

The Central Gonja District was recently carved out of the former West Gonja District in 2004. To this end all information on population of the district is not separated from that of West Gonja district. Information on the population of the district is scanty. The limited information on the population of the district is discussed below. The district had about 87,877 people according to 2010 population and housing census. The population, though not evenly distributed, has large concentration of people in a few large settlements such as Buipe (8347), Yapei (4044), Mpaha (4126). The population density of the district is 8.3 persons per sq. km which is below the districtal density of 25.9 persons per sq. km. The district population growth rate of 3.1% is higher than the national rate of 2.9%.

3.9.1 Age Structure of the Population

The sex ratio is 103 males to 100 females. This phenomenon is due to the fact that most females in the district migrate outside the district than their male counterparts (Ghana Statistical Service, 2012). Also, there is a large arable land for men who are mainly farmers who work in the district. The urban population decreased from 18% in 1984 to 14.5% in 2000 due mainly to the ethnic conflicts in 1990 and 1996 respectively. This resulted in the devastation of several settlements and exodus of thousands of people outside the district and district as a whole. The population is concentrated in a few accessible areas or settlements like Buipe, Yapei, Mpaha etc. The age structure is typical of developing countries with over 50% between 15-60 years of age. The age and sex structure also follow the National and Districtal patterns.

Figure 3.3: Age and Sex Structure of the District



Source: Population and Housing Census, 2010.

Figure 3.3 shows the age and sex distribution of the population in the Central Gonja district. The chart shows the features of a young population which indicates that there is high fertility rate in the district. This can be attributed to the desire for large family size, low contraceptive usage and early marriages in the district. From the chart, the age cohort 0-9years representing the population of children in the district form the largest population of about 25,372. Notwithstanding that, the age cohort of 65 years and above happens to be slightly lower compared to the age cohort 25 years to 39 years which is considered mostly as the active working group. The chart above indicates a high dependency ratio in the district.

3.10 Social Characteristics

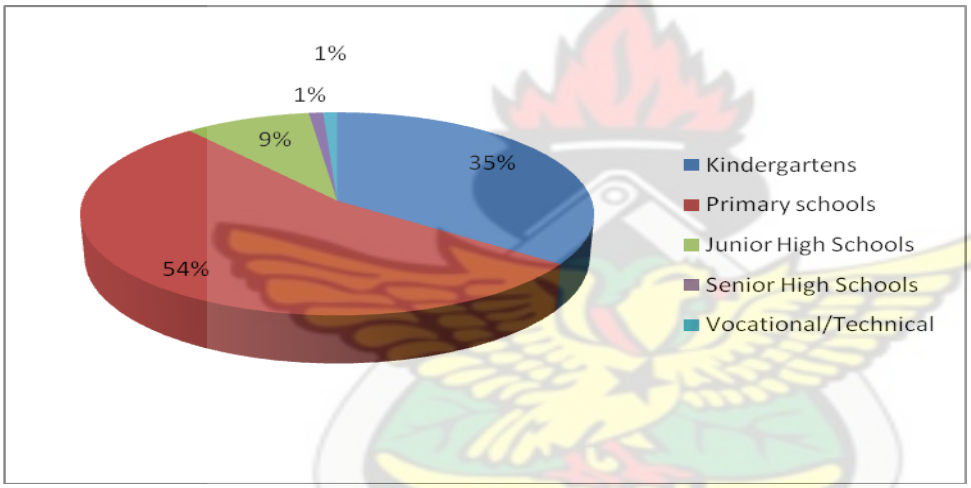
Social characteristics comprise of education, health, water, sanitation, ethnicity and cultural values of the Central Gonja District. Education, health, water and sanitation constitute the basic social services in the district which is very crucial for development.

3.10.1 Education

In line with the general mission of the Ghana Education Service (GES), the District Education Department (DED) has a vision to provide relevant education in collaboration with the Assembly, Civil Society Organizations and other stakeholders in all spheres to ensure quality human resource development.

The District is divided into seven circuits namely: Buipe, Yapei, Mankpang, Mpaha, Sheri, Chama and Kusawgu. The following are the educational composition in the district.

Figure 3.4: Distribution of Educational Institutions in the Central Gonja District.



Source: District Educational Department Buipe, 2010.

Figure 3.3 shows a pie chart illustrating the number of educational institutions in the Central Gonja District. From the Central Gonja District records, primary schools form the largest number of educational institutions in the district. It represents 54% of the total number of educational institutions in the district. This is influenced by the free and compulsory basic education policy which was introduced in the country to encourage school going children to attain basic education. In spite of the fact that Primary schools happen to be the largest number of educational institutions in the district, unfortunately there are very limited number of Senior High Schools and vocational/technical institutes to absorb the large track of pupils

from the basic levels. Junior high schools happen to be very limited in number. All the schools have School Management Committees and Board of Governors and these serve as means of monitoring and supervising educational activities in the district.

To encourage school enrollment and retention, a number of primary schools in the District have been selected and currently benefiting from the Ghana School Feeding Programme in the district. It is refreshing to note that with the introduction of the capitation grant and school feeding programme, enrollment in school has been encouraging especially at the basic level. However, the total number of schools currently benefiting from the school feeding programmes is woefully inadequate and there is the need for more schools to be covered for higher retention and enrollments.

3.10.2 Health

The Central Gonja District Assembly has the following Health facilities that enhance quality health care delivery. There are four health centres in the district which can be found in Buipe, Yapei, Kusawgu and Mpaha with one Community-based Health Planning (CHPS) compound at Sankpala.

3.10.3 Ethnicity and Cultural values

There are about 20 ethnic groups in the district. The major groups are; Gonja, Dagomba, Hanga, Mamprusi and Dagarbas. Others include Ewes, Akans, Chekosi and Konkombas. The lack of ethnic homogeneity tends to constrain socio-cultural development. There are inter-tribal marriages and peaceful co-existence which enhances unity in diversity

The culture of the people is deeply enshrined in their customs and beliefs. The result of this is still manifested in the numerous traditional festivals still practiced. On the religious front, the people in the District are mostly Muslims since this was the first religion introduced to them by Arabs from North Africa. It is therefore not surprising that almost 70 percent of the

people are Muslims. It is common for the people in the Central Gonja district to have large families. This practice until recently was to get more people to help on family farms. It is considered a great pride among the indigenous people to own more than one wife. The number of children one owns is one of the indices for measuring one's wealth. Property is communally owned. Animals such as cattle are family properties and no family head can dispose of a cow without consulting the other members of the family.

Festivals, until recently, were largely enshrined in the customs of the Gonjas. The most important festivals include yam festival, fire festival and Damba festival and the Ed-dul-Fitr and Ed-dul-Adha which are religious in nature.

The yam festival is celebrated at the beginning of the yam harvesting period to give thanks to God for the good harvest and asking for further and better yields in the coming years. The Damba festival on the other hand is to commemorate the birthday of the holy Prophet of Islam, Muhammed. Damba is celebrated after the fire festival.

Table 3.2: Major Religious Groups in the Central Gonja District.

Religious breakdown	Percentages
Islam	70
Christianity	18
Traditional African Religion	10
Others	2

Source: District Planning and Coordinating Unit, 2010.

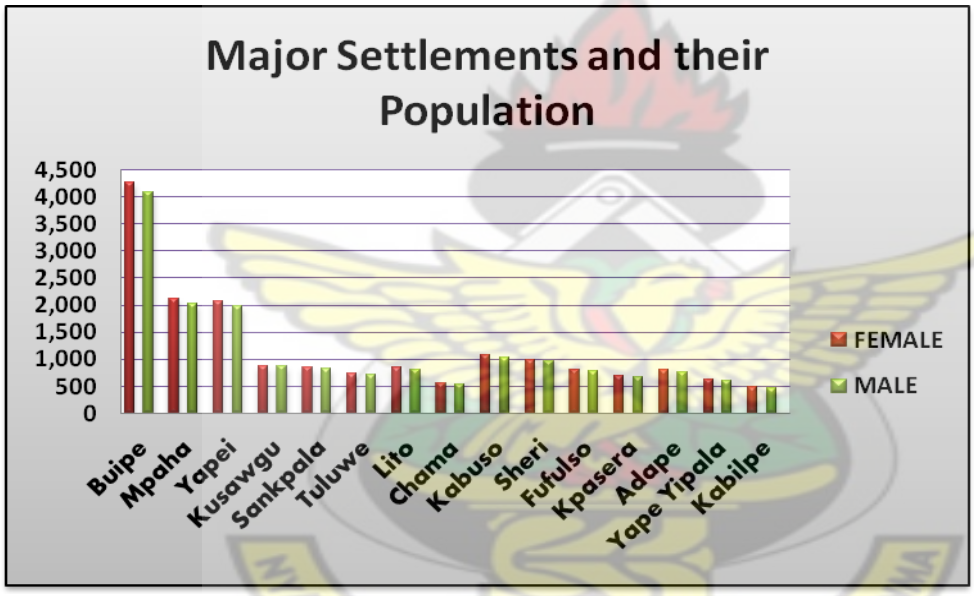
Table 3.2 shows the major religious groups in the Central Gonja District where Islam forms the major religious group in the district with 70% of the population practicing Islam. Christianity forms the next major religious group in the district with 18% of the population practicing Christianity. Traditional African religion which is based mainly on oral transmission and written in people's hearts, minds, oral history, customs, temples and religious functions involves the worship of idols and constitute about 10% of the entire

population. Others who cannot be categorized under any of the religious groupings constitute the lowest group of people in the district.

3.10.4 Settlements and Settlement Patterns

The Central Gonja District has different settlement patterns. The rural communities are mostly scattered in nature where as the District capital and others along the trunk roads are linear in nature. There are 256 settlements in the district according to the 2010 Population and Housing Census.

Figure 3.5: Major Settlements in the District and their Population



Source: DPCU Field Survey, 2006.

The above bar chart shows fifteen major settlements and their population distribution in the Central Gonja district. From the chart above, Buipe which is the district capital is the largest settlement with a population of 8,347 with the female population being slightly above that of their male counter parts. Kabilpe another major settlement forms the lowest most populated area in the district with a population of about 1000 people.

3.10.5 Water

The Central Gonja District is naturally endowed with water bodies but the source of potable water remains a problem. According to Ghana Statistical Service (2008), 35% (aproximately 31,000 out of 88,000 individuals) of the Gonja's population had access to safe, clean potable water via boreholes, covered hand dug wells, and small town pipe systems.

Table 3.3: Distribution of Potable Water Facilities by Urban/Area Council

Urban/Area Council	Number of Communities	Number of Communities with safe sources of water	Number of Working Boreholes	Total Population	Population Covered	Percentage of population covered
Buipe	62	13	25	29,914	7,650	25
Mpaha	60	13	13	22,915	5,550	35
Yapei	56	5	5	20,355	3,300	15
Kusawgu	39	8	23	23,460	3,450	16
Tuluwe	39	6	5	13,932	2,100	9
Total	**256**	**45**	**71**	**110,576**	**22,050**	**100**

Source: DPCU and I-WASH/UNICEF survey, 2009.

Table 3.3 shows the distribution of potable water facilities by area/urban council in the district. Buipe and Mpaha which are the largest settlements in the district have the largest number of communities with safe sources of drinking water. Yapei happens to be the community with the lowest number of safe sources of drinking water despite its population. Geology is a factor hindering communities' access to water in the Central Gonja District.

Boreholes are not ideal options for many parts of the District due to the nature of the rocks in the district. An alternative could be to utilize the Black and the White Volta.

3.10.6 Sanitation

Similar to water, the sanitation coverage in the District is poor. According to the Central Gonja District Assembly (2009) and I-WASH/UNICEF survey less than 20% of the population has access to safe excreta disposal. Sanitation facilities included in this survey were Public Kumasi Ventilated Improved Pits (KVIP), Public Pit Latrines, Private Ventilated Improved Pits (VIP), and Private Pit Latrines.

According to the Central Gonja Environmental Health Unit (CGEHU), each KVIP and Public Pit Latrine constructed in Central Gonja is a 10-Seater Unit facility. According to the CGEHU the coverage for a 10-seater KVIP is 250 individuals; a 10-seater Public Pit Latrine is 250 individuals. Inadequate Environmental Health Unit (EHU) staffing in the District further aggravates the poor sanitation situation. The EHU is made up of only 18 staff, with the majority concentrated in Buipe and Yapei. Currently there are no EHU staffs in Tuluwe. The Assembly is making efforts to ensure the proper disposal of waste especially littering at public places. To do this, there are however, few refuse containers which are located mostly at the District capital. According to the Environmental Health Unit, there are six refuse containers in the District and these were located in five settlements with Buipe the district capital having the largest number of refuse containers of four. The remaining settlements were Kusawgu, Yapei and Tuluwe and they all had one refuse container each.

3.11 Economic Characteristics

The main occupation of the people in the District is agriculture. This involves crop production, fishing and livestock farming. About 65% of the population is estimated to be

either directly or indirectly involved in this sector. Major food crops cultivated include yam, maize, cassava, sorghum, groundnuts, rice, millet, cowpea, bambara beans and soyabeans.

Table 3.4: Distribution of Crops per Land Put Under Cultivation and Output per Hectare.

Crops	Land put under cultivation (Hectares)	Output per Hectare in CGDA. district (Tons/Hectare)	Targets of outputs per hectare in CGDA (Ton/Hectare)
Yam	**6,000**	**7.50**	**45000**
Maize	**6,000**	**3.00**	**18000**
Cassava	**14,000**	**28.90**	**404,460**
Sorghum	**1200**	**0.81**	**972**
Groundnut	**6,000**	**0.70**	**4,200**
Rice	**1600**	**1.60**	**480**
Millet	**1,400**	**0.63**	**882**
Cowpea	**1,600**	**0.82**	**600**

Source: DPCU -Buipe Report, 2007.

Table 3.4 shows the distribution of crops per land put under cultivation and output per hectare. Cassava happens to be the largest crop put under cultivation in the district with a total land of 14,000 hectares yielding an output of 28.90 metric tons and covering an area of 10,000 hectares. This could partly be as a result of the fact that cassava is one of the staple foods of the people. Sorghum happens to be the least crop put under cultivation with about 1200 hectares of land.

Farming activities are however limited to the rainy seasons with high seasonal unemployment during the dry season. The district is the hub of river fish supply in and within the district.

CHAPTER FOUR: DATA ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter is aimed at analyzing the data collected from the field on the distribution of agricultural land use and its implication(s) for development in the Central Gonja District. It examined the responses from 102 respondents interviewed. Through the use of tables and bar graphs, the responses were analyzed and presented in two sections. The first section dwelled on the general background information of respondents, covering gender, educational, occupational and ethnic distributions of respondents. The second section was analyzed with reference to certain variables and their relationship to the research objectives.

From the first chapter it was established that, agriculture being the dominant land use type in most rural areas in Ghana was in constant struggle with other land uses with the growing population and therefore there was the need to put measures to prevent the change in which the areas under cropped land and forest land were gradually shrinking. In the second chapter, emphasis was made on how these distributions could lead to levels of conflict depending upon how a particular agricultural land resource is to a number of users. This chapter focuses on analyzing and discussing the primary data that was collected during the study in relation to certain key variables.

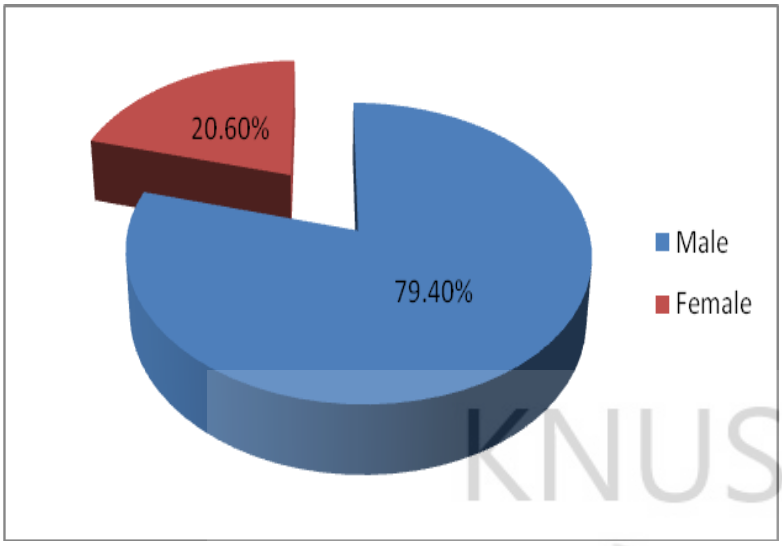
4.2 General Background of Respondents

This section examines the number of respondents in the study, with special reference to gender, educational background, occupational distribution and ethnic groupings.

4.2.1 Gender Distribution of Respondents

Figure 4.1 shows that out of a total of 102 respondents interviewed, about 79 per cent were males whilst 21 per cent were females.

Figure 4.1: Gender Distributions of Respondents



Source: Field Survey, 2012.

The gap between the males and females was due to three main reasons. First of all, women within the district choose to farm on farmlands closer to their homes; unfortunately these lands are often of less fertility as a result of it having been cultivated for several years and are often limited in quantity. For that matter, most women usually desist from farming because the fertile lands are usually farther away from the home requiring hours of travel.

Secondly most women within the district experienced greater difficulties in accessing financial resources, which limited their purchase of farm inputs such as fertilizer and tools and the ability to pay hired laborers.

Finally in the district, the woman's multiple responsibilities at home and their poor culture over family labour discouraged them from engaging in farming activities. Rather they preferred to engage in petty trading in the retail of farm produce brought home by their husbands. This has affected the differential between the male and the female respondents.

4.2.2 Educational Background of Respondents

Table 4.1 shows the educational status of respondents with respect to Primary, Junior High, Senior High, Post-Secondary, tertiary and Arabic education.

Table 4.1: Educational Background of Respondents

Education Level	Frequency	Percent
Primary	28	27.5
JHS/Middle School	10	9.8
SHS	5	4.9
Post-Secondary/Nursing	1	1.0
Tertiary	1	1.0
Arabic Education	26	25.5
None	31	30.4
Total	**102**	**100.0**

Source: Field Survey, 2012.

In spite of the fact that several campaigns have been undertaken to increase the awareness of the importance of education, people from the Central Gonja are still not enthused about enrolling their children in schools. The respondents interviewed attained various levels of education. From the 102 respondents, about 27 per cent of respondents acquired primary education representing the highest level of education acquired in the district whilst only one per cent of respondents had acquired Post-Secondary/Nursing and Tertiary education. About 25 per cent of the respondents acquired Arabic education whilst about nine per cent of respondents acquired Junior High and Middle school education. In relation to Senior High school education about four percent of respondent acquired that level of education.

Notwithstanding the various levels of education acquired by the respondents, a large percentage of the entire population (about 30) had not attained any level of education.

Although education is generally seen as the foundation of society to bring about economic wealth, social prosperity and political stability, cultural and religious (Muslim) practices in the Central Gonja District were huge hindrances to attaining higher education.

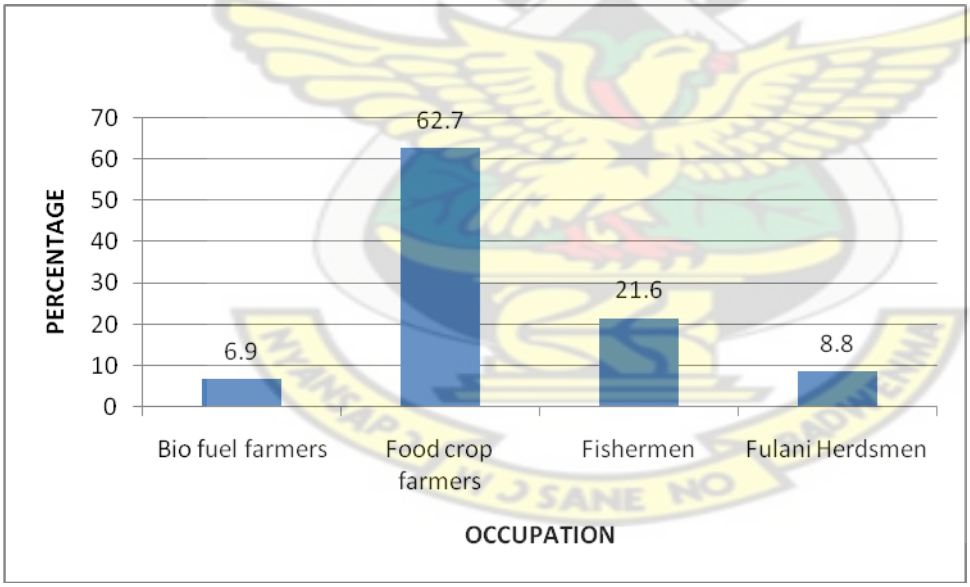
From the research it was revealed that Muslim parents were not necessarily enthused about enrolling their children in school or attaining higher educational levels. This was partly due to the fact that a large number of the farmers and pastoralist Fulani acquired Arabic education among the respondents within the district. Primary education which takes the greatest proportion of what the respondents acquired in the district was as a result of the Free Compulsory Universal Basic Education (FCUBE) programme which was introduced into the country to provide the opportunity for every school-age child to enroll into school. It was revealed that due to financial constraints and other social factors most parents in the district were not able to support their children to further their education after the basic level.

Thus, the opening of schools in the District did not naturally imply that parents were willing to send their children to school and did not also imply that the structures in themselves were enough to result in appropriate education. This therefore called for the need to raise more awareness on the importance of education since education is very important for an individual's success in life. Therefore any education for the children of the district required the changing of parental attitudes to western education, provision of flexible financial schemes to support parents and the availability of personnel ready to sacrifice and create a vision for education.

4.2.3 Occupational Distribution of Respondents

Figure 4.2 shows the occupational distribution of the respondents. From the 102 respondents, about 62 per cent constituted food crop farmers. The bio fuel farmers constituted about six per cent of the respondents whilst fishermen and Fulani herders constituted 21 per cent and eight per cent respectively. Food crop farming had the largest number of people from the respondents because the primary occupation of the people in the district was mainly food crop farming where the farmers produced food mainly on subsistence levels and sold the surplus. This accounted for the large number of food crop farmers associations in the district. Unlike the food crop farmers, the bio fuel farmers were the least number of respondents representing about six per cent of the respondents.

Figure 4.2 Occupational Distributions of Respondents



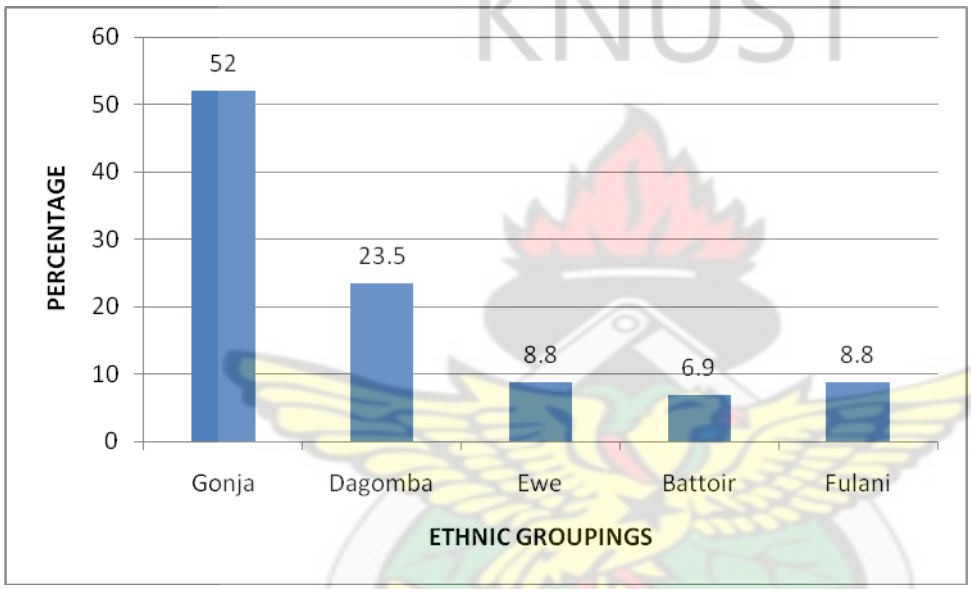
Source: Field Survey, 2012.

The data collected also revealed that fishing was one of the prominent occupations in the district because of the presence of the White and Black Volta Rivers. Therefore about 21 percent of respondents were engaged in fishing activities across the district. Fulani herdsmen from the data collected constituted about eight percent of the respondents.

4.2.4 Ethnic Groupings of Respondents

Figure 4.3 shows the ethnic groupings of the respondents. From the data collected it was discovered that 52 per cent of the respondents were Gonjas forming the largest ethnic group in the district whilst the Battoirs were about six per cent of the respondents forming the lowest ethnic groups in the district. The Dagombas, Ewes and Fulanis represented about 23%, 8% and 8% respectively

Figure 4.3: Ethnic Groupings



Source: Field Survey, 2012.

4.3 Distribution of Agricultural Land Use and its Implication(s) for Development

The second section was analyzed based on the research objectives. This took into consideration the various resource needs of each category of users in the district, the nature of distribution of resources arising from the varying demands of each user, how the activities of these users influenced development issues and finally how the traditional authority and the District Assembly as a planning authority put in place measures to manage the competing demands among the various resource users.

4.4 Resource Needs of Each Category of Users and How the Needs Affect other Users.

Table 4.2 shows a cross tabulation of the proportion of resources each agricultural land user needed. There were four major types of agricultural land users in the district with five agricultural land resources available. These agricultural land users were the bio fuel farmers, the food crop farmers, the fishermen and the Fulani herdsmen. Similarly the resources that were available to them were arable lands, rivers, ponds, grass land and cattle.

From the data collected it was revealed that, food crop farmers' resource needs were arable lands, grass land and the river. About 56 per cent of food crop farmers needed arable lands to carry out their activities. It was revealed from the data collected that, on average food crop farmers in the district cultivated on three hectares of arable lands. Arable lands were the largest of all the resources which was needed by the food crop farmers and the other resource users. This was because food crop farming was the occupation in the district where most people were engaged in (on subsistence bases) purposely for household consumption and sold the surplus when available. Grass land was also a resource needed by the food crop farmers. Some food crop farmers in the district used the grass land as grazing grounds for their livestock.

Also about two percent of the food crop farmers depended on the White and Black Volta rivers during the dry season for their farming. Usually some farmers during the dry season farmed along the White Volta River so they could make use of the water. This was done to improve household food security and to provide off season employment.

Furthermore, the resource needs of the bio fuel farmers were also the arable lands. About six percent of bio fuel farmers depended on the arable lands to carry out their activities. They were engaged in jatropha production where small holder farmers and other large tracts of land were taken. The destruction of economic trees such as shea-nut and 'dawadawa' trees denied community members especially women their sources of livelihood.

In addition, fishermen's resource needs were the White and Black Volta rivers and ponds in the district. About 21 percent of the fishermen in the district needed the rivers and ponds to carry out their activities. The nature of their work required that they use the water bodies to carry out their activities. About 12 percent of the fishermen in the district depended on the rivers for fishing as compared to about nine percent of the fishermen who depended on the ponds in the district.

The gap between those who depended on the rivers and ponds was as a result of the fact that, there were no levies on the rivers to fish but with regards to the ponds, one had to pay an amount of money to the traditional authority before the opportunity was given to that particular person to fish on the pond. Therefore during the dry season some fishermen paid the required levies to the chiefs to enable them fish on the ponds. Interestingly fishermen in the district formed the second largest proportion (21 percent) of the respondent in the district.

Also, about five percent of the Fulani herdsmen required cattle to carry out their activities. The Fulani nomads' population in the district was about nine percent compared to the indigenous population of 69.9 percent. The nature of life of the Fulani was in a way that their lives revolved around their herds. It was believed that the more cattle a man owned, the more respect he was given hence their lives were dedicated to their herds. From the data collected, it was revealed that on average, a Fulani nomadic herder was entrusted with about 80 cattle from different people in the district. Aside being entrusted with other people's cattle, the Fulani nomads were in possession of their own cattle. Their primary occupation therefore was herding.

Aside the cattle, about one percent of the Fulani nomads also required farmlands, which they testified that their cattle usually graze on. It was also revealed that about one percent of the Fulani herdsmen used the water in the ponds for their cattle to drink. Whilst two percent of

the Fulani nomads also disclosed that they used the grass land for their animals to graze on since their food was mainly grass.

In spite of the resource needs of each of the agricultural land users, it was discovered that, the resource needs of each agricultural land user had an effect on the other users. First of all, food crop farmers' major resource needs were the arable lands, but from the data collected, not only food crop farmers needed access to arable lands but also bio fuel farmers, Fulani nomads and fisher men also needed a percentage of the arable lands in the district. This is because on average a peasant farmer from the district used about three hectares of land to cultivate but as a result of the distribution of these resources, indigenous farmers are being compelled to cultivate on land less three hectares so that they can properly manage the land against perpetrators. Therefore there was a competing demand on the arable lands. Hence if measures are not taken with time the number of arable lands required by the food crop farmers will eventually decrease which will lead to less lands for the cultivation of food crops and eventually a reduction in food crop produce. Such a situation can gradually lead to food insecurity and even escalate to conflict. Likewise, when food crop farmers have enough access to arable lands then all things being equal there will be abundant food crop supply in the district.

Secondly, the fishermen's resource needs were the water bodies (rivers and ponds) but the food crop farmers and Fulani nomads also required the water bodies to carry out some of their activities. This meant that the fishermen did not have full access and control over their resource use because there were other groups of people whose activities interfered with their fishing.

The Fulani nomads and food crop farmers also depended on the grass land. The activities of the Fulani nomads depended on grazing their cattle on the grass land where as the food crop farmers also used the grass land to rear their livestock.

Table 4.2: A Cross Tabulation of Agricultural Land Users and Resources they Required.

Agricultural land users	Resources Required					Total
	Arable lands	water bodies (river)	water bodies (pond)	grass land	Cattle	
Bio fuel farmer	6.9%	0.0%	0.0%	0.0%	0.0%	6.9%
Food crop farmer	55.9%	2.0%	0.0%	4.8%	0.0%	62.7%
Fishermen	1.0%	11.8%	8.8%	0.0%	0.0%	21.6%
Fulani herdsmen	1.0%	0.0%	1.0%	2.1%	4.7%	8.8%
Total	64.8%	13.8%	9.8%	6.9%	4.7%	100.0%

Source: Field Survey, 2012.

Notwithstanding the various resource needs of the agricultural land users, the research also revealed that these resources were usually available all year round for majority of respondents (74.6 percent) to undertake their production activities, whist 25.4 percent of respondents experience seasonal availability of resources for production. Among the respondents, food crop farmers (about 60 percent) disclosed that their major production resource were available all year round with only 2 percent of the respondents from the food crop farmers having their production resource occurring seasonally.

The Fulani herdsmen who constituted nine percent of the respondents had about 7 percent of their productive resources available to them seasonally whilst 2.1 percent of their resource needs occurring all year round. Also, 21.6 percent of respondents were engaged in fishing

with 16.7 percent and 4.9 percent of them having the main productive resources available to them seasonally and all year round respectively as shown by table 4.3.

Table 4.3: Agricultural land Users and Resource Availability

Agricultural land Users	Availability of resource		
	Occur seasonally	All year round	Total
Bio fuel farmers	0.0%	6.9%	6.9%
Food crop farmers	20.0%	60.8%	62.7%
Fishermen	16.7%	4.9%	21.6%
Fulani nomadic herder	6.7%	2.1%	8.8%
Total	25.4%	74.6%	100.0%

Source: Field Survey, 2012.

It is important to note that these resources demanded by the agricultural land users were acquired by respondents through various modes including inheritance, belonging to a clan, international laws and through traditional authority. Among these, the right of being a member of a family or clan was the major mode of getting access to the productive resources as cited by 52 percent of the respondent; whilst international laws was the least with only two percent of respondents. This is because international laws such as the ECOWAS Protocol are not yet fully implemented or operationalize in Ghana.

Also, about 18 percent of respondents had access to the resources through the chiefs or traditional authority who are usually the custodians of land in Northern Ghana in general; whilst 14.7 percent and 13.7 percent of respondents accessed their production resources through inheritance and negotiation with the traditional resources owners respectively as shown in Table 4.4.

Table 4.4: Mode of Gaining Access to the Resources

Mode	Frequency	Percent
Through inheritance	15	14.7
Right of being a member of a family or clan	53	52.0
Negotiation with traditional owners of the resources	14	13.7
National or international laws	2	2.0
Through the chiefs	18	17.6
Total	**102**	**100.0**

Source: Field Survey, 2012.

4.5 The Nature of Resource Distribution Arising from the Varying Demands of Each User

Findings from the data collected revealed the nature of demand on the various resources that were required by agricultural land users in the district. From the data collected, it was realized that in spite of the resource needs of the various agricultural land users, each key resource users' demand for a resource varied considerably with other resource users. Some resource users used a combination of two or more resources to carry out their activities.

Arable land was the most used resource as it was used by about 65 percent of respondents with the major user being food crop farmer (56 percent) and other users such as bio fuel farmers (7 percent) and Fulani herdsmen (1 percent).

Also, about 14 percent of respondents which comprises of food crop farmers (2 percent) and fishermen (11.8**)** used rivers, while 9.8 percent of respondents used ponds. Furthermore, about seven percent of respondents used grass land with Fulani herdsmen being the major users (2.1

percent). Besides, while about 72 percent of respondents used a combination of arable lands and grass land with the major user being food crop farmers (60.7 percent), 1 percent of fishermen and about 3 percent of Fulani herdsmen used a combination of grass land and cattle. Harvested farms were also used by the herdsmen to feed their animals during the dry season. Again 29.4 percent of the fishermen used both the rivers and ponds alternatively to carry out their activities.

4.5.1 The Use of Agricultural Land for Herding and its Effect on other Farming Activities

Findings showed that a greater proportion of respondents (89 percent) indicated that demand for farm land for herding posed some negative effects on other farming activities, especially food crop farming.

According to majority of the respondents (42.7 percent), demand for farm land for herding led to poor crop yield as a results of over grazing which led to soil erosion and poor soil fertility; whilst a very small proportion of respondents representing about one percent asserted that demand for farm land for herding reduced the amount of land available for crop cultivation. This is because on average a farmer required about three hectares of arable lands to cultivate, but as a result of the destructions caused by the activities of the herdsmen on the arable lands, farmers in the district are now narrow to cultivate on arable lands less than a hectare. This is to enable them manage smaller farms which is not in their interest. Also, about 19 percent of respondents believed that grazing of the cattle made the land to become hard for cultivation because as the cattle continued to move and graze on a piece of land, the soil became very compact. Besides, a significant proportion of respondents (37.1 percent) alluded to the fact that the cattle sometimes destroyed crop farms and the farmers sometimes bear the cost of the damages which usually resulted in conflict between the crop farmers and the herdsmen.

Table 4.5: Effects of Demand for Arable land for Grazing

Effect	Frequency	Percent
Poor crop yield	38	42.7
Land becomes hard for cultivation	17	19.1
Less land for cultivation	1	1.1
Destruction of crop farms	33	31.7
Total	89	100.0

Source: Field Survey, 2012.

Apart from the above, about 42 percent of respondents believed that demand for land for grazing also had some negative effects on fishing because the cattle required the use of water bodies. Majority of these respondents (39.5 percent) admitted that the flock usually pollutes the water bodies used by the fishermen in fishing which had the tendency of contaminating the fish, and therefore posed danger to human health.

According to 37.2 percent of these respondents, the flock sometimes destroyed the catch and the fishing nets of the fishermen by stepping on them when they go to drink water from the water bodies. This made the fishermen to suffer some losses which affected their fishing activities as well as their livelihood. Besides, about 23 percent of respondents revealed that when the cattle entered the water to drink, they often drove the fish away deep into the water which made it difficult for the fishermen to catch the fish. This meant that there was the need to designate some water bodies purposely for the animals and others for fishing. This would minimize tensions and the possible outbreak of conflict between the fishermen and the herdsmen.

Table 4.6: Effects of Demand for Water for Animals on Fishing Activities

Effect	Frequency	Percent
Pollution of water bodies	17	39.5
Destruction of harvested fish and fishing nets	16	37.2
Cattle drive fish deep into the water	10	23.3
Total	**43**	**100.0**

Source: Field Survey, 2012.

Furthermore, 78.4 percent of respondents admitted that the demand for land for bio fuel farming also affected food crop farming as they were both competing for the same piece of land. First, majority of these respondents (representing 58.7 percent) explained that increase in demand for arable land for commercial farming which involves the cultivation of bio fuel such as jatropha, reduced the amount of land available for food crop production in the district. This is because, on average a food crop farmer in the district cultivated on about three hectares of land but as a result of the new entrants in the district demanding for large tracts of land, peasant farmers now have to cultivate on less than a hectare of land. A similar statement was made by 42.2 percent of the respondents when they admitted that it could threaten food security in the district because less land was used for the cultivation of food crops.

In terms of the causes of competition among agricultural land users respondents cited several causes which included increase in population, poor resource use monitoring by land owners (the chiefs), bad public relations of some resource users, and non-enforcement of agreements by the chiefs. Among these causes, non-enforcement of agreements was indicated by respondents as the major source of conflict by 49.0 percent of the respondents. According to them, resources were allocated to some users (especially the non-indigenes) by the chiefs based on certain agreement which they were expected to go by. However, these non-

indigenes tend to breach these agreements which sometimes resulted in conflict and unfortunately the chiefs fail to enforce such agreements.

However, some respondents (13.7 percent) attributed the competition among agricultural land users to over population which results directly into less availability of resources in terms of resource per capita. This is because; most farmers in the district have narrowed their arable lands for cultivation to less than a hectare in order to control the activities of the Fulani herdsmen. Also, 21.6 percent of respondents believed that poor monitoring of resources users by the traditional authority caused competition for agricultural land use. This failure to monitor resource users is what usually gave grounds for resource users to breach agreements. Besides, 15.7 percent of respondents were of the view that bad public relations of some resources users such as the Fulani nomadic herdsmen and the fishermen who were always very busy and did not get time to socialize with other resource users, caused the competition for agricultural land use in the study area.

Table 4.7: Causes of Distribution of Agricultural land Use

Cause	Frequency	Percent
Increase in population	14	13.7
Poor supervision of resources by land owners	22	21.6
Bad public relations	16	15.7
Non-enforcement of agreement	50	49.0
Total	**102**	**100.0**

Source: Field Survey, 2012.

4.5.2 Effects of the Distribution of Agricultural land use

The distribution of agricultural land use in the Central Gonja district produced some effects which can be categorized into various dimensions including economic, social and psychological.

The economic effects included temporary unemployment, fluctuation of food prices, less access to credit, reduction in the purchase of farm equipment and inputs, and stunted growth in cattle. Temporary unemployment occurred due to the fact that when the cattle of the Fulani nomadic herdsmen destroyed some food crop farms, those farmers became unemployed for the rest of the season because they could no longer farm until the next farming season since they depended on rainfall which was seasonal. This caused shortage of food which forced food prices to rise. Also, it reduced the assets base of the farmers and constrained their ability to access credit leading to their inability to purchase farm implements and inputs. Furthermore, when the nomadic herdsmen were unable to get enough land to graze their cattle due to the activities of the bio fuel producers and food crop farmer, it resulted in stunted growth of their cattle.

In addition, respondents outlined some social effects of the competition which they encountered. First, they revealed that there was increase in school dropout of their children because when the cattle of the nomadic herdsmen destroyed their farms, it limited their ability to take care of their children in school leading to an increased in school dropout. Besides, the farmers and their families experienced poor health because they could not afford to go to the hospital when they fell sick. They tend to depend on traditional medicine which relatively cost less.

Socially, bio fuel farmers, food crop farmer and fishermen experienced some psychological effects when their properties were being destroyed by the cattle of the nomadic herdsmen.

These psychological effects included anxiety, uncontrollable worrying, panic, fatigue, loss of will power and difficulty in learning new ideas.

4.6 How the Distribution of Agricultural Land Use Manifest In the District

From the data that was collected, it was disclosed by the traditional authority (the chief) in the district that, the distribution of agricultural land use was usually noticeable in the district through the various complaints lodged by affected resource users. Besides the traditional authority, the district officer in charge of DADU also disclosed that, distribution of agricultural land in the district was visible through the destruction of arable lands caused by the cattle of the Fulani herdsmen and the various reports they received from the Assemblymen in the various communities with regards to complaints about resource users activities. Both the traditional authority and the district officer in charge of DADU revealed that these distributions were usually seasonal especially at the beginning of every farming season.

According to the traditional authority, non-indigenes such as the Fulani nomads and bio fuel producers were required to sign an agreement with the chiefs in the district before using any resource. It was unveiled that, there were two types of Fulani herdsmen in the district. The first types were those living with the people whom the traditional authority and other natives entrusted their cattle with and the second type were those who had immigrated into the district with their own cattle. With regards to the first type of Fulani nomads in the district, the traditional authority made the lands available to them usually at the outskirt of the communities to settle whilst the other Fulani nomads who come in with their cattle were given the authority by the paramount chief of Gonja lands in Kusawgu to settle in the communities (Yapei and Kusawgu) with the natives.

Various measures were taken by respondents to mitigate the effects of the distribution. One measure adopted by majority of respondents represented (i.e 28.4 percent) was respect for all resource users in the district which ensured peaceful coexistence among them. About 15 percent of respondents resort to cautioning the nomadic herdsmen to handle their cattle well in order not to destroy their farms. Also, 22.5 percent of respondents usually reported instances where their farms were destroyed by the cattle of the herdsmen to the traditional authority for adjudication. However, they were mostly dissatisfied with how the chiefs handled some of the cases because, according to them, the chiefs mostly supported the nomadic herdsmen because they often received some material benefits such as money and also labour support from the Fulani nomadic herdsmen and moreover, some of the traditional authority had their cattle entrusted in the care of the Fulani herdsmen.

An interview with the cattle owners who entrust their animals with the Fulanis revealed that, the role they play when the Fulanis report to them about the destruction caused by their animals, is to estimate the amount of destruction caused based on their observation and then compensate the affected victim. This could be biased since there was no standard of measuring the destructions on arable lands. The cattle owners also claimed that, they cautioned the Fulani to desist from destroying the arable lands.

In addition about 14 percent of the respondents usually avoided using other resource users' property in order not to create any conflict between them; while others constituting 9 percent adopted the application of fertilizer on the farms so as to reduce the impact of overgrazing of cattle which resulted in loss of soil fertility. Again, some respondents representing about 12 percent tended to maintain a cordial relationship with other resource users in order to minimize tension and possible conflicts among them. See Table 4.9 below.

Table 4.8: Measures to Ensure Healthy Distribution of Agricultural Land Use

Measure	Frequency	Percent
Respect all resource users	29	28.4
Cautioning herdsmen in handling their cattle well	15	14.7
Report cases to the traditional rulers	23	22.5
Avoid using other resource users property	14	13.7
Applying fertilizer to arable lands	9	8.8
Cordial relationship with other resource users	12	11.8
Total	**102**	**100.0**

Source: Field Survey, 2012.

4.7 Assertion of Rights over Resources

Analysis of the field data indicates that half of the respondents (50 percent) admitted that they had sufficient right over the use of the resources whilst 50 percent also indicated that they did not have sufficient right over the use of the resources. For those who did not have sufficient right, various reasons were advanced to support their claim.

Many of these respondents (i.e 34 percent) argued that the encroachment of the Fulani nomads and bio fuel farmers in the area made it very difficult for them to have full access over the resources, hence their right over the resources were limited; whilst a few of them who constituted only 8 percent explained that the nomadic herdsmen in the district were many, but there were limited land available for them to graze their cattle. Therefore, in their attempt to get more land for the cattle to graze, they ended up infringing upon the rights of other resources users such as food crop farmers.

Also, some respondents (30 percent) attributed the issue of limited right over the use of the resources to the fact that land ownership in the area was family/clan based which limits individual right over the use of the resources. Besides, 28 percent of the respondents viewed

this issue to be as a result of the fact that many people in the area depended on the grass land either directly or indirectly, therefore, there was high fragmentation of right over the use of the resources.

Table 4.9: Reasons for Insufficient Right over Resources

Reason	Frequency	Percent
More herdsmen but limited land to graze	4	8.0
Most families depend on family lands	15	30.0
Fulani encroachers and bio fuel farmers make it difficult to have full access	17	34.0
Many people depend on grass land	14	28.0
Total	**50**	**100.0**

Source: Field Survey, 2012.

In order to assert their right over the use of the resources, fishermen and food crop farmers usually took some measures against the herdsmen and bio fuel producers which include organizing and killing the flocks, pouring poisonous chemicals on crop residues and reporting the herdsmen to the traditional authority when the flocks destroyed their crops or fish.

4.8 Impact of Climate Change on Resources Availability

Despite the reasons for the insufficient rights over the resources available to the agricultural land users, it was also disclosed that climate change had a tremendous effect on the resources they required.

Findings revealed that, about 72 percent of the respondents agreed that climate change impacted on the availability of the resources which they depended on as their source of livelihood. Among these respondents, majority of them which constituted about 55 percent of the sample asserted that climate change brought about desertification which led to reduction in soil fertility, and hence, low crop yield. Some, respondents represented (16 percent) also believed that climate change caused irregular or erratic rainfall pattern which affects the growth and yield of crops negatively; whilst 12 percent of respondents indicated that climate

change brought about insufficient water and grass for the animals of the herdsmen to feed. Again, other respondents, especially the fishermen, who constituted 17.3 percent of the sample, were of the opinion that climate change caused rising temperatures of water bodies which resulted directly in the killing fingerlings. See Table 4.10 below.

Table 4.10: Impact of Climate Change on Availability of Resources

Impact	Frequency	Percent
Irregular rainfall	12	16.0
Reduction in soil fertility	41	54.7
No sufficient water and grass to graze on	9	12.0
Heated water bodies kills fingerlings	13	17.3
Total	**75**	**100.0**

Source: Field Survey, 2012.

4.9 How Activities of Agricultural land Users Influence Development in the District

The research revealed that, the various activities of the agricultural land users contributed to the development of the district in various ways in spite of the challenges they faced.

From the data collected it was discovered that the activities of various resource users contribute to the development of their communities in the district. First, about 33 percent of respondents indicated that they paid tax to the town council which contributed to the Internal Generated Funds of the District Assembly. This is often used to undertake development projects in the district such as construction of schools, bore-holes etc.

Also, another 33.3 percent of the respondents claimed that their activities created employment opportunities for other people. For example, fishing created opportunities for other people to be employed as fish mongers. Therefore, they contributed to employment creation along the value chain.

Besides, 13.7 percent of the respondents admitted that through their activities, they contributed to infrastructural development in their communities. Thus, they were usually

levied when the District Assembly was undertaking development projects such as construction of bore-hole which require community contribution or communal labour.

Again, 9.8 percent of respondents claimed that through their activities they were able to provide for the educational needs of their children who are the future leaders of the community and the nation at large; whilst another 9.8 percent of respondents asserted that they were able to increase the accumulation of their assets or wealth through their economic activities as shown in Table 4.11.

Table 4.11: Contribution of Occupation to Development

Contribution	Frequency	Percent
Payment of tax to town council	34	33.3
Create of employment	34	33.3
Provide for children's educational needs	10	9.8
Contribute to infrastructure development	14	13.7
Increase in asset accumulation	10	9.8
Total	**102**	**100.0**

Source: Field Survey, 2012.

Notwithstanding the above, farming activities in the communities especially food crop farming contributed to increase and availability of a variety of food items in the district which increased people's food consumption choices and preferences.

Moreover, the farming activities (crop farming, fishing and herding) provided farmers with income through the sale of their output. This increased their purchasing power and enabled them to consume tradable goods. Besides, increased in their income levels contributed in reducing poverty among the farmers.

4.10 Measures Put in Place by Traditional Authority and District Assembly to Address the Distribution of Agricultural Land Use in the District

This objective was aimed at examining the measures the traditional authority (chiefs) and the District Assembly put in place to address the problem emanating from the distribution of agricultural land use.

From the data that was collected, the traditional authority and District Assembly disclosed that food crop farmers occasionally had their farms destroyed and displaced by the activities of the Fulani nomads and bio fuel farmers. This situation however was managed by the traditional authority, by means of making the perpetrators compensate the affected victims with some amounts of money for the damages caused.

In spite of this, the traditional authority (chiefs) and District Assembly also disclosed that certain measures were put in place to ensure harmony and peaceful coexistence among all resource users in their areas of jurisdiction. These included the following:

- Adjudication of conflicts among resource users;
- Appointment of people to monitor the activities of resource users and report;
- Enactment of by-laws governing the use of the resources;
- Sanctioning of persons who break by-laws; and
- Payment of compensation to affected victims by perpetrators

The traditional authority (chiefs) also revealed that, the issue of competition for agricultural land use could be addressed at the community level by giving more priority to the food crop farmers and fishermen in the community and also ensuring that poor lands were given to the Fulani nomads whilst a better approach was found to manage the influx of the bio fuel farmers.

Notwithstanding the information elicited from the traditional authority and District Assembly, the agricultural land users also outlined various measures they believed could be adopted to address the competition for agricultural land use in the Central Gonja district. These measures are outlined as follows:

- There should be proper enforcement of the by-laws enacted to govern the use of the resources;
- There should be proper procedure and guidelines that are fair and transparent in allocating resources among resource users;
- The traditional authority should stop taking bribes from the nomadic herdsmen which will enable them pass fair judgment when a case is brought before them;
- The nomadic herdsmen should be allocated an area for grazing their cattle which should be far away from the farms.
- There should be good public or human relations among all resource users.

Notwithstanding the above measures, resource users at their own individual level took some other measures to prevent the occurrence of conflict between them and other resource users. These measures included the following:

- Development of cordial relationship with other resource users;
- Cautioning herdsmen to take good care of their cattle so that they do not destroy farms;
- Exercising patience and ensuring peaceful coexistence with other resource users;
- Negotiation and discussion with other resource users so as to have a common understanding; and
- Respect for the rights of other resource users.

CHAPTER FIVE: SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This chapter presents a summary of the findings. The chapter also draws conclusions from the findings. Finally the chapter provides some recommendation for consideration by policy makers and appropriate authorities for action.

5.2 Summary of Major Findings

The purpose of the research was to examine the distribution of agricultural land use and its implication (s) for development. Several key issues emerged from the research and these form the basis for recommending appropriate solutions. The major findings are presented as follows.

5.2.1 Resource Needs of Agricultural Land Users.

From the research conducted, it was revealed that the main resource needs of the food crop farmers were arable lands, grass land and the White and Black Volta rivers in the district. The farmers used the arable lands to cultivate their food crops at the same time as they depended on the grass land indirectly to influences rainfall for their food crops. Also some farmers (about 2 percent) depended on the White and Black Volta rivers during the dry season for their farming. These farmers move closer to the riverbanks to cultivate their food crops because of the benefit they will derive from the rivers.

Again it was discovered that the fishermen's resource needs were the water bodies which comprise of the rivers and ponds in the district. They depended on these water bodies for their fishing activities.

In addition, the bio fuel farmers' resource needs were arable lands. They used the arable lands to cultivate their jatropha.

Finally the Fulani herdsmen's resource needs were cattle, arable lands, grass land, harvested farms and water bodies.

5.2.2 Availability of Resources

For majority of the respondents (72.5 per cent) resources were usually available all year round to undertake their productive activities whilst about 27.5 percent of respondents experienced seasonal availability of resources for production.

5.2.3 Mode of Gaining Access to Resources

Respondents acquired resources through various forms including inheritance, right of being a member of a clan or family, through international laws, negotiations with traditional owners of the resources, and through the chiefs. Among the respondents (i.e 52 percent), the right of being a member of a family or clan formed the main mode of getting access to the productive resources whilst few respondents got access to the resources through international laws such as ECOWAS.

5.2.4 The Nature of Demand for Resources

From the research conducted, it was discovered that arable lands were the most used resource as it was being used by 55.9 percent of the respondents with the major user being food crop farmers (48 percent) and other users such as bio fuel farmers (6.9 percent) and Fulani nomadic herdsmen (1 percent); while only 1 percent of respondents used cattle which is the least used resource by the Fulani nomadic herdsmen. Also, 13.7 percent of respondents comprising of food crop farmers (1 percent), Fulani nomadic herdsmen (1 percent) and fishermen (11.8 percent) used rivers, while 4.9 percent of respondents used ponds. Furthermore, 4.9 percent of respondents used grass land with food crop farmers being the

major users (3.9 percent). The use of the grass land by food crop farmers was indirect because the grass land influenced the rainfall pattern which they depended directly on for production. Besides, whilst 11.8 percent of respondents used a combination of farmlands and grass land with the major user being food crop farmers (9.8 percent), 2.9 percent used a combination of grass land, cattle and harvested farms. Harvested farms were only used by the nomadic herdsmen to feed their animals during the dry season. Again, 4.9 percent of respondents used rivers and ponds because they were engaged in fishing

5.2.5 Causes of the Distribution of Agricultural land use among Resource Users

With regards to the causes of distribution of agricultural land use among agricultural land users respondents alluded to several causes which includes bad public relations of some resource users, high population growth, poor resource use monitoring by land owners (the chiefs) and non-enforcement of agreements by the chiefs. Among these causes, non-enforcement of agreements was indicated by respondents as the major source of competition by 49.0 percent of the respondents whilst high population growth which was cited by 13.7 percent of respondents was the least cause of distribution of agricultural land use.

According to the respondents, in terms of non-enforcement of agreements, some resources such as land were allocated to some non-indigenes by the chiefs based on certain agreements which sometimes result in conflict but unfortunately enforcement by the chiefs was weak.

5.2.6 Impact of Climate Change on Resources

As it was established in chapter one, most of the people in the Central Gonja District rely heavily on climate sensitive resources such as water bodies and agricultural lands and these resources are gradually being depleted due to climate changes. These changes have immediate and indirect effects on the individuals. From the study it was revealed that, climate change impacted on the availability of the resources they depended on for their livelihoods.

Among the respondents, majority of them constituting 54.7 percent of the sample asserted that climate change brought about desertification which led to the reduction in soil fertility. Other responses indicated that, climate change led to heated water bodies killing fingerlings, irregular rainfall and insufficient water and grass to graze on.

5.2.7 Measures to Ensure Healthy Distribution of Agricultural Land Resources

In view of the fact that competition cannot be avoided, different measures have been put in place by the respondents to ensure a healthy competition. These include, respect for all resource users, cautioning herdsmen in handling their cattle well, reporting cases to the traditional rulers, applying fertilizer to arable lands and developing a cordial relationship with other resource users.

5.2.8 Influence of Agricultural Land Users on Development in the District

From the data collected, it was revealed that the activities of the various resource users contributed in one way or the other to the development of the District in diverse ways. Majority of the respondents constituting about 33.3 percent asserted to the fact that their activities contributed to the payment of tax to the town councils and the creation of job opportunities for women. The other respondents alluded to the fact that their activities contributed to increase in asset accumulation, infrastructural development and catering for children's school education.

5.2.9 Measures to Address the Distribution of Agricultural Land Use by Traditional Authority and District Assembly

Various measures have been put in place by the traditional authority and District Assembly to address the distribution of agricultural land use. These measures include enactment of by-laws governing, increase in technology for agricultural production among resource users,

appointing people to monitor the activities of resource users, sanctioning of persons who break by-laws and payment of compensations by perpetrators.

5.3 Recommendations

From the literature reviewed, it was established that Common Pool Resources such as agricultural lands provide a wide of range of social and economic benefits for variety of users. However its poor definition and enforcement of the institutional arrangement governing the use of these resources sometimes lead to social conflict and resource degradation. Likewise data collected also revealed that several factors lead to the distribution of agricultural lands such as limited resources, increase in population and non-enforcement of agreements among others. Based on these findings practical measures need to be taken to reduce the rate of competition.

5.3.1 Policies Addressing the Primary Drivers of Distribution of Agricultural Lands.

It is important to note that distribution of agricultural land use in itself is not a driver affecting food and farming in the future but has the potential to influence other drivers and in affecting food and farming in the near future. Hence in addressing these issues policies should rather be formulated to address the primary drivers that are emerging as a result of the distribution of agricultural land use. These drivers include population growth, dietary preferences and protected areas. Policies addressing these drivers and pressures could have a significant impact in reducing competition for agricultural lands.

5.3.2 National Framework to Integrate Competing Users

Since agricultural land resources are critical resources for the future of the rural people, it is important to develop a national framework to integrate the competing uses of land to help resolve inevitable conflicts. That is, national plans at the district level can integrate a diversity

of land uses and work with land owners and land users to provide a range of desired outcomes.

5.3.3 Technology for Increasing Productivity

Technologies for increasing productivity of agricultural land are very necessary in improving the infertility of arable lands caused by over grazing of cattle. Since agriculture offers an important path way for reducing poverty levels in the district, it is important that, farmers are supported with modern methods of growing crops so that they will be able to grow more to feed themselves and earn extra income. Techniques such as conservation agriculture can prevent the need for further clearing of natural habitats for agriculture and keep the forest and grass lands intact.

5.3.4 Effective Enforcement of By-Laws

The traditional authority and the District Assembly should revise and effectively enforce by-laws. By-laws that sanctions perpetrators and allow some to pay fines at the community levels should be effectively enforced. These will help reduce the breaching of agreements and default of some key resource users. Hence it is important to revise the existing by-laws by incorporating the key resource users and ensuring effective enforcement of the by-laws.

5.3.5 Chieftaincy Titles Suspended

It is important to note that, since traditional leaders (chiefs) play a central role in the distribution of agricultural land use in the district, measures should be put in place by the paramount chief of the Gonja community together with the District Assembly to suspend traditional leaders (chiefs) who connive with the Fulani pastoralist and bio fuel producers to deplete the agricultural land resources the community have been endowed with.

5.4 Conclusion

Distribution of agricultural land use resources among various key resource users is often very complex. There are usually many causes and many interconnected issues involved in resource distribution. However, it is important to note that the intensity of such distributions can greatly degenerate into conflict since resources are increasingly subject to intense competition. Therefore it is important that prudent and practical measures be adopted to fairly distribute resources among agricultural land users to help increase their contribution to the development of the district.

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APENDIX I

AGE AND SEX STRUCTURE OF THE CENTRAL GONJA DISTRICT

AGE	FEMALE	MALE
0-4	6300	6386
5-9	6473	6213
10-14	5350	5093
15-19	2502	4142
20-24	2243	3625
25-29	3686	3797
30-34	3452	2416
35-39	4401	2934
40-44	2985	1985
45-49	1640	1726
50-54	1294	1381
55-59	863	777
60-64	777	863
65+	2158	2416
TOTAL		

APPENDIX 2

MAJOR FOOD CROPS AND THEIR PRODUCTION ZONES IN THE CENTRAL GONJA DISTRICT

CROP	MAJOR PRODUCING ZONES
Maize	Sankpala, Kusawgu and Yapei zones.
Yam	Mpaha, Kusawgu, Chama, Lito and Sankpala zones.
Groundnut	Sankpala, Kusawgu, Yapei, and Buipe zones
Rice	Sankpala, Yapei, Kusawgu, zones.
Cassava	Buipe, Lito, Mpaha, Kusawgu, Yapei, and Sankpala zones.
Cowpea	Sankpala, Kusawgu, Yapei and Buipe.
Soybean	Sankpala, Kusawgu, Yapei and Buipe.
Sorghum	Lito, Sankpala, Kusawgu, Chama and Yapei

APPENDIX 3

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ARCHITECTURE AND PLANNING

DEPARTMENT OF PLANNING

This Research Instrument is designed to collect data for a special study on the topic:

DISTRIBUTION OF AGRICULTURAL LAND USE AND ITS IMPLICATIONS FOR DEVELOPMENT: THE CASE OF CENTRAL GONJA DISTRICT OF GHANA.

INTERVIEW GUIDE FOR BIO FUEL FARMERS.

Name of Respondent: ……

Date of interview: ……...

Time of interview: ……

Name of community: ……

1) Age: ……..

2) Sex: Male[ ] Female [ ]

3) Ethnic group:……

4) Marital status:

   a. Single [ ]

   b. Married [ ]

   c. Divorce [ ]

   d. Other (Specify) ……

5) Educational level:

   a. Primary [ ]

   b. JHS/Middle school [ ]

c. SHS [ ]

d. Post-Secondary/Nursing

e. Tertiary [ ]

f. Quaranic Education

g. None [ ]

h. Other (specify)……..

6) What is your primary occupation?

a. Farming (cash crop producer) [ ]

b. Farming (food crop producer) [ ]

c. Fishing [ ]

d. Nomadic herder [ ]

e. Others (specify)……..

7) How do you carry out your primary occupation? ……

……

8) What resource(s) do you use to carry out your primary occupation?

a. Arable lands/crop land/farm land [ ]

b. Water bodies (river, ponds, lake) specify…….

c. Grass land [ ]

d. Cattle [ ]

9) How do you gain access to the resource(s) mentioned above?

a. Through inheritance

b. As a right of being a member of a family or clan

c. By virtue of private negotiation with traditional owners of those resources

d. By national or international laws example ECOWAS

e. Others (specify)…….

10) Do you have sufficient access or exclusive right over these resources? Yes [ ] No [ ] if no why?……

……

11) How do you use these resource(s) in carrying out your activities? (What are your methods of fishing)……

……

12) What categories of people require the same or similar resources that you use?

……

…..

13) How extensive are the resources mentioned above in the in the community

a. They occur seasonally [ ]

b. All year round [ ]

c. Others(specify)……

14) How would you rate the nature of demand on these resources?

a. Arable land/crop land/farm land: very high[ ] high[ ]very low [ ] low[ ] medium[ ]

b. Water bodies (river, ponds, lake): very high[ ] high[ ]very low [ ] low[ ] medium[]

c. Grass land: very high[ ] high[ ]very low [ ] low[ ] medium[ ]

d. Cattle: very high[ ] high[ ]very low [ ] low[ ] medium[ ]

15) Does climatic change have an impact on the availability of these resources? Yes and No if yes how does it affect it?.....

.....

16) Does the demand for;

a. Crop land for herding affect farming activities? Yes or No; if yes how?……

……

……

b. Water for herding affect fishing activities? Yes or No; if yes how?……

……

……

c. Crop lands for commercial farming affect food crop farming? Yes or No; if yes how?

……

……

d. Grass land for herding affect farming activities? Yes or No; if yes how?……

……

……....

17) In what ways do you the cash crop farmer think the various resource users are able to gain advantage of access to these resources mentioned above over you? For example, how does the bio fuel farmer gain access to the ponds over you? ……..

18) How do you assert your rights to these resources?

a. By shooting strangers on arable lands [ ]

b. Organizing and killing animals[ ]

c. Pouring poisonous chemicals on farm crops[ ]

d. Others (specify)……

19) What in your view are the causes of distribution ofagricultural land use in the community?

a. Over Population [ ]

b. Limited Resources[ ]

c. Poor management of resources by land owners

d. Bad public relations

e. None enforcement of agreements

f. Others (specify)……

20) How do the challenges above affect your farming activities

a. Economically (livelihood)……

……

b. Socially (Education, Health, Water)……

……..……

……

c. Psychologically……

……

d. Others (specify)……

……

21) How can you ensure harmony in the competition for these resources?.....

.....

.....

22) How do the traditional rulers ensure there is peace and harmony among the various users of these resources?.....

.....

.....

23) What did you put in place to ensure healthy distribution of limited resource use?.....

.....

.....

24) In what ways does your primary occupation contribute to the development of the community?.....

.....

.....

25) How does your farming influence

a. Availability of food ……

……

b. Tradable resources……

……

……

c. Income or capital accumulation in the community……

……

……

26) In what ways do you think the problem of the distribution of agricultural land use can be addressed?.....

.....

.....

APPENDIX 4

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ARCHITECTURE AND PLANNING

DEPARTMENT OF PLANNING

This Research Instrument is designed to collect data for a special study on the topic: DISTRIBUTION OF AGRICULTURAL LAND USE AND ITS IMPLICATIONS FOR DEVELOPMENT: THE CASE OF CENTRAL GONJA DISTRICT OF GHANA.

INTERVIEW GUIDE FOR FISHERMEN.

Name of Respondent: ……

Date of interview: ……...

Time of interview: ……

Name of community: ……

1. Age: ……..
2. Sex: Male[ ] Female [ ]
3. Ethnic group:……
4. Marital status:
    a. Single [ ]
    b. Married [ ]
    c. Divorce [ ]
    d. Other (Specify) …….
5. Educational level:
    a. Primary [ ]
    b. JHS/Middle school [ ]

c. SHS [ ]

d. Post-Secondary/Nursing

e. Tertiary [ ]

f. Quaranic Education

g. None [ ]

h. Other (specify)……..

6. What is your primary occupation?

a. Farming (cash crop producer) [ ]

b. Farming (food crop producer) [ ]

c. Fishing [ ]

d. Nomadic herder [ ]

e. Others (specify)……..

7. How do you carry out your primary occupation? ……

……

……..

8. What resource(s) do you use to carry out your primary occupation?

a. Arable lands/crop land/farm land [ ]

b. Water bodies (river, ponds, lake) specify…….

c. Grass land [ ]

d. Cattle [ ]

9. How do you gain access to the resource(s) mentioned above?

a. Through inheritance

b. As a right of being a member of a family or clan

c. By virtue of private negotiation with traditional owners of those resources

d. By national or international laws example ECOWAS

e. Others (specify)…….

10. Do you have sufficient access or exclusive right over these resources? Yes [ ] No [ ] if no why?……

……

11. How do you use these resource(s) in carrying out your activities? (What are your methods of fishing)……

……

……

12. What categories of people require the same or similar resources that you use?

……

….....

13. How extensive are the resources mentioned above in the in the community

a. They occur seasonally [ ]

b. All year round [ ]

c. Others (specify)……

……

14. How would you rate the nature of demand on these resources?

e. Arable land/crop land/farm land: very high[ ] high[ ]very low [ ] low[ ] medium[ ]

f. Water bodies (river, ponds, lake): very high[ ] high[ ]very low [ ] low[ ] medium[]

g. Grass land: very high[ ] high[ ]very low [ ] low[ ] medium[ ]

h. Cattle: very high[ ] high[ ]very low [ ] low[ ] medium[ ]

15. Does climatic change have an impact on the availability of these resources? Yes and No if yes how does it affect it?.....

.....

16. Does the demand for;

    e. Crop land for herding affect farming activities? Yes or No; if yes how?……

    ……

    f. Water for herding affect fishing activities? Yes or No; if yes how?……

    ……

    g. Crop lands for commercial farming affect food crop farming? Yes or No; if yes how?……

    ……

    h. Grass land for herding affect farming activities? Yes or No; if yes how?……

    ……

17. In what ways do you the fisherman think the various resource users are able to gain advantage of access to these resources mentioned above over you? For example, how does the fisherman gain access to the ponds over you?

18. How do you assert your rights to these resources?

    e. By shooting strangers on arable lands [ ]

    f. Organizing and killing animals[ ]

    g. Pouring poisonous chemicals on farm crops[ ]

    h. Others (specify)……

19. What in your view are the causes of the distribution of agricultural land use in the community?

    g. Over Population [ ]

h. Limited Resources[ ]

i. Poor management of resources by land owners

j. Bad public relations

k. None enforcement of agreements

l. Others (specify)……

20. How do the challenges above affect your fishing

e. Economically (livelihood)……

……

f. Socially (Education, Health, Water)……

……

g. Psychologically……

……

h. Others (specify)……

……

21. How can you ensure harmony in the distribution of these resources?.....

.....

22. How do the traditional rulers ensure there is peace and harmony among the various users of these resources?.....

.....

.....

23. What did you put in place to ensure healthy distribution of limited resource use?.....

.....

.....

24. In what ways does your primary occupation contribute to the development of the community?.....

.....

.....

25. How does your fishing influence

d. Availability of food ……

……

……

e. Tradable resources……

……

……

……

f. Income or capital accumulation in the community……

……

……

……

26. In what ways do you think the problem of the distribution of agricultural land use can be addressed?.....

.....

.....

APPENDIX 5

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ARCHITECTURE AND PLANNING

DEPARTMENT OF PLANNING

This Research Instrument is designed to collect data for a special study on the topic: DISTRIBUTION OF AGRICULTURAL LAND USE AND ITS IMPLICATIONS FOR DEVELOPMENT: THE CASE OF CENTRAL GONJA DISTRICT OF GHANA.

INTERVIEW GUIDE FOR FULANI HERDERS.

Name of Respondent: ……

Date of interview: ……...

Time of interview: ……

Name of community: ……

1. Age: ……..
2. Sex: Male[ ] Female [ ]
3. Ethnic group:……
4. Marital status:
    e. Single [ ]
    f. Married [ ]
    g. Divorce [ ]
    h. Other (Specify) …….
5. Educational level:
    i. Primary [ ]
    j. JHS/Middle school [ ]

k. SHS [ ]

l. Post-Secondary/Nursing

m. Tertiary [ ]

n. Quaranic Education

o. None [ ]

p. Other (specify)……..

6. What is your primary occupation?

f. Farming (cash crop producer) [ ]

g. Farming (food crop producer) [ ]

h. Fishing [ ]

i. Nomadic herder [ ]

j. Others (specify)……..

7. How do you carry out your primary occupation? ……

……

……..

8. What resource(s) do you use to carry out your primary occupation?

e. Arable lands/crop land/farm land [ ]

f. Water bodies (river, ponds, lake) specify…….

g. Grass land [ ]

h. Cattle [ ]

9. How do you gain access to the resource(s) mentioned above?

f. Through inheritance

g. As a right of being a member of a family or clan

h. By virtue of private negotiation with traditional owners of those resources

i. By national or international laws example ECOWAS

j. Others (specify)…….

10. Do you have sufficient access or exclusive right over these resources? Yes [ ] No [ ] if no why?……

……

……

……

11. How do you use these resource(s) in carrying out your activities? (What are your methods of operation)……

……

……

12. What categories of people require the same or similar resources that you use?

……

…..

13. How extensive are the resources mentioned above in the in the community

d. They occur seasonally [ ]

e. All year round [ ]

f. Others (specify)……

……..

14. How would you rate the nature of demand on these resources?

i. Arable land/crop land/farm land: very high[ ] high[ ]very low [ ] low[ ] medium[ ]

j. Water bodies (river, ponds, lake): very high[ ] high[ ]very low [ ] low[ ] medium[]

k. Grass land: very high[ ] high[ ]very low [ ] low[ ] medium[ ]

l. Cattle: very high[ ] high[ ]very low [ ] low[ ] medium[ ]

15. Does climatic change have an impact on the availability of these resources? Yes and No if yes how does it affect it?.....

.....

.....

16. Does the demand for;

i. Crop land for herding affect farming activities? Yes or No; if yes how?……

……

j. Water for herding affect fishing activities? Yes or No; if yes how?……

……

k. Crop lands for commercial farming affect food crop farming? Yes or No; if yes how?……

……

l. Grass land for herding affect farming activities? Yes or No; if yes how?……

……

17. In what ways do you the Fulani nomad think the various resource users are able to gain advantage of access to these resources mentioned above over you? For example, how do the nomadic herdsmen gain access to the ponds over you?.....

18. How do you assert your rights to these resources?

i. By shooting strangers on arable lands [ ]

j. Organizing and killing animals[ ]

k. Pouring poisonous chemicals on farm crops[ ]

l. Others (specify)……

19. What in your view are the causes of the distribution of agricultural land use in the community?

m. Over Population [ ]

n. Limited Resources[ ]

o. Poor management of resources by land owners

p. Bad public relations

q. None enforcement of agreements

r. Others (specify)……

20. How do the challenges above affect your nomadic activities

i. Economically

(livelihood)……

……

j. Socially (Education, Health, Water)……

……

k. Psychologically……

……

l. Others (specify)……

……

21. How can you ensure harmony in the distribution of these resources?.....

.....

22. How do the traditional rulers ensure there is peace and harmony among the various users of these resources?.....

.....

.....

23. What did you put in place to ensure healthy distribution of limited resource use?.....

.....

24. In what ways does your primary occupation contribute to the development of the community?.....

.....

25. How does your nomadic activities

g. Availability of food ……

……

h. Tradable resources……

……

……

i. Income or capital accumulation in the community……

……

26. In what ways do you think the problem of distribution of agricultural land use can be addressed?.....

.....

APPENDIX 6

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ARCHITECTURE AND PLANNING

DEPARTMENT OF PLANNING

This Research Instrument is designed to collect data for a special study on the topic:

DISTRIBUTION OF AGRICULTURAL LAND USE AND ITS IMPLICATIONS FOR DEVELOPMENT: THE CASE OF CENTRAL GONJA DISTRICT OF GHANA.

INTERVIEW GUIDE FOR FOOD CROP FARMERS.

Name of Respondent: ……

Date of interview: ……...

Time of interview: ……

Name of community: ……

INTERVIEWEE'S PERSONAL INFORMATION

1. Age: ……..
2. Sex: Male[ ] Female [ ]
3. Ethnic group:……
4. Marital status:
    a. Single [ ]
    b. Married [ ]
    c. Divorce [ ]
    d. Other (Specify) …….
5. Educational level:
    a. Primary [ ]

b. JHS/Middle school [ ]

c. SHS [ ]

d. Post-Secondary/Nursing

e. Tertiary [ ]

f. Quaranic Education

g. None [ ]

h. Other (specify)……..

6. What is your primary occupation?

k. Farming (cash crop producer) [ ]

l. Farming (food crop producer) [ ]

m. Fishing [ ]

n. Nomadic herder [ ]

o. Others (specify)……..

7. How do you carry out your primary occupation? ……

……

……..

8. What resource(s) do you use to carry out your primary occupation?

a. Arable land/crop land/farm land [ ]

b. Water bodies (river, ponds, lake) specify…….

c. Grass land [ ]

d. Cattle [ ]

9. How do you gain access to the resource(s) mentioned above?

a. Through inheritance

b. As a right of being a member of a family or clan

c. By virtue of private negotiation with traditional owners of those resources

d. By national or international laws example ECOWAS

e. Others (specify)…….

10. Do you have sufficient access or exclusive right over these resources? Yes [ ] No [ ] if no why?……

……

……

……

11. How do you use these resource(s) in carrying out your activities? (What are your methods of farming)……

……

……

……

12. What categories of people require the same or similar resources that you use?

……

….....

.....

13. How extensive are the resources mentioned above in the in the community

a. They occur seasonally [ ]

b. All year round [ ]

c. Others (specify)……

……..

14. How would you rate the nature of demand on these resources?

a. Arable land/crop land/farm land: very high[ ] high[ ]very low [ ] low[ ] medium[ ]

b. Water bodies (river, ponds, lake): very high[ ] high[ ]very low [ ] low[ ] medium[]

c. Grass land: very high[ ] high[ ]very low [ ] low[ ] medium[ ]

d. Cattle: very high[ ] high[ ]very low [ ] low[ ] medium[ ]

15. Does climatic change have an impact on the availability of these resources? Yes and No if yes how does it affect it?.....

.....

.....

.....

16. Does the demand for;

a. Crop land for herding affect farming activities? Yes or No; if yes how?……

……

……

b. Water for herding affect fishing activities? Yes or No; if yes how?……

……

……

c. Crop lands for commercial farming affect food crop farming? Yes or No; if yes how?……

……

……

d. Grass land for herding affect farming activities? Yes or No; if yes how?……

……

……

17. In what ways do you the food crop farmer think the various resource users are able to gain advantage of access to these resources mentioned above over you? For example, how does the food crop farmer gain access to the ponds over you?
18. How do you assert your rights to these resources?

a. By shooting strangers on arable lands [ ]
b. Organizing and killing animals[ ]
c. Pouring poisonous chemicals on farm crops[ ]
d. Others (specify)……

19. What in your view are the causes of distribution of agricultural land use in the community?

a. Over Population [ ]
b. Limited Resources[ ]
c. Poor management of resources by land owners
d. Bad public relations
e. None enforcement of agreements
f. Others (specify)……

20. How do the challenges above affect your farming

a. Economically (livelihood)……

……

…….....

b. Socially (Education, Health, Water)……

……

……

c. Psychologically……

……

……

d. Others (specify)……

……

……

21. How can you ensure harmony in the distribution of these resources?.....

.....

.....

22. How do the traditional rulers ensure there is peace and harmony among the various users of these resources?.....

.....

.....

23. What did you put in place to ensure healthy distribution of limited resource use?.....

.....

.....

.....

24. In what ways does your primary occupation contribute to the development of the community?.....

.....

.....

25. How does your farming influence

a. Availability of food ……

……

……

b. Tradable resources……

……

……

……

c. Income or capital accumulation in the community……

……

……

……

26. In what ways do you think the problem of distribution of agricultural land use can be addressed?.....

.....

.....

APPENDIX 7

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ARCHITECTURE AND PLANNING

DEPARTMENT OF PLANNING

This Research Instrument is designed to collect data for a special study on the topic: DISTRIBUTION OF AGRICULTURAL LAND USE AND ITS IMPLICATIONS FOR DEVELOPMENT: THE CASE OF CENTRAL GONJA DISTRICT OF GHANA.

INTERVIEW GUIDE FOR DISTRICT PLANNING AND COORDINATING UNIT AT CENTRAL GONJA DISTRICT.

1. How does agricultural land use conflict manifest itself in your district?.....

.....

.....

.....

2. What measures has your District Assembly put in place to manage the conflict?.....

.....

.....

.....

3. Have there been instances where a particular project or economic activity has been stopped because of the conflict arising from the distribution of resource? Yes or no;

    a. If yes which project or economic activity…….

    ……

    …….

b. When did it happen?.....

.....

.....

c. What was the outcome?.....

.....

.....

4. How frequent do conflicts over agricultural land use arise?.....

.....

.....

5. In what ways do you think the problem of distribution of agricultural land use can be address

a. Organizing peace conferences[ ]

b. Zoning of the areas in the community[ ]

c. Ensuring strict enforcement of laws[ ]

d. Employing Alternative Dispute Resolution measure[ ]

e. Others (specify)……

……

6. Why do you adopt this particular method instead of the others chosen above?.....

.....

.....

APPENDIX 8

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF ARCHITECTURE AND PLANNING

DEPARTMENT OF PLANNING

This Research Instrument is designed to collect data for a special study on the topic: DISTRIBUTION OF AGRICULTURAL LAND USE AND ITS IMPLICATION FOR DEVELOPMENT: THE CASE OF CENTRAL GONJA DISTRICT OF GHANA.

INTERVIEW GUIDE FOR THE TRADITIONAL RULERS AT CENTRAL GONJA DISTRICT.

1. In what ways does the conflict arising the distribution of agricultural lands manifest itself in your district?.....

.....

.....

.....

2. What measures have the traditional authority put in place to manage the conflict?.....

.....

3. Have there been instances where a particular project or community activity been stopped because of the conflict arising from the distribution of resource? Yes or no;

    a. If yes which project or economic activity…….

    ……

    ……

b. When did it happen?.....

.....

.....

c. What was the outcome?.....

.....

.....

4. How frequent do conflicts over agricultural land use arise?.....

.....

.....

5. In what ways do you think the problem of distribution of agricultural land use can be address

f. Organizing peace conferences[ ]

a. Zoning of the areas in the community[ ]

b. Ensuring strict enforcement of laws[ ]

c. Employing Alternative Dispute Resolution measure[ ]

d. Others (specify)……

……

……

……

6. Why do you adopt this particular method instead of the others chosen above?.....

.....

.....