UNIVERSITY FOR DEVELOPMENT STUDIES

EFFECTS OF ETHNIC CONFLICTS ON LIVESTOCK PRODUCTION: A CASE STUDY OF THE BAWKU MUNICIPALITY OF THE UPPER EAST REGION

BY

BARIYAM TAMILKA SERAPHINE (B.Sc. Agricultural Technology)

(UDS/MAN/0016/14)

THESIS DISSERTATION SUBMITTED TO THE DEPARTMENT OF ANIMAL SCIENCE, FACULTY OF AGRICULTURE, UNIVERSITY FOR DEVELOPMENT STUDIES, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PHILOSOPHY IN ANIMAL SCIENCE.

(PRODUCTION)

2018

DECLARATION

I, Bariyam Tamilka Seraphine, hereby declare that this thesis is my own work for the award of a Master of Philosophy in Animal Science and that to the best of my knowledge, it contains no material previously published by another person, nor material which has been accepted for the award of any other degree, except those for which due acknowledgement has been made in the text.

Bariyam Tamilka Seraphine	……..	……..
(Student)	**Signature**	**Date**

Supervised by:

Prof. Addah Weseh	……..	……..
(Principal Supervisor)	**Signature**	**Date**
Mr. Benjamin Alenyorege	……..	……..
(Co- Supervisor)	**Signature**	**Date**
Dr. Anthony Amison Agbolosu	……..	……..
(Head of Department)	**Signature**	**Date**

ABSTRACT

The perennial conflicts in Northern Ghana have affected economic activities and the animal production industry. This study investigated the effects of ethnic conflicts on livestock production in the Bawku Municipality. Semi-structured questionnaire were used to interview respondents. Data was collected on the effects of ethnic conflicts on livestock farmers, butchers, food vendors, livestock traders, veterinary officers and key informant in the Bawku Municipality. The data gathered was analysed using PROC FREQ procedure of SAS. Livestock production data was analysed using PROC FREQ whereas prices and incomes of respondents were analysed by the MIXED LINEAR MODULE procedure of SAS for PROC FREQ. Differences were tested by the Chi square test of proportions. Ethnic conflicts in Bawku is usually triggered by the celebration of the "Samanpiid" festival and then fueled by political party politics. The severest ethnic conflict occurred in the 2000-2001 and this period was used as the reference period for this study. Common livestock produced in the area included: cattle, sheep, goats, poultry and pigs. Commonest housing systems for livestock were the extensive system (82%) with only 14% and 4% practicing the intensive and semi-intensive system of management, respectively. The average number of cattle, sheep, goats, pigs and poultry before the conflict were 5, 9, 11, 1 and 10 respectively and the numbers after the conflict were 1,3,4,5 and 0, respectively. The corresponding percentage reduction/increase was 80%, 66.7%, 63.6%, 400%, and 100% respectively. The losses were attributed to starvation (2%), poisoning (2%), indiscriminate killing (13%) and stealing (83%). The prices of livestock differed greatly (<.0001) before and after the conflict. The market prices of cattle, sheep and goats before the conflict were GHS 1222.00, GHS 293.20 and GHS 562.40, respectively but these increased to GHS

3040.00, GHS 658.00 and GHS 1184.00 respectively, after the conflict. The higher price of the animals after the conflict was attributed to the reduction in animal numbers. This resulted in a reduction/increase (<.0001) in the income levels of respondents after the conflict from GHS 3046.64 to GHS 611.04 (livestock farmers), GHS 3000 to GHS 3500 (livestock traders), GHS 3000 to GHS 2428.85 (Food vendors), GHS 3000 to GHS 2000 (Butchers), GHS 3000 to GHS 2000 (Veterinary officers), respectively. The conflict also affected the activities of livestock traders. Generally, livestock production was adversely affected because volume of production and levels of incomes generated from livestock production decreased due to the excesses of the conflicts. The livestock management systems in Ghana are basically subsistent and therefore the industry suffers most during conflicts. Policies on alternative dispute resolution should be implemented to curb the rampant ethnic conflicts in the area.

DEDICATION

I dedicate this work to my parents, siblings and lovely niece Melissa Telgaal Bariyam.

ACKNOWLEDGEMENTS

I wish to extend my sincere gratitude to God who made it possible for me to undertake this academic exercise. I would not have attained this level of success in this research without the assistance of my supervisors, Prof. Addah Weseh and Mr. Benjamin Alenyorege. I am grateful for their patience and guidance.

I also thank Mr. Sulley Fuseini, the immediate past district veterinary officer for the Bawku municipality for his help with secondary data used in this study. I cannot forget Alhaji Abdul- Salam Issaka, a livestock trader and secretary to the livestock traders association for his immense support. I am also grateful to my family, friends, staff and students of the Department of Animal Science for their support.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

LIST OF APPENDICES

LIST OF ACRONYMS/ABBREVIATIONS

AQIM	Al-Qaeda in the Islamic Magreb
AU	African Union
CSO	Civil Society Organisation
CBPP	Contagious Bovine Plueropnemonia
ECPF	ECOWAS Conflict Prevention Framework
ECOWAS	Economic Community of West African States
EFCC	Economic and Financial Crimes Commission
FAO	Food and Agriculture Organisation
GSS	Ghana Statistical Service
ILRI	International Livestock Research Institute
JHS	Junior High School
LURD	Liberians United for Reconciliation and Democracy
MEND	Movement for the Emancipation of Niger Delta
MODEL	Movement for Democracy in Liberia
MOFA	Ministry of Food and Agriculture

NGO	Non-Governmental Organization
NMLA	National Movement for the Liberation of Azawad
NPFL	National Patriotic Front of Liberia
RUF	Revolutionary United Front
SALW	Small Arms and Light Weapons
SAS	Statistical Analysis Software
SHS	Senior High School
SNAP	Syrian Needs Assessment Project
TRC	Truth and Reconciliation Commission
UN	United Nations
UNDP	United Nations Development Programme
WANEP	West African Network for Peace building

CHAPTER ONE

GENERAL INTRODUCTION

1.1 Background to the study

The concept of conflict has several definitions because of the variations in magnitude, influencing factors and other issues that underscore its occurrences. Conflict is defined as any violent confrontation that involves armed struggle between groups, state and groups, and two or more states (Bujra, 2002). Conflict is also defined as clashes of interests that result from interactions between parties, groups or states due to opposing and/or incompatible goals (Oyeniyi 2011). Although the concept of conflict in some cases is used interchangeably with war, war is mostly restricted to violent conflicts involving violent struggles with arms. Conflict is therefore a normal form of conducting disputes between and among groups and parties in the societal settings (Oyeniyi, 2011). According to the World Bank, war is described as any conflict that results in more than 1,000 combat related deaths per year (World Bank Seminar Series Development report 2011). It is indicated that the causes of conflicts in Africa are several and they frequently recur. The commonly noted causes of conflicts in Africa include: issues of inter-state borders, ethnicity, military, international politics, domestic politics, persecution, discrimination, natural resource access/use and poor economic performances (Oyeniyi, 2011). In another view, the causes of conflicts in developing countries are said to be varied but often consistent. These include; ethnic rivalries, unfair allocation and control of natural resources (land, water, forest, mineral and oil resources), an imbalance in the distribution of the national cake,

colonial and post-colonial land tenure arrangements and selfish political manipulations (Messer and Cohen, 2004; Bacho and Abdul-Kadir, 2007).

Conflict and war are related but they are different in content and scope. Wars are associated with violent and destructive tendencies whereas conflicts could occur without loss of lives and property unlike war situations. Depending on the scale, conflict could be scaled to war situation. Conflicts often occur within a certain political, social and cultural dimensions. According to Kendie and Akudugu (2010), although Ghana is internationally acclaimed as the most peaceful country in West Africa, it has experienced some pockets of conflicts that are mainly inter-ethnic and intra-ethnic disputes resulting from disputes over chieftaincy, land, identity and resources and ethnic struggles for state political power (Kendie and Akudugu, 2010; Tsikata and Seini, 2004).

The effects of conflict are manifested variously in most African countries. In Ghana, violent conflict has resulted in loss of innocent human lives. In the period of 1994-1995, the Konkomba and Nanumba/Dagomba conflict is recorded to have claimed over 2000 human lives in Northern region of Ghana (Mahama, 2003). The Food and Agriculture Organization reported that conflicts cost Africa over $120 billion worth of agricultural production during the last third of the twentieth century resulting in 198,000,000 people suffering from food insecurity (FAO, 2004). In the Northern Region of Ghana, research has shown that the 1994-1995 Guinea fowl triggered conflict adversely affected livestock production in the conflict areas. Whereas every household had livestock before the Guinea fowl conflict only 23% of households still had livestock after it ended. (Addah and Zezebi, 2008). Similarly, Addah (2009) investigated the impact of ethnic conflicts on cattle

population in the Eastern Corridor of the Northern Region of Ghana. It was obvious from these studies that ethnic conflicts especially those that are inter-ethnic are acknowledged to have much negative impact on livestock production in other places of the northern part of Ghana. The Bawku area has been plagued with recurrent ethnic conflicts but the effect of these conflicts on livestock production has been studied in Bawku Municipality in the Upper East Region of Ghana.

1.2 Significance of the Study

The significance of this study to stakeholders such as the Government, Donors, Non-governmental organizations (NGOs), civil society and researchers as well as the communities cannot be overemphasized. In the first place, the study profiled the nature of the ethnic conflict in Bawku Municipality, showcased the state of ruminant production and demonstrated how the ethnic conflicts affected the production of ruminants in the municipality. The outcome of this study serves as benchmarks for development actors to make interventions especially on mitigating the adverse effects of the ethnic conflicts in the study area. It also contributes to a body of knowledge and literature on ethnic conflicts and their impacts on socio-economic life of the affected people. In addition, the findings of the study equally serve as bases upon which further researches could be conducted.

1.3 Problem Statement

The Bawku conflict is a deep-seated and longstanding ethno-political conflict between two ethnic groups; the Mamprusis and Kusasis in the Bawku Traditional Area of the Upper East region of Ghana. The conflict is identity-based, and revolves around the claim for the traditional political power or chieftaincy between the Kusasis and the Mamprusis. It dates back to the colonial times and has taken different twists since then and remained intense

and unresolved. The two ethnic groups involved have taken entrenched positions. Over the years, governments and other development stakeholders have made peace building efforts on the conflict to no avail. Meanwhile, the conflict remains protracted and prolonged and adversely impacting on local development in terms of businesses, education, healthcare, agriculture and security (Kendie and Bukari, 2010). However, there is inadequate research on the conflict and how the conflict impacts economic activities of the people. It is evident that livestock production is a major economic livelihood activity among the people in the conflict area. Meanwhile, empirical study is lacking on the impact of the conflict on livestock production in the Bawku Municipality of Upper East Region. The inadequate, biased and lack of empirical study on the impact of ethnic conflicts on livestock production in Bawku Municipality underscore this study.

1.4 Research Objectives

The main objective of this study is to determine the effects of the ethnic conflicts in Bawku on livestock production. Specifically, the study sought to determine the effects of the 2000 – 2001 ethnic conflict on livestock production

1.5 Research Questions

i. What is the nature of ethnic conflicts in the Bawku Municipality?

ii. What is the state of livestock production in the Municipality?

iii. How does the ethnic conflict affect livestock production and other industries that depend on the livestock production in the Municipality?

1.6 Ethical Considerations

Proper community entry was done during primary data collection. Preliminary field visits were used to assess and identify the power dynamics (chain of command) of each of the sampled communities. The rationale was to ensure that appropriate channels were used for community entry. This practice facilitated and enhanced rapport building and acceptability of the researchers in view of the volatility of the study area relative to the subject matter of the study. Also, the purpose of this study was adequately explained to the respondents and institutions who were involved. This practice enhanced trust for disclosure of detailed and relevant information for the study. As much as possible sensitive questions were avoided and those that are germane were tactically posed to the respondents. Respondents were also given assurance of confidentiality of the information to be given and that it shall not be shared with any other respondents. Primary data were equally cleaned as part of best practices to ensure that results reflect the reality of the variables under investigation.

CHAPTER TWO

LITERATURE REVIEW

2.1.1 Ethnic Conflict

Ethnic conflict is any episode of sustained violent conflict in which nationals, ethnic and religious or other communal minorities challenge government to seek major changes in status (Bates et al.2003). Ethnic conflict contrasts civil war and conventional warfare; in ethnic conflicts, there are disagreements over issues, the disagreement is expressed in armed violence and is usually recurrent especially in situation where there is failure of compromise (Toft, 2003).

2.2 Theories of Ethnic Conflicts

The theories of ethnic conflicts are drawn from three schools of thoughts in the academic discourse. These schools of thoughts are the; primordialist, instrumentalist and constructivist. In recent times academic debates on ethnic conflicts have gone around the three school theories in an attempt to offer tentative solutions to the numerous ethnic conflicts in present society. Numerous efforts have been made in this regard by political scientist and sociologist. Discussed below are the three theories of ethnic conflicts according to the three schools of thoughts.

2.2.1 Primordialist Theory

This theory of ethnic conflicts is based on the arguments that ethnic groups and nationalities exist because there have common traditions, values and beliefs (Grosby, 1994). The theory also argues that primordial objects including biological features,

territorial location, and lineages are the bases upon which ethnic groups and nationalities exist. These objects are the bonding factors for smooth and successful coexistence of people who are identified with each other in society (Grosby, 1994). This theory suggests that ethnic groups are possible because of numerous factors identified and that presupposes that when these primordial objects or factors are broken there are the tendencies that intra-ethnic conflicts could occur. Also, when different ethnic groups disagree, it is highly possible that the contention of the disagreement is tied to these factors. It could also be deduced that the issue of identity is very critical in incidence of ethnic conflicts. According to Horowitz (1985), the primordial theory is also very dependent on kinship amongst members of an ethnic group. It is further indicated that kinship is the bedrock upon which ethnic groups are able to think and identify themselves in family resemblance. It is common to see that most political scientist refer to ethnic conflicts as myths. This populous view assert that most often than not political decisions and institutional weaknesses coupled with unfair distribution of economic resources by governments are the root causes of ethnic conflicts in society (Horowitz, 1985; Grosby, 1994).

2.2.2 Instrumentalist Theory

This theory and school of thought gained recognition during the 1960s through the 1970s especially in the United States of America. This was a period when the issue of ethnic persistence became very critical in causing change in society. Leaders increasingly adopted this strategy in community mobilization as means of garnering power and authority. This theory sought to explain such persistence as the result of the actions of community leaders, "who used their cultural groups as sites of mass mobilization and as constituencies in their competition for power and resources, because they found them more effective than social

classes. In this context, the theory accounts for ethnic identification and race as institutional identities as a means to an end. At the heart of this theory, the status of ethnicity either as a fixed perception or not has no relevance in the instrumentalist theory of ethnicity. The scholars of this school of thought generally do not oppose the view that ethnic difference plays a part in many conflicts. They simply claim that ethnic difference is not sufficient to explain conflicts. It is clear from this theory that ethnicity though is a very celebrated attachment especially to people in their association; however, that value is never significant to explain ethnic conflicts. Thus, simply, numerous are the root causes of ethnic conflicts rather than the value of ethnicity (Smith, 2001; Cornell *et al.*, 1998; Schlichting, 1997).

2.2.3 Constructivist Theory

The third theory and school of thought is the constructivist theory. This theory emphasizes the relevance of socially constructed nature of ethnic groups, taking the views of Benedict Anderson's concept of the imagined community. Proponents of this school of thought refer to Rwanda as a case in point because the Tutsi/Hutu distinction was codified and linked to the Belgian colonial power in the 1930s on the basis of cattle ownership, physical measurements and church records. Discrimination on the bases of these codified variables played a critical role in the 1994 genocide of Rwanda (Mamdani, 2001). Also in the view of Toft (2003), "settlement patterns, socially constructed identities, charismatic leaders, issue indivisibility, and state concern with precedent setting can lead rational actors to escalate a dispute to violence, even when doing so is likely to leave contending groups much worse off". This school of thought looks similar to that of the primordial theory that places emphasis on value attachments. However, discrimination and deliberate

marginalization of other ethnic groupings using either structural advantages or political power monopolization could cause an entrenched conflict with even greater devastating effects on the larger society (Toft, 2003).

2.1.2 Violent Conflicts and Civil Strifes in West Africa

The West African sub region has recorded some violent and civil strifes for decades with the periods between 1980-1990s presenting more violent conflicts which affected a lot of economies of countries in the region (Aning and Bah,2009;UNSC Report, 2011).

Some notable countries that plunged into violent conflicts during that period include Liberia, Sierra Leone, Guinea-Bissau and Côte d'Ivoire (Aning and Bah, 2009). All these conflicts have resulted in the 'destruction of lives and property, the internal displacement of people, a region-wide refugee crisis, poverty and disease, the proliferation of small arms and light weapons, human and drug trafficking, illegal exploitation of natural resources and banditry' (Afolabi, 2009).

2.1.2.1 Past conflicts

Liberia plunged into its first violent civil war in December 1989 with the invasion of Charles Taylor's National Patriotic Front of Liberia (NPFL). Taylor's rebellion, which sought to overthrow the autocratic and repressive rule of then President Samuel Doe, not only succeeded with his ascension to power in the 1997 elections, but also resulted in the outbreak of a violent seven-year civil war (Vinck *et al.*, 2011). In 1996, with the support of the ECOMOG, violence was abated leading to a ceasefire. Nevertheless, this seeming peace was short-lived as longstanding and simmering ethnic tensions, corruption, subjugation and abject poverty of the people thrust the country back into a second civil war

in 1999; two years after Taylor was elected into office as president (Kieh and Klay, 2009). During the ensuing five-year civil war, the country was besieged by violent confrontations between Taylor's NPFL, the Liberians United for Reconciliation and Democracy (LURD) and the Movement for Democracy in Liberia (MODEL) until the signing of a Comprehensive Peace Agreement in 2003 which led to the attainment of appreciable peace and stability in Liberia (Vinck *et al.,* 2011). The 2009 report of the Liberian Truth and Reconciliation Commission (TRC) indicated that 250,000 people were killed in the almost 14-year conflict and one million displaced (LTRC, 2009). Subsequently, in 2010, the country reportedly ranked 162 of 169 countries in the Human Development Index, making it one of the poorest countries in the world (Vinck *et al.* 2011). Two years after the outbreak of civil war in Liberia, violent civil conflict also erupted in neighbouring Sierra Leone in 1991 hinged on a coup led by Foday Sankoh's Revolutionary United Front (RUF) rebel group against President Momoh's regime (Richards, 2003). Clashes between the Ghaddafi and Taylor supported RUF and the incumbent resulted in violent conflict which was officially declared over in February 2002. The conflict, arising from corruption, bad governance, social injustice, and breakdown of democratic institutions resulted in the killing of 50,000 people, and the destruction of infrastructure as well as other pertinent social services (Kargbo, 2002). Similarly, Guinea-Bissau and Côte d'Ivoire experienced violent civil conflicts in 1998 and 2002 respectively. Like other West African states, Guinea-Bissau's history is characterized with periodic conflicts however; the '7th June War' in 1998 pushed the former Portuguese colony into a violent civil strife (Voz di Paz and Interpeace, 2010). The 11-month conflict which ended on 7 May 1999, led by Brigadier Ansumane Mane, was supposedly caused by weapon trafficking in neighboring

Senegal for the Casamance independence movement, corruption and human rights abuse. Like all violent conflicts, casualties were recorded as it claimed the lives of thousands and entrenched poverty in the country (Voz di Paz and Interpeace, 2010). Despite enjoying turbulent peace over the past ten years after the 1998 conflict, characterized by periodic political crisis, the coup d'état in April 2012 which led to the arrest of Prime Minister Carlos Gomes Júnior threatened the security and already fragile peace of this small West African state (Crisis Group, 2012).

Besides, the civil conflict that plagued Côte d'Ivoire, the one-time economic power house and the beacon of stability in West Africa cannot be overlooked. Deeply rooted in ethnic-religious divisions and identity aggravated by politics of exclusion, the country erupted into full-fledged civil strife in September 2002 (Ogwang, 2011). Following the explosion of the civil strife into a violent conflict, several peace initiatives were adopted but failed to resolve the conflict in Côte d'Ivoire until the successful signing of the Ouagadougou peace accord in 2007 restored peace and stability in the country (Ogwang, 2011). With three years of relative peace in the country, Ivoirians were ready to take to the polls in November 2010, a critical election which was anticipated to consolidate the peace the country had enjoyed and unify its stratified population. Much to their chagrin, the country nearly relapsed back into a violent civil war after the disputed elections led to a violent confrontation between loyalists of incumbent Laurent Gbagbo and main opposition leader Alassane Ouattara (Ogwang, 2011). The following five-month battle led to the death of over 3000 people and the displacement of many.

2.1.2.2 Present and emerging conflicts

Generally, even though there is a decline in large scale violent conflicts and civil strife, pockets of simmering tensions, insurgency and the re-emergence of coups d'état continues to trouble the sub-region. For example the recent coups d'état in Guinea-Bissau and Mali; insurgency in the Sahel region affecting West African countries of Mali, Niger and Mauritania, as well as low-scale conflicts in notably stable countries like Ghana, Senegal and Nigeria further makes the sub-region capricious and prone to more violent conflicts (Gilmour, 2012; Olonisakin, 2011). The recent Boko Haram insurgency in northern Nigeria, which hinged upon religion and economic deprivation, also poses security threats in the sub-region. Since its emergence in 2002, the Boko Haram insurgency has taken many lives, displaced several thousand and destroyed state property (Walker 2012). Travelling to the south of Nigeria, the prolonged Niger Delta conflict over oil has further compounded the insecurities in West Africa's most populous nation. The Niger Delta conflict has led to several kidnapping of expatriates, casualties and the increased use of sophisticated weaponry in the region by militant groups such as the Movement for the Emancipation of the Niger Delta (MEND) thereby heightening insecurity within the country and across the sub-region (Ejibunu 2007).

2.1.3 Causes of Conflicts in West Africa

The root of violent conflicts and civil strife in West Africa is linked to several complex factors. Obi (2012) asserted that roots of conflict in West Africa are much deeper and complex, and are embedded in the interplay of historical factors, socio-economic crisis, legacies of authoritarianism and the politics of exclusion, international forces, and local struggles.

Indeed, the aforementioned constitute the broader causal factors. However, embedded within and related to them are bad governance and corruption, human rights violations, poverty, ethnic marginalization and small arms and light weapons proliferation (among others), which continue to serve as triggers and drivers of violent conflicts in the sub-region. Even though there are several other specific causes of violent conflicts and civil strife in West Africa, the aforementioned are discussed in this study.

2.1.3.1 Bad governance and corruption

Post-colonial rule of West African countries has been fraught with several challenges. Elemental among them are the issues of bad governance and corruption. Following independence, several regimes across the sub-region have mismanaged state resources and weakened governance institutions which led to economic stalemate, political apprehensions and breakdown of social peace and stability. Today, these twin factors constitute a major cause of violent conflicts and civil strife in West Africa. Several scholarly works on conflicts in the sub-region have identified bad governance and corruption as the underpinning factors fueling and renewing violence in West African countries. Conflicts in Nigeria, Guinea-Bissau, Sierra Leone, Liberia, Côte d'Ivoire and other West African countries notably hinge upon bad governance and corruption. For instance, in the Sierra Leonean war, it was identified that bad governance, corruption and poverty were the root causes of the conflict (Fithen, 1999). Besides, Vinck *et al.* (2011) indicated that majority of the population (64%) identified, among other factors, greed and corruption as the cause of the Liberian civil war.

Corruption in West Africa's most populous nation, Nigeria, has been highlighted as one of the underlining factors in the Niger Delta conflict and the more recent, yet very pronounced, Boko Haram insurgency (Ejibunu, 2007; Brock, 2012). Ironically, the Niger Delta region though blessed with the largest oil resource in Nigeria is also the poorest region in the country. This is perhaps attributable to the high corruption at the national level which does not give opportunity for oil wealth to trickle down to the ordinary 'Deltarians' and the larger Nigerian population. In 2003 for example, the Nigerian Anti-Corruption Agency, the Economic and Financial Crime Commission (EFCC) reportedly estimated that 70 % of the oil earnings, constituting over US$ 14 billion was stolen and wasted (Ejibunu, 2007). The majority of the perpetrators of corruption in Nigeria include senators, ministers, commissioners and individuals with higher connections in the political playground (Ejibunu, 2007). In affirming the linkage between corruption and violence in Nigeria's Niger Delta, Hassan Tai Ejibunu (2007) indicates that 'seeing money coming from the Federal Government, on earnings on crude oil sales, with essentially none of which reaches the ordinary people, has created a condition for insurrection' (Ejibunu, 2007).

Likewise, in a small country like Guinea-Bissau, bad governance and corruption are deeply entrenched in the social, political, judicial and economic system leading to bitter pent-up feelings among the local population which are sometimes expressed through violence (Voz di Paz and Interpeace, 2010). In their 2010 joint report on the 'Root Causes of Conflict in Guinea-Bissau: The Voices of the People,' Voz di Paz and Interpeace, international non-governmental and peace-building institutions, chronicled the voices of local citizens of Guinea-Bissau on issues of corruption and conflict.

2.1.3.2 Human rights violations

Incidences of human rights abuses and violations are numerous in West Africa and as such this forms the basis for the eruption and renewal of violent conflicts and civil strife in the sub-region. Across the sub-region, there are reported incidences of sexual and gender-based violence, reprisal killings, beatings, impunity for state officials and institutions, high social injustice, repressive and brutal leadership, and unequal distribution of state resources among others (HRW 2003). All these serve as both triggers and consequences of war. For instance in Nigeria, violations of the human rights of local citizens underscore one of the factors causing the militancy in the Niger Delta region (Ejibunu, 2007). Many of the oil companies in the region are reported to be causing environmental pollution and economic marginalization while the state supinely looks on. A specific instance is the 1992 killings of youth from Bonny, a local community, during a peaceful demonstration against the ecological pollution and marginalization caused by Shell Company (Brisibe, 2001). Unfortunately, the state security institutions support these oil companies to violate the rights of its own citizens as was the case in January 1993 when 300,000 Ogoni protestors who were harassed, arrested and killed by Federal government troops when demonstrating peacefully against Shell oil for environmental pollution and economic marginalization (Ejibunu, 2007).

Moreover, human rights violations in seemingly stable West African countries such as The Gambia, Ghana and Equatorial Guinea among others are increasingly creating precarious situations for instability. Although these countries have not experienced large-scale violent conflicts in recent times as their neighbours have, the brutal, undemocratic, unequal and authoritative rule by incumbent regimes is creating tensions which, unresolved, could bring

the countries to a boiling point of violent war and civil strife. The 2011 Freedom House report on the 'Worst of the Worst: The world's Most Repressive Societies' named Equatorial Guinea and Côte d'Ivoire as part of the 20 most repressed societies in the world (Freedom House 2011). The Theodoro Obiang Nguema Mbasogo regime in Equatorial Guinea was not only accused of pervasive corruption but also rife human rights abuses including detention of political opponents, torture, extrajudicial killings, interference in the judicial system, disregard for rule of law, widespread violence against women and impunity of security forces (Freedom House, 2011: 14; USDS, 2011).

2.1.3.3 Poverty

Poverty is also noted as one of the major setbacks in West Africa and the continent of Africa. According to the 2012 UNDP Human Development report nearly half of sub-Saharan Africans live in poverty (UNDP, 2012). Consequently, the poverty that many across the continent endure can be seen to be one of the major contributing factors to the occurrence of violent conflicts in Africa. Like the rest of Africa, the West Africa sub-region is neither immune to the poverty canker nor ignorant of its impact on their fragile peace and stability. With over 60 % of its population living below the poverty line of US$1 a day, civil unrest and grievances, both recipes for conflicts, become widespread. These agitations sometimes take violent forms and are seen as channels for punishing governments for their failure to alleviate poverty (ECOWAS, 2006). For instance, in research conducted by Vinck *et al.* (2011), 30% of the Liberian population indicated that poverty was one of the root causes of the Liberian civil war. Similar assertions have also been made with regards to the conflicts in Nigeria and Guinea-Bissau (Voz di Paz and Interpeace, 2010; Ejibunu 2007). In Voz di Paz and Interpeace 2010 report, poverty was

stated as one of the major cause of the Bissau-Guinean conflicts, citing food insecurity, lack of infrastructure and access to basic social needs as some of the poverty indicators in the country (Voz di Paz and Interpeace, 2010). Emphasizing the connection between poverty and conflict, the Bissau-Guineans have an adage which states 'In homes where there is no bread everyone fights and no one is right' (Voz di Paz and Interpeace, 2010). The daunting economic challenges left over from past policy legacies makes it difficult for Africa to reduce poverty, which along with famine are key causes of conflict in Africa (Moe, 2009).

2.1.3.4 Ethnic marginalization

Ethnicity by itself is not violent however the concept has been manipulated in 'societies polarized into two imbalanced divides with one faction feeling marginalized' (Annan and Danso 2013). Correspondingly, also believe that 'a greater degree of ethnic or religious diversity by itself' is not 'a major and direct cause' of violent civil conflict (Fearon and Laitin, 2003). Nevertheless, to a larger extent, for a heterogeneous community like most West African countries, ethnicity has become a dividing factor that continues to drive violent conflicts and civil strife within and among communities and states, destabilizing the peace in the sub-region. Research conducted across the sub-region identifies ethnicity and ethnic fragmentation as one of the root causes of violent conflicts in West Africa. Particularly for Liberia, this was prominent as 49% of the population reportedly identified ethnicity and ethnic divisions as the root cause of the Liberian civil wars (Vinck *et al.*, 2011). More specifically, in the 10-year repressive rule of Samuel Doe, the Krahn and Mandingo ethnic groups were more favoured than the others which resulted in various ethnic tensions that saw the rebellious invasion of Charles Taylor, an Americo-Liberian,

leading to the violent civil war that overthrew Doe's government in 1996 (Vinck *et al.*, 2011). Currently, Liberians are still afraid of a potential renewal of civil war along ethnic lines when the United Nations (UN) Peacekeeping mission ends (Vinck et al 2011). Similar situations exist in other countries such as Côte d'Ivoire, Guinea-Bissau and Nigeria(Voz di Paz and Interpeace, 2010; Ejibunu, 2007; Ogwang, 2011). For a small country like Guinea-Bissau, ethnic divisions are so entrenched among the various communities and at the national level, resulting in constant fighting and violence (Voz di Paz and Interpeace, 2010). Likewise, in a country like Ghana which is noted for stability and peace, ethnic division in its northern region, among the Andanis and Abudus, and between Konkombas and Nanumbas have led to violent inter and intra-ethnic strifes that threaten the peace in the entire country.

2.1.3.5 Proliferations of small and light weapons

Small Arms and Light Weapons (SALW) proliferation is one of the major challenges in West Africa. The sub-region remains an area of considerable SALW proliferation because of their affordability, accessibility and availability; and porosity of the borders and legal frameworks legitimizing their use (Keili, 2008). As reported by Edeko (2011), West Africa hosts about 7 to 10 million of the world's illegal SALW as well as 8 million out of the 100 million circulating in Africa (Edeko, 2011; Kwaja, 2012). Additionally, 77,000 of the small arms are allegedly within the control of West African insurgent groups (Ebo and Mazal, 2003). The circulation of illegal arms within and across states has increased the proclivity of conflicts within the sub-region. Small arms proliferation has contributed to the mobilization for coups d'état, undemocratic overthrow of governments, increasing casualties and violent inter-communal and intra-state conflicts in West Africa (Ero and

Ndinga-Muvumba, 2004). Since the 1960s there have been over 37 successful military coups in almost all the countries in West Africa often resulting in violent wars; killing millions and displacing many (Keili, 2008). Furthermore, small arms proliferation notably fueled the conflicts in Liberia, Sierra Leone, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal and Togo (Keili, 2008). For example, arms were supplied by governments to aid the civil wars in Liberia, Sierra Leone and Côte d'Ivoire (Keili, 2008). For instance, Charles Taylor's National Patriotic Front of Liberia (NPFL) was accused of supplying and distributing Foday Sankoh's Revolutionary United Front (RUF) with arms to fuel the conflict in Sierra Leone. The conflict led to the death of over 50,000 people; 30,000 amputations; and the sexual violation of over 257,000 women (Ploughshares, 2002). Besides, the Liberians United for Reconciliation and Democracy (LURD) rebel group received weapons from the Guinean governments which they used to kill civilians in Monrovia during the conflict in Liberia (Keili, 2008).

2.1.4 Initiatives towards Conflict Prevention and Resolution in West Africa

The outbreak of violent conflicts and civil strife in West Africa has led to several actions and interventions played by different actors. These actors include Civil Society Organizations (CSOs), ECOWAS, the African Union (AU) and the international community.

At the sub-regional level, ECOWAS' involvement and efforts in addressing critical security challenges have achieved some noticeable success. In Liberia, Sierra Leone, Guinea-Bissau and Côte d'Ivoire, the deployment of peacekeepers through ECOMOG and the key mediatory role played by the sub-regional bloc helped salvage peace and stability,

bringing an end to the violent conflicts (Olonisakin, 2011). Besides, the involvement of ECOWAS can be witnessed through its lead on the process of drafting and signing numerous peace agreements that resulted in the attainment of peace in several countries in the sub-region (Aning *et al.*, 2010). These include but are not limited to the Linas-Marcoussis, Accra II & III, and Pretoria Agreements on Côte d'Ivoire; the Accra, Cotonou and Abuja Peace Agreements on Liberia; and the Lomé Peace Agreement on Sierra Leone (Aning *et al.*, 2010). In terms of mediation, ECOWAS was involved in recent conflicts in Côte d'Ivoire, Mali and Guinea-Bissau to ensure that stability is restored. For instance, during the 2012 coups d'état in Mali and Guinea-Bissau, the ECOWAS Heads of States and Governments appointed H.E. Blaise Compoare of Burkina Faso and H.E. Goodluck Jonathan of Nigeria as mediators for the respective countries (ECOWAS, 2012). The ECOWAS has furthermore been collaborating with civil society organizations to implement its Early Warning Mechanism (ECOWARN) which seeks to prevent and monitor conflicts in the sub-region. For instance, for the past eight years since the operationalisation of ECOWARN, ECOWAS has been working with the West Africa Network for Peace building (WANEP) to monitor elections in Ghana, Togo, Côte d'Ivoire, Guinea Conakry and other countries on the continent (WANEP, 2011). In addition, the adoptions of the Protocol, Relating to the Mechanism for Conflict Prevention, Management, Resolution, Peacekeeping and Security in December 1999 and the ECOWAS Conflict Prevention Framework (ECPF) in 2008, among other protocols, have helped enhance and affirm ECOWAS' role as a key player in conflict prevention and resolution in West Africa (ECOWAS, 2008; ECOWAS, 1999).

2.1.5 Contribution of livestock production to the wellbeing of society

As household income increases, the consumption of protein increases, principally from animal origin, allowing the substitution of vegetal by animal protein. Besides milk, eggs and meat used as a source of food, other livestock products are used for domestic consumption and local sale such as skins, hides and horns. Livestock can be converted into cash whenever the family needs it, is a security asset influencing access to informal credits and loans and being also a source of collateral for loans . In many rural regions, especially where financial markets are absent or non-existent, livestock stocks or herds are a source of asset accumulation and a measure of prosperity. Livestock stocks or assets can be mobilized at any time, satisfying planned expenditures such as children school fees and bride wealth or unplanned expenses such as the illness and death of family members. This livestock asset could be seen as “bank account” and it is also an important source of family savings that can be used in years of low crop production, reducing income insecurity and household vulnerability, being an important source of risk reduction and security increase (ILRI, 1995).

Livestock production is closely interrelated with crop production. The use of livestock and its sub product manure are important in crop production. Livestock is a source of energy providing draught animal power while manure improves soil structure and fertility as well as water retention. Both uses are environmentally friendly improving energy and nutrient cycling. Livestock is also used to transport agricultural inputs and outputs and people (Moyo and Swanepoel, 2010).

Livestock production is an important means of exchange between rural households and, when sold, contributes to boost and strengthen rural markets. Rural markets are an important place in the operation mode of rural communities and a significant contribution for rural families' wellbeing and wealth (Moyo and Swanepoel, 2010).

The livestock social functions correspond to the symbolic values associated to each species and the use of animals for the fulfillment of a set of rituals and social obligations of families and communities. Livestock gives social status to its owners once it is considered a common means of demonstrating wealth and provides economic status as it facilitates the access to informal credits and loans to the households. Livestock is also used in traditional rituals, ceremonies and festivities and is given as a gift in worships (e.g. installation of ancestral spirits, ritual slaughter, and bride wealth).

In some cultures, animals can be considered sacred (cattle in India) and in others cultures (pigs in Muslim countries) animals are impure. For both these cultures, those species are not consumed by the population. In other countries or cultures, animals play an important leisure role, being used for betting, like horse racing and cock fighting, for sports, like horses in polo and bullfighting and for hunting, like dogs, falcons and horses (Ouma *et al.*, 2003).

In effect, livestock helps in food supply, family nutrition, family income, asset savings, soil productivity, livelihoods, transport, agricultural traction, agricultural diversification and sustainable agricultural production, family and community employment, ritual purposes and social status (Moyo and Swanepoel, 2010).

2.2 Impact of ethnic conflicts on livestock production

In the Northern Region of Ghana, Addah and Zezebi (2008) investigated the impact of ethnic conflicts on livestock production in Africa using the "Guinea Fowl War" (1994 – 1995) in the "Eastern corridor" of the Northern Region of Ghana as a case study. The study underscored the effects of rampant ethnic conflicts and civil wars in most African countries on livestock production. The findings of the study showed that before the outbreak of the conflict, every household owned livestock. The negative impact of the conflict on livestock was felt after the conflict period because water bodies were poisoned leading to the death of many livestock; some livestock were stolen whiles others were indiscriminately killed. Other livestock starved to death. The conflict also destroyed other allied livestock support services and infrastructure culminating into sporadic outbreaks of livestock diseases. The study further indicated that post conflict recovery assessment showed that only 23% of households had some surviving livestock left after the conflict that could be used for breeding to restock their farms.

Kendie and Bukari (2012) assessed how conflicts affected socio-economic development in the Bawku Traditional Area of the Upper East region of Ghana. Another study conducted by Aganah (2008) investigated the effects of chieftaincy conflicts on local development in the Bawku Municipality. The findings of the study showed that chieftaincy conflict impacted negatively on investments in agricultural production, commerce and industry. Many people also had their assets destroyed and their livelihoods disrupted by the perennial violence. It was evident that the chieftaincy conflict adversely affected health care delivery and education in the Municipality. These pushed many more people into poverty. The data also showed that the lack of development and household poverty in the

Municipality are important considerations in the chieftaincy conflict. The lack of development results in social and economic discontent and drive individuals and interest groups to ethnic-based solidarities in a bid to compete for limited resources.

Conflicts in some regions in Northern Ghana arise due to cattle destroying the crops of farmers. The worst ever of these conflicts was in December 2011, when a night raid of a Fulani village in Zamashegu, a farming community in the Gushegu district of the Northern region claimed 30 lives with several injuries. Similarly, more recently, conflicts arose in Agogo, a town located in the Ashanti Region of Ghana, following the accusation of Fulani Herdsmen of rape, murders and brutalization of farmers who resisted the dominance or destruction of their farm lands (Botchway, 2016).

Ibrahim *et al.* (2014) studied the effects of farmer-cattle grazer conflicts on rural development in the North-West Region of Cameroon. The study showed that farmer-grazer conflicts in the area were centered on the cattle owners and crop farmers. The population of both crop farmers and cattle grazers is rapidly increasing but land remains fixed. These causes are seen in terms of competition for land, cattle trespasses, struggle for leadership, conflict of culture and corruption by some officials. Nomadic livestock producers are therefore agents of conflicts that affect agricultural production (Haman, 2002).

Studies in Ghana show that despite the several intra ethnic conflicts, their impact on cattle production was comparably less severe than that of the inter-ethnic conflicts (Addah, 2009). The study revealed that the four inter-ethnic conflicts that occurred from 1981-1995 have caused the Northern Region to lose GHS 46,111,372.75 as a result of a loss of 23,002 cattle. It was further revealed that the guinea fowl war that occurred from 1994-1995 alone

had caused a loss of 11.9% of the Northern Region's cattle herd and also 1% of the entire country's cattle herd. Though the intra ethnic Dagbon crises had no significant adverse impact on cattle population, rather it impinged on projected cattle production by 2.7%. The study also found that the protracted conflicts reduced the annual sales of cattle by households and that in turn affected the national number of cattle slaughtered for domestic consumption in Ghana.

Kusimi *et al.* (2006) also conducted a study to determine the consequences and effects of conflicts on the socioeconomic life of the people. It was revealed that the conflicts in northern Ghana worsened the already endemic poverty situation of the people and increased the sense of perpetual fear and mistrust. The specific consequences and effects of conflicts in northern region included destruction of infrastructure and settlements, slack in economic activities, frequent loss of lives and property and increased rural-urban migration. It is worth noting that even though this study was not directly on effects of livestock production; its findings suggest that the past conflicts in the northern region affect the socio-economic and agricultural activities in general. Every productivity thrives in peaceful and secured environment. Hence, any situation of insecurity has a potential of adversely affecting livestock production.

In a study of the longstanding ethnic conflict between the Kusasis and Mamprusis it is stated that the politicization of the conflict has affected the efforts by government to resolve the conflict (Lund, 2003).

In a CRISE working paper on Traditional leadership and ethnic conflicts in Northern Ghana, Jonsson (2007) claimed that the link between development and conflict in the

region exist on different practical levels. In the discourse of actors, in the socio-economic grievances they perceive as important in the causation of the violence, through the effects of the fighting and conclude that conflicts have disrupted the development of the region and also destroyed the resources and development projects

In another study, Mwangi *et al.* (2014) assessed the impact of conflict and political instability on agricultural investments in Mali and Nigeria. According to the study, the conflict led to withdrawal of international Non-governmental Organization (NGOs) from the conflict hit areas especially in Mali. Also, the conflicts disrupted the provision of public social services such as; health, education, water and electricity services. Specifically on livestock value chains, the study revealed that livestock production in Nigeria was greatly affected by the conflicts. It is indicated that livestock farmers no longer had access to animal markets and that affected their livestock production because feeding of livestock became a problem. The reduced livestock production also affected feed producers in the country and thereby overall actors in the livestock value chain lost income and others shut down because every livestock activity was virtually getting curtailed.

In a study of the relationship between conflicts and hunger in Africa, Messer and Cohen (2004) showed that armed conflicts frequently lead to the destruction of food systems in most parts of Africa. It is indicated that during armed conflicts, conflicting parties use and manipulate starvation as a deliberate tactic especially where there are opportunities for the parties to control access to fundamental needs of the people. For instance, access to food and other services are curtailed as punishment to their opponents. According to the study, records of United Nations agencies show that “as at February 2004, more than 80% of

people affected by food insecurity resulting from armed conflicts are in Sub-Saharan Africa and that over 45 million people in developing countries are experiencing or recovering from conflict and were in need of food and other emergency humanitarian assistance". Communal violence and food security in Africa it was established by the study that "communal violence affects food security through limiting people's access to food, destruction of infrastructure for food production, cutting access to food supplies, physical destruction and plundering of crops, livestock and food reserves" (Sambe *et al.*, 2013), Similar to the findings of Messer and Cohen (2004), Sambe *et al.* (2013) found that communal violence leads to displacement of human labour and some cases food resources used as weapon of war through manipulation and control of food resources. The study finally asserts that communal violence directly and indirectly leads to food insecurity in African countries.

In a related observation, Food and Agricultural Organization (2004) has also acknowledged and indicated adverse effects of communal violence in African countries. It was observed that communal violence resulted in Africa losing $120 billion worth of agricultural production during the last third of the 20thcentury. In addition, the study stated that given the indispensable value of agricultural livelihood towards general economic wellbeing, there is no doubt that countries in Africa that are plagued by violent conflicts are recorded as the hardest hit of poverty and food insecurity. This finding goes to corroborate those of Messer and Cohen (2004) and Sambe *et al.* (2013).

Another study conducted by Thys, *et al* (2010) on armed conflicts on urban livestock production in Brazzaville, Republic of Congo indicated that armed conflicts may influence

agriculture and livestock production in particular, but the specific impact of armed conflicts on urban livestock production is not well documented in Africa. The study revealed that Brazzaville has experienced a series of armed conflicts since 1993; the most dramatic event in 1997 was a serious threat for the population and the livestock keepers. The results of the studies indicated that the conflict had negative impact on livestock keeping, as most livestock keepers lost their animals. Financial resources were an important factor in rebuilding the flock after 1997. Further factors related to restarting livestock activities were: farmers' past experience in livestock raising, location, being the owner of the plot, and possessing Congolese nationality.

A study by Bolarinwa *et al* (2013) investigated the impact of communal violent conflict on farmers' livelihood activities in two agro-ecological zones of Nigeria. The study acknowledged that there is hardly a year where there were no major violent conflicts in Nigeria. However, much has not been published on the quantitative impact of the conflicts on the farmers' livelihood as the manager of crops, domesticated and wild life animals. The findings of the study showed that the violent conflicts have impacted negatively on the livestock production in the study areas of Nigeria. It was revealed that the impact of the conflict on sheep and goat production was higher. The decline in production of sheep and goats was attributed to conflict because majority (78.4%) of the farmers claimed that they had lost their productive land to conflict.

A study conducted by Mwangi *et al.* (2014) was an investigation of the impact of conflict and political instability on agricultural investments in Mali and Nigeria. The study found that livestock traders faced enormous security challenges in bringing their products to

market. It was shown that the rebels often attacked their flocks and plundered their cash and animals. Thus, many of them were either forced to limit their activities or quit livestock marketing altogether. This led to the spread of several livestock diseases, such as foot-and-mouth disease and Contagious Bovine Pleuropneumonia (CBPP) throughout the conflict zone.

Okantah et al. (1999) also conducted a study in five districts in the Accra Plains. The results of the survey found the mean flock size of livestock was 73.6 and the average cattle herd size was 133.

2.3 Overview of livestock production in Ghana

In Ghana, livestock production is an integral part of agricultural economy of the country. It is also a major source of livelihood for many rural households in the Northern, Upper East and Upper West Regions of Ghana (Adzitey, 2013). Available literatures have shown that livestock are raised in Ghana under the extensive, semi-intensive and/or intensive system. However, the extensive system is the commonest method and it is practiced most especially in rural communities. Livestock holdings are owned by families or individuals on commercial or subsistence basis. Commercial farmers normally keep poultry, and mostly under the intensive system. Different animal species are reared in Ghana purposely for local consumption. The most common livestock raised by the people of Northern Ghana are cattle, sheep, goats, and pigs (Adzitey, 2013). Also poultry is another sector that has increasingly been engaged by the people in the Northern Parts of Ghana over the past few decades. Statistics on the production of livestock in Ghana over the past years have

been documented by Food and Agriculture Organization (FAO) and the details contained in Table 2.1 below.

2.4 Socio-economic characteristics of livestock farmers in Upper East Region of Ghana

Livestock production in the Upper East Region of Ghana is not different from the practices across the three Northern regions of the country. The extensive system of rearing their livestock is the commonest management system in the region. Livestock are allowed to move freely under caretaker and to graze on free-range throughout the day. In Most cases, the owner rarely looks for them until they return at the close of the day. For cattle, there is a caretaker who follows them for grazing during the farming season except off-farm season when they are also allowed to graze freely with very limited assistance of the caretaker (Karbo and Bruce, 1996). Koney (1992) also noted that these livestock depend largely on the indigenous forage through the communally owned lands. Those that get supplements are mostly few cases. Joy and Wibberley (1979) also noted that children in the northern part of Ghana are responsible for taking care of the household cattle. The cattle are herded by children throughout the year; that is the rainy and the dry season except in some few cases where the services of Fulani herdsmen were employed. In the case of the Fulani herdsmen, both grown men and children are used. Cattle are left to search for anything edible in the wild for consumption. A study conducted by Adams and Ohene- Yankyera (2014) also revealed that adult children and female-spouses contribute meaningfully to livestock management practices. The study further showed that the majority of farmers have no formal education and also lacked access to livestock extension training and access to credit facilities. In the Upper East Region, “the high importance of small livestock to

satisfy non-faith based cultural functions means strategies to improve small livestock to enhance rural livelihoods is relevant" (Adams and Ohene- Yankyera, 2014). This underscores the relevance of livestock production as feasible alternative sources of livelihood for the people in Upper East Region.

Table 2 stock resources in Ghana

Specie	Year				Annual Growth Rate (%)	
	1980	1990	2000	2002	1980-1990	1990-2000
Cattle	804	1145	1302	1330	3.6	1.3
Sheep &	3875	4242	5820	6152	0.9	3.2
Pigs	379	474	324	310	2.3	3.7
Poultry	11500	9686	20472	24251	-1.7	7.8
Total L	980	1188	1503	1585	1.9	2.4

Source: 2005).

A study conducted by Adzitey (2013) assessed animal and Meat Production in Ghana and aimed at providing an overview of animal and meat production in the country. The study did analysis of animal and meat production within a 10 year period. The study found that between 2001 and 2010 the average live animals produced in Ghana were 3,958,560 for goats, 3,269,460 for sheep, 1,373,700 for cattle, 404,600 for pigs and 33,252 for chickens. Also, in general, the increase in goat and sheep production was higher than the increase in cattle, pigs and chicken production within this period. It was also indicated that keeping livestock takes planning, research, a small investment, hard-work and determination. Farm animals can be bought and sold at competitive market rates; keeping farmers, livestock traders, and butchers busy all year round, especially during holiday seasons. Traders purchase animals from livestock farmers and then ship the animals to the markets where they are sold to consumers, butchers and other traders (Adzitey, 2013; http://mofa.gov.gh/site/).

Also, according to Ministry of Food and Agriculture (2004), the livestock sub-sector is an important component of agriculture in the country. It is defined to include livestock (cattle, sheep and goats), pigs, Poultry (chicken, guinea fowl, ducks, turkey, ostrich, etc.), and non-conventional species (grass cutter, snail, guinea pigs, rabbits, etc). Prominent among the numerous contributions the livestock sub-sector makes to the economy of the country is food security, providing animal protein to enhance the nutritional adequacy in diets of the people. The sub-sector provides employment opportunities for a large part of the population, particularly, in the rural areas and offers considerable prospects for wealth generation, income enhancement and improvement in rural livelihoods (MoFA, 2004).

In a study conducted by Timpong-Jones *et al.* (2014) investigated the constraints of livestock production in the Coastal Savannah Plains of Ghana. The main focus of that study was to determine livestock production practices and the main production constraints. This study found that women involvement in livestock production is low representing 15% of the entire livestock producers who were randomly selected. This shows that 85% of the respondents were male livestock farmers. The study also revealed that small livestock are mostly kept in small holdings of between 1-10 animals. Cattle are kept in much larger holdings of above 20 animals. It was further revealed by this study that the commonly produced livestock include; goats, sheep, and cattle. It was further shown that Forty-nine percent of livestock keepers interviewed had only one type of animal and among those with more than one, the combination of cattle and goats formed the majority. The study concluded that there are more goat producers than cattle producers and that majority of goat and sheep producers hold between 1 and 10 animals whiles majority of cattle producers own more than twenty (20) animals. In terms of the pattern of grazing, the study also found that in the dry season, 41% of cattle farmers graze their animals within village boundaries, 41% relocated animals 5-20 km away and 18% herded cattle to places 1.5-64 km daily.

2.5 Inferences from literature review

This chapter has addressed the literature of the study. The review covered theoretical and empirical aspects of the study. Upon the empirical review, it was revealed that research is very limited in the area of ethnic conflicts and its impacts on livestock production in the study area and even Ghana as a whole. It was also revealed that there is inadequate literature on the study area specifically addressing the impacts of ethnic conflicts on

livestock production. The few studies on the topical area are also much skewed in terms of the methodology. However, there are some of the studies that are bases upon which this current study is conducted.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Profile of the study area

The study was conducted in ten (10) communities in the Bawku municipality of the Upper East region. The Bawku municipality can righty be tagged as 'Borderland Municipality' because of its location at the north-eastern most corner of the region where the country shares international borders with Togo and Burkina Faso (Aganah 2008).

The Bawku municipality (Fig. 1) is located approximately between latitudes 11^0 11″and $10^0$40″ North and longitude $0^0$18″W and $0^0$6″E in the north-eastern corner of the of the Upper East region. It shares boundaries with Pusiga District to the North, Binduri District to the South, Garu-Tempane District to the East and Bawku West to the West. The municipality has a total land area of 247.23720sq.km. The Bawku Municipality with its administrative capital at Bawku is one of the 13 Metropolitan, Municipal and District Assemblies in the Upper East Region of Ghana (GSS, 2014).

The district like the rest of Northern Ghana has two seasons; the raining and dry seasons. The raining season is between four to six months (May to September or October) and about six to seven months for the dry season (October to April or May).

Fig 3.1: Relief Map of Bawku municipality (Ghana Statistical Service, 2014)

3.1.1 Population size, structure and composition

The Bawku Municipal has a population of 98,538 which represents 9.4% of the total population of the Upper East region GSS, 2014). The data also shows that males constitute 48% of the population. Also, the district has 36.4 % and 63.6% rural and urban populations respectively. The population of the district is youthful (40.3%) depicting a broad base population pyramid which tapers off with a small number of elderly persons (5.2%). The total age dependency ratio for the municipality is 87.4, the age dependency ratio for males is higher (43.7) than that of females (GSS, 2014).

3.1.2 Agriculture

Nearly 61% of the people in the district are engaged in agricultural activities. Agricultural is the mainstay of rural communities, employing 51.2% of the households whereas 49% of households are employed in agricultural industries in the urban areas. Most (54.6%) of the households in the municipality are involved in crop farming. Poultry (chicken) is the dominant animal reared in the district (GSS, 2014).

3.2 Study design

A descriptive design was adopted in this study. This is a type of research design that is suitable for gathering of information and/or data mostly about prevailing conditions or situations with the ultimate purpose of effective description and interpretation of such information/data. The focus of this type of research design goes beyond mere gathering of data, and includes efficient analyses, interpretation, comparison, and assessment of trends and relationships. According to Best and Kahn (2007), when a study is conducted focusing on present phenomenon in terms of conditions, processes, relationships and trends,

practices and beliefs, then the design is known as a descriptive survey design. In view of the nature of this study that sought to investigate the effects of ethnic conflicts on livestock production, descriptive survey design was therefore appropriate since relationship between ethnic conflicts and livestock production formed the bases upon which the study was carried out.

3.3 Research ethics

The study protocol was vetted and passed by the ethics committee in accordance with the demands of the University for Development Studies Research Ethics.

3.4 Sources of data

Primary and secondary sources of data were collected. The secondary sources included; reports from Municipal Assembly, reports of Ministry of Food and Agriculture (MoFA), and other published articles that were consulted for already documented information on livestock production and how conflicts affect the livestock production. On the other hand, the primary data sources were the questionnaire administered surveys and key informant interviews that were conducted. Information that was gathered from this source is described as primary data since that was first-hand information provided by the respondents.

3.5 Study population

The study was targeted at a population from whom units of respondents were drawn. This implies that study populations include all categories of groups of the population in the study area that were targeted. The specific population of the study was; household heads in the Bawku Municipality who were identified and interviewed as livestock producers.

Livestock producers were targeted for survey interviews; Butchers, food vendors, livestock traders and veterinary officers were also part of the target population who were contacted as key informants as illustrated in Table 3.1.

3.6 Sampling Procedure

3.6.1 Sample size determination

Sample size refers to the actual number of people selected as units of respondents. This number was determined from the available number of people who were potential respondents and stand the chance of being selected to participate in the study. The sample size for this study was determined with the application of Sloven's sample size calculation formula.

The sample size of the study is 277 respondents. This represents the sample size for household respondents who were contacted and interviewed for the study.

3.6.2 Sampling techniques

A multi-stage sampling technique was used during the study. In the first stage, the study area, Bawku Municipality, was sampled purposively for this study because it is the central point in the ethnic conflict. A cluster sampling technique was used in the second stage to group respondents into ethnic groups. This technique enabled data collection from each of the feuding ethnic groups involved in this study. At the third stage of sampling, the study communities were selected purposively to include areas in the Municipality that were severely affected by the conflict. The purposive sampling was adopted at this stage because adequate data could only be sourced from severely affected conflict areas. At the last stage,

simple random sampling technique was then used to obtain the final units of respondents. Household heads were then randomly selected and interviewed.

Table 3.1: Categories of respondents

Category of Respondents	Number of Respondents
Livestock Farmers	220
Butchers	14
Food Vendors	14
Livestock Traders	25
Veterinary Service Officers	4
Total	277

(Source: Field Survey 2015)

3.7 Data collection methods

Both quantitative and qualitative methods of data collection were used in the study. In terms of quantitative data, livestock farmers were interviewed using the survey questionnaires. This instrument facilitated gathering of quantitative data. This data includes the general household background information such as education, sex, age, number of household members, etc. The quantitative methods also aided the generation of data on types of livestock produced, state of livestock production and effects of ethnic conflicts on livestock production in the study area. On the aspect of qualitative methods discussions with the stakeholders was guided by key informant interview guide. Detail information gathered as supplement to the descriptive statistics was facilitated through the key informant interviews.

3.8 Instruments for data collection

This study employed semi-structured questionnaires and key informant interview guide as instruments for data collection. The semi-structured questionnaire was used as quantitative data collection tool and key informant interview guide also used as qualitative data collection tool. Details of these instruments are discussed below.

3.8.1 Semi-structured questionnaires

The semi-structured questionnaires were used to collect data from the households of selected communities that are identified to have been affected by the ethnic conflict. The questionnaires were enumerator-administered to the respondents because of illiteracy. The respondents were asked questions aimed at addressing the objectives of the study.

Plate 1: Administering of questionnaire to a livestock farmer

3.8.2 Key informant interview guide

Data was gathered from the identified stakeholders who were interviewed as key informants in the study. These interviews were conducted using a key informant interview guide. The questions and issues were documented and used as a guide for facilitating discussions with each of the key informants. The guide contained open-ended issues raised that allowed the respondents the opportunity for detail response to the issues. Just like the survey questionnaire, the interview guide captured all salient issues that were germane to the study objectives.

3.9 Techniques of data analysis

Data collected was cleaned, edited, reduced, organised prior to analyses using PROC FREQ procedure of SAS (Statistical Analysis Software). Livestock production data was analysed using PROC FREQ whereas prices and incomes of respondents were analysed by the MIXED linear module procedures of SAS for PROC FREQ and differences were tested by the chi square test of proportions. The close-ended questions were coded into the SPSS software as a data template. The field data was then entered into the data template using the codes of answers. The data set was then previewed for correction of data gaps and errors. Finally, the data was analysed with automatic command of the analysis according to the themes of the study objectives. The qualitative information that was gathered through the open-ended questions and other interviews were also summarized manually by grouping the information on the bases of similarities and dissimilarities. The qualitative data was grouped according to the themes of the objectives. The information that was similar to particular themes was summarized on bases of similarities and others also treated as independent information. At the close of the summary, the processed and summarized qualitative data were therefore blended with the analysed quantitative data during interpretation of results of the data.

CHAPTER FOUR

RESULTS

4.1 Demographics of respondents

4.1.1 Age distribution of respondents

The ages of respondents were generated through interviews aimed at establishing their age categories. The results are presented in Table 4.1 below.

Table 4.1: Age Distribution

Age Categories(Years)	Frequency
16 – 25	39 (14.2)
26 – 35	43 (15.5)
36 – 45	78 (28.1)
46 – 55	117 (42.2)
Total	277 (100.0)

Values in parenthesis are percentages

(Source: Field Survey 2015)

As shown by the results contained in Table 4.1, various age categories of respondents participated in the study. According to the results, the least age group was those within the ages of 16-25 years. The most represented age group of respondents was those within the ages of 46-55 years. Apparently, most of the respondents are the active working populations whose age ranges are below 56 years of age as in Table 4.1

4.1.2 Marital status of respondents

Marital status of respondents was assessed during the study to establish status of marriage as a demographic characteristic of people who are engaged and participated in the study. The results generated are presented in Table 4.2 below.

Table 4 ital Status

Marital	Frequency
Single	30 (10.8)
Marriec	237 (85.6)
Separat	3 (1.1)
Divorce	1 (0.4)
Widow	6 (2.2)
Total	277 (100.0)

Values i hesis are percentages

(Source: urvey 2015)

The results on the marital status of respondents as contained in Table 4.2, shows that majority (85.6%) of the respondents were married people at the time of the study and some of these were inter marriages with the warring factions.

4.1.3 Gender

In another assessment, the study addressed the sex of respondents who were interviewed during the study. This aspect took care of the gender aspect of respondents and also to indicate the sex of those respondents who participated in the study.

As high as 96% of the respondents were males and 4% of them were females.

4.1.4 Educational status

In assessing the educational status of respondents, the study took data to determine the numbers of respondents who had formal education and those who did not have. The results are contained in figure 4.1 below.

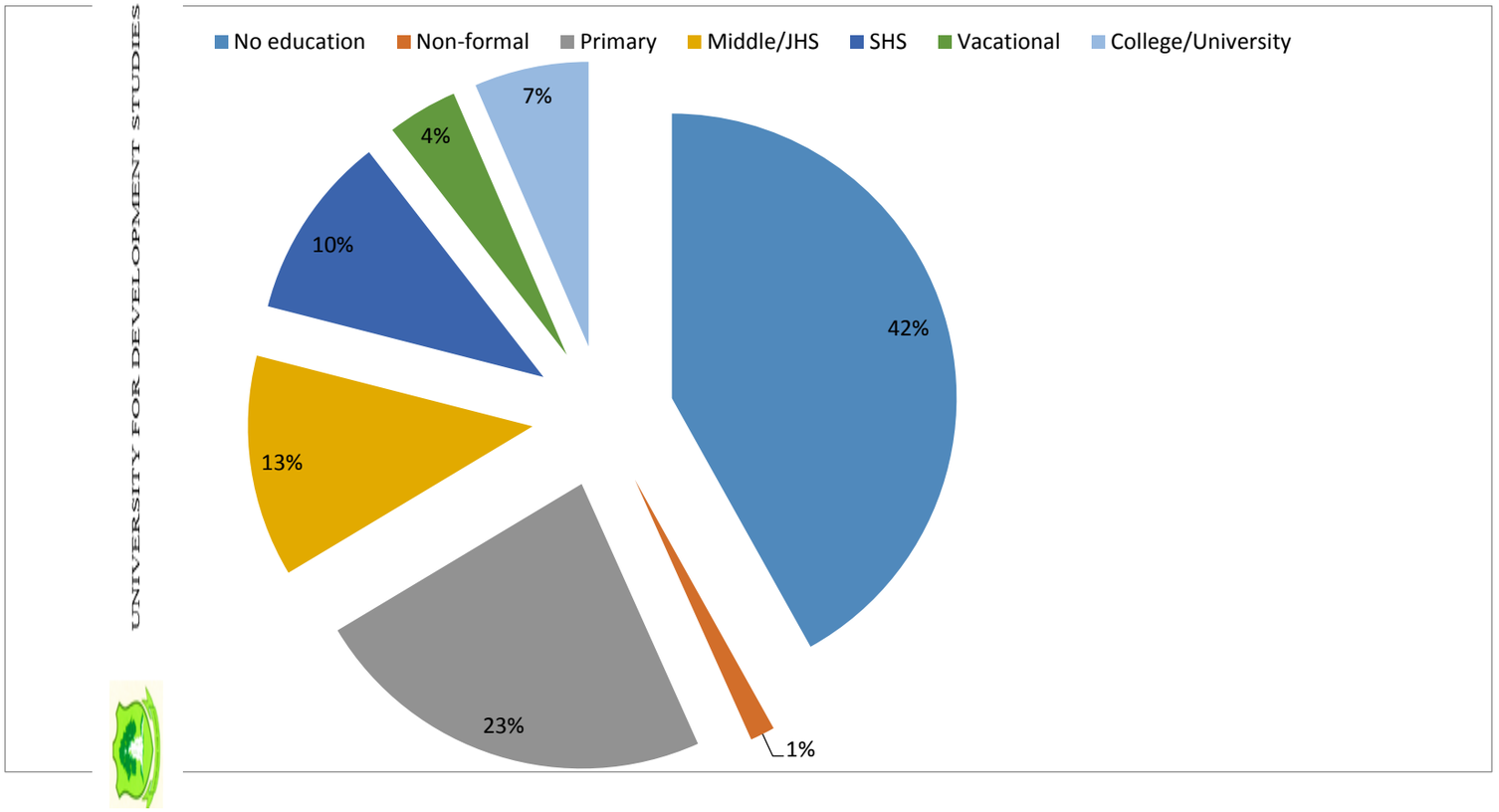

Fig 4.1: Educational status of respondents

(Source: Field survey 2015)

As revealed by the study, the respondents had various educational standing such as; college/university, vocational, Senior High School (SHS), Middle/Junior High School (JHS), primary, and even non-formal education. According to the results, a significant proportion (42 %) of the respondents had no formal education.

4.1.5 Vocation of respondents who participated in the study

As part of background information of the respondents, the various types of vocation of respondents who participated in the study are presented in Table 4.3 below.

Table 4 ribution of Vocation

Categor	spondents	Frequency
Livesto	er	220 (79.4)
Livesto	er	25 (9.0)
Veterin	vices Providers	4 (1.4)
Food V		14 (5.1)
Butcher		14 (5.1)
Total		277 (100.0)

Values i hesis are percentages

(Source: urvey 2015)

As shown in Table 4.3, out of 277 respondents on vocation practiced, 79% were livestock farmers, 25% were livestock traders, 4% were veterinary service providers, 14% were food vendors and a further 14% were butchers. It can be seen that the major occupation was livestock farmer and the least subscribed vocation was veterinary services. The information generated on each of the objectives of the study was provided by these categories of respondents from the Bawku municipality of Upper East Region of Ghana.

4.2 Nature of the ethnic conflicts in Bawku municipality

In addressing the aspect of the study that sought to establish the nature of ethnic conflicts in the Bawku Municipality, respondents' views were taken on the content of each conflict and its dynamics. Various views gathered from 277 respondents comprising of traders, farmers, butchers, food vendors and veterinary officers revealed the nature of the ethnic conflict that plagued the municipality over the years. Generally, the responses gathered showed that the Bawku ethnic conflict dates back to the 1950s. The conflict exists between the Kusasis and Mamprusis who have been fighting over the rightful custodian of the area they are currently occupying. The conflict situation has remained a recurrent one. It resurfaces and at a point subsides. During the 1980s the conflict sparked and appeared to have died off for quite a long time. This conflict event was around the 1983 during the celebration of Samanpiid festival which is usually celebrated by the Kusasis to signify bumper harvest. In 1984, the same conflict erupted again between the same ethnic groups in the Bawku Municipality. Each of these conflict events have been destructive and always hamper activities of the people living around the municipality. In 1984, the recurred conflict was attributed to the issue of ownership of farmlands that still had links with the pending issues over rightful custodians of the area.

Again in 1985, the conflict reoccurred during the Samanpiid festival celebrations. This same ethnic conflict manifested and got linked to the orthodox political activities leading to subsequent occurrence again in the year 2000 during the elections. In addition, from 2001-2007 the two ethnic groups were at war again also around the time of celebration of the Samanpiid festival. According to the various respondents, the ethnic conflict in Bawku has not only remained a recurrent one but has also become very protracted in that the minority tribes settling in the area have aligned themselves and identify with either of the conflicting ethnic groups. These minority tribes include; Bimobas, Dagombas, Bisa, Moshes and Hausas. The ripple effect of this recurrent ethnic conflict includes; the sense of insecurity, mistrust amongst the people, destruction of property and reduction in productivity including livestock production. Presented in Figure 4.2 below is the time-line for ethnic conflicts that occurred in Bawku Municipality over the years.

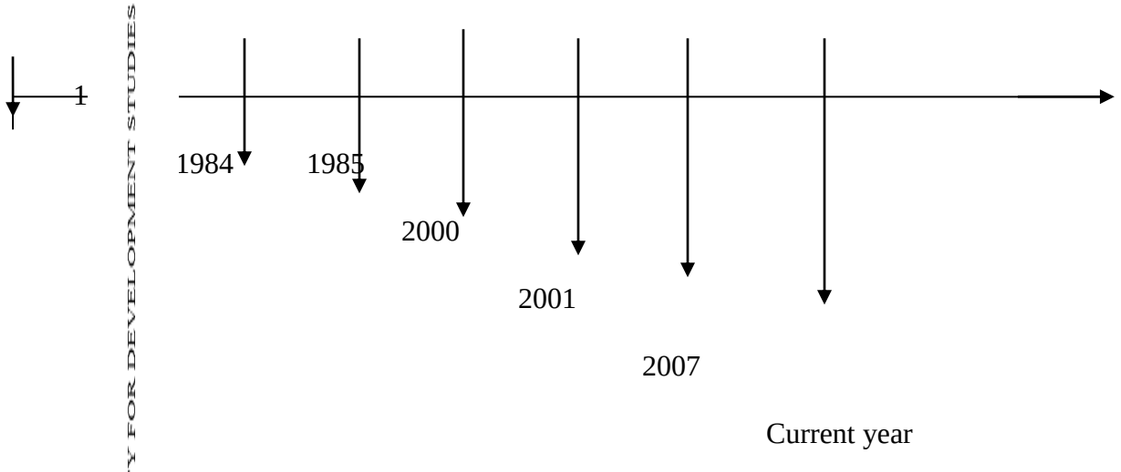

Figure 4 ıe-lines of ethnic conflicts in Bawku Municipality

(Source Survey 2015)

The Figure 4.2 above shows the time-lines of ethnic conflicts that have occurred over the recent past years. The study gathered from the various actors who participated in the study that from their memory, they could trace the conflict occurrence to the 1980s. According to the study, the initial ethnic friction over ownership and authority in the area degenerated in1983. This event continued through 1984 to 1985 when it appeared to have subsided. The issue became quiet dormant from this time until the year 2000. This actually was triggered and made more volatile during the 2000 national political elections. The respondents felt that politicians fed on the latent ethnic conflict and that molded the situation into another monster of an issue because it became volatile and destructive during the year 2000 onwards. The year 2000 conflict situation travelled through 2001. This attracted serious government attention and peace interventions and had also travelled through up to the year 2007. Since 2007, the people of Bawku Municipality are yet to clearly state that they have reached peace grounds. The respondents are with view that the conflict situation has only been managed and currently could be described as latent. They described the ethnic conflict as one that borders on issues of the true custodian or controller of the area and that makes the substantive issues difficult for compromise. They further stated that the ethnic conflicts that occurred have also been destructive and pose insecurity to human lives in the municipality.

It is obvious from the discussions with various respondents that the ethnic conflict in the Bawku Municipality has attachment with ethnic identity, territorial ownership and control, recognition and subsequently influenced by the political affiliation of the people involved in the conflict. It is also obvious from the study results that the conflict has gotten protracted because of other ethnic settlers in the area taking sides with the main conflicting

ethnic groups making the nature of the conflict complex and inseparable from the other socio-cultural and political issues in the Bawku Municipality.

In another set of interactions, respondents were made to indicate the severity of the various types of conflict events in the municipality. It was the basis on which they selected the time lines in Figure 4.2 above. It was revealed that 96% of the respondents indicated the conflict event that occurred in the year 2000 through 2001 to around 2007 as the severest.

4.3.1 Breeds of livestock produced in the Bawku Municipality

As part of the objectives of the study, data was generated from the respondents of various categories to establish the species of livestock that they produced and the results are contained in Table 4.4.

Table 4 ıership of different species of livestock in the Bawku municipality

Species	Yes	No
Cattle	74	26
Sheep	87	13
Goats	92	8
Pigs	18	82

(Source ;urvey 2015)

The study revealed that the major livestock produced by the people in the Bawku Municipality include cattle, sheep, goats and pigs. These results showed that majority of the respondents are engaged in the production of cattle, sheep, goats and pigs with the dominant species being sheep and goats. Even though, the study revealed that most of those households that produce livestock also produce various types of poultry at the household levels.

4.3.2 Number of livestock produced before conflict

In addition to establishing the types of livestock that were produced by the responding households, the study also investigated the number of livestock produced by the households. The results of such assessment are contained in Table 4.5 below.

Table 4 ıber of Animals Produced Prior to Conflicts

Livesto	ıes Produced	Number of animals produced	Maximum/farmer	Mean number of animals/farmer
Cattle		1509	40	5
Sheep		2574	40	9
Goats		2954	60	11
Pigs		206	30	1
Poultry		4546	50	10

(Source: ıurvey 2015)

The results contained in Table 4.5 above reflect statistics of number of animals produced by the respondents who participated in the study. The results showed that the minimum number of livestock produced by the respondents was those who had none of the animals produced ranging from cattle, sheep, goats and pigs at the time of this study. It also indicates that on the average pigs constituted the least category of animals produced by the respondents, whilst the category of goats had the greatest mean of 11 goats per farmer. Out of a total of 220 livestock farmers interviewed, only 18 representing 8.2% were engaged in pig rearing with number of pigs owned ranging from 5-30.Thus, cattle, sheep and goats were the main livestock produced by the people in Bawku Municipality during the period before the recurrence of recent ethnic conflicts.

4.3.3 The state of livestock production in Bawku Municipality

This part of the study describes the state of livestock production in the Bawku Municipality. The respondents comprising of household heads, butchers, and veterinary officers were interviewed to establish the state of livestock production. According to the study, the main occupation of the people in the Bawku Municipality is agriculture. Thus, having agriculture as the main stay of the people, majority of the labour force is engaged in several forms of agriculture including livestock production. Interactions with the respondents during interviews showed that livestock production in the area is mostly blended with the crop production. It was stated that crop production in the area is based on rain-fed and a single yearly season of engagement. The livestock is the supporting engagement for every household because it provides manure to improve the soil fertility and thereby increasing yields of crops, some respondents sold some animals to get farm

inputs such as seeds and fertilizer for the main cropping season and also to pay for labour, provides supporting livelihood income for them and their families.

4.3.4 Production years

Livestock production is practiced by the people in various forms. Some are engaged in its production as a full time economic engagement and others also engaged as unintended supplementary production activity. The respondents were required to indicate the number of years they have been engaged in the production of livestock. The details of results that assessed the duration of respondents' engagements in livestock production are presented in Table 4.6 below.

Table 4 's of Engagement in Livestock Production

Years	Frequency
1- 5	29 (10.5)
6 -10	77 (27.8)
11-15	78 (28.2)
15+	93 (33.6)
Total	277 (100.0)

Values thesis are percentages

(Source Survey 2015)

As shown in Table 4.6 above, majority of the respondents (33.6%) were engaged in livestock production for 15 or more years, 28.2% were engaged in livestock production for 11-15 years. Furthermore, 27.8% were into livestock production for 6-10 years and the least duration of engagement was 1-5 years (10.5%).

4.3.5 Housing systems for production

Aside the engagement in livestock production, the system and mode of production of the livestock was also assessed during the study. The import of this section of the study was to establish the housing systems used by the respondents in their livestock farms. Results generated from this assessment are contained in Table 4.7 below.

Table 4 sing systems used for livestock production

Housin	m	Frequency
Non-Pr		57 (20.6)
Extensi		182 (65.7)
Intensiv		30 (10.8)
Semi-ir		8 (2.9)
Total		277 (100.0)

Values i hesis are percentages

(Source: urvey 2015)

It is obvious in Table 4.7 that three types of housing systems were used by the livestock farmers. By the results, it is clear that most of the livestock farmers practiced the extensive system of housing for their livestock. This system allowed the animals to explore and roam freely without guidance. The animals also find places outside to sleep mostly around the residence of their owner. The semi-intensive also allowed some level of free movement of the animals but regulated especially in terms of where they move to and where they sleep. There is some form of partial regulation of the animals unlike the extensive system of housing. In the intensive housing system, the farmer completely regulates the movement of the livestock by taking care of them under housing structure where the animals feed, drink and can move about within the premises of the farm.

It was revealed by the study that majority (65.7%) of the respondents who produce livestock uses the extensive systems for the production of their livestock. In sum, the state of livestock production shows that 79.4% of the respondents were engaged in livestock production. Livestock production therefore constitutes one of the productive activities of the people. According to the respondents, the extensive system is relatively cheap in terms of housing and feeding since the animals are allowed to move freely without any regulation. However, they also appreciated the fact that the animals under extensive system are prone to diseases and theft as well as indiscriminate killing by either vehicles or crop farmers. From table 4.8, a higher animal population was kept before the conflict than after the conflict except for pigs whose number increased in the intensive system and semi-intensive system of management after the conflict.

Table 4 cts of management system on populations of livestock before and after the conflict

Species livestoc	Extensive System of Management		Intensive System of Management		Semi-intensive System of Management	
	Before (Year 2000)	After (Year 2001)	Before (Year 2000)	After (Year 2001)	Before (Year 2000)	After (Year 2001)
Cattle	7.4 (760)	2.2 (222)	6.3 (122)	1.9 (36)	6.6 (32)	1.2 (6)
Sheep	16.3 (1690)	5.8 (598)	12.9 (248)	5.4 (104)	17.8 (86)	6.6 (32)
Goats	17.2 (1782)	6.7 (688)	14.4 (278)	6.2 (120)	22.0 (106)	6.6 (32)
Pigs	1.2 (126)	8.4 (868)	4.2 (80)	7.6 (146)	0.0 (0)	9.1 (44)
Poultry	34.9 (3610)	0.02 (2)	41.1 (792)	0.0 (0)	29.9 (144)	0.0 (0)
X^2	0.0001		0.0001		0.0001	

Values thesis are frequencies

(Source: Field Survey 2015)

4.3.6 Effects of ethnic conflicts on livestock production

In another assessment, data was gathered on effects of ethnic conflicts on livestock production in the study area. This section was aimed at establishing how the ethnic conflicts affect the production of livestock in the Bawku Municipality. In order to determine the effects of conflicts on the livestock production, the study investigated changes in productivity of livestock and incomes generated from livestock sales.

4.3.6.1 Effects of ethnic conflicts on production levels of livestock

One of the indicators for measuring the effects of ethnic conflicts on livestock production was determined using changes in the levels of productivity. The study generated data on production before and after ethnic conflicts in the study area. The production data for before (Year 2000) and after (Year 2001) were generated and compared. The import of this assessment is to establish the pattern of changes in the productivity. The results on changes in productivity are presented in Table 4.9 below.

Table 4 ıber of livestock after the conflict

Livesto species	Number of animals before conflict (Year 2000)	Number of animals lost during conflict (Year 2000- 2001)	Percentage lost	Number of animals right after conflict
Cattle	1509	1295	85.8	214
Sheep	2574	1483	57.6	1091
Goats	2954	1842	62.4	1112
Pigs	206	50	24.3	156
Poultry	4546	1684	37.0	2862

(Source: urvey 2015)

The results in Table 4.9 above show the statistics on the lost livestock during the period of the ethnic conflict (From 2000 – 2001) which most respondents considered the severest of all. These results suggest that the ethnic conflict in the Bawku Municipality have adversely affected the production levels of livestock in the area. It was revealed that the population of each of the livestock species such as; cattle, sheep, goats, poultry and pigs has decreased. The livestock farmers suffered great loss in terms of their animals that got lost during the conflict period. The factors that accounted for the reduction in population of livestock in the study areas included the fact that there was general human insecurity and that livestock farmers had no time and safety to care for their livestock, animals were not grazing well leading to starvation, indiscriminate stealing and killing and sometimes animals were suffering from various diseases. The reduction in livestock production was attributed to these enumerated factors. Perhaps the loss was worsened by the fact that majority of farmers practiced the extensive system of housing.

The decline in production of sheep and goats could be attributed to conflict because majority (78.4%) of the farmers claimed that they have lost their productive land to conflict.

Details of diseases that affected livestock during the Bawku ethnic conflict are presented in figure 4.3

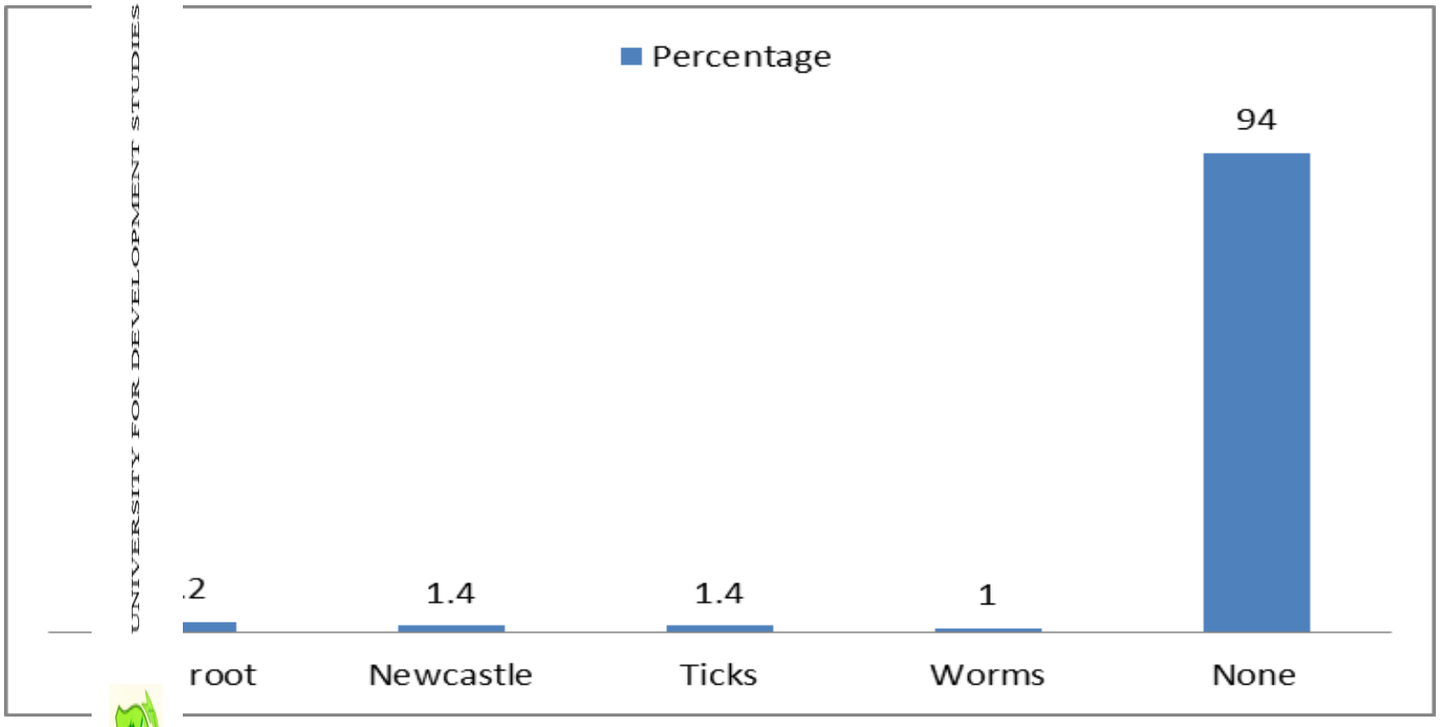

Fig. 4.3 of Diseases that Affected Livestock during the Conflict Period

(Source: Field Survey 2015)

As shown in Figure 4.3 above, the results of the study shows that the livestock that were produced by the farmers in the study communities in Bawku Municipality were affected by diseases such as; foot root, Newcastle, ticks and worms. It was revealed by the study that majority of the farmers representing 94% (261) indicated they did not experience any form of diseases in their livestock. This suggests that the reduction in livestock production was not due to diseases but rather by other factors such as; starvation, indiscriminate stealing and killing (classified as none). More so, there was a lack of livestock feed due to limited production of feed and a decrease in imports.

4.3.6.2 Effects of conflict on income levels of respondents from livestock production

In another dimension, the study investigated effects of the ethnic conflict on livestock production by ascertaining how the conflict situation affected the levels of income of respondents generated from the livestock production annually. The respondents indicated their average annual incomes that were generated from the sales of livestock before the re-occurrence of the ethnic conflict (2000 – 2001) and also after the ethnic conflict reoccurrence (after 2000 – 2001 conflict). The results of how ethnic conflicts affected the livestock production in Bawku Municipality are contained in Table 4.10 below.

Table 4 ome levels of respondents before and after the ethnic conflict

Categor	spondents	Before (GHS) (Year 2000)	After (GHS) (Year 2001)	SEM	p-value
Livesto	ers	3046.64[a]	611.04[b]	126.71	<.0001
Food ve		3000.00[a]	2428.85[b]	132.89	0.0053
Butcher		3000.00[a]	2000.00[b]	0.001	<.0001
Veterin	cers	3000.00[a]	2000.00[b]	0.001	<.0001
Livesto	rs	3000.00[b]	3500.00[a]	0.001	<.0001

Values ferent superscripts are significantly different (P<0.05)

(Source Survey 2015)

Results in Table 4.10 shows there were significant differences in average annual income obtained by Livestock farmers, Food vendors, Butchers, Veterinary officers and Livestock traders before and after the conflict. The implication of these results is that respondents earned varied and significant amounts of incomes from the livestock production prior to the re-occurrences of the ethnic conflicts.

As part of establishing the effects of the ethnic conflicts on the incomes of respondents, Table 4.10 further indicates that the mean income of an average livestock farmer before the conflict was significantly higher than the mean income after the conflict. According to the responses, during the conflict period, socio-economic life of the people was destructed; production of livestock suffered set-backs and also worsened by poor market situation as indicated by the butchers. The people of the municipality were more concerned about their personal security and this affected their livelihood. The study further indicated that ratio of mean income levels of respondents before the conflict to their mean income levels after the conflict was GHS 2.80. That is, for every GHS1.00 earned by a respondent from livestock business after the conflict, he could have earned GHS2.80 from the same activity before the conflict. This result shows a significant loss of income from livestock production in the Bawku Municipality. The implication of these findings is that the ethnic conflict affected the entire value and supply chain of livestock production. It was clear that productivity and income levels of livestock dropped significantly and that affected the domestic economy of the Bawku Municipality.

4.3.6.3 Effects of ethnic conflict on activities of livestock traders

The analysis covers how the conflict affected livestock bought and sold by livestock traders during the period before the ethnic conflict and after the conflict. The essence of this assessment was to determine the effects of the ethnic conflict on activities of traders showing the "before" and "after" conflict period. The results on these assessments are presented in ensuing sections. More livestock were bought and sold before the conflict than after the conflict as indicated in tables 4.11a and 4.11b.

Table 4 ercentage animals bought by livestock traders before and after the conflict

Period	Specie				
	Cattle	Sheep	Goats	Total	X^2
Before)00)	26.04 (487)	38.50 (720)	29.52 (552)	94.06 (1759)	0.0023
After (Y)1)	2.41 (45)	2.46 (46)	1.07 (20)	5.94 (111)	
Total	28.45 (532)	40.96 (766)	30.59 (572)	100.00 (1870)	

Values thesis are frequencies.

(Source. Field Survey 2015)

Table 4 ıe livestock marketing by traders before and after the conflict

Period		Livestock				X^2
		Cattle	Sheep	Goats	Total	
Before	)00)	26.04 (487)	38.50 (720)	29.52 (552)	94.06 (1759)	<.0001
After (Y	)1)	3.90 (73)	1.50 (28)	0.53 (10)	5.94 (111)	
Total		29.94 (560)	40.00 (748)	30.05 (562)	100.00 (1870)	

Values ıthesis are frequencies.

(Source Survey 2015)

4.3.6.4.1 State of livestock trade before and during conflict period

Another aspect investigated to determine the effects of ethnic conflict on livestock production was the impact of the ethnic conflict on livestock trade in the municipality. As part of the study, livestock traders were interviewed to help establish how the ethnic conflict affected their livestock trading activities during the ethnic conflict period. The results from these activities are presented in Figure 4.4 below.

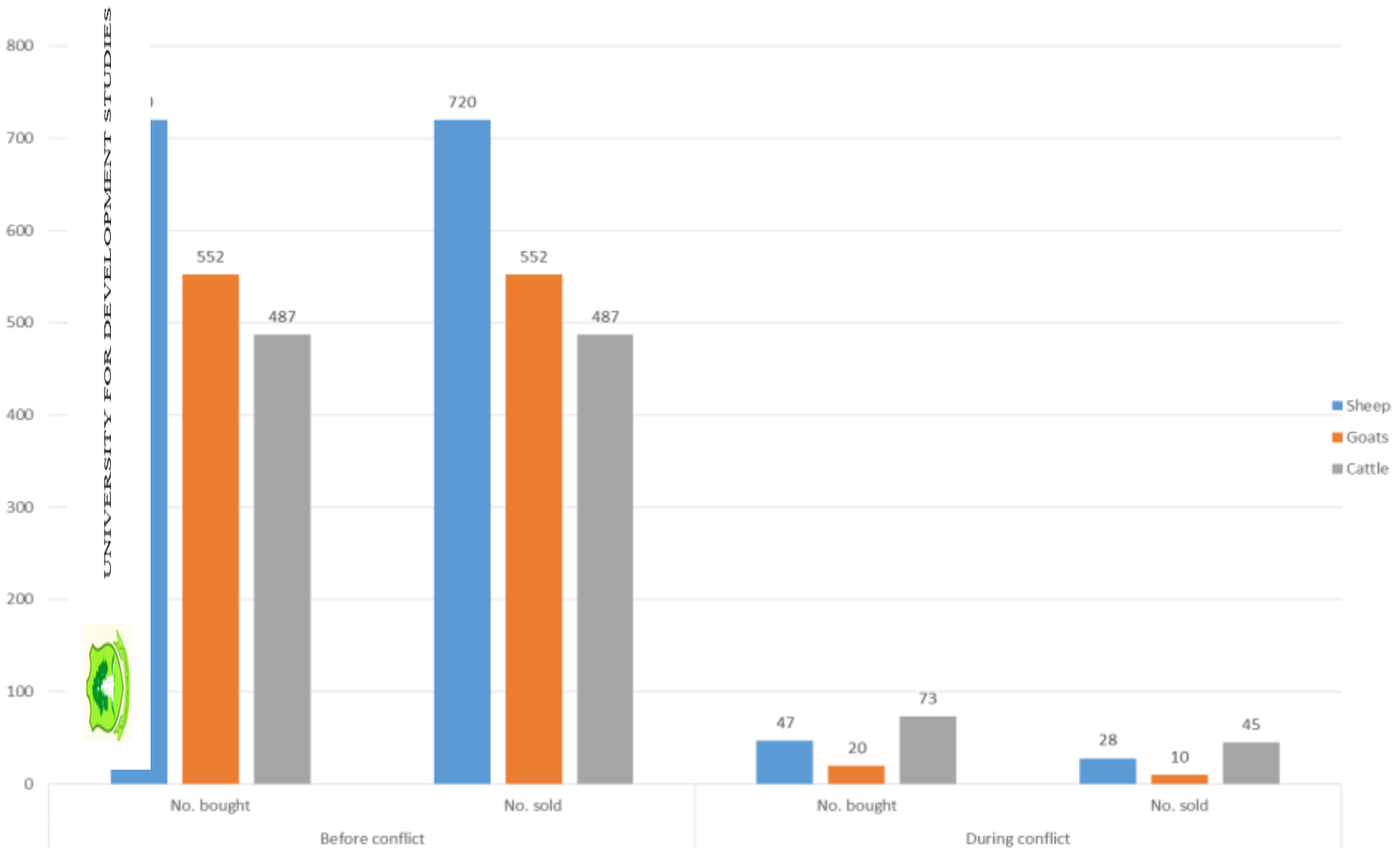

Figure 4.4: Livestock traded before and during the conflict period

The study showed that prior to the occurrence of the conflict, the numbers of livestock bought by the traders for sale were; 720, 552, 487 of sheep, goats and cattle respectively. The results further suggest that on the average, each of the twenty-five (25) traders could buy at least 28-29 sheep, 22 goats, and 19 cattle within a month. These statistics shows the benchmark of at least the minimum values of stock of livestock purchased by the traders prior to the period of the ethnic conflict. In comparing the stocks of livestock bought and sold during this period by the livestock traders, it was obvious that the stocks purchased by the traders were all sold.

Results on the stock of livestock traded during the conflict period were also presented in Figure 4.4 above. As shown in the table, the results imply that trade activities in terms of the numbers of livestock traded during the conflict period was low and that indicated the impacts of the conflict situation on trading activities of the livestock traders in the Bawku Municipality. This trend was attributable to the insecurity at that time.

Another aspect that the study tackled was the prices of livestock before and after the conflict and the results are shown in table 4.12 below.

Table 4 ces of livestock before and after the conflict.

Specie	tock	Before (GHS) (Year 2000)	After (GHS) (Year 2001)	SEM	P value
Cattle		1222.00[b]	3040.00[a]	148.66	<.0001
Goats		293.20[b]	658.00[a]	148.66	<.0001
Sheep		562.40[b]	1184.00[a]	148.66	<.0001

Values fferent superscripts are significantly different (P<0.05)

From the table above, it is evident that there were significant differences in the average prices of the various livestock before and after the conflict period.

This has resulted in high prices per kilogram of meat from an average of two Ghana cedis (GHS 2.00) before the conflict to seven Ghana cedis (GHS 7.00) as reported by food vendors in this study.

The picture below shows a typical market day at the Kariyama livestock market in the Bawku municipality.

Plate 2: Kariyama small ruminant market

Plate 3: Buyers/sellers interactions in the market

4.3.6.4.2: Comparison of activities of butchers before and during conflict period

Responding butchers were made to indicate the numbers of livestock they slaughtered before and during the period of the ethnic conflict. The essence was to determine the net situation by comparing the state of their activities over the three periods. More livestock where slaughtered by butchers before the conflict as compared to the numbers slaughtered during the conflict and the numbers declined further after the conflict (Table 4.13). This trend is obvious since before the conflict things where normal and people went about their

normal livelihood activities but the conflict caused many to flee their communities which affected their activities, others also lost their capital and could therefore not undertake any livelihood activities to support their families.

Table 4 ects of ethnic conflicts on the number of livestock slaughtered by butchers

Period	Livestock			Total	X^2
	Cattle	Sheep	Goats		
Before 2000)	4.33 (13)	30.00 (90)	30.00 (90)	64.33 (193)	
During 2000-2(	1.00 (3)	9.67 (29)	9.67 (29)	20.33 (61)	0.0179
After (Y 2001)	3.33 (10)	6.00 (18)	6.00 (18)	15.33 (46)	
Total	8.66 (26)	45.67 (137)	45.67 (137)	100.00 (300)	

Values i hesis are frequencies.

The results showed a significant decline in the total number of animals slaughtered daily. An average of thirteen (13) cattle was slaughtered by the butchers daily before the conflict period. This decreased to three (3) daily during the conflict period. This , they attributed to the dusk to dawn curfew that was imposed on the municipality and so the cow slaughtered will not be completely sold out thereby causing losses to the butchers. This however improved after the conflict with an average of ten (10) cattle slaughtered daily. According to them, they now have to buy the cow on credit from the farmers to slaughter and until he can raise the amount to pay for the animal, he cannot get any on credit again. They stated that the conflict has thrown a lot of them out of business. In terms of goats, an average of ninety (90) goats were slaughtered daily the period before the conflict and this also further reduced to twenty-nine (29) daily and currently they just manage to slaughter eighteen (18). The same numbers also applies to sheep. These changes in numbers of sheep and goats slaughtered between the two periods were found to be statistically significant That is, slaughter of cattle, goats and sheep for sale was adversely affected since the market for livestock products went down due to the conflict situation in the Municipality.

Plate 4: A butcher at the Bawku central market

Plate 5: A victim of the Bawku ethnic conflict

The picture in plate 5 shows a victim of the Bawku ethnic conflict who lost all his animals in the conflict. He was also badly injured and can no longer go about his work properly. His face is hidden to protect his identity.

4.7 Post conflict recovery of livestock

The results on the levels of production of livestock during the post conflict period are contained in Table 4.14 below.

Table 4.14: Distribution of livestock owned during post conflict period

Animals owned	Number of Animals	Max./farmer
Cattle	264	10
Sheep	734	20
Goats	840	30
Pigs	105	22
Poultry	2	1

(Source: Field Survey 2015)

The results in Table 4.14 show the number of livestock owned by the respondents during post conflict period. It indicates that the greatest livestock owned by the farmers was goat and the least was poultry. These numbers of livestock constitutes the states of livestock ownership in the post ethnic conflict period. The study investigated how livestock farmers acquired their present stock during the post ethnic conflict period. The results of such assessment are contained in Table 4.15 below.

Table 4 ırces of livestock owned during the post conflict period

Source		Frequency
Non-Li	Farmers	57 (20.6)
Old sto		148 (53.4)
Family	rs	14 (5.1)
NGOs		2 (0.7)
Other (l		56 (20.2)
Total		277 (100.0)

Values ıthesis are percentages

(Source Survey 2015)

The results in Table 4.15 reflect the various forms or sources of acquisition of present stock of livestock after the conflict period. It was found that majority (53.4%) of the respondents still had some of their old stock left after the ethnic conflict subsided. However, only 0.7% of the respondents indicated that they got their present stock after the conflict through the interventions of NGOs in the area.

CHAPTER FIVE

DISCUSSIONS

The study found out that 96% of the respondents were males and only 4% were females. It confirms a study by Timpong-Jones et al (2014) who found out that female involvement in livestock production is low.

The import of this is that more males are engaged in livestock rearing and trading as compared to females which account for the larger numbers in male respondents than females. In this context, more male respondents participated in the study compared with the female respondents. The variation was obviously attributed to the difficulty in getting the female household heads to participate in the interviews of the study. Also, female household heads are generally much fewer than male household heads. That is, males normally take decisions as to how their households should be managed. To a greater extent, therefore the males would be well informed about the causes and more importantly, the effects of the conflict on their sources of livelihood.

5.1.1 Age distribution of respondents

Given the age structure of the respondents, they will be discerning enough to have realized the negative impact that the conflict had on their livelihood. This means that they will be more likely to imagine how subsequent conflict can be devastating, and thus do all within their power to prevent future occurrence of conflict. Also, the youth seem not to be interested in animal production since the results shows the majority of respondents in this study were 40years and above, this could have also contributed the low levels of regrowth of the livestock sector in the study area.

This conforms to similar works in Cameroon and northern region of Ghana by Nformi et al 2014 and Addah and Zezebi (2008) respectively who found out that the active work force of farmers range between 31-50 years was the majority in the sampled farmers at 52.58% and 40% respectively.

5.1.2 Marital Status

The results showed that majority (85.6%) of respondents were married. The impression of the results is that most of the respondents were people who were potentially duty bearers who had some forms of direct household and family responsibilities. This further suggests that those who are married from the other faction or ethnic group might have felt the greatest impact of the conflict, since they were indirectly fighting against themselves.

5.1.3 Gender

The study found out that 96% of the respondents were males and only 4% were females. It confirms a study by Timpong-Jones et al., (2014) who found out that female involvement in livestock production is low.

The import of this is that more males are engaged in livestock rearing and trading as compared to females which account for the larger numbers in male respondents than females. In this context, more male respondents participated in the study compared with the female respondents. The variation was obviously attributed to the difficulty in getting the female household heads to participate in the interview of the study. Also, female household heads are generally much fewer than male household heads. That is, males normally take decisions as to how their households should be managed. To a greater extent, therefore the males would be well informed about the causes and more importantly, the effects of the conflict on their sources of livelihood.

5.1.4 Educational status

The study also found that 42% of the respondents had no education and this confirms the report by GPRS, 2003 and which says that illiteracy rates in Ghana tend to be worse in rural areas with the national average of 64.2%. This also explains why majority (61%) are into agricultural activities.

The result on educational status suggests that, animal production in the Municipality, is largely left in the hands of illiterates, this could have accounted for the delayed improvement or growth of the sector after the conflict, since, the uneducated may not be able to readily apply new technological advancements in order to increase productivity in a short while. Also, owing to the fact that, animal production is mostly not taking as a major or main job of the people, educated people may be tempted to taking up more formal jobs instead rearing animals.

5.1.5 Vocation of respondents

Majority of the respondents representing 79.4% were livestock farmers and their livelihoods were greatly affected by the ethnic conflict in the area. Views were also taken from other actors of the livestock value chain such as livestock traders, butchers, food vendors as well as the staff from the municipal veterinary service department of the department of Agriculture.

The implication of these results is that views that informed the findings of the study were varied and sourced from targeted and relevant actors involved in the livestock production, marketing and processing. This is to emphasize the fact that those categories of people in

the area will be well aware of the effects that conflict can have on the livestock business as well as their sources of livelihood.

5.2 Number of livestock produced before conflict

The average numbers of animals produced as presented in Table 4.5 are not quite different from the national averages reported by Ghana Statistical Service (2014), especially for goats and sheep which were 11.7, 10.5 respectively. According to the respondents, apart from the fact that there is ready market for the livestock they produce, they are also easy to manage. Majority of the respondents also indicated that the production of livestock is a major additional source of income for them. This confirms the description of livestock production by Otte and Chilonda (2002) as an income generating activity whose contribution to livelihood cannot be underestimated.

5.3 Production years

The results discussed herewith suggest that while some of the respondents are not old in livestock production; others have been engaged in production for several years. Their levels of exposure to challenges, achievements and experience vary in view of the differences in times of engagement in the livestock production activities. Livestock production is striving because of the vibrant animal market (Kariyama market) in the area where neighbouring countries such as Burkina Faso and Togo come to do their livestock trading in this market and vice versa.

5.4 Housing systems for production

The results discussed herewith suggest that while some of the respondents are not old in livestock production; others have been engaged in production for several years. Their levels of exposure to challenges, achievements and experience vary in view of the

differences in times of engagement in the livestock production activities. Livestock production is striving because of the vibrant animal market (Kariyama market) in the area where neighbouring countries such as Burkina Faso and Togo come to do their livestock trading in this market and vice versa.

This trend can be attributed to the fact that most of the farmers lost their livestock during the conflict under the extensive system so the animals were either killed or stolen by individuals of the opposing factions and some unscrupulous members of the community.

The high rate of the extensive system of animal production could have contributed to the high loss of animals during the conflict since animals were always left to roam about, thereby making them vulnerable to harsh weather conditions, diseases, theft among others. Meanwhile the current high dominance of the extensive system could also be as a result of the fact that, farmers lost so much during the conflict that they are currently not able or are to put up housing structures for their animals for fear of future reoccurrences.

5.5 Effects of ethnic conflicts on production levels of livestock

The finding of this study goes to corroborate earlier findings by Mwangi *et al* (2014) who conducted a study in Mali and Nigeria and reported that the conflicts affected agricultural value chains because farmers were restricted from their farm sites, access to farm inputs became very limited, crop yields was drastically reduced and agricultural interventions were halted during the periods of conflicts.

The most affected livestock specie in terms of proportionate loss of production was sheep. The respondents further indicated that several factors emerging from the ethnic conflict

situation affected the productivity of the various livestock. The findings on effects of ethnic conflict on livestock production as revealed by the current study has also confirmed the earlier findings made by Bolarinwa et al (2013) who found that communal violent conflict impacted negatively on farmers' livelihood activities in two agro-ecological zones of Nigeria. Their study acknowledged that there is hardly a year when there are no major violent conflicts in Nigeria. Their study showed that the violent conflicts had impacted negatively on the livestock production in most parts of Nigeria. They further noted that the savannah area covered by the study suffered more of the impact of the conflict on sheep and goat production because they recorded lower mean numbers (180) of sheep and goats as against higher mean numbers (2007) of sheep and goats recorded in previous years and areas where there were no conflicts.

Furthermore, the findings of the study conforms with that of Addah and Zezebi (2008) who investigated the impact of ethnic conflicts on livestock production in Africa which the guinea fowl war (1994 –1995) in "Eastern corridor" of the Northern Region of Ghana as a case study. They reported that the impact of the conflict on livestock was felt after the conflict period because water bodies were poisoned leading to the death of many livestock; some livestock were stolen whiles others were indiscriminately killed. According to them, other livestock starved to death, whilst some allied livestock support services and infrastructure were destroyed culminating into sporadic outbreaks of livestock diseases. These findings go to confirm the Syrian Needs Assessment Project (2013) and FAO (2013) that found that violent conflict situation in Syria had impacted negatively on livestock production because animals were reported killed or stolen, veterinary service was significantly eroded coupled with insecurity hindering the movement of animal health

workers. Also, vaccines were no longer produced in the country, existing stocks were reported to be almost exhausted and imports were banned under the sanctions. More so, there was a lack of livestock feed due to limited production of feed and a decrease in imports.

5.5.1 Effects of conflict on income levels of respondents from livestock production

The findings from this study confirm the findings of Kendie and Bukari (2012) as well as Aganah (2008) who concluded from their studies that conflicts in the Bawku Municipality impacted negatively on investments in agricultural production, commerce and industry which eventually affected socio-economic development in the Bawku Traditional Area of Upper East Region of Ghana. The findings also conforms with the findings by Addah (2009) whose study revealed that the four inter-ethnic conflicts that occurred from 1981-1995 in the Northern Region have brought the region a cost of GHS46,111,372.75 as a result of a loss of 23,002 cattle. However, livestock traders in this current study rather made more income after the conflict; this could be as a result of these traders taking advantage of the scarcity of animals in the study area to charge higher prices for animals as a way of making more money.

5.6 State of livestock trade before and during conflict period

The implication of the results is that there was market for the livestock and that the traders could sell off their stocks without any constraints as shown by the results in Figure 4.4. Hence, there was good market for the livestock traders during the period before the occurrence of ethnic conflict in the Bawku Municipality. This finding is similar to that of Kusimi et al (2006) whose study on conflicts in northern Ghana revealed that the conflicts

in northern Ghana have worsened the already endemic poverty situation of the people and as well continuously put people in perpetual fear and mistrust.

5.7 Post conflict recovery of livestock

The implication of the results is that the recovery strategies of the livestock farmers whose production was affected is more internal than external since there was more sense of self initiative of either remobilization of capital to acquire new stock or falling back on family support even though few benefitted from interventions of NGOs in the area.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary of major findings

The summary include core findings on the nature of ethnic conflicts, state of livestock production, types of livestock produced, and how the ethnic conflicts affect the production of livestock in the Bawku Municipality.

6.1.1 Nature of ethnic conflicts

The ethnic conflict was described as one that borders on issues of true custodian of the area and that makes the substantive issues difficult for compromise. They further stated that the ethnic conflict were destructive posed and continue to pose insecurity to human lives in the municipality. It is obvious from the discussions with various respondents that the ethnic conflict in the Bawku Municipality has to do with ethnic identity, territorial ownership/control and recognition. The conflict has subsequently been influenced by the political affiliation of the people involved in it. It is also obvious from the study results that the conflict has gotten protracted because of other ethnic settlers in the area who took sides with the conflicting ethnic groups making the nature of the conflict complex and inseparable from the other socio-cultural and political issues in the Bawku Municipality. Respondents indicated the conflict event that occurred in the year 2000 through 2001 was the most severe.

6.1.2 Types of livestock produced

Cattle, sheep, goats and pigs were the main species of livestock produced by the people in Bawku Municipality during periods before the ethnic conflict. The results also showed that sheep and goats were the dominant species. The least produced specie in the Municipality is the pig. This is because the municipality is predominantly a Moslem settlement and it is a taboo for a Moslem to rear pigs. Also pigs tend to compete with humans for nearly the same type of feed sources which makes it a bit difficult for farmers to cope with, because even humans may not have had enough for themselves yet, pig production may also require more funds to begin as they may more urgently need housing structures as compared to other livestock.

6.1.3 State of livestock production

In terms of number of years of engagement in livestock production, majority of the respondents have been engaging in livestock production and kept animals for over fifteen years, whilst some were not producers of livestock. The respondents' levels of exposure to challenges, achievements and experience vary in view of the differences in times of engagement in the livestock production activities.

On the aspect of housing systems used by livestock farmers, it was obvious from the results that three types of housing systems were used by the farmers. Most of the livestock farmers practiced the extensive system of housing. This system allowed the animals to explore and roam freely without guidance. The animals also find places outside to sleep mostly around the residence of their owner. The semi-intensive system of housing also allowed some level of free movement of the animals but regulated especially in terms of where they move to and where they sleep. There is some form of partial regulation of the

animals unlike the extensive system of housing. As regards the intensive housing system, the farmer completely regulates the movement of the livestock by taking care of them under housing structure where the animals feed they drink and they can move about within the premises of the farm. In was revealed by the study that majority of the respondents who produce livestock representing 62% uses the extensive housing systems for the production of their livestock which also accounts for the reduction in livestock numbers after the conflict.

6.1.4 Effects of ethnic conflict on livestock production

Livestock production generally decreased due to the conflict. While the decreases in cattle and goat populations were similar, that of sheep was very drastic. Income levels of respondents decreased significantly as a result. The conflict also made the lives of the people of the Municipality highly insecure and negatively affected the livelihood engagements of the people.

Livestock trade also dropped significantly in the Municipality due to the conflict. In fact, the ethnic conflict affected the entire value and supply chain of livestock production. It was clear that productivity in the ruminant sub sector and incomes levels of farmers, traders, butchers and food vendors fell significantly thus affecting the domestic economy of the Bawku Municipality.

6.2 Conclusion

This study investigated the effects of ethnic conflicts on ruminant production in Bawku Municipality, taking into consideration the nature of ethnic conflicts, types of ruminants produced, state of ruminants production and how the ethnic conflicts affected the ruminants production in the in the Bawku Municipality.

The study found that ethnic conflicts in the Bawku Municipality are rooted in ethnic dominance, recognition and traditional authority and control. Also, the ethnic conflict mostly occurs during traditional events and aggravated by political sympathy that subsequently turns violent and destructive posing insecurity to human lives and general socio-economic situation in the area.

The study further found that cattle, sheep, goats and pigs are the livestock that were produced by the people of the Bawku Municipality at the time of the study.

In terms of the state of ruminant production, it was concluded that respondents who participated in the study were largely engaged in ruminant production. That is, majority of the households in the Bawku Municipality are engaged in ruminant production, and therefore constitutes one of the productive activities of the people in the area. In terms of number of years of engagement in ruminant production, the results suggest that whiles some of the respondents are not old ruminant farmers; others have been engaged in its production for several years. Their levels of exposure to challenges, achievements and experience vary in view of the differences in times of engagement in the ruminant production activities. On the aspect of housing systems used by ruminant farming, it was

obvious from the results that three types of housing systems (i.e. extensive, semi-intensive and intensive) were used by the varying ruminant farmers.

The conclusion drawn on the effect of the conflict on the level of production of ruminants in the Municipality is that there was a significant decrease in all ruminants considered, especially, the goat, cattle and sheep. As a result income levels of the ruminant producers also decreased considerably which eventually slowed economic development of the Municipality.

6.3 Recommendation

Having investigated the effects of ethnic conflicts on livestock production in the Bawku Municipality, the following recommendations are made based on the major findings.

On the nature of ethnic conflict, it is recommended that Ghana as a country needs to have specific law that defines and regulates tribal politics. When there is specific law that regulates the conduct of political parties especially on the conflict situations, it could reduce the extent to which politicians exploit ethnic groups that are in conflict. The Bawku conflict which is believed to be worsened by the infiltration of the political parties had led to protracted nature of the conflict.

Ghana as a country needs to have specific laws that defines and regulates the conduct of political parties especially in the conflict areas. It would reduce the extent to which politicians exploit ethnic groups that are in conflict.

The capacities of stakeholders such as the traditional authorities, religious leaders and government agencies in the area needs to be built on non-violent approaches to conflict prevention and resolution as well as dialogue.

By the location of Bawku Municipality close to the boarder, conflict situation has a greater tendency to escalate because of the ease of movement of people and arms in and out of the municipality. Boarder security should be intensified.

In addition, based on the close location of the municipality to the boarder, the use of extensive systems of livestock production should be discouraged.

The Livestock Value Chain in the Municipality should be widened by key stakeholders such as MoFA, livestock farmers associations and other farmer groups and made attractive to many people. This will ensure that more persons especially the youth who are usually lured into fighting will be able to start their own businesses to benefit from this initiative, therefore, may not want to derail those benefits in a conflict. Besides, some people may be so gainfully occupied in the enterprise that they will not have time to plan and promote conflicts.

References:

Adams, F. and Ohene- Yankyera, K. (2014). Socio- Economic Characteristics of Subsistent Small Ruminant Farmers in three regions of Northern Ghana. Asian Journal of Applied Science and Engineering, 3, 93-106.

Addah, W. and Zezebi, N. (2008). Impact of Ethnic Conflicts on Livestock Production in Africa: The Case of Northern Region of Ghana. Journal of Agriculture and Social Research (JASR), 8: 2008.

Addah, W. (2009). Impact of Ethnic conflicts on cattle population and production in the eastern corridor of Northern region of Ghana. International Journal of Tropical Agriculture and Food Systems, 3:1-6

Adzitey Frederick (2013). Animal and Meat Production in Ghana-An Overview. Journal of World's Poultry Research. J. World's Poult. Res. 3(1):01-04, 2013.

Afolabi, B.T. (2009). Peacemaking in the ECOWAS region: Challenges and Prospects, Conflicts Trends, 2:25, Durban: ACCORD.

Aganah, G.A.M. (2008). The Effects of Chieftaincy Conflicts on Local Development: The Case of Bawku East Municipality. Thesis Dissertation Submitted for the Degree of Master of Philosophy in Peace and Conflict Transformation. University of Tronso.

Aning, K. E. and Bah, S. A. (2009). ECOWAS and conflict prevention in West Africa: Confronting the triple threats. New York: New York University, Centre on International Cooperation.

Aning, K. E., Birikorang, E. and Jaye, T. (2010). Compendium of ECOWAS peace and security decisions. Accra: KAIPTC.

Annan, N. (2014). Violent Conflicts and Civil Strife in West Africa: Causes, Challenges and Prospects. Stability: International Journal of Security & Development, 3: 1-16.

Annan, N. and Danso, S. (2013). Religion and Ethnicity in Africa: An Obstacle to Development? In: Yaye Nabo Séne (ed) Africa: A new dawn? Volume 3, January-December, 2013, Addis Ababa: AU Herald.

Bacho, Z. L. F. and Abdul-Kadir, M. S. (2007). Artificial creation of states and enduring conflicts in Africa: legacies of the "indirect rule" policy in Northern parts of Ghana and Nigeria. Ghana Journal of Development Studies 4:13–27.

Bates, R.H., David, L.E., Jack, A.G., Ted, R.G., Barbara, H., Colin, H.K., Marc, A.L., Michael, L., Monty, G.M., Thomas, M.P., Jay, U and Mark, R.W. (2003). Political Instability Task Force Report: Phase IV findings.

Best, J. W. and Kahn, J.V. (2007). Research in Education, New Delhi, Prentice Hall of India Private.

Bolarinwa, K. K.; Abdulsalam-Saghir, P; Oyekunle, O. (2013). Impact of Communal Violent Conflict on Farmer's Livelihood Activities in Two Agro-Ecological Zones of Nigeria.

Botchway K. (2016). The Fulani herdsmen will surely return. Ghanaweb.

Brisibe, A. A. (2001). The identity of a people: With special focus on globalization & its impact in the Niger Delta. In: African Tradition, C.O.O.L Conference, Boston, MA on 18 March 2001.

Brock, J. (2012). Nigeria's boko haram killed 935 people since 2009. Reuters, 24 January. Available at http://www.reuters.com/article/2012/01/24/usnigeriasectidUSTRE80N1GX20120124

Bujra, A. (2002). African conflicts: Their causes and their political and social environment. Development Policy Management Forum Occasional paper, No. 4. Addis Ababa

Cornell, S. and Hartmann, D. (1998). Ethnicity and Race: Making Identities in a Changing World. Thousand Oaks, CA: Pine Forge. p. 59. ISBN 0761985018.

Crisis Group (International Crisis Group). (2012). Beyond turf wars: Managing the post-coup transition in Guinea-Bissau, Africa Report No. 190. Brussels, Crisis Group.

Ebo, A. and Mazal, L. (2003). Small arms control in West Africa, Monitoring the Implementation of Small Arms Control (MISAC), West Africa Series No.1, London: International Alert.

ECOWAS Protocol. (1999). Relating to the Mechanism for Conflict Prevention, Management, Resolution, Peacekeeping and Security. December 1999.

ECOWAS Report. (2006). 'Regional Integration for Growth and Poverty Reduction in West Africa: Strategies and Plan of Action.' A regional strategy paper prepared by the WAEMU Commission and the ECOWAS Executive Secretariat, Abuja and Ouagadougou, December, 2006.

ECOWAS. (2008). Conflict Prevention Framework. In: ECOWAS Commission, Abuja, Nigeria in January 2008.

ECOWAS. (2012). 41st Ordinary Session of the Authority of Heads of States and Government of ECOWAS. In: Final Communiqué Yamoussoukro on 28–29 June 2012.

Edeko, S. E. (2011). The proliferation of small arms and light weapons in Africa: a case study of the Niger Delta in Nigeria. Sacha Journal of Environmental Studies, 1: 55–80.

Ejibunu, H. T. (2007). Nigeria's Niger Delta crisis: Root causes of peacelessness. Tuschl, R H (ed.), EPU Research Papers, 7(7).

Ero, C. and Ndinga-Muvumba, A. (2004). 'Small Arms and Light Weapons.' In: Adebajo, A and Rashid I (eds.) West Africa's Security Challenges: Building Peace in a Troubled Region. London: Lynne Rienner Publishers.

Fearon, J. and Laitin, D. (2003). Ethnicity, insurgency and civil war. American Political Science Review, 97: 75–90.

Fithen, C. (1999). Diamonds and war in Sierra Leone: cultural strategies for commercial adaptation to endemic low-intensity conflict. London: Department of Anthropology, University College, London.

Food and Agriculture Organization (2005). Livestock Information, Sector Analysis and Policy Branch, AGAL-Livestock Sector Brief in Ghana.

Food and Agriculture Organization of the United Nations, (2004). The state of food and Agriculture: 2003 – 04, FAO, Rome 2004.

Freedom House. (2011). Worst of the worst: The world's most repressive societies, Freedom House Annual Global Survey of Political Rights and Civil Liberties. Piano, A, Puddington, A, Roylance, T and Young, E (eds). Washington D.C.: Freedom House.

Ghana Statistical Service. (2014). 2010 Population and Housing Census: National Analytical Report

Ghana Statistical Service. (2014). 2010 Population and Housing Census. District Analytical Report. Bawku Municipality.

Gilmour, J. G. (2012). The terrorist threat in North-West Africa: Part One. Journal of Military and Strategic Studies, 14:1-6

Grosby, S. (1994). "The verdict of history: The inexpungeable tie of primordiality – a response to Eller and Coughlan". Ethnic and Racial Studies 17: 164–171.

Haman, U. (2002). Land use patterns between the pastoralists and crop farmers. Case of Mezam division, North-West Region, Cameroon. Monograph University of Dschang-Cameroon. Pp 15-25

Haman, U. (2002). Land use patterns and conflicts between the pastoralists and crop farmers. Case of Mezam division, North-West Region, Cameroon. Monograph University of Dschang-Cameroon. pp. 15-25.

Horowitz, D. L. (1985). Ethnic Groups in Conflict. Berkeley, CA: University of California

HRW (Human Rights Watch). (2003). The regional crisis and human rights abuses in West Africa: A briefing paper to the U.N. Security Council. New York: HRW.

Ibrahim, N., Mary J., Dorothy E. and Ajaga N. (2014). Effects of farmer-grazer conflicts on rural development: a socio-economic analysis. Journal of Agricultural Science,4: 113-120.

ILRI (International Livestock Research Institute). (1995). Livestock Policy Analysis, ILRI Training Manual 2, ILRI, Nairobi, Kenya.

Jonsson, J. (2007). The overwhelming minority, Traditional leadership and ethnic conflict in Ghana's Northern Region. Queen Elizabeth House, Oxford University. CRISE working paper 30

Joy, D. and Wibberley, E. J. (1979). A Tropical Agriculture Handbook. CASSELL LONDON.

Karbo, N. and Bruce, J. (1996). Improving rural sheep and goats industry. Technical Bulletin No. 12, December 1996. Agricultural Information Services- Presbyterian church of Ghana, Accra, Ghana.

Kargbo, J. A. (2002). Effect of the civil war and the role of Librarian in post-war reconstruction in Sierra Leone. World Libraries, 12:1-16

Keili, F. L.(2008). Small arms and light weapons transfer in West Africa: a stock taking. Disarmament Forum, 4:5-12

Kendie, S.B. and Akudugu, M.A .(2010). Application of game theory in the management of Natural resources conflicts: the case of the Bongo District. A paper prepared for the 2010 Harmattan School Series. University for Development Studies (UDS), Centre for Continuing Education and Interdisciplinary Research (CCEIR).

Kendie, S.B. and Bukari, K.N. (2012). Conflict and its effects on development in the Bawku Traditional Area. Institute for Development Studies, University of Cape Coast, Cape Coast, Ghana.

Kieh, J. and Klay, G. (2009). The roots of the second Liberian civil war. International Journal on World Peace, 26: 7-30

Koney, E.B.M. (1992). Livestock production and health in Ghana. First edition. Advent press. Osu, Accra.

Kusimi, J., Forbil, J., Atugba , R., Erawoc, I. and Oduro, F. (2006). Conflicts in Northern Ghana – A mirror of answers to sub- regional stability and security questions. Asteriskos. Journal of international and peace studies 2: 209-228.

Kwaja, C. (2012). Confronting the challenges of small arms and light weapons. West Africa Insight.

Lund, C. (2003). Bawku is still volatile: ethno-political conflict and state recognition in Northern Ghana. Journal of African studies. Cambridge University 41: 587-610

LTRC (Liberia Truth and Reconciliation Commission). (2009). Preliminary Findings and Recommendations, 1:

Mahama, I. (2003). Ethnic conflicts in Northern Ghana. Tamale: Cyber Systems. pp. 262

Mamdani, M. (2001). When Victims Become Killers: Colonialism, Nativism, and the Genocide in Rwanda. Princeton, NJ: Princeton University Press. ISBN 0691058210.

Messer, E. and Cohen, M. J. (2004). Breaking the links between conflict and hunger in Africa. Paper presented at an international conference ("Assuring food and nutrition security in Africa by 2020") organized by the Vision 2020 Initiative of the Food Policy and Research Institute (IFPRI) in Kampala, Uganda. April 1-3, 2004. Conference brief No. 10.

Moe, A.T. (2009). The causes and dynamics of conflict in Sub-Saharan Africa. U.S. Army College, Carlisle Barracks, PA 17013-5050

Moyo, S. and Swanepoel, F. J. C. (2010). Multifunctionality of livestock in developing communities. In: The Role of Livestock in Developing Communities: Enhancing Multifunctionality,.Technical Centre for Agricultural and Rural Cooperation (CTA) and University of the Free State.

Mwangi K., Jideofor A., Moussa D., Abigail J. J., Alpha K., Temesgen T. D., Jessica E. P and Andrew W. (2014a). "The Impact of Conflict and Political Instability on Agricultural Investments". Africa Growth Initiative Working Paper 17.

Mwangi, K., Jideofor, A., Moussa, D., Abigail, J.J., Alpha, K., Temesgen, T.D., Jessica, E.P and Andrew, W. (2014b). The Impact of Conflict and Political Instability on Agricultural Investments in Mali and Nigeria. African Growth Initiative Working Paper-17

Nformi, M.J., Juliet, B. M., Engwali, F.D and Nji, A. (2014). Effects of farmer-grazer conflicts on rural development, a socio-economic analysis. Scholarly Journal of Agricultural Science 4:113-120

Obi, C. (2012). Conflict and peace in West Africa. Uppsala, Sweden: The Nordic Africa Institute. Available at http://www.nai.uu.se/publications/news/archives/051obi.

Ogwang, T. (2011). The root causes of the conflict in Ivory Coast, Backgrounder, No. 5, p. 1. Waterloo, Canada: The Centre for International Governance Innovation (CIGI).

Okantah, S.A., Obese F.Y., Oddoye E.O.K., Gyawu P. and Asante Y.(1999). A survey on livestock and milk production characteristics of peri-urban agro-pastoral dairying in Ghana. Ghana Journal of Agriculture Science 32: 39-46.

Olonisakin, F. (2011). ECOWAS: From economic integration to peace-building. In: Jaye, T and Amadi, S (eds.) ECOWAS and the dynamics of conflict and peacebuilding. Dakar, Senegal: Consortium for Development Partnership (CDP). pp. 11–26.

Otte, M.J. and P. Chilonda. (2002). Cattle and small ruminant production systems in sub-Saharan Africa, A systematic review. Livestock Information Sector Analysis and Policy Branch, FAO Agriculture Department. http://www.fao.org/ag/againfo/resources/en/publications/agapubs/AGAL-Y4176E.pdf. (25/02/2016).

Ouma, E. A., Gideon A. O. and Steven J. S. (2003). "Cattle as assets: assessment of non-market benefits from cattle in smallholder Kenyan crop- livestock systems", Proceedings of the 25th International Conference of Agricultural Economists (IAAE), 16-. 22 August, 2003, Durban, South Africa.

Oyeniyi, A. (2011). Conflict and violence in Africa: Causes, Sources and Types. Transcend Media Services.

Ploughshares. (2002). Armed conflict: Sierra Leone (1991–2002). Available at http://ploughshares.ca/pl_armedconflict/sierra-leone-1991-2002/

Press. p. 57. ISBN 0520053850.

Richards, P. (2003). The political economy of internal conflict in Sierra Leone, Working Paper Series, Working Paper 21. The Hague: Netherlands Institute of International Relations 'Clingendael.'

Sambe, N., Avanger, M.Y. and Alakali. T.T. (2013). Communal Violence and Food Security in Africa. IOSR Journal of Humanities and Social Science (IOSR-JHSS); Volume 9, Issue 3 (Mar. Apr. 2013), PP 43-47e-ISSN: 2279-0837, p-ISSN: 2279-0845.

Schlichting, U. (1997). "Conflict between Different Nationalities: Chances for and Limits to Their Settlement". In Klinke, Andreas; Renn, Ortwin; Lehners, Jean Paul. Ethnic Conflicts and Civil Society. Aldershot: Ashgate. ISBN 1840144556.

Seddon, D, and Hussein, K. (2002). The Consequences of Conflict: Livelihoods and Development in Nepal. Working Paper 185. Overseas Development Institute, December, 2002.

Smith, A. (2001). "Nationalism: Theory, Ideology, History". Cambridge: Polity: 54–55. ISBN 0745626580.

Syrian Needs Analysis Project (2013). Impact of the conflict on Syrian economy and livelihoods. Available on www.acaps.org

Thys, E; Mfoukou-Ntsakala, A; Nkouika-Dinghani-Nkita, G; Van Huylenbroeck, G; and Speybrbroeck, N. (2010). Impact of Armed Conflicts on Urban Livestock Production

in Brazzaville, Republic of Congo. SAGE Journals: *Outlook Agric* September 2010. 39.3 159-167.

Timpong-Jones, E C; Adogla-Bessa, T; Adjorlolo, L K; and Sarkwa, F. O. (2014). "Some Constraints of ruminant livestock production in the Coastal Savannah Plains of Ghana". Livestock Research for Rural Development, 26 (5) 2014.

Toft, M. D. and Princeton, N. J. (2003). The Geography of Ethnic Violence: Identity, Interests, and the Indivisibility of Territory. Princeton, NJ: Princeton University Press. ISBN 0691113548.

Tsikata, D.and Seini, W. (2004). Identities, inequalities and conflicts in Ghana. CRISE working paper. Oxford: CRISE.

UNDP (United Nations Development Program) (2012). UNDP Human Development Report, 2012. New York: UNDP.

UNSC (United Nations Security Council). (2011). Emerging security threats in West Africa. New York: United Nations.

USDS (US Department of State). (2011). Country Report on Human Rights Practices 2011. Washington D.C.: USDS. Available at http://www.state.gov/j/drl/rls/hrrpt/humanrightsreport/index.htm?dlid

Vinck, P., Pham, P. N. and Kreutzer, T. (2011). Talking Peace: A population-based survey on attitudes about security, dispute resolution, and post-conflict

reconstruction in Liberia. Berkeley, CA: Human Rights Center, University of California, Berkeley.

Voz di Paz and Interpeace. (2010). Root causes of conflict in Guinea-Bissau: The voices of the people. Guinea-Bissau: Voz di Paz/Interpeace.

Walker, A. (2012). What is Boko Haram?, Special Report 308. Washington D.C.: United States Institute of Peace (USIP). Available at http://www.usip.org/files/resources/SR308.pdf

WANEP. (2011). Consultative Meeting of Experts on Development of a Practice Guide for Responding to Electoral Disputes in West Africa in Accra, Ghana on 28–29 April 2011.

World Bank Series. World Development Report 2011. Conflict, Security and Development.

APPENDICES

Appendix I: SURVEY QUESTIONNAIRE

UNIVERSITY FOR DEVELOPMENT STUDIES

FACULTY OF AGRICULTURE

DEPARTMENT OF ANIMAL SCIENCE

Good morning/afternoon!

My name is……., and I am an Mphil student of the University for Development Studies. I would like to ask you some questions concerning the impact of the Bawku conflict on the livelihoods of people in this area especially in the area of livestock production. There will be no risk involved. All of the answers will be treated as confidential and I expect you to answer all questions truthfully without any worries. I hope you will participate since your views about your household are important. The interview takes about one hour to complete. Would you like to ask me anything else about the survey? Do you agree to participate?

Name of Enumerator	
Date of interview	
Start time of interview	

GENERAL HOUSEHOLD INFORMATION

Name of HH Head		Name of Respondent	
Sex of HH Head		Sex of Respondent	
Region		Contact No.	
District		Occupation	
Community/suburb		Total No. of HH Members	
Compound Name		No. of Children under 18	
Marital status of HH Head(tick one)	Single Married Separated Spouse migrated Divorced Widowed		
Educational status of HH Head (tick one)	No Education Non-Formal Primary Middle/JHS SHS Vocational College/University		

Livestock Traders

1. Name the conflicts this area has experienced

---

2. Which one of the conflicts was the severest?

---

3. How many livestock could you buy and sell before that conflict?

Type of livestock	Total number sold	Total number bought
Sheep		
Goats		
Cattle		
Poultry		

4. How many could you buy and sell after the conflict?

Type of livestock	Total number bought	Total number sold
Sheep		
Goats		
Cattle		
Poultry		

5. What was the price of these livestock before the conflict?

Type of livestock	Price (GHS)
Sheep	
Goats	
Cattle	
Poultry	

6. What were the prices after the conflict

Type of livestock	Price (GHS)
Sheep	
Goats	
Cattle	
Poultry	

7. Where do you sell your animals? (tick one)

   i. Bawku [ ]

   ii. Tamale [ ]

   iii. Kumasi [ ]

   iv. Accra [ ]

   v. Other [ ] specify

8. How long have you been in this business? (tick one)

   i. 1-5 years [ ]

ii. 6-10 years [ ]

iii. 11-15 years [ ]

iv. 15+ years [ ]

Livestock farmers

9. Name all the conflicts experienced in this area and their nicknames

---

---

10. Which conflict was the most severe of all the conflicts?

---

11. How long have you been into livestock production? (tick one)

i. 1-5 years [ ]

ii. 6-10 years [ ]

iii. 11-15 years [ ]

iv. 15+ years [ ]

12. What system of housing did you practice before the conflict?

    i. Extensive

    ii. Intensive

    iii. Semi-Intensive

13. What system of housing do you practice currently?

    i. Extensive

    ii. Intensive

    iii. Semi- Intensive

14. How many animals did you keep before the conflict?

Specie of livestock	Number
Cattle	
Sheep	
Goats	
Poultry	

15. How many were lost during the conflict?

Specie of livestock	Number
Cattle	
Sheep	
Goats	
Poultry	

16. In what ways did these losses occur?

    i. Stealing/ looting [ ]

    ii. Starvation [ ]

    iii. Poisoning [ ]

    iv. Indiscriminate killing [ ]

17. Did you notice any strange disease in your flock after the conflict? If yes, what are they…….

18. What was the price of each at that time?

Specie of livestock	Price (GHS)
Cattle	
Sheep	
Goats	
Poultry	

19. What was your annual income before the conflict?

20. What was your annual income after the conflict

Recovery

21. How many of the following animals do you have after the conflict?

    i. Cattle ……..

ii. Goats ……..

iii. Sheep ……..

iv. Poultry …….

22. How did you acquire your present stock after the conflict?

i. Old stock [ ]

ii. Family members [ ]

iii. NGO's [ ]

iv. MoFA [ ]

v. Other [ ] specify

23. What are some of the disease symptoms you encounter currently in the following animals?

i. Cattle ……

ii. Goats ……....

iii. Sheep ……...

iv. Poultry ……....

Stakeholders in livestock production

A. Veterinary service

24. Name all the conflicts this municipality has experienced

---

25. Which one was the most severe?

---

26. What was the common system of housing in the area before the conflict?

i. Extensive

ii. Intensive

iii. Semi- Intensive

27. What is the common system of housing currently?

i. Extensive

ii. Intensive

iii. Semi- Intensive

28. What were the commonest diseases reported before the conflict in the following animals?

    i. Cattle

    ……...

    ii. Goats

    …….

    iii. Sheep

    ……

    iv. Poultry

    ……..

29. What were the commonest diseases reported before the conflict in the following animals?

    i. Cattle

    ……

    ii. Goats

    ……

    iii. Sheep

    ……

    iv. Poultry

    ……

30. What reasons accounts for these disease conditions in the animals?

B. Butchers

31. Name all the conflicts this municipality has experienced

---

32. Which one was the most severe?

---

33. How many animals did you slaughter in a day before the conflict?

i. Cattle ……

ii. Goats …….

iii. Sheep ……..

34. How many animals did you slaughter in a day during the conflict?

i. Cattle ……

ii. Goats …….

iii. Sheep …….

35. How many animals did you slaughter after the conflict (currently)?

i. Cattle ……

ii. Goats …….

iii. Sheep …….

C. Food venders

36. Name all the conflicts this municipality has experienced

---

37. Which one was the most severe?

---

38. How many animals were slaughtered in a day before the conflict?

    i. Cattle …….

    ii. Goats …….

    iii. Sheep …….

39. How many animals were slaughtered in a day during the conflict?

    i. Cattle ……

    ii. Goats ……

    iii. Sheep ……

40. How many animals were slaughtered in a day after the conflict (currently)?

    i. Cattle ……

    ii. Goats ……

    iii. Sheep ……

Thank you for participating in this research. Are there any other comments you would like to make?

End Time of survey	

Appendix II a: Types of Diseases that Affected Livestock during the Conflict Period

Disease	Frequency	Percentage
Foot root	6	2.2
Newcastle	4	1.4
None	261	94.0
Ticks	4	1.4
Worms	2	1.0
Total	277	100.0

Source: Field Data, 2016.

Appendix II b: Livestock Traded Before and During the Conflict Period

Livestock traded	Livestock traded before the conflict				Livestock traded during the conflict period			
	Number Bought	Mean	Number Sold	Mean	Number Bought	Mean	Number Sold	Mean
sheep	720	28.80	720	28.80	46	1.84	28	1.12
goats	552	22.08	552	22.08	20	0.80	10	0.40
Cattle	487	19.48	487	19.48	73	2.92	45	1.80

Number of traders = 25

Appendix II c: Number of various species of livestock owned and slaughtered by butchers before, during and after the conflict

Time of conflict	Number of livestock kept by butchers			Number of livestock slaughtered		
	Cattle	Sheep	Goats	Cattle	Sheep	Goats
Before	6	9	7	1	6	6
During	15	13	20	0	2	2
After	0	0	0	1	1	1

Appendix II d: Holding sizes of livestock kept by veterinary officers before and after conflict

	Specie				
Period	Cattle	Sheep	Goats	Total	X^2
Before	4.90 (12)	8.98 (22)	7.76 (19)	21.63 (53)	
After	24.49 (60)	21.22 (52)	32.65 (80)	78.37 (192)	0.1190
Total	29.39 (72)	30.20 (74)	40.41 (99)	100.00(245)	

Values in parenthesis are frequencies.

Appendix II e: Holding sizes of livestock kept by food vendors

	Specie				
Period	Cattle	Sheep	Goats	Total	X^2
Before	12.48 (132)	7.66 (81)	16.35 (175)	36.48 (386)	
During	19.85 (210)	17.20 (182)	26.47 (280)	63.52(672)	0.0865
Total	32.33(342)	24.86(263)	42.82(455)	100.00(1058)	

Values in parenthesis are frequencies

Appendix II f: Holding sizes of livestock kept by Butchers

	Specie				
Period	Cattle	Sheep	Goats	Total	X^2
Before	7.87 (76)	12.63 (122)	9.94 (96)	30.43 (294)	
During	21.74 (210)	18.84 (182)	28.99 (280)	69.57 (672)	<.0001
Total	29.61 (286)	31.47 (304)	38.92 (376)	100.00 (966)	

Values in parenthesis are frequencies

Appendix III a: SAS Output on management system and number of livestock before and after conflict.

The SAS System

The FREQ Procedure

Table 1 of Time by species
Controlling for Management=Extensiv

Frequency / Percent / Row Pct / Col Pct	Time	species					
		Cattle	**Sheep**	**Goats**	**Pigs**	**Poultry**	**Total**
	Before	760	1690	1782	126	3610	7968
		7.35	16.33	17.22	1.22	34.89	77.02
		9.54	21.21	22.36	1.58	45.31	
		77.39	73.86	72.15	12.68	99.94	
	After	222	598	688	868	2	2378
		2.15	5.78	6.65	8.39	0.02	22.98
		9.34	25.15	28.93	36.50	0.08	
		22.61	26.14	27.85	87.32	0.06	
	Total	982	2288	2470	994	3612	10346
		9.49	22.11	23.87	9.61	34.91	100.00

Statistics for Table 1 of Time by species
Controlling for Management=Extensiv

Statistic	DF	Value	Prob
Chi-Square	4	3443.2536	<.0001
Likelihood Ratio Chi-Square	4	3764.1894	<.0001

Statistic	DF	Value	Prob
Mantel-Haenszel Chi-Square	1	328.1292	<.0001
Phi Coefficient		0.5769	
Contingency Coefficient		0.4997	
Cramer's V		0.5769	

Sample Size = 10346

Table 2 of Time by species
Controlling for Management=Intensiv

Frequency
Percent
Row Pct
Col Pct

Time	species					
	Cattle	Sheep	Goats	Pigs	Poultry	Total
Before	122	248	278	80	792	1520
	6.33	12.88	14.43	4.15	41.12	78.92
	8.03	16.32	18.29	5.26	52.11	
	77.22	70.45	69.85	35.40	100.00	
After	36	104	120	146	0	406
	1.87	5.40	6.23	7.58	0.00	21.08
	8.87	25.62	29.56	35.96	0.00	
	22.78	29.55	30.15	64.60	0.00	
Total	158	352	398	226	792	1926
	8.20	18.28	20.66	11.73	41.12	100.00

Statistics for Table 2 of Time by species
Controlling for Management=Intensiv

Statistic	DF	Value	Prob
Chi-Square	4	503.9859	<.0001
Likelihood Ratio Chi-Square	4	605.9417	<.0001

Statistic	DF	Value	Prob
Mantel-Haenszel Chi-Square	1	118.9863	<.0001
Phi Coefficient		0.5115	
Contingency Coefficient		0.4554	
Cramer's V		0.5115	

Sample Size = 1926

Table 3 of Time by species
Controlling for Management=Semi-int

Frequency
Percent
Row Pct
Col Pct

Time	species					
	Cattle	Sheep	Goats	Pigs	Poultry	Total
Before	32	86	106	0	144	368
	6.64	17.84	21.99	0.00	29.88	76.35
	8.70	23.37	28.80	0.00	39.13	
	84.21	72.88	76.81	0.00	100.00	
After	6	32	32	44	0	114
	1.24	6.64	6.64	9.13	0.00	23.65
	5.26	28.07	28.07	38.60	0.00	
	15.79	27.12	23.19	100.00	0.00	
Total	38	118	138	44	144	482
	7.88	24.48	28.63	9.13	29.88	100.00

Statistics for Table 3 of Time by species
Controlling for Management=Semi-int

Statistic	DF	Value	Prob
Chi-Square	4	188.7465	<.0001
Likelihood Ratio Chi-Square	4	206.7949	<.0001

Statistic	DF	Value	Prob
Mantel-Haenszel Chi-Square	1	6.9222	0.0085
Phi Coefficient		0.6258	
Contingency Coefficient		0.5305	
Cramer's V		0.6258	

Sample Size = 482

The SAS System

The FREQ Procedure

species=Cattle

Time	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Before	220	100.00	220	100.00

Chi-Square Test for Equal Proportions

Chi-Square	0.0000
DF	0
Pr > ChiSq	.

Sample Size = 220

The FREQ Procedure

Table 1 of Time by species
Controlling for Management=Extensiv

Frequency Percent Row Pct Col Pct	Time	species					
		Cattle	**Sheep**	**Goats**	**Pigs**	**Poultry**	**Total**
	Before	760	1690	1782	126	3610	7968
		7.35	16.33	17.22	1.22	34.89	77.02
		9.54	21.21	22.36	1.58	45.31	
		77.39	73.86	72.15	12.68	99.94	
	After	222	598	688	868	2	2378
		2.15	5.78	6.65	8.39	0.02	22.98
		9.34	25.15	28.93	36.50	0.08	
		22.61	26.14	27.85	87.32	0.06	
	Total	982	2288	2470	994	3612	10346
		9.49	22.11	23.87	9.61	34.91	100.00

Statistics for Table 1 of Time by species
Controlling for Management=Extensiv

Statistic	DF	Value	Prob
Chi-Square	4	3443.2536	<.0001
Likelihood Ratio Chi-Square	4	3764.1894	<.0001
Mantel-Haenszel Chi-Square	1	328.1292	<.0001
Phi Coefficient		0.5769	
Contingency Coefficient		0.4997	

Statistic	DF	Value	Prob
Cramer's V		0.5769	

Sample Size = 10346

Table 2 of Time by species
Controlling for Management=Intensiv

Frequency
Percent
Row Pct
Col Pct

Time	species					
	Cattle	Sheep	Goats	Pigs	Poultry	Total
Before	122	248	278	80	792	1520
	6.33	12.88	14.43	4.15	41.12	78.92
	8.03	16.32	18.29	5.26	52.11	
	77.22	70.45	69.85	35.40	100.00	
After	36	104	120	146	0	406
	1.87	5.40	6.23	7.58	0.00	21.08
	8.87	25.62	29.56	35.96	0.00	
	22.78	29.55	30.15	64.60	0.00	
Total	158	352	398	226	792	1926
	8.20	18.28	20.66	11.73	41.12	100.00

Statistics for Table 2 of Time by species
Controlling for Management=Intensiv

Statistic	DF	Value	Prob
Chi-Square	4	503.9859	<.0001
Likelihood Ratio Chi-Square	4	605.9417	<.0001
Mantel-Haenszel Chi-Square	1	118.9863	<.0001
Phi Coefficient		0.5115	
Contingency Coefficient		0.4554	

Statistic	DF	Value	Prob
Cramer's V		0.5115	

Sample Size = 1926

Table 3 of Time by species
Controlling for Management=Semi-int

Frequency Percent Row Pct Col Pct	Time	species					
		Cattle	Sheep	Goats	Pigs	Poultry	Total
	Before	32	86	106	0	144	368
		6.64	17.84	21.99	0.00	29.88	76.35
		8.70	23.37	28.80	0.00	39.13	
		84.21	72.88	76.81	0.00	100.00	
	After	6	32	32	44	0	114
		1.24	6.64	6.64	9.13	0.00	23.65
		5.26	28.07	28.07	38.60	0.00	
		15.79	27.12	23.19	100.00	0.00	
	Total	38	118	138	44	144	482
		7.88	24.48	28.63	9.13	29.88	100.00

Statistics for Table 3 of Time by species
Controlling for Management=Semi-int

Statistic	DF	Value	Prob
Chi-Square	4	188.7465	<.0001
Likelihood Ratio Chi-Square	4	206.7949	<.0001
Mantel-Haenszel Chi-Square	1	6.9222	0.0085
Phi Coefficient		0.6258	
Contingency Coefficient		0.5305	

Statistic	DF	Value	Prob
Cramer's V		0.6258	

Sample Size = 482

The SAS System

The FREQ Procedure

Table of Time by species

Frequency Percent Row Pct Col Pct	Time	species			
		Cattle	Sheep	Goats	Total
	Before	76	122	96	294
		7.87	12.63	9.94	30.43
		25.85	41.50	32.65	
		26.57	40.13	25.53	
	During	210	182	280	672
		21.74	18.84	28.99	69.57
		31.25	27.08	41.67	
		73.43	59.87	74.47	
	Total	286	304	376	966
		29.61	31.47	38.92	100.00

Statistics for Table of Time by species

Statistic	DF	Value	Prob
Chi-Square	2	19.7842	<.0001

Statistic	DF	Value	Prob
Likelihood Ratio Chi-Square	2	19.3225	<.0001
Mantel-Haenszel Chi-Square	1	0.3944	0.5300
Phi Coefficient		0.1431	
Contingency Coefficient		0.1417	
Cramer's V		0.1431	

Sample Size = 966

Appendix III b: SAS Output on annual income before and after conflict

The SAS System

The Mixed Procedure

Model Information

Data Set	WORK.SERAPHINE
Dependent Variable	Amount
Covariance Structure	Diagonal
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Residual

Class Level Information

Class	Levels	Values
Time	2	After Before

Dimensions

Covariance Parameters	1
Columns in X	3
Columns in Z	0
Subjects	1
Max Obs Per Subject	440

Number of Observations

Number of Observations Read	440
Number of Observations Used	440
Number of Observations Not Used	0

Covariance Parameter Estimates

Cov Parm	Estimate
Residual	3532204

Fit Statistics

-2 Res Log Likelihood	7857.7
AIC (smaller is better)	7859.7
AICC (smaller is better)	7859.7
BIC (smaller is better)	7863.8

Type 3 Tests of Fixed Effects

Effect	Num DF	Den DF	F Value	Pr > F
Time	1	438	184.74	<.0001

Least Squares Means

Effect	Time	Estimate	Standard Error	DF	t Value	Pr > |t|
Time	**After**	611.04	126.71	438	4.82	<.0001
Time	**Before**	3046.64	126.71	438	24.04	<.0001

Differences of Least Squares Means

Effect	Time	_Time	Estimate	Standard Error	DF	t Value	Pr > |t|
Time	**After**	**Before**	-2435.60	179.20	438	-13.59	<.0001

The Mixed Procedure

Model Information

Data Set	WORK.SERAPHINE
Dependent Variable	Amount
Covariance Structure	Diagonal
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Residual

Class Level Information

Class	Levels	Values
Time	3	3000 After Before

Dimensions

Covariance Parameters	1
Columns in X	3
Columns in Z	0
Subjects	1
Max Obs Per Subject	28

Number of Observations

Number of Observations Read	28
Number of Observations Used	27

Number of Observations

Number of Observations Not Used	1

Covariance Parameter Estimates

Cov Parm	Estimate
Residual	5.59E-10

Fit Statistics

-2 Res Log Likelihood	-456.5
AIC (smaller is better)	-454.5
AICC (smaller is better)	-454.3
BIC (smaller is better)	-453.3

Type 3 Tests of Fixed Effects

Effect	Num DF	Den DF	F Value	Pr > F
Time	1	25	1.21E16	<.0001

Least Squares Means

Effect	Time	Estimate	Standard Error	DF	t Value	Pr > |t|
Time	**After**	2000.00	6.556E-6	25	3.051E8	<.0001
Time	**Before**	3000.00	6.318E-6	25	4.749E8	<.0001

Differences of Least Squares Means

Effect	Time	_Time	Estimate	Standard Error	DF	t Value	Pr > |t|
Time	**After**	**Before**	-1000.00	9.105E-6	25	-1.1E8	<.0001

The Mixed Procedure

Model Information

Data Set	WORK.SERAPHINE
Dependent Variable	Amount
Covariance Structure	Diagonal
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Residual

Class Level Information

Class	Levels	Values
Time	2	After Before

Dimensions

Covariance Parameters	1
Columns in X	3
Columns in Z	0
Subjects	1
Max Obs Per Subject	50

Number of Observations

Number of Observations Read	50
Number of Observations Used	50
Number of Observations Not Used	0

Covariance Parameter Estimates

Cov Parm	Estimate
Residual	0

Fit Statistics

-2 Res Log Likelihood	-18E307
AIC (smaller is better)	-18E307
AICC (smaller is better)	-18E307
BIC (smaller is better)	-18E307

Type 3 Tests of Fixed Effects

Effect	Num DF	Den DF	F Value	Pr > F
Time	1	48	Infty	<.0001

Least Squares Means

Effect	Time	Estimate	Standard Error	DF	t Value	Pr > |t|
Time	After	3500.00	0	48	Infty	<.0001
Time	Before	3000.00	0	48	Infty	<.0001

Differences of Least Squares Means

Effect	Time	_Time	Estimate	Standard Error	DF	t Value	Pr > |t|
Time	After	Before	500.00	0	48	Infty	<.0001

Appendix III c: SAS output for holding sizes of livestocks by respondents

The SAS System

The FREQ Procedure

Table of Time by species

Frequency / Percent / Row Pct / Col Pct	Time	species			
		Cattle	Sheep	Goats	Total
	Before	487	720	552	1759
		26.04	38.50	29.52	94.06
		27.69	40.93	31.38	
		91.54	93.99	96.50	
	After	45	46	20	111
		2.41	2.46	1.07	5.94
		40.54	41.44	18.02	
		8.46	6.01	3.50	
	Total	532	766	572	1870
		28.45	40.96	30.59	100.00

Statistics for Table of Time by species

Statistic	DF	Value	Prob
Chi-Square	2	12.1667	0.0023
Likelihood Ratio Chi-Square	2	12.4984	0.0019
Mantel-Haenszel Chi-Square	1	12.1595	0.0005
Phi Coefficient		0.0807	
Contingency Coefficient		0.0804	
Cramer's V		0.0807	

Sample Size = 1870

The FREQ Procedure

Table of Time by species

Frequency / Percent / Row Pct / Col Pct	Time	species			
		Cattle	**Sheep**	**Goats**	**Total**
	Before	132	81	173	386
		12.48	7.66	16.35	36.48
		34.20	20.98	44.82	
		38.60	30.80	38.19	
	During	210	182	280	672
		19.85	17.20	26.47	63.52
		31.25	27.08	41.67	
		61.40	69.20	61.81	
	Total	342	263	453	1058
		32.33	24.86	42.82	100.00

Statistics for Table of Time by species

Statistic	DF	Value	Prob
Chi-Square	2	4.8961	0.0865
Likelihood Ratio Chi-Square	2	4.9806	0.0829
Mantel-Haenszel Chi-Square	1	0.0014	0.9702
Phi Coefficient		0.0680	
Contingency Coefficient		0.0679	
Cramer's V		0.0680	

Sample Size = 1058

Appendix III d: SAS Output on price of a pound of meat before and after the conflict

The SAS System

The Mixed Procedure

Model Information

Data Set	WORK.SERAPHINE
Dependent Variable	Amount
Covariance Structure	Diagonal
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Residual

Class Level Information

Class	Levels	Values
Time	2	After Before

Dimensions

Covariance Parameters	1
Columns in X	3
Columns in Z	0
Subjects	1
Max Obs Per Subject	28

Number of Observations

Number of Observations Read	28

Number of Observations

Number of Observations Used	28
Number of Observations Not Used	0

Covariance Parameter Estimates

Cov Parm	Estimate
Residual	0.09066

Fit Statistics

-2 Res Log Likelihood	16.6
AIC (smaller is better)	18.6
AICC (smaller is better)	18.8
BIC (smaller is better)	19.9

Type 3 Tests of Fixed Effects

Effect	Num DF	Den DF	F Value	Pr > F
Time	1	26	1371.30	<.0001

Least Squares Means

Effect	Time	Estimate	Standard Error	DF	t Value	Pr > |t|
Time	**After**	7.0000	0.08047	26	86.99	<.0001
Time	**Before**	2.7857	0.08047	26	34.62	<.0001

Differences of Least Squares Means

Effect	Time	_Time	Estimate	Standard Error	DF	t Value	Pr > |t|	Adjustment	Adj P
Time	**After**	**Before**	4.2143	0.1138	26	37.03	<.0001	Bonferroni	<.0001

Appendix III e: SAS Output on livestock bought by Livestock traders before and after the conflict.

The SAS System

The FREQ Procedure

Table of Time by species

Frequency / Percent / Row Pct / Col Pct	Time	species			
		Cattle	**Sheep**	**Goats**	**Total**
	Before	487	720	552	1759
		26.04	38.50	29.52	94.06
		27.69	40.93	31.38	
		91.54	93.99	96.50	
	After	45	46	20	111
		2.41	2.46	1.07	5.94
		40.54	41.44	18.02	
		8.46	6.01	3.50	
	Total	532	766	572	1870
		28.45	40.96	30.59	100.00

Statistics for Table of Time by species

Statistic	DF	Value	Prob
Chi-Square	2	12.1667	0.0023
Likelihood Ratio Chi-Square	2	12.4984	0.0019
Mantel-Haenszel Chi-Square	1	12.1595	0.0005
Phi Coefficient		0.0807	
Contingency Coefficient		0.0804	
Cramer's V		0.0807	

Sample Size = 1870

Appendix III f: SAS Output on Livestock sold by Livestock traders before and after the conflict

The SAS System

The FREQ Procedure

Table of Time by species

Frequency / Percent / Row Pct / Col Pct	Time	species			
		Cattle	Sheep	Goats	Total
	Before	487	720	552	1759
		26.04	38.50	29.52	94.06
		27.69	40.93	31.38	
		86.96	96.26	98.22	
	After	73	28	10	111
		3.90	1.50	0.53	5.94
		65.77	25.23	9.01	
		13.04	3.74	1.78	
	Total	560	748	562	1870
		29.95	40.00	30.05	100.00

Statistics for Table of Time by species

Statistic	DF	Value	Prob
Chi-Square	2	74.3866	<.0001
Likelihood Ratio Chi-Square	2	69.4193	<.0001
Mantel-Haenszel Chi-Square	1	63.5604	<.0001
Phi Coefficient		0.1994	
Contingency Coefficient		0.1956	
Cramer's V		0.1994	

Sample Size = 1870

Appendix III g: SAS Output on the prices of livestock before and after the conflict

The SAS System

The Mixed Procedure

Model Information

Data Set	WORK.SERAPHINE
Dependent Variable	Amount
Covariance Structure	Diagonal
Estimation Method	REML
Residual Variance Method	Profile
Fixed Effects SE Method	Model-Based
Degrees of Freedom Method	Residual

Class Level Information

Class	Levels	Values
Time	2	After Before
species	4	Cattle Goats Pigs Sheep

Dimensions

Covariance Parameters	1
Columns in X	15
Columns in Z	0
Subjects	1
Max Obs Per Subject	200

Number of Observations

Number of Observations

Number of Observations Read	200
Number of Observations Used	200
Number of Observations Not Used	0

Covariance Parameter Estimates

Cov Parm	**Estimate**
Residual	552459

Fit Statistics

-2 Res Log Likelihood	3109.3
AIC (smaller is better)	3111.3
AICC (smaller is better)	3111.3
BIC (smaller is better)	3114.5

Type 3 Tests of Fixed Effects

Effect	**Num DF**	**Den DF**	**F Value**	**Pr > F**
Time	1	192	45.18	<.0001
species	3	192	74.60	<.0001
Time*species	3	192	13.79	<.0001

Least Squares Means

Effect	**Time**	**species**	**Estimate**	**Standard Error**	**DF**	**t Value**	**Pr > |t|**
Time	**After**		1227.55	74.3276	192	16.52	<.0001
Time	**Before**		521.00	74.3276	192	7.01	<.0001
species		**Cattle**	2131.00	105.12	192	20.27	<.0001
species		**Goats**	475.60	105.12	192	4.52	<.0001

Least Squares Means

Effect	Time	species	Estimate	Standard Error	DF	t Value	Pr > |t|
species		Pigs	17.3000	105.12	192	0.16	0.8694
species		Sheep	873.20	105.12	192	8.31	<.0001
Time*species	After	Cattle	3040.00	148.66	192	20.45	<.0001
Time*species	After	Goats	658.00	148.66	192	4.43	<.0001
Time*species	After	Pigs	28.2000	148.66	192	0.19	0.8497
Time*species	After	Sheep	1184.00	148.66	192	7.96	<.0001
Time*species	Before	Cattle	1222.00	148.66	192	8.22	<.0001
Time*species	Before	Goats	293.20	148.66	192	1.97	0.0500
Time*species	Before	Pigs	6.4000	148.66	192	0.04	0.9657
Time*species	Before	Sheep	562.40	148.66	192	3.78	0.0002

Differences of Least Squares Means

	Time	species	_Time	_species	Estimate	Standard Error	DF	t Value	Pr > |t|	Adjustment	Adj P
	After		Before		706.55	105.12	192	6.72	<.0001	Bonferroni	<.0001
		Cattle		Goats	1655.40	148.66	192	11.14	<.0001	Bonferroni	<.0001
		Cattle		Pigs	2113.70	148.66	192	14.22	<.0001	Bonferroni	<.0001
		Cattle		Sheep	1257.80	148.66	192	8.46	<.0001	Bonferroni	<.0001
		Goats		Pigs	458.30	148.66	192	3.08	0.0024	Bonferroni	0.0141
		Goats		Sheep	-397.60	148.66	192	-2.67	0.0081	Bonferroni	0.0488
		Pigs		Sheep	-855.90	148.66	192	-5.76	<.0001	Bonferroni	<.0001
	pecies	After	Cattle	After	Goats	2382.00	210.23	192	11.33	<.0001	Bonferroni	<.0001
	pecies	After	Cattle	After	Pigs	3011.80	210.23	192	14.33	<.0001	Bonferroni	<.0001
	pecies	After	Cattle	After	Sheep	1856.00	210.23	192	8.83	<.0001	Bonferroni	<.0001
	pecies	After	Cattle	Before	Cattle	1818.00	210.23	192	8.65	<.0001	Bonferroni	<.0001
	pecies	After	Cattle	Before	Goats	2746.80	210.23	192	13.07	<.0001	Bonferroni	<.0001
	pecies	After	Cattle	Before	Pigs	3033.60	210.23	192	14.43	<.0001	Bonferroni	<.0001
	pecies	After	Cattle	Before	Sheep	2477.60	210.23	192	11.79	<.0001	Bonferroni	<.0001
Time*species		After	Goats	After	Pigs	629.80	210.23	192	3.00	0.0031	Bonferroni	0.0868
Time*species		After	Goats	After	Sheep	-526.00	210.23	192	-2.50	0.0132	Bonferroni	0.3692

Differences of Least Squares Means

	Time	species	_Time	_species	Estimate	Standard Error	DF	t Value	Pr > |t|	Adjustment	Adj P
species	After	Goats	Before	Cattle	-564.00	210.23	192	-2.68	0.0079	Bonferroni	0.2223
species	After	Goats	Before	Goats	364.80	210.23	192	1.74	0.0843	Bonferroni	1.0000
species	After	Goats	Before	Pigs	651.60	210.23	192	3.10	0.0022	Bonferroni	0.0624
species	After	Goats	Before	Sheep	95.6000	210.23	192	0.45	0.6498	Bonferroni	1.0000
species	After	Pigs	After	Sheep	-1155.80	210.23	192	-5.50	<.0001	Bonferroni	<.0001
species	After	Pigs	Before	Cattle	-1193.80	210.23	192	-5.68	<.0001	Bonferroni	<.0001
species	After	Pigs	Before	Goats	-265.00	210.23	192	-1.26	0.2090	Bonferroni	1.0000
species	After	Pigs	Before	Pigs	21.8000	210.23	192	0.10	0.9175	Bonferroni	1.0000
species	After	Pigs	Before	Sheep	-534.20	210.23	192	-2.54	0.0118	Bonferroni	0.3316
species	After	Sheep	Before	Cattle	-38.0000	210.23	192	-0.18	0.8568	Bonferroni	1.0000
species	After	Sheep	Before	Goats	890.80	210.23	192	4.24	<.0001	Bonferroni	0.0010
species	After	Sheep	Before	Pigs	1177.60	210.23	192	5.60	<.0001	Bonferroni	<.0001
species	After	Sheep	Before	Sheep	621.60	210.23	192	2.96	0.0035	Bonferroni	0.0980
species	Before	Cattle	Before	Goats	928.80	210.23	192	4.42	<.0001	Bonferroni	0.0005
species	Before	Cattle	Before	Pigs	1215.60	210.23	192	5.78	<.0001	Bonferroni	<.0001
Time*species	Before	Cattle	Before	Sheep	659.60	210.23	192	3.14	0.0020	Bonferroni	0.0552
Time*species	Before	Goats	Before	Pigs	286.80	210.23	192	1.36	0.1741	Bonferroni	1.0000

Differences of Least Squares Means

	Time	species	_Time	_species	Estimate	Standard Error	DF	t Value	Pr > |t|	Adjustment	Adj P
species	**Before**	**Goats**	**Before**	**Sheep**	-269.20	210.23	192	-1.28	0.2019	Bonferroni	1.0000
species	**Before**	**Pigs**	**Before**	**Sheep**	-556.00	210.23	192	-2.64	0.0089	Bonferroni	0.2479