UNIVERSITY FOR DEVELOPMENT STUDIES

THE EFFECTS OF THE CASH AND CARRY SYSTEM IN ANIMAL HEALTH CARE DELIVERY ON PEASANT LIVESTOCK FARMERS' OUTPUT IN THE BOLGATANGA MUNICIPAL

BY

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DECLARATION

Student's Declaration

I, Robert Atampugre, hereby declare that this dissertation is the result of my own research and that no previous submission in part or whole of this work for a degree has been made here or elsewhere. I declare that to the best of my knowledge, any help received and sources used for information have been duly acknowledged.

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Supervisor's Declaration

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

Supervisor's Name: **Professor David Millar**

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Date……

ABSTRACT

The main constraints to livestock development in Ghana are diseases, nutrition. The impacts of these diseases are devastating in peasant farmers' households. However, there are no adequate veterinary services to support in Animal Health Care. The study was carried out in the Bolgatanga Municipality of the Upper East Region of Ghana to assess the effects of cash and carry of veterinary health care delivery on peasant livestock farmers' output using hundred peasant livestock farmers from ten communities who were selected using purposive and simple random sampling techniques and ten veterinary personnel from the Ministry of Food and Agriculture (MOFA). Semi-structured questionnaire and personal observation were employed. Only 54% of the farmers treat their sick livestock while 46% of them sell, slaughter or simply take no action when their livestock are sick due to their inability to afford services as veterinary officers charge high rates for services due to the absence of a regulatory mechanism to check and monitor their activities. Majority of the farmers do not also have access to veterinary health care services in the Bolgatanga municipality due to limited number of veterinary officers. Output of livestock of peasant farmers is thus seriously affected leading to high mortality rates, up to 50% or even more. This also results in high income losses to farmers' households, between a minimum of GH¢45.00 to a maximum of GH¢2,650.00 annually. The Veterinary Services Department should educate farmers on the health needs of their livestock, MoFA should monitor services rendered by veterinary personnel, MoFA should set price ceilings for various services to make it affordable for farmers and health insurance scheme should be instituted by MoFA for livestock health care services.

DEDICATION

I dedicate this work to the Lord Almighty, my maker by whose abundant grace and mercy I have successfully gone through my education up to this very stage.

I also dedicate this work to my mother, Mrs. Asebiga Atampugre, my wife, Cynthia, children (Robert junior, Thedmund and Divine-Favour) and the entire family of Atampugre for their unceasing prayers and support that have made this dream a reality.

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LIST OF ACRONYMS OR ABBREVIATIONS

ADF	African Development Fund
AHAs	Animal Health Assistants
AHTs	Animal Health Technicians
AIDS	Acquired Immune Deficiency Syndrome
ASAL	Arid and Semi-Arid Lands
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
HIV	Human Immune Virus
IFAD	International Fund for Agricultural Development
ILRI	International Livestock Research Institute
MoFA	Ministry of Food and Agriculture
SRID	Statistics, Research and Information Directorate

CHAPTER ONE

1.0 Introduction

Livestock production is an integral part of Ghana's agricultural economy and a major source of livelihood for many rural households in the Northern, Upper East and Upper West Regions of Ghana. In Ghana, livestock are raised under the extensive, semi-intensive and/or intensive systems. However, the extensive system is the commonest method and it is practised most especially in rural communities. Livestock production holdings are commercially, family or individually owned.

Livestock represent a critical dimension of the livelihood strategies of many poor and disadvantaged rural and urban communities in Ghana. For many, livestock play a central role in their social and cultural identity and are a source of food, employment, food security and are also assets for store or trade. Access to quality services enhances the health of the animals and productivity and thus the income and welfare of individual producer households and the livestock sector as a whole. Effective technical support enhances the quality of meat, milk, eggs and other produce, increasing value added and opening new potential markets in Ghana and abroad.

Livestock production in Ghana is important to the country's agriculture. The sub-sector is estimated to contribute about 9% to the nation's agricultural gross domestic product (GDP) and is a source of income for several rural farm households, especially in the northern part of the country. For instance, in the northern part of Ghana, livestock are referred to as a walking bank and provide financial reserves, serving as a risk-coping

strategy, which is a buffer during crop failures and in periods of economic stress (Asafu-Adjei and Dantankwa, 2001).

About ninety-eight percent of crop farmers make up 98% of the people who keep livestock in Ghana. Crop farming in Ghana is mainly rain-fed and therefore provides seasonal income. Livestock keeping, however, provides substantial household cash income, particularly for the poor and supports food security in many rural households (Asafu-Adjei and Dantankwa, 2001).

In this region, livestock keeping serves as insurance against food deficits that occur frequently. Livestock is also a primary source of monetary income to farmsteads and improves the stability of many farm enterprises by providing income for various purchases such as inputs for crop farming. Thus, livestock keeping is crucial to the optimization of the Ghanaian farming and livelihood systems.

The crucial role played by livestock in the livelihood of these farmers makes it important to have healthy livestock in order to get high incomes to be able to take care of their families needs.

1.1 BACKGROUND TO THE STUDY

Agriculture is one of the major contributors to the economy of Ghana. The animal production sub-sector has been and continues to be an important component of agriculture. However, this sub-sector has not been given adequate attention in agricultural programmes in the country. Policies regarding the production of animal protein from local sources to meet the demand of the ever-increasing population of Ghana have been adhoc (Ministry of Food and Agriculture [MOFA], 1992).

The food security of many of the world's chronically undernourished people depends to a large measure upon the livestock they own. Disease outbreaks have a serious negative impact upon this. The livestock products of meat, milk, poultry and eggs are complemented by the indirect support to their food security gained from the supplies of dung for fuel, crop cultivation, draught power for cultivation and transport and hides and skin for marketing or personal use (Food and Agriculture Organization [FAO], 1997).

Poor animal health is a major constraint to increasing livestock production in many developing countries. Full livestock productivity is highly dependent on the availability of high-quality and regularly provided animal health services. The widely recognized externalities associated with livestock disease control have prompted countries throughout the world to invest in centralized control schemes designed to lower disease prevalence. As disease levels drop and fiscal deficits climb, however, many governments are beginning to reconsider the design and delivery of their animal health services (Umali, Feder and Dettaan, 1994).

In many developing countries, central government veterinary institutions traditionally provide basic animal health services. These institutions are generally underfunded, however, which limits their ability to deliver sustainable animal health services. Fiscal restrictions and the subsidization of animal health services have also often resulted in compromises in the quality and quantity of services they provide (International Fund for Agriculture Development [IFAD], 2004).

The world recession in the 1970's and 1980's and the ensuing debts of developing countries led to the Structural Adjustment Policies that advocated for sharp reduction in government expenditure on state-funded services (Leonard, 1993). This policy also advocated increased private sector participation. Over the years, countries throughout the world have implemented these structural adjustment programmes (SAPs) to reorient rapidly deteriorating government institutions and services, and improve their efficiency. In developing countries, where livestock constitutes an important source of livelihood, privatization of animal health services has been a major focus.

The constraints that retard traditional livestock production in Ghana include management and husbandry, research needs, breeding and genetics with the major constraints being animal nutrition and health (MOFA, 1992). Disease constraints are estimated to cause losses up to 30% of annual livestock output in developing countries and twice that is estimated for developed countries (FAO, 1990). Vulnerability of animals to death is also higher in animals kept extensively or under the free-range system compared to those kept intensively. Veterinary services in Ghana are generally considered as expensive by livestock farmers (local and commercial farmers). Therefore, when animals are infected

with diseases treatment can be a challenge and death of animals can be eminent (Adzitey, 2011).

The prevention, control and treatment of animal diseases are the sole responsibility of both farmers and the Veterinary Services Department of the ministry of agriculture (MOFA). The availability and quality of animal health care play a major role in increasing the productivity of the livestock sub-sector (Umali et al, 1994). Farmers' ability to afford veterinary services is an important factor in assessing the level of animal health that can be achieved in animal production.

Increasing fiscal constraints on the government, a lackadaisical performance by public sector animal health and breeding services and pressure from donor partners have prompted the governments of various developing countries to rethink the role of the public sector in the provision of veterinary services. Various countries have started to implement, or have already implemented, privatization of some veterinary services. The results are mixed. It is established that private provision alone is not optimal, and a blend of private and public sector veterinary services is required to utilize the virtues of both (Sen and Chander, 2003).

Private sector participation in veterinary services delivery in Ghana resulted in farmers paying more for services they enjoyed. They are also expected to pay for vaccination or treatment of their animals. With the privatization of veterinary services, farmers pay fees for the vaccination of their animals and pay full cost of drugs for the treatment of their animals and 5% of the cost of drugs as service charge (Leonard, 1993).

1.2. PROBLEM STATEMENT

Ghana's economy like any other developing country's economy depends mainly on agriculture. Agriculture is one of the leading sectors of the economy of which the livestock sub-sector is a major contributor. The livestock industry in many developing countries such as Ghana faces a lot of challenges. Among these challenges are; shortage of feed and water at certain times of the year, diseases and the conservative attitude of farmers (Koney, 1992).

Ghana as a developing country has two major constraints to livestock production that affect the income level of peasant farmers thereby increasing their poverty levels. These constraints are animal health and nutrition (MoFA, 1992).

Disease constraints are estimated to cause losses of up to 30% of annual livestock outputs in developing countries (FAO, 1990).

In Ghana, the situation is even serious as the death rate is higher. The Bolgatanga municipality is one of the hardest hit areas in terms of losses due to diseases since majority of the farmers are peasant. In some cases, you can even have a farmer recording losses up to 100% just like it happened recently (March, 2015) when a strange disease came and wiped almost all poultry species within the municipality leaving them helpless (Researcher's preliminary observation).

Although peasant farmers are willing and ready to produce livestock, they are discouraged by these losses and are very reluctant to increase their stock so as to increase their income.

The world recession in the 1970's and 1980's and the ensuing debts of developing countries led to the Structural Adjustment Policies that advocated for sharp reduction in government expenditure on state-funded services (Leonard, 1993). As a result, Ghana reduced state funding of several state-owned companies and institutions including the veterinary services.

With the "Cash and Carry" system of veterinary services, farmers pay fees for the vaccination of their animals and pay full cost of drugs for the treatment of their animals and 5% of the cost of drugs as service charge. This is a requirement of the full cost recovery component of the Structural Adjustment Programme (Leonard, 1993). Farmers become so reluctant to treat their diseased livestock or even vaccinate them against diseases due to the exorbitant fees charged by veterinary officers and the high cost of drugs due to this system of animal health care delivery. This results in income losses to farmers as there is reduced output from diseased livestock, high number of products condemned in slaughter houses due to untreated diseases and even total loss of income due to death (Acker and Cunningham, 1991). This serves as disincentives for the youth to venture in to livestock production and resort to migration to the south with the excuse that, there is no any viable economic activity for them to engage in after the cropping season is over.

Policy makers believe that, privatization of veterinary services adequately executed and supported by proper pricing policies and sound technological and socio- economic condition can transform the production potential of agriculture (animal sub-sector). This they argue offers the best production practices prospect for income levels, food security and self sufficiency at household, regional and national levels.

Unfortunately, this is not the situation on the ground. As Rich and Perry (2011) noted, livestock disease disrupts markets, reduce household asset base, and increases vulnerability of livestock dependent households. According to Asafu-Adjei and Dantankwa (2001), "Except for commercial poultry and pig producers, livestock farmers rarely use currently available technology to control diseases, feed and house their livestock. These factors result in low output, low incomes and widespread poverty among the rural population".

Peasant livestock farmers in the Bolgatanga municipality who rear their livestock to augment the crop produce harvested to feed their households and sell the surplus to earn some income often experience widespread poverty in times of shortage of crop produce due to the fact that, the livestock are not being able to fetch them substantial amount of income to supplement the food requirements of their families because of low output and their unhealthiness leaving them to suffer serious feeding problems, especially during the lean season of the year and other challenges related to their households needs provision.

1.3.0 RESEARCH QUESTION

In an attempt to address the problem of low productivity of livestock among peasant livestock farmers' farms as a result of the low patronage of veterinary services in the Bolgatanga municipality, the following research questions would be answered:

1.3.1. MAIN QUESTION

What effect does the "Cash and Carry" system in veterinary services has on livestock health and output of livestock in the Bolgatanga municipality?

1.3.2. SPECIFIC QUESTIONS

I. What are the implications of the "Cash and Carry" system on veterinary services in the Bolgatanga municipality?

II. What are the implications of statutory action as regard patronage of the services and cost affordability?

III. What is the resultant effect of this policy on livestock health and output in the Bolgatanga municipality?

IV. Within this policy, how can the livestock sector be made more effective and efficient as regards access and performance of veterinary services in the Bolgatanga municipality?

1.4.0 OBJECTIVES OF THE STUDY

1.4.1. THE GENERAL OBJECTIVE

The main objective of the study is to find out what the effects of the "Cash and Carry" system of veterinary services are on the health and output levels of livestock of peasant livestock farmers in the Bolgatanga municipality?

1.4.2. THE SPECIFIC OBJECTIVES

I. To find out what the implications of the "Cash and Carry" system are on veterinary services in the Bolgatanga municipality.

II. To investigate what the implications of statutory action are as regard patronage of the services and cost affordability.

III. To analyze what the resultant effect of the Cash and Carry system has on livestock health and output in the Bolgatanga municipality.

IV. To study how the livestock sector can be made more effective and efficient as regards access and performance of veterinary services in the Bolgatanga municipality within this policy.

1.6. RELEVANCE OF THE STUDY

Livestock production is a major source of income to majority of the peasant farmers in the Bolgatanga Municipality and beyond. Since this industry contributes greatly to the income levels of farmers, diseases prevention and treatment should be well managed to increase the income levels of these farmers by reducing losses associated with diseases. By this, their standard of living will be improved leading to a reduction in the poverty level in the municipality.

The research will therefore help in finding a solution to the problem of loss of income from livestock as a result of peasant farmers' inability to vaccinate and treat their livestock. It will also inform stakeholders and the public of the effects that privatization of veterinary services has had on the production levels of livestock in the Bolgatanga municipality. This will help in making informed decisions with regards to animal health care delivery system that will motivate peasant farmers to increase their stock in order to alleviate poverty among livestock farmers in particular and people in general in the Bolgatanga municipality.

CHAPTER TWO

LITERATURE REVIEW

2.1 Importance of Livestock

Livestock rearing plays a key role in the economies of West African countries providing, at times, 44% of agricultural GDP. With 60 million heads of cattle and 160 small ruminants, 400 million poultry, the Sahel and West Africa is an exceptional region for livestock rearing. In numbers, and in comparison, with the entire sub-Saharan Africa region, the Sahel and West Africa contain 25% of the cattle, 33% of the sheep, and 40% of the goats.

Livestock rearing is one of the main economic activities on which the poorest populations depend for food and income. It is also essential to ensure against vulnerability and risk related to climatic conditions for populations highly dependent on rain-fed agriculture for their livelihoods **(**Kamuanga, Somda, Sanon & Kagone, 2008**).**

Throughout history, livestock has been kept for a variety of purposes, with almost the exclusive focus on food use of livestock in modern agricultural systems a relatively recent development. But in many developing countries, livestock is still a critical support to the livelihoods of people who live in or near poverty, and it is here that nonfood uses remain predominant. These include the use of animals for work and as a source of fertilizer (manure), as a means to store wealth, and as a buffer to hedge against the vagaries of nature and other emergencies. Livestock, or symbols of them, also play an important role in religious and cultural lives (Gerber, Mooney, Dijkman, Tarawal & de Haan, 2010).

In recent years, there has been increasing recognition of the importance of livestock to the poor, with estimates indicating that at least 70% of the rural poor depend on livestock for part of their livelihoods (Livestock in Development, 1998).

Livestock are important to millions of poor households across the world not only as a source of income but also as a major source of protein and supplementary nutrition, draft power, fertilizer, fuel and a store of wealth. A large number of rural households across the world own livestock and the majority of them poor. A large majority of livestock owners comprise of small and marginal farmers, who also account for a large share of poor. In general, the distribution of livestock has been found to be more equitable than that of land, leading to a much more equitable distribution of gains from livestock production (Ahuja and Redmond, 2001).

There is increasing recognition of the role of livestock in contributing towards poverty reduction, enhancing nutritional security, and supporting the livelihoods of poor people in developing countries. It is also being recognized that globalization and increased trade openness are putting additional pressures on poor small farmers in developing countries to enhance the efficiency of livestock production at farm level. The delivery of animal health services is emerging as an important priority area given the crucial role of animal health in enhancing the competitiveness of livestock production (Ahuja, 2004).

Livestock production plays a major role in the economies of developing countries like Ghana. Efficient performance of the livestock sector contributes towards the overall development of agrarian-based economies (Ashley, Holden,& Bazeley, 1996).

Livestock production is important for the majority of farmers in developing countries where 50 – 85% of the people are farmers (Acker and Cunningham, 1991). Subsistence farmers keep livestock for food, fiber, fertilizer, fuel, draught power, as buffer against crop failure and for social and cultural functions. Livestock provide the protein needs and cash for a good number of people. It is even considered the main source of livelihood for many. To others, it provides extra source of income, clothing, wealth and a medium of exchange in many cultural functions.

Table 2.1: The average contribution of livestock to the economies of different regions in 1998

Region	**Livestock as a percentage of:**	
	AGRICULTURE	GDP
Africa	29.08	8.21
Latin America	47.50	8.08
North America, Australia and Europe	53.90	2.81
Asia	20.86	8.64

Source: World Bank data base cited (Umali *et al*, 1994).

From table 1, it is clear that livestock contributes in most areas more than 8% of the GDP of the various regions of the world. According to (Internal Livestock Research Institute [ILRI], 2002; Carriger, 2007), livestock contribute to the livelihoods of more than two

thirds of the world's rural poor and a significant minority of peri-urban poor. The poorest of the poor often do not have livestock but it has been argued that acquiring livestock can provide a passport out of poverty (ILRI, 2002). Livestock have a positive impact on diets, health, incomes, financial security, sustainable crop yields, employment prospects and social status.

Livestock serve the following functions; they contribute to food and nutritional security, they provide transport and on farm power, they generate income and are an important mobile means of storing wealth, they provide transport and on farm power, and they help maintain soil fertility through their manure.

Livestock keeping supports the financial, human, and social capital needs of about 70 % of the world's poor in developing countries through direct income provision for the following: farming activities, medical care, finance, and education, as well as serving as a social safety-net (FAO 2011). Yet, poor livestock keepers in marginal areas often lack access to affordable clinical and preventive animal health services (Awa and Achukwi 2010). Diseases such as contagious bovine pleurapneumonia (CBPP) and peste des petits ruminants (PPR) among others continue to affect livestock production and inflict losses to livestock keepers (Awa and Achukwi 2010; FAO 2011). Providing quality and sustainable animal health services to livestock dependent communities is a key to reducing economic losses and human health risks associated with animal diseases.

Carriger (2007) observed that livestock play a unique role in livelihood studies by enabling families to survive crop failure, coping with income shocks meeting unexpected or major family expenses through sale of an animal, and serving as a kind of high-interest savings account for rural people with no access to formal financial institutions, since investing in livestock is the preferred means of building wealth security.

According to ILRI (2002) livestock contribute to improved human health by providing meat and milk which improve nutrition and have mitigating effect on HIV/AIDS and related opportunistic diseases, selling animal products which makes more affordable the healthcare, education and housing that are conducive to better health and supplying manure which increases soil fertility and thereby food security.

However, when mismanaged, livestock expose people to health risks such as zoonotic diseases, water contaminated by manure and urine and poor indoor air quality by burning manure. Livestock may contribute to making people poor by degrading land and water resources (ILRI, 2002). Pets provide companionship, security and in some cases emotional well-being to humans.

Animal food products such as meat and milk are concentrated sources of high-quality protein and certain vitamins and minerals. When eaten by children even in modest amounts, these products help alleviate poor growth, poor mental development and general poor health.

However, domestic livestock off-take supplies only about 30% of the national (Ghana) animal protein requirement (Alhassan, Karbo, Aboe, & Opong-Anane, 1999). According to Ghana Statistical Service (2014) annual report, the contribution of the Agricultural sector to the Gross Domestic Product (GDP) for the period of 2009 to 2013 is shown on the table below;

Table 2.2: Agric sector contribution to GDP for 2009 to 2013.

	2009	2010	2011	2012	2013
Agriculture	31.8	29.8	25.3	23.0	22.0
Crops	23.6	21.7	19.1	17.3	16.9
Cocoa	2.5	3.2	3.6	2.6	2.2
Livestock	2.0	2.0	1.8	1.6	1.5
Forestry and Logging	3.7	3.7	2.8	2.6	2.2
Fishing	2.5	2.3	1.7	1.5	1.4

Though the estimates show an improvement in the growth of the Agriculture sector, 5.2 percent in 2013, compared to 2.3 percent in 2012, its contribution to the economy continues to decline, with its share reducing from 23.0 percent in 2012 of GDP to 22.0 percent in 2013. The livestock sub-sector was the least contributor to GDP.

In Ghana, livestock represent a significant economic activity in the lives and livelihoods of numerous rural smallholder farmers, traders and processors, especially in northern Ghana (African Development Fund 2001; Asafu-Adjei & Dantankwa 2001; Turkson &

Naandam, 2006). Livestock not only play a significant role in the socio-cultural aspects of the people but also, help to balance human nutrition (Adam, Atengdem & Alhassan, 2010). Most rural farming communities in northern Ghana use livestock as an important means to improve soil fertility (manure) and increase cultivated farmland area using draught power (African Development Fund 2001; Ghana Environmental Protection Agency [GEPA] 2002; Karbo *et al.* 1999). Vulnerable households, especially rural women who represent half of smallholder farmers' population in Ghana depend on livestock, especially small ruminants, for economic sustenance (Duku, Price, Tobi & Zijpp, 2011). Livestock contribute significantly to the process of agricultural intensification and the sustainability of crop production. Livestock keeping increases the labor use per unit of land. The use of animal traction helps to alleviate labor problems, improves the quality and timeliness of farm operations and increases farm productivity. Animal traction is particularly important in increasing transportation and harvesting food crops, particularly in the Northern and Upper regions of Ghana. Moreover, the use of animal manure replenishes soil fertility and improves productivity in crop farming (Asafu-Adjei and Dantankwa, 2001).

The Food and Agriculture Organization (FAO) (2012) estimated that the rural population in Ghana represents 62% of the total population of 24,000,000, and 77% are subsistent farmers with about 1 to 2 ha of farmland holdings (Karbo and Agyare 1997). Such subsistent farmers produce food crops and livestock using rainfall. Statistics suggest that 40.5% of Ghana's rural population manage some livestock. The data implies that about 6.02 million households partly depend on livestock for their livelihood (Ghana Statistical

Service 2012). Despite such significant contribution of livestock production to Ghana's economy, efforts to increase smallholder productivity are marginal (Asafu-Adjei & Dantankwa 2001; Oppong-Anane 2011). The little public investment in the livestock sector has partly led to moderate traditional animal breeding programs which primarily depend on local farmers' knowledge and experience. As a result, only few improved animals have been supplied to farmers, and not many farmers have been trained (African Development Fund 2001). Smallholders, therefore, raise indigenous livestock breeds under the traditional free-range production system, characterized by high mortality, high morbidity and consequently, low productivity.

2.2 Livestock Population in Ghana

The major production of livestock is concentrated in the Northern, Upper East and Upper West regions of Ghana where the vegetation is Sudan savannah and Guinea savannah type. These three regions account for up to 77% of cattle production while the relatively dry costal savannah area accounts for 15%. The remaining 8% is produced in humid forests and transitional zones. Sheep and goats (small ruminants which are mostly of the West African dwarf type) and poultry are evenly distributed across the country. Sheep and goats are a frequent source of cash income for farm families, although the average number of flock is small (about 10 heads of sheep and goats). The off-take rate for small ruminants is about 30% higher than that of cattle, which is only 11%. Pigs are produced both commercially and in smallholder farms. Twenty percent of poultry in Ghana is produced commercially while the other 80% is traditionally produced. Commercial poultry are kept in the periphery of urban areas, especially in the southern parts of the

country. Birds are primarily raised for eggs, making poultry meat a secondary production (Asafu-Adjei and Dantankwa, 2001). Livestock population in Ghana has grown over the years as shown below:

Table 2.3: Trend of Livestock Population ('000) from 2006 to 2015 in Ghana

Type of livestock	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Cattle	1,392	1,407	1,422	1,438	1,454	1,498	1,543	1,590	1,657	1,734
Sheep	3,314	3,420	3,529	3,642	3,759	3,887	4,019	4,156	4,335	4,522
Goats	3,997	4,196	4,405	4,625	4,855	5,137	5,435	5,751	6,044	6,352
Pigs	477	491	506	521	536	568	602	638	682	730
Poultry	34,030	37,038	39,816	43,320	47,752	52,575	57,885	63,732	68,511	71,594

Source: *Source: SRID and Veterinary Services Directorate, MoFA, Accra,2016*

Cattle population grew from 729,408 in 1973 to 1,002,105 in 1984 and by 1990, the population reached 1,146,692. The population of sheep rose from 808,602 in 1973 to 1,449,418 in 1980 and by 1990 the population was 2,223,629. The number of goats in this country increased from 744,199 in 1973 1,303,889 in 1980. By 1990 the figure stood at 2,018,527. The population of pigs increased from 139,453 in 1973 to 224,487 in 1980. By 1990 the pig population reached 473,946 (Koney, 1992). The three northern regions alone now have more than the total number of cattle for the whole country as at the time of independence. The estimated cattle per person ratio have been 0.08 (Oppong, 1998).

Table 2.4: Livestock population (000) in Ghana

Type of livestock	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Cattle	1288	1302	1315	1330	1344	1359	1373	1392	1407	1422	1438	1454
Sheep	2658	2743	2771	2922	3015	3112	3211	3314	3420	3529	3642	3759
Goats	2931	3077	3199	3230	3560	3925	3923	3997	4196	4405	4625	4855
Pigs	332	324	312	310	303	297	290	477	491	506	521	536
Poultry	188102	20472	22032	24251	26395	28727	28386	34030	37038	39816	43320	47752

Source: Veterinary Services Directorate, MoFA, Acca

Table 2.5: Livestock Population in the Bolgatanga Municipality

YEAR	2010	2011	2012	2013	2014
Cattle	19,305	20,685	22, 545	26,310	31,170
Sheep	41,685	44,610	47,415	48,210	54,090
Goats	58,905	65,595	74,655	79,485	78,180
Pigs	13,320	18,285	20,940	24,285	26,790
Local Fowls	139,470	136,320	146,925	166,110	174,135
G. Fowl	52,275	63,285	101,505	116,750	116,340
Donkey	3,966	4,581	5,089	5,773	7,680

Source: Ministry of Food and Agriculture, Bolgatanga Municipal (2015).

2.3 Constraints to Livestock Production in Ghana

According to (International Fund for Agricultural Development [IFAD], 2004), “many of the poor people living in the rural areas are engaged in livestock husbandry. Since disease is an important constraint on livestock productivity in the developing world, development projects that improve veterinary services, or make them more available to the target group, can have a significant impact on rural poverty alleviation”.

Animal diseases have a major impact on livestock production and productivity in Africa and thereby human livelihoods. Diseases continue to constrain livestock productivity, agricultural development, human well-being and poverty alleviation in many developing countries in varied ways. Common diseases or conditions of food animals in Ghana include contagious bovine pleuropneumonia, anthrax, blackleg, trypanosomosis and endo- and ecto-parasitism (in cattle); peste des petits ruminants, or pneumonia, heartwater, mange, foot rot and gastroenteritis (in sheep and goats); mange and helminthosis (in pigs); and New castle disease, fowl pox, infectious bursal disease (Gumboro), coccidiosis and ecto-and endo-parasitism (in poultry).

Animal diseases may impact food security by affecting the production and productivity of animals in terms of quality and/or quantity of meat, milk, eggs, and manure output and traction power, causing food insecurity especially in the poor. Animal diseases transmissible to man (Zoonoses) affect public and human health as evidenced by recent outbreaks of new and emerging diseases such as highly pathogenic avian influenza (bird flu), bovine spongiform encephalopathy (Mad Cow Disease), Rift Valley Fever, Nipah

Virus, Ebola, Severe Acute Respiratory Syndrome (SARS), among others, and the continued occurrence of classical zoonoses such as rabies, salmonelloses, bovine tuberculosis etc. These may impact human well-being and productivity through mortality and morbidity. An efficient and effective animal health services delivery system is critical to the prevention and control of diseases from impacting on food security and public health. Results of studies on perceptions of veterinary staff and livestock owners or keepers are presented to provide a backdrop to the need for quality of services (Turkson, 2008).

According to (Awa and Achukwi 2010; FAO 2011), diseases such as contagious bovine pleura pneumonia (CBPP) and peste des petits ruminants (PPR) among others continue to affect livestock production and inflict losses to livestock keepers.

Providing quality and sustainable animal health services to livestock dependent communities is a key to reducing economic losses and human health risks associated with animal diseases.

The livestock industry in many developing countries continues to face a lot of problems. Among these problems are shortage of feed and water at certain times of the year, occasional shortage of basic but important drugs such as anthelmintics and inadequate extension services. Recent research in Kenya has indicated that poor herders and farmers spend a large proportion of their income treating endemic diseases (Heffernan and Misturelli, 2000).

Ghana as one of the developing countries has two major constraints that retard the development of livestock and poultry in the country. These constraints are animal nutrition and health (MOFA, 1992). Others include conservative attitude of many farmers to change old practices and adopt new ideas. Many farmers are reluctant to have their animals vaccinated against diseases, even in the face of an imminent outbreak although the vaccine is free of charge (Koney, 1992). Disease constitutes the second most important constraint to livestock production and development in Ghana apart from nutrition and adequate supply of water (MOFA, 1992). Disease constraints are estimated to cause losses of up to 30% of annual livestock outputs in developing countries (FAO, 1990).

A number of infectious and parasitic diseases pose hindrances to the production and productivity of the livestock industry in Ghana. Even though Rinderpest has been eradicated, diseases such as Contagious Bovine Pleuro pneumonia (CBPP), the main zoonoses (Tuberculosis, Brucellosis, Anthrax and Rabies), foot-and-mouth disease (FMD), trypanosomosis and tick-borne diseases (Dermatophilosis, Babesiosis and Anaplasmosis and Heart water) hamper the growth of livestock development. In small ruminant peste des petits ruminant (PPR), mange and internal parasites are the major diseases. Throughout the country, Newcastle and Gumboro are the major epidemics in poultry. In pigs, mange and internal parasites predominate. Rabies is endemic throughout the country and is a threat to humans.

Feed is a constraint to animal production. The significant fluctuations in the supply and price of maize affect the quality of maize, consequently affecting the quality of feed. Access to water is an acute problem, especially in the dry season and in the northern parts of Ghana. Extensive trekking of animals in search of water affects their weight. Although around 450 dams and dugouts have been constructed in Northern Ghana for use by both humans and animals, most of them are either silted or overgrown with weeds, partly due to lack of maintenance and partly due to neglect (Asafu-Adjei and Dantankwa, 2001).

According to Gaari (1998), 26 diseases which are classified as scheduled diseases constitute the most important livestock diseases by virtue of their economic and public health importance. Some of these diseases are; Trypanosomiasis, Contagious Bovine Pleuro Pneumonia, Rinderpest, Anthrax, Tuberculosis, Rabies, Peste des petit ruminants, Foot and Mouth disease, and Black leg. The main factors that cause diseases in livestock and poultry include hereditary, nutrition, environment and pathogens. Pathogenic diseases are caused by infectious agents such as viruses, bacteria, protozoa, fungi and external parasites (Acker *et al*, 1991).

According to Adzitey (2013), local livestock farmers keep few animals and sometimes cannot afford veterinary services when their animals are sick. The implication is that fewer animals are contributed by these farmers to the animal and meat industry of Ghana coupled with the vulnerability to high animal mortality.

2.4 Importance of Animal Diseases

Losses of production due to ill-health may be in different forms, some of which have a devastating effect. A sick animal represents not only an economic loss but it represents pain and suffering on the part of the animal and inconvenience on the part of the owner (Hoopes and Thwaits, 1997).

Reduced growth rates, reduced output of animal products (such as meat, milk and eggs), high mortalities, loss of value and exclusion from markets are all losses in production as a result of ill-health (Payne, 1989). Consumption of infected or contaminated animal products by humans has a negative impact on their health. It has been estimated that up to 60% of human illness due to food is as a result of eating animal products that have been infected by virus, bacteria, worms, protozoa and fungi (Brander Pugh, Bycoator, & Jenkins, 1991). This means that it is a threat to human life to consume unwholesome or infected animal products that are derived from sick animals and hence there is the need therefore, to develop adequate and practical preventive measures. Some of these diseases that affect humans as a result of eating animal meat or products are worms, anthrax, tuberculosis, brucellosis, rabies, tetanus, trypanosomiasis, bovine spongiform encephalopathy, leptospirosis, botulism and toxoplasmosis (Oppong, 1998). These diseases are described as zoonotic diseases as they can be transferred from animals to humans. Zoonoses cause a special loss to the animal industry. Revenue lost due to consumers' fear of contracting diseases through infected animal products is not measurable (Acker *et al*, 1991). In Ghana, calf mortality under traditional unimproved husbandry systems is estimated at 23 – 55%. But with minimal health care as pertained in

the Aveyime Ranch, calf mortality was reduced to 9.2% (MOFA, 1992). The outbreak of rinderpest between 1916 and 1918 in Northern Ghana had a devastating effect on cattle numbers such that many officials wondered "whether cattle would not become extinct" in the region (Oppong 1998). Mortality however, is only a part of the monetary cost associated with animal diseases. Other costs include those for vaccines and other chemicals used to prevent and control animal diseases and pests, veterinary expenses, losses from reduced productivity of diseased animals, cost of state disease eradication programs and value of products condemned in slaughter houses (Acker *et al*, 1991). It is therefore in the light of the above challenges that if the ultimate aim of livestock production is to feed humans and improve upon farmers income, then adequate and effective measures should be taken to ensure that livestock is produced with minimal incidence of diseases.

2.5 History of Veterinary Services

The first veterinary services in the English-speaking world were often established by British army (West, 1961), when veterinarians were needed to protect the health of cavalry and pack horses against diseases. Military services have been described in South Africa as early as 1795 (Wilkins, 1961), India in 1799 (Ware, 1961), Burma in 1874 (Rippon, 1961) and Sudan in 1902 (Jack, 1961). Civilian veterinary services only emerged at the turn of the century when it became apparent that the exotic breeds that accompanied colonist were particularly susceptible to indigenous diseases in the new colonies (Henderson, 1986; Leonard, 1993). Many settlers experienced massive losses as a result of disease epidemics (Walshe, 1973). Growing trade between the colonies also

increased the risk of introducing new diseases (Falconer, 1973) and provided further impetus for the establishment of civilian veterinary services (Holden *et al*, 1996).

Colonial veterinary officers were confronted with tropical diseases whose causes were unknown and for which methods of prevention and treatment had not yet evolved. In the absence of vaccines, services relied on quarantine, import restrictions, movement controls and the slaughter of infected stock and wildlife reservoirs, to prevent or contain the spread of major contagious and infectious diseases (West, 1961; Thrusfield, 1986; Leonard, 1993). At the same time research institutions were established to investigate their causes, treatment and prevention (Holden *et al*, 1996). Veterinary Services were first introduced in Africa in order to deal with epidemic diseases, initially through stringent movement controls (quarantines) and then later through mass vaccination campaigns. For a long period of time these were the only veterinary services to indigenous African livestock for which economic benefits exceeded total costs, and this is still true in some parts of Africa (Leonard *et al*, 1999).

Veterinary services in Kenya started in 1902 when the British colonial administration established the Department of Veterinary Services to provide comprehensive public veterinary provision in high potential areas (Silkin and Kasirye, 2002). During the colonial and immediately post-independence era most clinical vet services in Kenya were provided by private practitioners and 'Vet Scouts'. The private practitioners were confined in high potential areas, mainly in the so-called white settler areas. Vet Scouts were local livestock keepers who received informal training from local vet staff, were

employed by the County Council and seconded to the government, and lived and provided clinical and other services in the villages.

The provision of private animal health services was, and still is, mainly governed by the Veterinary Surgeons Act (Cap 366) and the Pharmacy and Poisons Act (Cap 244). The Veterinary Surgeons Act was borrowed mostly unchanged from the British Veterinary Surgeons Act. This Act broadly limits the practice of veterinary medicine and surgery to registered veterinary surgeons, and staff under their direct supervision. However, there are two clauses at the end of the Act added in recognition of the fact that many of the larger commercial farmers of the time provided their own veterinary services. These clauses allow anyone to treat their own animals, or those belonging to a neighbor, provided it is not done for profit. The Pharmacy and Poisons Act limits the sale of pharmaceuticals (including veterinary pharmaceuticals) to registered Pharmacists. Veterinarians are allowed to keep limited stocks of drugs for their own use while treating animals, but they are not allowed to sell those (Young, Kajume & Wanyama, 2003).

Veterinary services in Uganda date back to 1908 when the first British vet arrived to serve in the protectorate. Before this, urgent disease problems were dealt with by the Chief Veterinary Officer in Kenya who took three days to travel from Nairobi to Kampala. By 1912, there were five foreign animal health specialists in the country and in 1921; the Veterinary Department was formally made responsible for the animal industry (Silkins and Kasirye, 2002). Veterinary services in Tanzania began when the German colonial government established a 3-person Veterinary Department in 1904. In 1905, a

Livestock Research Station was established at Mpwapwa for diagnosis and surveillance of livestock diseases and two years later the first dip was constructed. By 1915 the number of vets in the government service had increased to 21, and the first nine Native Veterinary Guards had been appointed. These were illiterate people trained on the job to assist foreign vets; their appointment marked the first extension of services into rural areas.

In 1937, the Veterinary Department started training Veterinary Assistants at Mpwapwa and Ukiriguru. The first Tanzanian was awarded a Diploma of Veterinary Science from Makerere College in Uganda in 1942 (Silkins and Kasirye, 2002).

Compared with other countries in the region, veterinary services developed late in Ethiopia. It is a moot point whether they began at the end of the 19th century, when the Italians carried out a rinderpest survey in Eritrea, or in 1908 when Emperor Menelik II set up the Imperial Veterinary Services in Addis Ababa. Whichever, animal health services really got under way in the 1940s and 50s when Ethiopia started to produce vaccine, and newly trained vaccinators were sent around the country to vaccinate against rinderpest. These people are regarded as the pioneers of the service (Admassu and Nega, 2001).

The first initiative in veterinary development in Eritrea was made by the Italian colonial authorities. In 1903, they established a veterinary laboratory and clinic on the outskirts of the newly established capital of Asmara. This facility was principally to treat African horse sickness which was afflicting the horses and mules used as pack animals by the Italian army. More recently, public sector provision has been shaped both by Ethiopia's

annexation of Eritrea in 1962 and by the services established by the Eritrean People's Liberation Front (EPLF) during the 1961-1991 independence struggles against Ethiopia (Silkins and Kasirye, 2002)..

In Tanzania, the Veterinary Surgeons Ordinance (Cap 376) and Animal Diseases Ordinance (Cap 156) make no provision for private veterinary practice (Mpelumbe, et al, 1997), although private practice has never been forbidden. A few private vets operated after independence and, as noted, government vets are able to offer services on a fee-paying basis. As in other East African countries, Tanzania has had an EU-funded PARC privatization scheme. Launched in 1994, the project had a target of assisting 60 vets into private practice. However, loans were given to only 15, most of them in urban centers, and of these only 3-4 are still operating. The scheme was closed in 1998 due to poor performance, blamed on the failure of vets to get collateral and to unfair competition from the public sector.

2.6. History of Veterinary Services in Ghana

The major challenge that faced Ghana's colonial masters in the Northern part of the then Gold Coast in the livestock industry was disease outbreaks such as rinderpest and contagious bovine pleuro pneumonia (CBPP) which almost led to the extinction of the industry.

In 1903, the chief commissioner in charge of the Northern territories (now Northern, Upper East, Upper West and some parts of Brong Ahafo regions) realized that the mortality rate was alarming and requested that a veterinary medical technician be sent to come and study the situation. Mr. W. P. B. Beal, who was the first veterinarian to be brought, arrived in the country in May 1909. On arrival, he was interviewed by His Excellency John Bodger, the governor where the following conditions were agreed upon: that; He will be on probation for 5 years, Accra will be his headquarters and he will make a veterinary survey of the country and make a recommendation from his findings.

In his recommendations, he stated the following; that, the Northern territories possessed a potential livestock industry sufficient enough to meet the protein needs and or demand of the country, the reason for the small numbers of animals was as a result of the outbreaks of diseases spread by the roaming herds and imported animals and the nucleus of the cattle industry is a potential and should be expanded.

He noted "the meat demand of the country was an ever increasing one and we are not in a position to meet the supply", adding that "our meat in the future is in danger of being cut off from us". The above were among other recommendations which led to the separation of the Veterinary Services Department from the administration of the Principal Medical Officer and had its headquarters in Kumasi and establishment of strong branches of the department in the Northern territories (Oppong, 1998).

2.7. The Situation of Animal Health Care Delivery in Sub-Saharan Africa

Veterinary services are animal health services provided by professionals aimed at providing livestock farmers with the following: Animal Health and Disease Control, Product and Market Development and Animal Production and Preservation. The availability and quality of veterinary services can play a key role in increasing the productivity of the livestock sector (Umali, Narrod & Deininger, 1994). Many argued that the presence of readily controlled diseases and the consequent poor performance of the livestock sector is indicative of a weak veterinary service system that has failed to provide the necessary advice and drugs to livestock producers. The state has typically assumed almost sole responsibility for the delivery of veterinary services in Nigeria (Achoja, Ike and Akporhuarch, 2010).

To provide quality and sustainable animal health services, most governments in developing countries promoted private practices and discontinued the automatic employment of veterinarians (service providers with a university degree in animal health training) and of para-vets (service providers with a diploma or certificate in animal health training). However, private practice is limited to some urban areas and in the intensive production systems, but not in livestock dependent marginal areas (Mockshell *et al, 2013).* Veterinary services can be classified in four categories: (a) Curative services, particularly the diagnosis and treatment to treat diseased animals; (b) Preventive services to stop the emergence and spreading of diseases through vaccination, vector control and control measures, such as quarantine and forced slaughter of affected animals; (c) Production of veterinary pharmaceuticals; and (d) Human health protection, such as

sanitary inspection of animal products (Adesiji *et al 2013)*. Leonard (1987) classifies veterinary services into preventive, curative and promotive. Preventive services exclude the occurrence of disease through administration of drugs, sera, vaccines and control of transmitting vectors. Curative services involve treatment of diseased animals while promotive services inhibit the occurrence of diseases and improve productivity. The majorities of veterinary departments in Africa were, and still remain, focused on preventive services.

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2.8. The Importance of Animal Health Care Delivery

The Food and Agriculture Organization (1991) identified three major functions of animal health services. These are:

(i) Development of animal health and production through disease investigation and surveillance, disease prevention, control and eradication, quarantine, emergency

response, clinical services, control of animal drugs and biological products, veterinary inspection, research, training, wildlife disease monitoring and veterinary aspects of aquaculture.

(ii) Protection of human health by control of zoonoses, food hygiene, meat inspection, residue testing and training.

(iii) Protection of animals and welfare by ensuring humane treatment of animals in general, enforcing welfare standards in markets, during transport and slaughter and control of laboratory animals (Eregae, 2003).

Poor livestock health remains one of the main constraints to sustainable livestock development in many developing countries. Veterinary medicine's primary roots are in agriculture, public health and comparative biology. It is aimed at raising livestock productivity to enhance food security, improve human health by preventing zoonotic diseases, improving human well-being and animal welfare (Adepegba *et al*, 2006).

Providing quality animal health care is critical to the improvement of livestock production in sub-Saharan Africa. Animal health services help in sustaining the productivity and viability of the livestock sector, and the value of such services is that they contribute to the reduction of production losses, protection of society from zoonotic diseases and improvement in livestock productivity and product quality (Turkson, 2007).

Animal health services help in sustaining productivity and viability of the livestock sector with their value being derived from reduction in production losses, protection of society from zoonotic livestock diseases and improvement in livestock productivity and livestock product quality (Umali et al., 1992).

Edwards (2004) noted that the recent outbreaks of new and emerging diseases, many of which are zoonotic have shown the inadequacies of veterinary services in many parts of the world. This includes failures of surveillance systems, lack of transparency in reporting of disease events and absence of or slow response to significant animal diseases. According to Payne (1989), the maintenance of animal health is for some reasons such as; (1) increasing the efficiency of production, (2) security against epidemic diseases, (3) improvement in human health with reference to zoonotic diseases and (4) improvement in animal welfare. At the core of animal diseases control, food security and public health is the efficiency and effectiveness of the animal health services delivery system in a country.

Losses resulting from diseases in the sector are a major constraint to productivity. Losses from these diseases are estimated to be up to 30% of livestock output annually in developing countries twice that estimated for developed countries (FAO, 1990).

Many were of the view that the presence of readily controllable diseases and the subsequent poor performance of the livestock sector was indicative of weak animal health care delivery systems that have failed to produce the necessary advice and drugs to livestock farmers (FAO, 1988). The state had typically assumed almost sole responsibility for the delivery of animal health services in developing countries (Leonard, 1993). It was suggested that in Sub-Saharan Africa, the control of tsetse fly, a vector for trypanosomiasis transmission could lead to a 16% and 18% increase in meat and milk production respectively (Tacher *et al*, 1988). One of the major challenges in the delivery of livestock services in Africa is the provision of adequate services of an acceptable

standard or quality. A major constraint to successful livestock production in Ghana has been lack of support for animal health services (Turkon, 2007).

The inadequate supply of Animal Health Care Delivery had therefore commonly been attributed to poor public-sector performance that could be resolved through programmes of privatization (Umali *et al*, 1994). Relevant to veterinary practice, privatization can be defined as the "process whereby activities carried out by government are transferred to the private sector." Since the early eighties, many governments in the area have deliberately pursued a policy of market liberalization and privatization. Solutions that involve giving access to new social players, especially from the private sector appear to be very attractive. However, these players have the capacity to mobilize social, political and financial resources. Moreover, the new models transfer animal health activities to a geographical micro-area consisting of local communities in which the community shares the problems and interests of the livestock sector (Privatization Database, 2001).

The private veterinary sector is to deliver preventive, curative and promotive services that largely benefit individual animals and their owners, i.e. to deliver private goods and services. This means that a private veterinarian should debit livestock owners the full cost of examination and diagnosis, medicines, economically motivated preventive vaccinations, surgery, husbandry advice, and other services provided, together with his or her time and transportation cost. In such cases, the public budget can cover part of the costs of the services. Private veterinary services have been in operation in many Least Developed Countries (LDC) for the last 10 years. The appropriate roles of the private

services would be: the implementation of sanitary measures; provision of curative services; and training and guidance on preventive health care and production diseases to individuals or to community animal health workers.

Although private veterinary activities are now allowed in many countries throughout the world, the lack of appropriate legislation stands as a real constraint. Thus, the PARC privatization scheme had limited success for the above-mentioned reason (Hassan, 2001).

Privatization of some veterinary services has received a strong impetus in the developing world over the last decade. Several factors contributed to this trend: Fiscal constraints and poor management of resources have led to a decline in the operational efficiency of public sector services. The number of veterinary staff has grown faster than the means (such as vehicles and fuel, drugs and vaccines) to support them in many African and Asian countries, thus forcing the services to cut back on field activities. For example, while 33 percent of the budgets of the veterinary services of six Sahelian countries was allocated to operating expenditures in 1961-62, this share has declined to 25 percent by 1975 and to sixteen percent by 1988 (de Haan and Bekure 1991). Five countries in West Africa allocated less than 5 percent of their national livestock budget to the funding of non-salary recurrent expenditures. While the situation in other regions may be less serious than in these Sahelian countries, the general tendency of relatively decreasing availability of recurrent funds is evident in most of the developing world.

The development of new technologies has shifted the focus from mostly herd-level prevention, which is more compatible with public intervention, to the treatment of individual animals, which is more suitable for private handling. Declining land areas for grazing due to population pressures have led to more intensive production. This, in turn, spurred the use of more capital-intensive technologies, such as higher value hybrid animals, for which individual treatments are more easily economically justified. Moreover, the introduction of mass fabrication of veterinary pharmaceuticals has reduced their cost of production and subsequently their prices, making individual interventions more attractive economically.

Traditional livestock farming is shifting toward more commercialized operations. Cattle ownership is shifting from the traditional cattle-owning ethnic groups with considerable indigenous knowledge, to much less experienced commercial crop farmers in several regions of Africa and China. These commercial operations require a higher level of service. At the same time, there is an increasing awareness by traditional livestock herders of the benefits of modern veterinary medicine.

Increasing supply of veterinarians and shrinking public market. Due to fiscal constraints, governments have been forced to abandon their policy of employing all veterinary graduates. In addition, some regions (that is, the Anglophone developing world, particularly India and East Africa), have seen a proliferation of veterinary faculties resulting in an increasing supply of veterinarians. Private practice is further enhanced by the opening of opportunities to sell related products such as drugs, feeds, and farm tools. These factors contribute to the large numbers of veterinarians seeking to establish private

practice. Thus, demand for veterinary services has increased strongly over the last decades, whereas public sector supply in many countries stagnated or deteriorated. At the same time a group of young graduates, all keen to establish themselves privately, has become available in many developing countries. Together these factors are generating a significant force for privatization (Umali and de Haan, 1992). There was therefore, the need for private sector participation in animal health care delivery to increase productivity.

According to them, veterinary services can be classified into four categories: (a) curative services, particularly the diagnosis and treatment to treat diseased animals; (b) preventive services to stop the emergence and spreading of diseases through vaccination, vector control and control measures, such as quarantine and forced slaughter of affected animals; (c) production of veterinary pharmaceuticals; and (d) human health protection, such as sanitary inspection of animal products.

In the developed world, veterinary services are mostly privately operated. Veterinary services in these countries share several common characteristics. The government role is generally reduced to the delivery of pure public goods. This includes control over epizootics and zoonoses and food control and hygiene. Growing priority is also given to the enforcement of animal welfare legislation by the public veterinary services. Externalities involved in the control of enzootic diseases are internalized through the creation of disease control funds, financed by compulsory memberships in insurance schemes and producer organizations and special product levies. The private input supply companies (pharmaceuticals and feed) are becoming increasingly involved in extension

(Holden *et al*, 1996). In the developing world, overall progress in privatizing veterinary services has been slow. A survey of livestock specialists from the World Bank and other government agencies carried out by Umali, Feder, and de Haan (1992) showed that in only a small of developing countries are veterinary services provided by private practitioners.

2.9.0 Constraints to Animal Health Care Delivery

Veterinary services are generally poorly developed in many underdeveloped countries of Africa and Asia. The situation is particularly serious in more remote, dry land areas inhabited by pastoral and agro pastoral communities. These areas are characterized by their large size, harsh climate, poor infrastructure, and relatively small but mobile human populations. These factors are constraints to conventional fixed-point service delivery through facilities such as government or private, urban-based veterinary clinics (eregae, 2003). The control of epizootics has been difficult in pastoral livestock due to the above-mentioned constraints, as well as the movement of stock across national boundaries. In certain areas, conflict and insecurity have adversely affected the implementation of large-scale vaccination campaigns (Hassan, 2001).

Studies that have analyzed the impact of privatization in countries which have already experimented with commercialization/privatization of these services have produced mixed results. Many argue that the presence of readily controlled diseases and the consequent poor performance of the livestock sector is indicative of weak delivery systems that have failed to provide the necessary advice and drugs to livestock producers

(Holden *et al* 1996). The inadequate supply of veterinary services has therefore commonly been attributed to poor public-sector performance that could be resolved through programmes of privatization (Umali *et al.,* 1992). Despite several years of privatization, there is little readily available evidence to indicate that the market-dependent private sector is any more capable of delivering services than the state. Where programmes of privatization have been pursued, private practices have tended to avoid rural constituencies and locate instead in the more lucrative urban markets. A study of private practices in Nigeria, for example, found that the majority (92%) operated in urban and peri-urban areas (Odeyemi, 1994a). According to Holden *et al.,* (1996), in Senegal, privatization has left many pastoral regions without veterinary services.

Holden *et al.,* (1996) assert that "given these patterns of distribution, there is a danger that the transfer of private-good services to market-dependent operators will leave the many subsistence livestock producers without access to animal health services. Veterinary medicine in Africa continues to have high transaction costs associated with distance despite the great improvements in transportation that have taken place.

Transaction costs refer to all costs that occur between the provider and the consumer of animal health services (Leonard, 2000). These include obvious costs associated with transportation and less evident costs such as losses associated with misdiagnosis and poor treatment when farmers lack information. Transportation is particularly important in pastoral systems of livestock production because of the movement of people and animals to exploit available food and water (McDermott, Randolph & Staal, 1999). Local

monopoly remains a distinguishing characteristic of most areas. However, for animal health products that are easily transported, regional price differentials usually disappear (Leonard, Koma, Ly, & Woods, 1999).

The professional level of animal health providers is another component on the cost of service delivery. The more highly trained the provider, the higher the fee he/she will demand and the greater the cost of transport is going to be, for increased professionalization tends to carry with it reduced numbers, urban residence and greater comfort in travel (Leonard *et al.*, 1999).

Animal Health Assistants more often than not use cheaper means of transport like bicycles and motorcycles. It is also generally accepted that veterinary services will be ineffective if staff salaries represent more than 60 percent of the total budget leaving less than 40 percent for veterinary supplies and transport (Leonard *et al.*, 1999). From an economic point of view, the appropriate training for providers would be determined by making the following calculation for the alternative levels and choosing the result with the highest total: "The average value of animals served (including externalities), the reduction in the probability of death resulting from service at a particular level of training, the average unit cost of providing that service (Leonard, 2000)."

A research carried out by Turkson (2008) noted that "A major constraint to livestock production identified in Ghana has been accessibility to veterinary services. The high cost of drugs has been identified as a deterrent to livestock production in Ghana. A high

proportion of respondents (about 70%) found the cost of drugs to be 'expensive' or 'very expensive".

In many developing countries, veterinary departments are not given the appropriate legal power in the administrative system (FAO, 1991). The current policy and legal framework in Kenya is a major constraint to delivery of animal health services. The Veterinary Surgeons Act, Cap.366 excludes semi-professionals from registration and therefore cannot establish private practices on their own unless under the employment of registered veterinary surgeons. This restricts semi-professionals and even other cadres of veterinary personnel, in private veterinary practices. The Pharmacy and Poisons Act, Cap. 244 does not allow veterinarians to carry out business of veterinary drug retailers unless to possess veterinary drugs for purposes of legitimate veterinary treatment. More so, it does not include veterinarians in drugs inspectorate service thereby consequently leading to veterinary drugs abuse and misuse in the field because pharmacist dispense them indiscriminately without regard to the laid down ethical practices. This situation leads to drug residues in animal products, poor quality of clinical work, accelerated microbial resistance to drugs and entry of inferior and unregistered drugs in the market. Several obstacles in both High Potential and ASAL areas meet animal Health Service delivery policy. Application of cost sharing policy in ASAL areas is hindered by several factors which include; Low cash economy, lack of easily accessible markets, long distance to consumer population, cultural resistance to rational herd off take, restricted livestock movement due to CBPP, regular droughts, unfavorable land tenure system, low literacy level, vastness of the area and pastoralism. In high potential areas, uneconomical land

size and mismanagement of farmers' organizations remain the major obstacles in the application of this policy. The policy on privatization and sustainability in ASAL areas is confronted by a range of obstacles which include; Long distances to drug supply points, poor infrastructure, general insecurity, lack of trained veterinary personnel, reluctance of veterinarians from high potential areas to work in ASALs, lack of government veterinary staff resulting in inadequate service delivery and difficulty to access credit facilities.

Considerable deficits in the areas of government control and standardization regarding animal production and health services have often been realized. This encourages among other vices the importation of substandard products. It is therefore not possible to design effective disease control programs. Information services as well as transport, communication, veterinary products and equipment are in most instances outdated and overtaken by new development in the livestock industry. Some of these problems result from the shortage of funds needed to sustain the activities of veterinary staff (Kleeman, 1995).

2.9.1 High transaction costs

Veterinary medicine in Africa continues to have high transaction costs associated with distance despite the great improvements in transportation that have taken place.

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to exploit available food and water (McDermott *et al.*, 1999). Local monopoly remains a distinguishing characteristic of most areas. However, for animal health products that are easily transported, regional price differentials usually disappear (Leonard *et al.*, 1999).

The professional level of animal health providers is another component on the cost of service delivery. The more highly trained the provider, the higher the fee he/she will demand and the greater the cost of transport is going to be, for increased professionalization tends to carry with it reduced numbers, urban residence and greater comfort in travel (Leonard *et al.*, 1999). Animal Health Assistants more often than not use cheaper means of transport like bicycles and motorcycles. It is also generally accepted that veterinary services will be ineffective if staff salaries represent more than 60 percent of the total budget leaving less than 40 percent for veterinary supplies and transport (Leonard *et al.*, 1999).

2.9.2 Policy and institutional constraints

According to the World Bank (1981), government policies play a crucial role in livestock development. They not only affect the economic environment, but also directly affect production, marketing, consumption and external trade in livestock products. Policy issues that may constrain or promote the dairy industry performances include: foreign exchange, dairy import, and commodity price policies. Over the past decades, National Agricultural Research Systems (NARS) have increasingly experienced budgetary constraints. The result of these budgetary constraints can be seen as NARS are not generating sufficient new technology to promote agricultural and livestock development, and links with extension services are limited. Budgetary and institutional constraints

hamper the provision of effective extension services. Extension agencies have been, and still are, more responsive to government bureaucracies than to the needs of the farmers.

According to (Asafu-Adjei and Dantankwa, 2001), The marketing of livestock, in particular cattle and small ruminants, has had a long history in Ghana, linking back to the 19th century North-South- West African trade routes that exchanged livestock for forest products. Traditionally, livestock flowed freely from the surplus regions of the Sahel on the hoof across the borders to Kumasi and then further down south to Accra-Tema and Cape Coast or Sekondi-Takoradi. The first break with this traditional marketing system occurred in 1968, when the Ghana government passed the Alien Compliance Act, which effectively removed all foreigners from a wide range of commercial activities including livestock trade. Cattle marketing in particular suffered as a result of the implementation of this Act.

Most livestock production is constrained by market access, both for inputs and outputs, being mainly restricted to local and informal markets. Access to the larger national, regional and international markets is limited because of poor infrastructure and increasing technical requirements (FAO, 2006). In developing countries, most livestock produced by smallholder pastoralists and farmers are marketed by private entrepreneurs who, operating as a marketing chain, collect, regroup and distribute the livestock and livestock products to terminal markets. International Livestock Research Institute [ILRI], (2003). Although the marketing chain is well known, the economic and institutional barriers to livestock marketing (transportation costs, quality standards, inadequate and uncoordinated livestock market information systems) limit livestock-sector development, with a consequent negative impact on the welfare of the large population of smallholder producers and others who depend on the sector for their livelihoods. Philip, Nkonya, Pender and Oni (2009), reported that livestock marketing and processing constraints in Nigeria include poor packaging facilities for products in the value chains, lack of cold storage facilities in abattoirs at wholesale and retail markets, and absence of standards for meat and other livestock and poultry products. Smith and Olaloku (1998), admitted that inadequate infrastructure such as poor feeder roads, unreliable power supply, inefficient cooling and processing capacity can discourage production or result in economic losses. According to (Shapiro, Jesse and Foltz, 1992), these factors that constitute formidable constraints to distribution and marketing, could discourage production because of the perishability of milk (in dairy market). The absence of functioning marketing facilities and conservation and processing infrastructure is a major constraint to livestock sector development.

In addition to the above, livestock departments are often limited by weak policy making, sector planning and implementation capacities, resulting from inadequate human resources, lack of accurate and detailed statistical information, and poor negotiating powers. According to FAO (2006), despite the fact that technological problems are relatively well understood, there is a lack of institutional capacity to apply appropriate solutions because institutional linkages between research institutions, extension services and veterinary services are extremely weak in many instances, resulting in poor design and delivery of programs.

2.10 Why Cash and Carry in veterinary Services?

Providing effective animal health services to livestock keepers in developing countries has remained a challenge. Provision of these services by the government prevailed in the first decades after developing countries reached their independence. In the structural adjustment period that began in the 1980s, government provision of livestock services came under increasing criticism for high costs and limited effectiveness.

Inadequate funding of Veterinary Services is noted to be one of the root causes of state failure in veterinary health delivery. Financial sustainability has therefore become a key issue governing the successful animal health delivery services by the state (Ashley *et al*, 1996). The source of finance for state veterinary services is through revenue accruing from taxes. In Sub-Saharan Africa for instance, livestock taxes represented on the average 33% of the livestock budgets of the 1970's (Anteneh, 1991).

In Ghana, from 1912 onwards the Veterinary Services Department started raising income from services rendered to the cattle traders which included taxes collected for the upkeep of quarantine stations and on imported animals as well as all animals crossing the Oti and Volta Rivers to the south. During those years between 1926 and 1939, the service generated substantial annual income sometimes even in excess of its total expenditure (Paterson, 1980).

Animal health delivery services should be financially sustainable provided the department is able to adjust its activities (and hence funding requirements) in line with tax revenues. It was thus thought that cost recovery programmes could be one way of facilitating financial sustainability in animal health service delivery by transferring some or all the costs of the services to producers. In this way, services would become less vulnerable to budgetary fluctuations (Anteneh, 1991), and the introduction of market driven incentives can improve efficiency (Blarcom *et al*, 1993).

2.11 Implementation of the Cash and Carry System in Ghana

Inadequate staffing is another problem facing the sector. The veterinary technical officer to farmer ratio of 1 to 1000 has not seen any improvement. The policy of training Community Livestock Workers (CLWs) to complement animal health care delivery in the rural areas appears very sound and promising but is in most cases saddled with logistical and institutional problems (Yidana, Adda, Sumaila, Addo-Kwafo, Apiiga, & Djang-Fordjour, 2006).

The commonly observed policy of guaranteeing employment for veterinary graduates meant that savings were sought instead by reducing operational budgets whiles retaining or even expanding staff numbers (Anteneh, 1991 and Winrock, 1992).

Drug shortages and support services such as transportation, relevant tools and equipment that were lacking and failure to maintain the equipment were symptomatic of the funding crisis (Anteneh, 1991). Drugs for treating animals were no longer available for distribution. As a result of this, very little could be done so people were found sitting in offices though willing to work but unable to do so (FAO, 1991). Staff morale declined and efficiency deteriorated further (Moris, 1991). The Veterinary Services Department never seemed to have enough funds to do their work (Oppong, 1998). Vaccinations were free until 1995 and 1996 when a vaccination exercise was carried out on 1,001,816 cattle (87% of the national herd) through a donor support from the European Union under the Pan-African Rinderpest Control Project Phase Two (PARC II). After this project, free mass vaccinations were stopped and farmers now had to pay for the cost of vaccination (Oppong, 1998). The Central Laboratory at Pong-Tamale which used to produce quality CBPP vaccine for the country and for export to Sierra Leone no longer did so due to lack of funds. Apart from CBPP, this laboratory also produced fowl pox, anthrax spore, hemorrhagic Septicemia and the Black Leg vaccines. The cost of prevention and treatment of animal diseases was shifted to the farmer to bear. The current policy is that farmers will bear the full cost of drugs plus 5% of the cost as service charge which is known as the ‘Cash and Carry’ System (Veterinary Services, 2001).

A solution was seen in the privatization of those veterinary services for which no market failure was assumed to exist (Leonard, 2002).

Since the existing structure of Veterinary Services does not fulfill the international trade standards, all countries adopted new ideas and approaches for restructuring. It was admitted that privatisation and community participation are the most effective tools of restructuring. These approaches were known to increase the efficiency and quality of rendered veterinary services". Privatisation of veterinary services has been widely advocated as a means of improving the provision of veterinary services (de Haan and Bekure, 1991).

2.12 Difficulties Facing Veterinarians in Private Practice

A study conducted by (Eregae, 2003) in Kenya revealed that a section of livestock farmers, especially women perceived treatment costs for livestock diseases as being relatively high. Turkson and Brownie (1999) have reported the constraints encountered in the process of privatization of veterinary services in Ghana. In their research, questionnaires were administered to veterinarians to elicit their responses on various issues concerning privatization. A significant proportion (61%) of government veterinarians, who formed 94% of the respondents were unwilling to go into private practice. Among the reasons given were that private practice was too risky, that farmers were unwilling or unable to pay for services, that capital to start practices was lacking and that the societal value for animals was low. Also, low livestock densities in many areas and the absence of commercial livestock farming were perceived as deterrents to the sustainability of private practice. Furthermore, the poor macroeconomic environment

of high inflation, high interest rates and unstable currency discouraged investment in this sector. In a similar study carried out in Kenya, Njoroge, Chema & Gathuma, (2000) established that recent veterinary graduates had not ventured into private veterinary practice due to lack of capital. Several constraints to setting and running a private veterinary practice in Kenya have been identified as lack of capital, high transport expenses, defaults in payments by clients, taxation, registration and license fees and lack of diagnostic support (Wamukoya, Gathuma, & Mutiga, 1995).

2.13 Access to Veterinary Services in Ghana

There are over 13 million smallholder farmers who live in rural and peri-urban areas of Ghana. In these areas, over 75% of rural people and 25% of peri-urban people depend on livestock for their livelihoods. The rearing of livestock plays an important role in enabling smallholder farmers have resilient livelihoods and to avoid both food insecurity and poverty, as livestock can contribute up to 33% of household income. Most of these farmers, however, are losing out due to high livestock mortality. In some communities, the mortality rates could be as high 60%. Ghana faces severe shortage of veterinary workers, with around 42 specialists and less than 2000 technicians available to meet the needs of millions of farmers. Eighty percent (80%) of vets in the country are located in major urban centers and only the more affluent farmers have access to them (MoFA, 2011).

Access to veterinary services in Ghana plays a critical role in increasing the productivity of livestock in the country and the incomes of livestock farmer. According to Turkson

(2008), a major constraint to livestock production identified in Ghana has been accessibility to veterinary services (1, 5, and 17).

Veterinary services are poorly developed in remote pastoral areas of Africa. Very many reasons have been suggested to be responsible for this state. In study carried out it was observed that most of the herders and farmers who participated in the study did not use government services. Reasons for the poor uptake were numerous. The majority of households (66%) were generally not cognizant that such services existed or even that the purpose of the government vets was to treat animal disease. This was particularly true where many were unaware of nearby vet practices and or indeed the need to buy purchase drugs specifically for livestock. For example, long distances, poor transport and communication facilities, low economic value of individual animals, lack of cash economy and the practice of nomadic and transhumant livestock production system imply that private veterinary practices cannot thrive in these areas (Dolan, 1996). In addition, Catley (1999) described large size, harsh climate, poor infrastructure and the relatively small and mobile human populations as constraints to conventional, fixed point service delivery.

2.15 Some Observations on Cash and Carry of Veterinary Services in Northern Ghana

Some works have been done on 'Cash and Carry' in the three Northern regions of Ghana by the Animal Science Department of the University for Development Studies and various results were obtained. From the results, it was noted that the privatization of veterinary services had a great negative impact on animal health and production levels of farmers in the three northern regions (Northern, Upper East and Upper West regions). However, due to effective extension work and positive results on production from health care given, farmers' response is gradually improving. High illiteracy among farmers is attributed to be a cause of the slow rate of acceptance of the system (Mohammed, 2004).

The veterinary services department has guidelines with regard to charges for surgical and vaccination cases which are fixed but for treatment using veterinary drugs, no fixed prices are set. Market price of drugs determines the cost of treatment, it therefore varies and fluctuates. Veterinary technicians acknowledge the negative effects of the system on production levels (Salifu, 2005). From their findings, most (70%) of the farmers treated their animals when they fell ill either by themselves using veterinary drugs or herbs or by inviting the veterinary technicians to treat them (Issakah, 2006).

In recent times, there is a strong advocacy for governments to give way or reduce their involvement in services that can best be provided by the private sector. The ideology behind this idea is that, government should not continue to provide goods and services that the private sector is willing and capable of providing. Government should rather

concentrate on providing goods and services that are private in nature but have the potential for market failure. This has been the move for privatization of veterinary services all over the world (Mohammed, 2004). A project to help privatize veterinary services was launched in 1993, encouraging veterinarians to go into private practice (Turkson, 2000). Despite several years of privatization, there is little readily available evidence to indicate that the market dependent private sector is any more capable of delivering services than the state. Where programmes of privatization have been pursued, private practices have tendered to avoid rural communities and locate instead in the more lucrative urban markets (Odeyemi, 1994). Given these patterns of distribution, there is a danger that the transfer of private goods and services to market dependent operators will leave many peasant livestock producers without access to veterinary or animal health care services.

There is a recent call for new measures beyond the market-dependent privatization to improve the efficiency of delivery and cost effectiveness of the animal health care services. There should be a partnership between the private sector and public sector but the roles of each partner should be clearly defined (Mohammed, 2004).

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter discusses the research design, methods used to collect the data and how the data were analyzed and presented.

3.1 Profile of Bolgatanga Municipality

Bolgatanga Municipality is located in the center of the Upper East Region, and is also the regional capital. It has a total land area of 729 sq km and is bordered to the North by the Bongo District, South and East by Talensi-Nabdam District and Kassena-Nankana District to the West. It was established by LI 1797 (2004).

The climate is classified as tropical and has two distinct seasons – a wet season that runs from May to October and a long dry season that stretches from October to April; with hardly any rains. Mean annual rainfall is 950mm while maximum temperature is 45°C in March and April with a minimum of 12°C in December (Ghana Meteorological Services Department, 2014).

The natural vegetation is that of guinea savannah woodland consisting of short deciduous trees widely spaced and a ground flora, which gets burnt by fire or scorched by the sun during the long dry season. The most common economic trees are the shea nut, dawadawa, baobab and acacia (MoFA, 2013).

According to the 2010 population the Bolgatanga municipality has a total population of 131,550 people comprising of 62,783 males and 68,767 females (GSS, 2010).

The Municipality has a total land area of 729 square km and 70% of this (51,030 ha) is cultivated. Eight percent (8%) of the population are peasant farmers. There are 14,145 agricultural households and with an average of six persons per household and average land holdings of between 1.0 and 3.0 ha.

Even though there are few dams and dugouts, the municipality is basically dependent on rain fed agriculture. The problems militating against agricultural development in the municipality include the following: Short and erratic rainfall pattern marred by dry spells and peak seasonal floods, inadequate feed and water for the animals during the long dry season which cause loss of weight and poor reproductive performance of females, prevalence of pests and diseases of both crops and livestock, no improved housing and inadequacy of improved breeding stock of livestock, livestock rearing is not seen as a business, fish farming is a new concept to farmers and inadequate water bodies in tihe muncipality. Most of the existing water bodies dry up during the long dry season (MoFA Bolga, 2014).

3.2 Target population

The target population for this study was peasant livestock farmers and veterinary services personnel in the Bolgatanga municipality.

3.3 Research Design

A study design is the process that guides researchers on how to collect, analyze and interpret observations. It is a logical model that guides the investigator in the various stages of the research (Degu and Yigzaw, 2006).

This study will use a mixed method design, which is a procedure for collecting, analyzing and "mixing" both quantitative and qualitative data at some stage of the research process within a single study, to understand a research problem more completely (Creswell, 2002). When used in combination, quantitative and qualitative methods complement each other and allow for more complete analysis (Tashakkori and Teddlie, 1998).

The quantitative method of generating information was in the form of a survey where a set of questions was administered to a sample of peasant livestock farmers and the necessary information obtained. According to Creswell (2003), a quantitative approach is one in which the researcher primarily uses postpositive claims for developing knowledge (i.e., cause and effect thinking, reduction to specific variables and hypotheses and questions, use of measurement and observation.), employs strategies of inquiry such as experiments and surveys, and collect data on predetermined instruments that yield statistics data whiles, a qualitative approach is one in which the researcher often makes knowledge claims based primarily on constructivist perspectives (i.e., the multiple meanings of individual experiences meanings socially and historically constructed, with an intent of developing a theory or pattern) or advocacy/participatory perspectives (i.e., political, issue-oriented, collaborative, or change oriented) or both. It also uses strategies of inquiry such as narratives, phenomenologies, ethnographies, grounded theory studies, or case studies. The researcher collects open-ended, emerging data with the primary intent of developing themes from the data.

In comparison to quantitative research, qualitative inquiry employs different philosophical assumptions; strategies of inquiry; and methods of data collection, analysis and interpretation (Creswell 2009, 173). A qualitative approach emphasizes the qualities of entities, processes and meanings that are not experimentally examined or measured in terms of quantity, amount, intensity or frequency (Denzin and Lincoln 2000, 8).

Common qualitative data-gathering techniques include interviews, focus groups, ethnography, sociometry, unobtrusive measures, historiography and case studies, among others.

The survey would be both descriptive and analytical. According to Wimmer and Dominic (2003), a descriptive survey attempts to picture or document current conditions or attitudes, that is, describe what exists at the moment while analytical surveys attempt to describe and explain why certain situations exist. In this approach, they added, two or more variables are usually examined to test research hypotheses. The results allow researchers to examine the interrelationships among variables and to draw explanatory inferences.

3.4 Sample Size

In an attempt to choose a sample size representative of the population, the challenging question then is; how big or how small should the sample be? This issue also arises in quantitative research methods, but there are several techniques available to determine the appropriate sample based on the statistical tool being used. In ethnographic research and qualitative research in general, the issue of sample size is not that easily determined. Researchers would love to observe everything but no researcher can observe everything at

once and so samples have to be drawn. The need for thick description makes it necessary that samples are small.

According to Barreiro and Albandoz (2001), because there is a big need of time, and second, of money, to study a whole population, it is convenient to use samples. Due to these resources constraints, it was impossible to interview every peasant livestock farmer to obtain the necessary information hence, a sample representative of the total population was chosen and the needed information collected from it. The researcher sampled hundred livestock farmers from ten communities, ten from each community and ten veterinary services personnel within the municipality for the administration of the questionnaire.

3.5 Sampling procedure

Researchers adopt a variety of sampling strategies in their research work since it is time consuming and cost intensive to study a whole population. Due to the difficulty of studying a whole population, sampling is employed to get a representation of the population of the Bolgatanga municipality for the study. The sampling procedure of the research was done using two sampling designs. These two sampling designs were random sampling and purposive sampling. The most straightforward is simple random sampling. Such sampling requires every member of the population to have an equal chance of being selected into the sample. In addition, the selection of one member must be independent of the selection of every other member. That is, picking one member from the population must not increase or decrease the probability of picking any other member (relative to the others). In this sense, we can say that simple random sampling chooses a sample by pure

chance. The advantage of using this sampling technique is that a random sample is in general a representative sample for a homogenous population, in this case, livestock farmers.

In carrying out this sampling to get the ten communities, the names of all the communities in the Bolgatanga municipality were each written on a separate piece of paper and put in a container and shaken together to mix.

After the papers were well mixed, each community was then randomly selected in turns till all the ten communities were selected to form the sample for the study. These ten communities which were randomly selected from the municipality were; Yorogo, Soe, Sokabisi, Sumbrungu, Gambibigo, Dulugu, Zonno, Kangoo, Katanga, and Moshie.

In order to get peasant livestock farmers who will form the respondents for the study, purposive sampling technique was used to sample hundred households that are peasant livestock farmers in the ten communities, ten from each community and ten veterinary personnel randomly selected were also interviewed.

The purposeful sample, which implies intentionally selecting individuals to learn to understand the central phenomenon (Miles & Huberman, 1994) that is farmers who rear livestock. The idea is to purposefully select informants, who will best answer the research questions and who are “information rich” persons (Patton, 1990, p. 169). This technique was therefore used to gather all peasant livestock farmers in each of the ten communities. After this purposive sampling of all peasant livestock farmers within each community,

the simple random sampling technique was then used to get the ten farmers each from each community to form the hundred respondents who formed the sample for the research.

3.6 Research Instruments

Degu and Yigzaw (2006) note that; after deciding on how to design the research study, the next methodological design is how to collect data. The most commonly used methods of collecting data, especially quantitative data are the use of documentary sources, interviews and self-administered questionnaires.

Interviews may be less or more structured and the advantages of it are that; it stimulates and maintains the respondent's interest and also an interviewer can make observations during the interview. On the other hand, Self-administered questionnaire is one that the respondent reads the questions and fills in the answers by himself (sometimes in the presence of an interviewer who "stands by" to give assistance if necessary. The use of self-administered questionnaires is simpler and cheaper, in that such questionnaires can be administered to many persons simultaneously.

The main research instrument used to gather the information from the peasant livestock farmers was the interview guide. This was done to enable information on the variables to be gathered from the sample within the research time. The interview guide was made up of both close ended questions which were answered by choosing from a number of fixed alternative responses and open-ended questions which the respondent answered in his/her own words. The questions were asked to elicit information that would address the objectives of the research. However, with the veterinary personnel, a questionnaire was

administered to them. Eriksson (2008) in his research notes that; the general advantages with a questionnaire survey is that, it is economical, generates great deal of information in short periods of time, can be dealt with when the respondent finds it suitable and may provide more trustworthy accounts compared to other studies. It may be less time-consuming and irritating for the respondents, and compared to interviews cheaper if there is a lot of respondents and they are geographically dispersed (Bryman, 1989).

3.7 Data Collection

Data for the study were collected through qualitative and quantitative research techniques. The survey design is perhaps the most used data gathering technique in social science; however, it is better described as the research design which is categorized by its structured method of data collection. According to De Vaus (1996), a survey has two distinguished features: the data are in the form of variables and the method is structured and systematic. Herzog (1996) noted that it is important to have a structure when the aim is to have consistency across situations. The same questions (especially when using questionnaires) may therefore be asked to numerous respondents, which will allow us to make comparisons between respondents, which is one of the aims of this study. However, in-depth interviews, telephone interviews, content analyses and so forth can also be used (de Vaus, 1996).

According to De Vaus (1996), a blend of the two methods helps researchers to improve quality and consistency of data collected. Survey research “is almost always conducted

in order to provide a quantitative picture of the units in question, hence the widespread tendency to associate survey with quantitative research (Bryman, 1989. p.106). The quantitative data facilitate for statistical manipulation which helps the process of analyses. The main sources of data used in carrying out the study were primary and secondary data. The primary data were collected using semi structured questionnaire, interviews of livestock farmers and veterinary personnel and personal observations. Interviewing is the oldest and most widely used method of information gathering and the foundation for many other tools (Leyland, 1997). The questions were designed in such a way as to obtain the desired information from the farmers. The secondary data were mainly from the Municipal Assembly, Meteorological Services Department and the Ministry of Food and Agriculture, Bolgatanga.

3.8 Data Analysis

Data processing and analysis was started in the field, with checking for completeness of the data and performing quality control checks, while sorting the data by instrument used and by group of informants that is, those who were interviewed and those that the questionnaire was administered to. The data were critically examined to see the extent to which the cash and carry system of veterinary services delivery has affected output levels of peasant livestock farmers in the Bolgatanga municipal. The data analyses involved describing the findings in written text, making inferences from the analyzed data and doing graphical presentations for illustration purposes. The graphical presentations involved the use of graphics such as frequency distribution tables, simple bar graphs and pie charts. Descriptive statistics for the survey items will be summarized in the text and

reported in tabular form. Frequencies analysis will be conducted to identify valid percent for responses to all the questions in the survey.

All statistical analysis of the quantitative results will be conducted with the help of IBM Statistical Package for Social Sciences software (SPSS), statistics version 21 and Microsoft Excel. This SPSS will be used to analyze the relations between variables using correlations, regressions and cross-tabulations.

However, it is important to understand that in qualitative research, software programs cannot do the analysis for you – not with the same output expectations of SPSS. The software will not read the text and decide what it means; the researcher is still the main tool for analysis (Weitzman 2000). Hence it is combined with the quantitative to triangulate the SPSS findings.

Triangulation is a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study. The term comes from military navigation at sea where sailors triangulated among different distant points to determine their ship's bearing (Jick, 1979). Denzin (1978) identified four types of triangulation: across data sources (i.e., participants), theories, methods (i.e., interview, observations, documents), and among different investigators. As a validity procedure, triangulation is a step taken by researchers employing only the researcher's lens, and it is a systematic process of sorting through the data to find common themes or categories by eliminating overlapping areas. A popular practice is for qualitative inquirers to provide corroborating evidence collected through multiple methods, such as

observations, interviews, and documents to locate major and minor themes (Creswell and Miller, 2000). The process of data sources triangulation, besides facilitating the achievement of internal validity, also aimed at improving the credibility of final findings (Creswell, 1998; Miles and Huberman, 1994). Hancock (1998) states that the main methods of collecting qualitative data are: individual interviews focus groups and observation.

3.9 The interview

Interviews can be highly structured, semi structured or unstructured. Structured interviews consist of the interviewer asking each respondent the same questions in the same way. A tightly structured schedule of questions is used, very much like a questionnaire. Semi structured interviews (sometimes referred to as focused interviews) involve a series of open ended questions based on the topic areas the researcher wants to cover. The open-ended nature of the question defines the topic under investigation but provides opportunities for both interviewer and interviewee to discuss some topics in more detail. If the interviewee has difficulty answering a question or provides only a brief response, the interviewer can use cues or prompts to encourage the interviewee to consider the question further. In a semi structured interview the interviewer also has the freedom to probe the interviewee to elaborate on the original response or to follow a line of inquiry introduced by the interviewee.

3.10 Observation

Not all qualitative data collection approaches require direct interaction with people. It is a technique that can be used when data collected through other means can be of limited value or is difficult to validate. For example, in interviews participants may be asked about how they behave in certain situations but there is no guarantee that they actually do

what they say they do. Observing them in those situations is more reliable: it is possible to see how they actually behave. Observation can also serve as a technique for verifying or nullifying information provided in face to face encounters.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.0 BACKGROUND INFORMATION OF RESPONDENTS

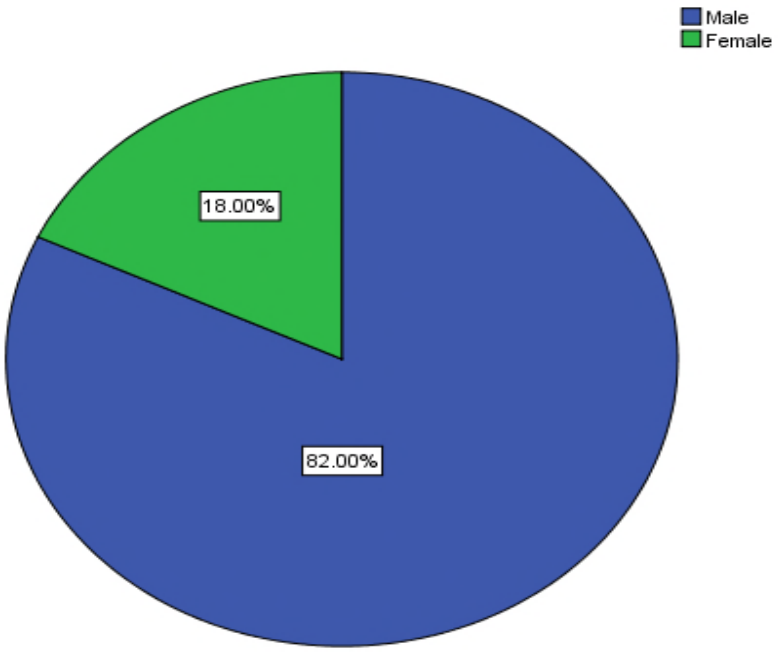
The study covered 100 livestock farmers selected from ten communities in the Bolgatanga municipality.

4.1 Socio-Demographic Characteristics of Respondents

Descriptive analysis was used in determining and explaining socio-demographic background information of respondents.

4.1.1 Sex Distribution of Respondents.

Figure 4.1: Sex distribution of respondents

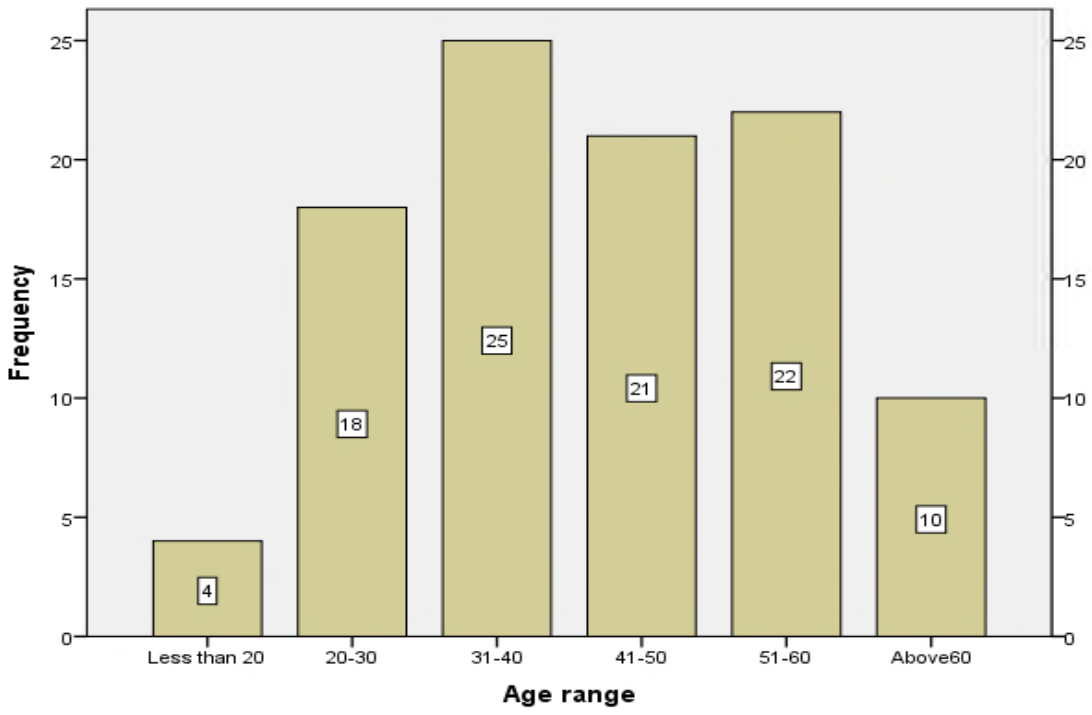


Source: Field Survey 2016

An analysis of the gender computed revealed that out of the 100 respondents of livestock farmers, 82 percent were males and 18 percent were females. This large ratio may be attributed to the gender roles assigned to the respective sexes traditionally and the ownership pattern of the traditional home which is such that anything that the woman has belongs to the man. This has limited the interest and courage of the female population to go into animal production since traditionally they cannot have control over those animals. This is synonymous to the findings of Dakare (2015) who noted that, in the Bole and Saula-Tuna-Kalba districts, the rearing of livestock is mainly done by males.

4.1.2 Age Distribution of respondents

Figure 4.2: Ages of Respondents



Source: Field Survey 2016

From table 3, it is revealed that the rearing of animals is done by both the young and the old. Out of the hundred farmers interviewed, 4 of them making 4 percent of the farmers were less than 20 years, 18 of them forming 18 percent were within the age bracket of 20-30, 25 of them representing 25% were within the age range of 31-40 years, 21 farmers forming only 21% were in the age bracket of 41-50 years, 22 farmers making up 22 percent of the sample were in the age bracket of 51-60 while 10 farmers representing 10% were above 60 years of age. It is clear from this statistics that majority of the farmers are within the most active class or the working class of the population. This is an indication that the animal production sector has a very high growth potential in the municipality and its environs. Energy is very important in livestock production and therefore needs a man/woman who is strong enough to be able to organize resources from wherever they are available to take care of the livestock. The industry demands one who expects to work more than 8 hours a day and consistently demonstrates his/her ability to stay ahead of the business. Also, the 10% of the farmers who are considered as the aged is a source of motivation and a reservoir of knowledge and experience that the young farmers can tap for accelerated animal production. However, the low number of the youth below 20 years in the livestock industry in the municipality shows the low interest that the youth have in agriculture. This is not a good sign for the industry since the future the industry cannot be projected highly due to this low number of people below 20 years involvement in it.

4.1.3 Educational levels of respondents

Table 4.1: Educational levels of Respondents

Level of education	Frequency	Percentage
None	38	38.0
Primary/JHS	20	20.0
Secondary/Tech/Voc.	22	22.0
Tertiary	17	17.0
Non-formal	3	3.0
Total	100	100

Source: Field Survey 2016

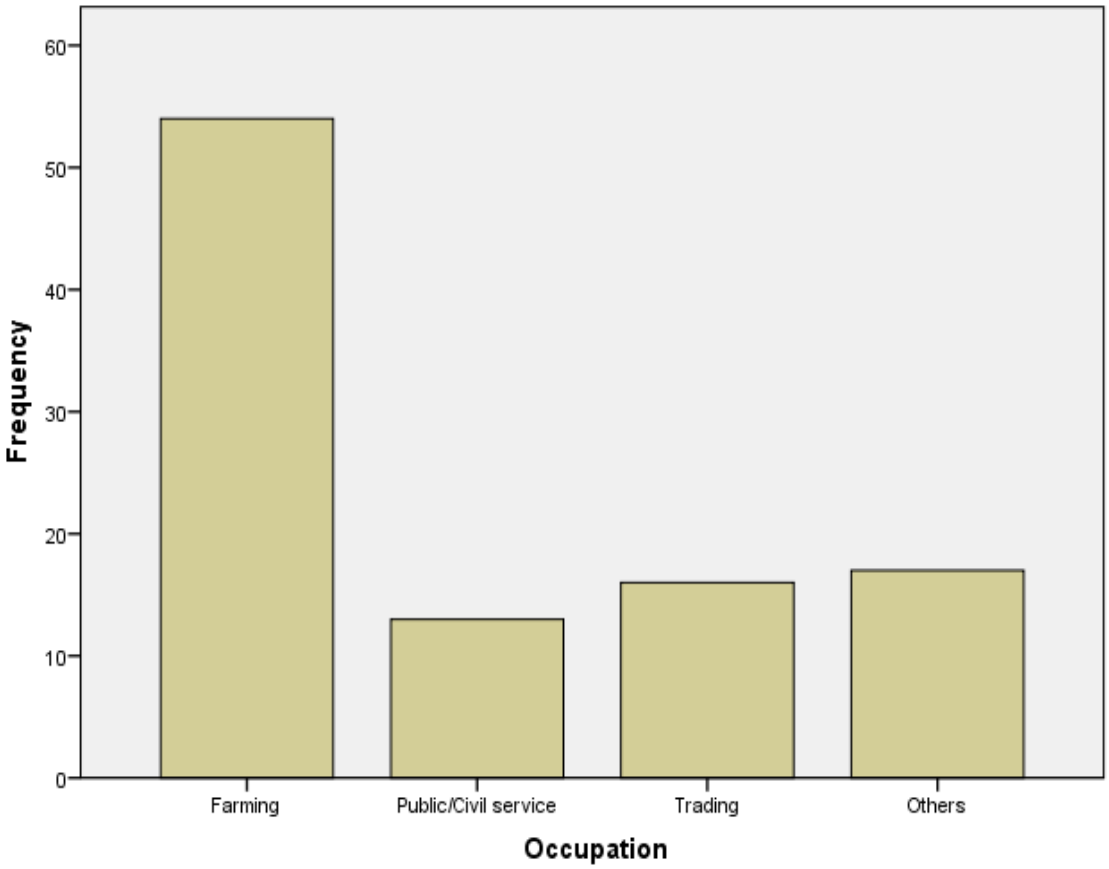
From the research conducted, as high as38 percent of the respondents did not go to school at all while 20 percent only ended at the basic school level. Respondents who attained SHS/Technical school education constituted 22 percent, while 17 percent of respondents were found to have obtained tertiary education. However, majority of those with tertiary education were public servants who did not devote much attention to their livestock production due to their limited time.

Basic education is very necessary in the livestock industry as it would help farmers carry out certain activities effectively on their own such as mixing of concentrates, preparation of fodder banks or forages, keeping of records on their livestock, deworming of animals among others. According to Marinda *et al.*, (2006), education is relevant if farmers are to access and apply livestock technology appropriately. However, the data suggests a high

illiteracy rate of 38 percent among livestock farmers in the Bolgatanga municipality. The implication of this result is that farmers 'ability to understand and apply livestock technology will be hindered by the limited educational background of the respondents. This was made evident when some of the farmers hinted that they do not see the need to vaccinate their livestock against diseases since they will still die even if you vaccinate them. This therefore calls for more extension education to salvage the situation.

4.1.4 Occupational Distribution of Respondents

Figure 4.3: Occupation of Respondents



Source: Field Survey 2016

The major occupations of the respondents include farming, trading, public and civil service, whiles artisans, pensioners and informal private sector employment were classified as others. Among these, farming was the dominant as 54% percent of the 100 respondents were engaged in it while 13 percent and 16 percent were engaged in public service and trading respectively. Those engaged in artisans, informal sector employment and pensioners also represented 17%. However, all those engaged in the above economic activities as their major occupations except farming, also undertook livestock farming as a secondary economic activity.

4.1.5 Marital Status

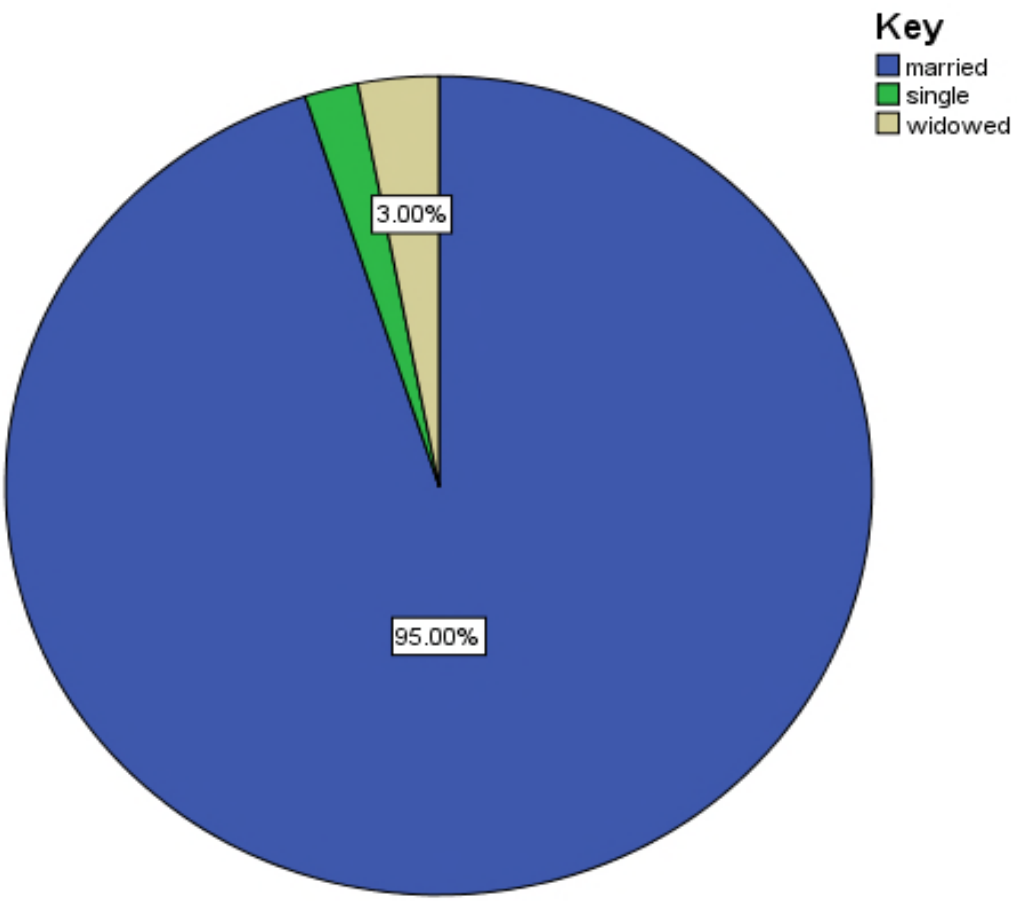
The majority of the respondents (95.9) were found to be married, while only 2.7 percent and 1.4 percent were widowed and single respectively as depicted by Figure 4. All those who were widowed were females. This can be attributed to the fact that most adult males in the Municipality can easily marry when their wives die, hence they hardly stayed as widowers. The females can marry one man at a time and prefer being a widow after the death of her husband than to go and remarry.

From the research, it was revealed that, those who are married put in more effort in the industry, explaining that the livestock helps them in times of food shortage and the physical needs of their families especially the educational needs of their children. Below are some of the comments made by some respondents:

"When I see that the food stuff will not take us through the dry season, I fall on the livestock to buy more food".

" I sell some of my livestock to buy my children's uniform and books as well as any fees they are required to pay at school because the food stuff I get from the farm is not even enough for us and so, I cannot sell anything from there..."

Figure 4.4: Marital status of Respondents



Source: Field Survey 2016

4.1.6. Reasons for Keeping Livestock

From the research findings, farmers keep livestock for several reasons but as peasant farmers, they keep their livestock to provide the protein needs of their family and sell the

surplus for income and sometimes use part of the livestock for other purposes such as dowry or sacrifices. From the survey, 63 of the farmers forming 63% keep livestock for consumption and sell the surplus whiles 37 of them representing 37% keep livestock for consumption, sell some of the surplus and use others for customary purposes such as sacrifices and dowries. This finding agrees with the finding of FAO (2011) that livestock keeping supports the financial, human and social needs of people such as their medical, financial and educational needs as well as a social safety net. . It is also similar to the findings of Gerber *et al*, (2010) in which they stated that animals are used for work and as a source of fertilizer (manure), as a means to store wealth, and as a buffer to hedge against the vagaries of nature and other emergencies and that livestock, or symbols of them, also play an important role in religious and cultural lives

Table 4.2: Reasons for keeping livestock

Reasons for keeping livestock	**Frequency**	**Percentage**
Consumption/sale	63	63
Consumption/sale/culture	37	37
Total	100	100

Source: Field survey 2016

4.2 Disease Prevalence on Livestock Farmers Stock

In the research process, the researcher sought to find out if farmers encountered diseases on their livestock. According to all hundred farmers, they encountered diseases on their farms at certain times of the year. During the raining season and around the harmattan period most of their livestock are always affected. They indicated that poultry is worse affected in the harmattan period during which time they could even lose completely all

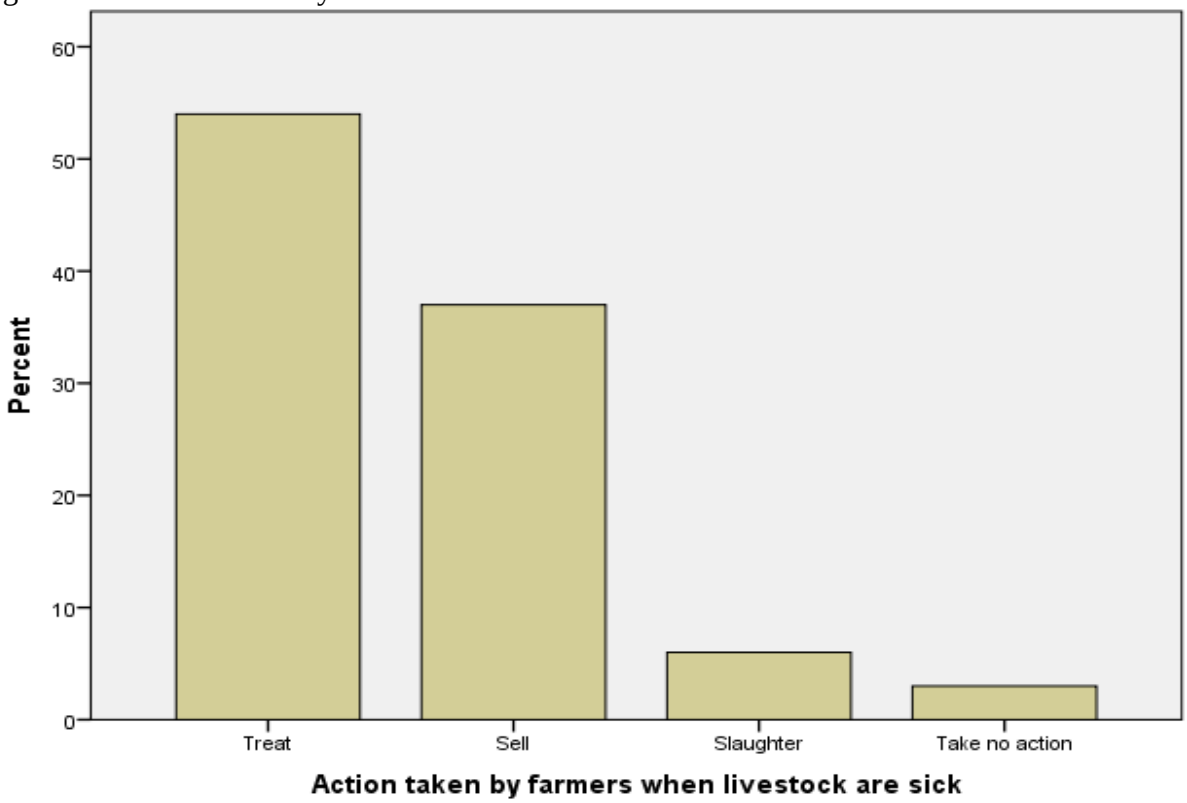
their birds or most of them as a result of new castle disease. At the peak of the rains, the animals are also always affected with diarrhea and foot and mouth diseases. With these diseases, they can lose up to 80% of their animals if no intervention is employed to remedy the situation. This finding is similar to the findings of (Beckley *et al*, 2016) where Anaplasma marginale, Babesia bigemina, and Theileria spp. have been identified in cattle on a national scale within Ghana and have been targeted as pathogens that constrain livestock production**.**

Additionally, animals of most rural farmers are increasingly becoming more vulnerable to diseases because of the cost, inadequate and unsuitable animal health and production inputs. The prevalence of readily preventable and controllable livestock diseases could be as a result of inadequate health care given to livestock.

4.3.0 MAJOR FINDINGS

4.3.1 Actions taken by farmers to control disease spread in their flock

Figure 4.5: Actions taken by farmers



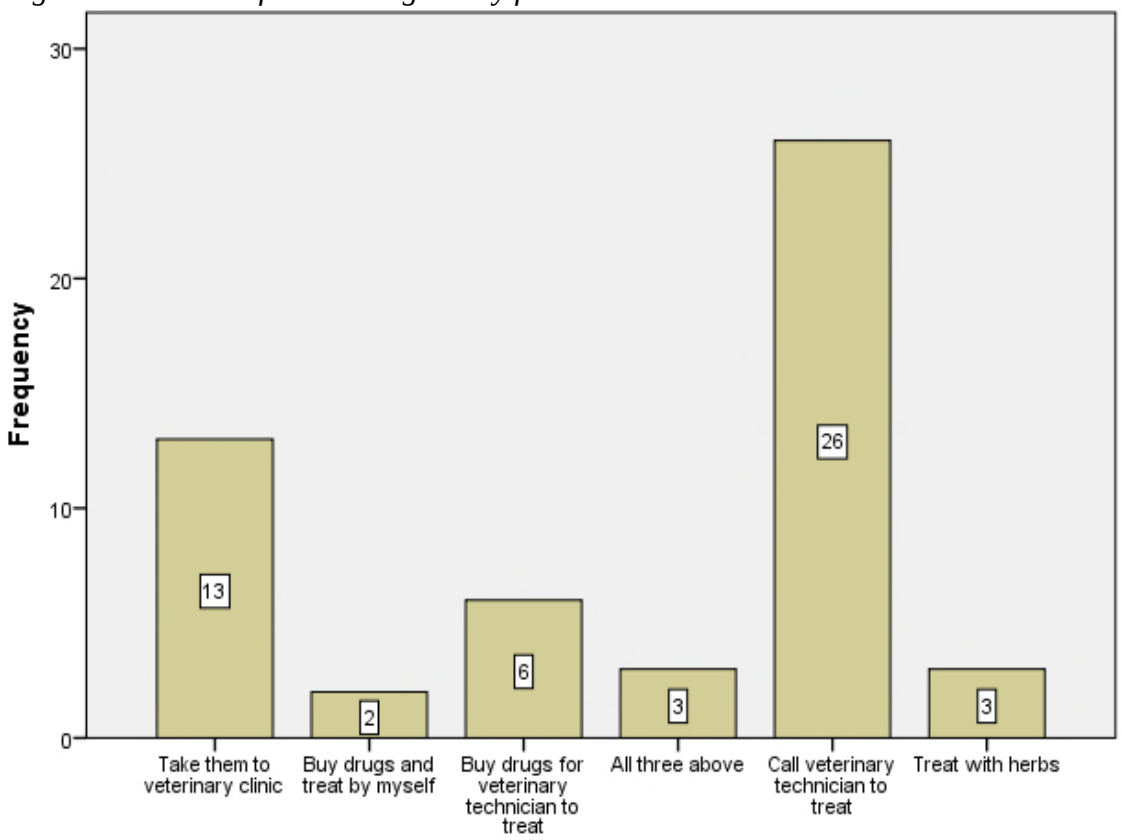
Source: Field Survey 2016

From the survey, it was found out that, majority of the farmers, 54 % treated their diseased livestock immediately they detected that they were sick, 37% of the farmers sold out their animals whenever they were ill as a measure to reduce losses, 6% slaughtered their sick animals upon detecting that such animals were sick in other to stop the spread of the disease, whiles 3% of the farmers simply took no action any time they discovered a disease condition in their livestock leaving the livestock to their fate, with the claim that even if you treat that livestock, it may still die.

Those farmers who sold, slaughtered or left their sick animals claimed that they had no money at hand to pay for treatment of their animals considering the cost involved. The slaughtering and selling of sick animals is not acceptable as it poses a serious threat to human health as stated by Oppong (1998) that, it is a threat to human life to consume unwholesome or infested animal products derived from sick animals.

4.3.2 Treatment Given by Farmers to their sick Livestock

Figure 4.6: Forms of treatment given by farmers to their diseased livestock



Source: Field Survey 2016

From the 54 farmers who treated their sick animals, majority, 26 representing 48.2 percent treated their animals by calling veterinary personnel to come to their homes to treat their sick animals, 24 percent (13 farmers) took their sick livestock to the veterinary clinic for treatment any time they were sick, 11.1 percent bought their own drugs and only called the veterinary personnel to come and administer, 5.6 percent of them bought their own drugs for a technician to treat or did the treatment themselves or took their livestock to the veterinary clinic for treatment, whiles 4 of them representing 7.4 percent treated their sick animals with local herbs, and 2 of them representing 3.7 percent bought their own drugs and treated their sick animals by themselves. Those who sought for clinical/field treatment however, complained of the high cost of treatment charged by the veterinary personnel. These actions adopted by farmers were dependent on their financial status and their knowledge on the importance of animal health care.

4.4.0. IMPLICATIONS OF CASH AND CARRY ON VETERINARY SERVICES

4.4.1 Government Resource Allocation to the Veterinary Services Department as a result of Cash and Carry

Table 4.3: Government Resource allocation to the Veterinary Services Department (responses from veterinary personnel).

Response	Frequency	Percent
Yes	8	80.0
No	2	20.0
Total	10	100.0

Source: Field survey 2016

In finding out what the implications of cash and carry in veterinary services are with regards to government resources allocation to the Veterinary Services Department, eight out of the ten veterinary officers, representing 80% indicated that government reduced the allocation of resources to the service following implementation of the cash and carry policy. What this means is that, government reduced the staff strength, budgetary allocation and other logistic supplies to the veterinary services department. They indicated, however, that government monitored their operations to ensure that there is efficiency and wider coverage of their services to boost productivity of farmers. This agrees with the work of Mockshell *et al*, (2013), who noted that, for quality and sustainable animal health services to be provided, most governments in developing countries promoted private practices and discontinued the automatic employment of veterinarians (service providers with a university degree in animal health training) and of para-vets (service providers with a diploma or certificate in animal health training). However, private practice is limited to some urban areas and in the intensive production systems, but not in livestock dependent marginal areas.

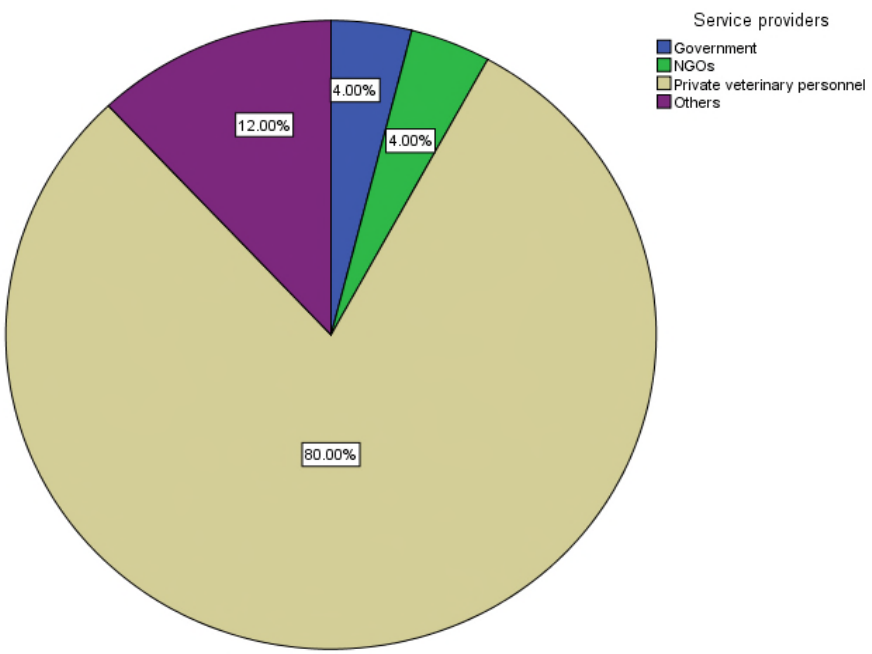
To confirm this claim by veterinary service personnel, farmers were asked whether government monitors the activities of services rendered to them by the veterinary services department, they all responded on the contrary, adding that the veterinary personnel just come and give them prices for services. The implication of this policy therefore is that monitoring is only done at the office and not on the field, and so veterinary technicians go to the field and do their own things without checks. However, they noted that

sometimes government organizes vaccination schemes for pet animals such as dogs and cats.

4.5 Veterinary Service Providers

From the survey conducted, the researcher sought to find out service providers that farmers got services from whenever their livestock were sick. According to them they got their health care services from various service providers such as veterinary services personnel, NGOs, Community Livestock Workers and by veterinary drug sellers for self medication. Out of the hundred farmers, 80% of them used private veterinary service provider with the rest of them (20%) using the other service providers.

Figure 4.7: Veterinary service providers



Source: Field Survey 2016

4.6 Government Participation in Getting Services to Prospective Farmers

Table 4.4: Government participation in getting services to farmers

Responses	Frequency	Percent
Yes	4	4.0
No	96	96.0
Total	100	100.0

Source: Field Survey 2016

The researcher wanted to know from respondents if government participated in ensuring that farmers get veterinary services any time they needed it to treat their livestock. The following responses were given by respondents; 96 of them representing 96 percent said government does not come in to help them access services, they do whatever they can in their power to get the services for their livestock and if they are not able to get it, then it ends there and only 4 of them representing 4 percent alleged that government comes in to help them get the services they need. When they were asked how government does that, they said, sometimes government organizes vaccination schemes for them especially during an epidemic situation but this is not a regular routine.

4.7 Monitoring of service providers by Government

Table 4.5: Government monitoring of service providers

Responses	**Frequency**	**Percent**
Yes	1	1.0
No	99	99.0
Total	100	100.0

Source: Field Survey 2016

For effective efficient veterinary health care service delivery, there must be monitoring by appropriate institution, in this case government through the Veterinary Services

Department of the Ministry of Food and Agriculture is supposed to monitor veterinary services personnel who are on the field rendering services to livestock farmers, especially peasant livestock farmers.

The research conducted in the Bolgatanga municipality, this is not the case, only one farmer representing 1% out of the hundred farmers said government monitors veterinary personnel but the 99 respondents representing 99% indicated that, government does not monitor the veterinary service personnel on the field, hence they come to them and charge them any amount they want and upon negotiation with them, depending on the number of livestock one wants to treat or vaccinate, they agree on an amount and service is rendered to them.

4.8 Influence of cost of services on livestock numbers kept by farmers

Table 4.6: Influence of cost of health care services on livestock numbers kept

Responses	Frequency	Percent
Yes	30	30.0
No	70	70.0
Total	100	100.0

Source: Field survey 2016

The researcher wanted to know from farmers if cost of veterinary health care had any influence on the stock numbers they kept, that is, whether it limited the number of livestock they reared or otherwise. 30 percent representing 30 farmers indicated that it had an influence on the number of livestock they kept whiles 70 percent, representing 70 farmers said cost of health care delivery does not determine the number of livestock they keep. Those who employ veterinary services whenever their livestock are sick added that,

even though it does not determine it does have an effect on the amount of money they spend on their health needs.

4.9 Government approved service charges given to veterinary personnel.

Table 4.7: Approved Veterinary Service charges

Animal	**Service charge GH₵**
Cattle	10.00
Sheep/goats/calves/pigs	5.00
Poultry (1-10 birds)	5.00

Source: Veterinary Services Directorate, Ministry of Food and Agriculture 2016

These service charges are required to be paid to government by veterinary personnel when they go to the field to treat livestock. It must however, be stated that, these charges according to the veterinary personnel, do not include the cost of drugs and fuel of service personnel. This therefore, means that farmers are expected to pay for the cost of the drugs, give fuel to veterinary personnel in addition to the service charge. The farmers therefore complained that the cost was so much for them to bear, hence their inability to access veterinary services when their livestock were ill. This finding is consistent with the report of Illukor *et al* (2013) where they stated that high cost of treatment is a factor that farmers identified as a problem militating against productivity.

4.10. Average expenses incurred by farmers for veterinary services in 2015

Table 4.8: Average cost of services

Animal	**Cost (GH¢)**		
	Vaccination	**Treatment**	**Castration**
Cattle	20.00 per one	40.00 per one	00
Sheep	5.00 per one	10.00 per one	00
Goat	5.00 per one	10.00 per one	5.00
Pig	3.00 per one	7.00 per one	5.00
Poultry	0.5 per one	2 per one	-

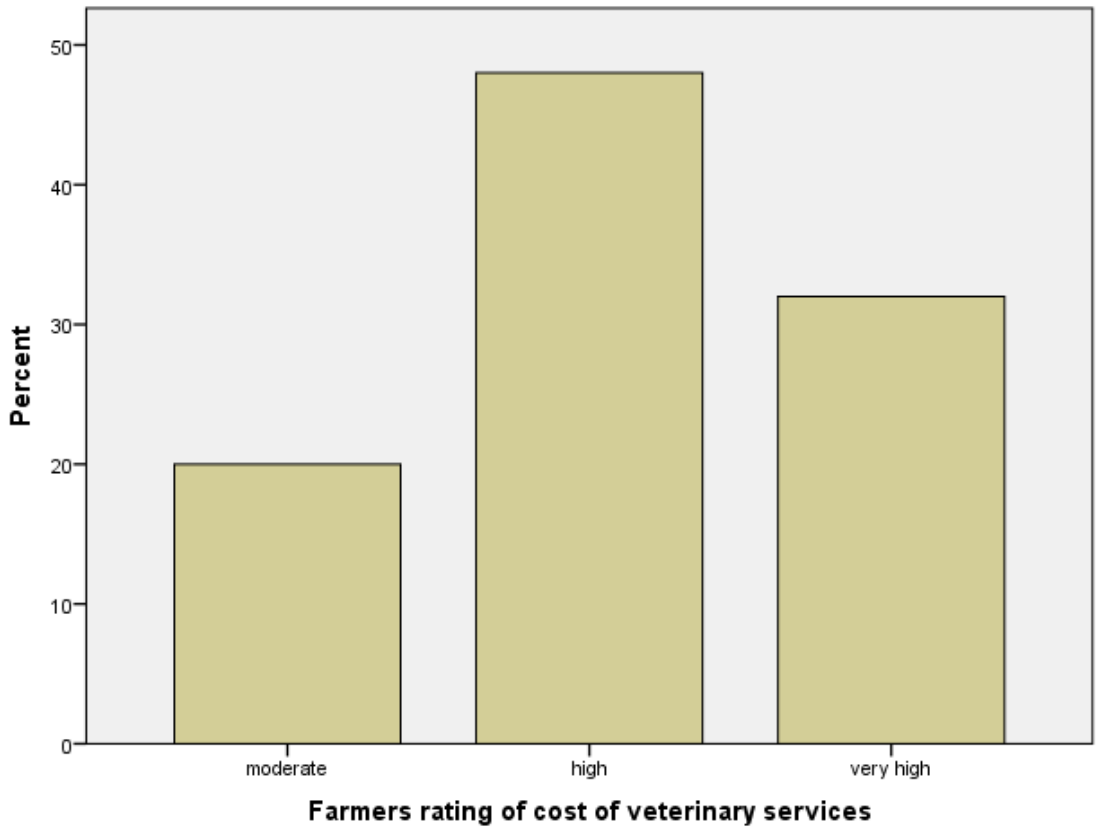
Source: Field Survey 2016

From the table, farmers on the average spend about GH₵ 60.00 on the health of a cow or bull in a year, GH₵14.00 on a goat per year, GH₵14.00 on a sheep per year, GH₵ 10.00 on a pig per year, and GH₵ 2 per a poultry bird per year for vaccinations, treatment and other routine health management practices.

4.11. Implications of statutory action as regard patronage of the services and cost affordability.

4.11.1 Farmers perception about cost of veterinary services

Figure 4.8: Service cost rating by farmers

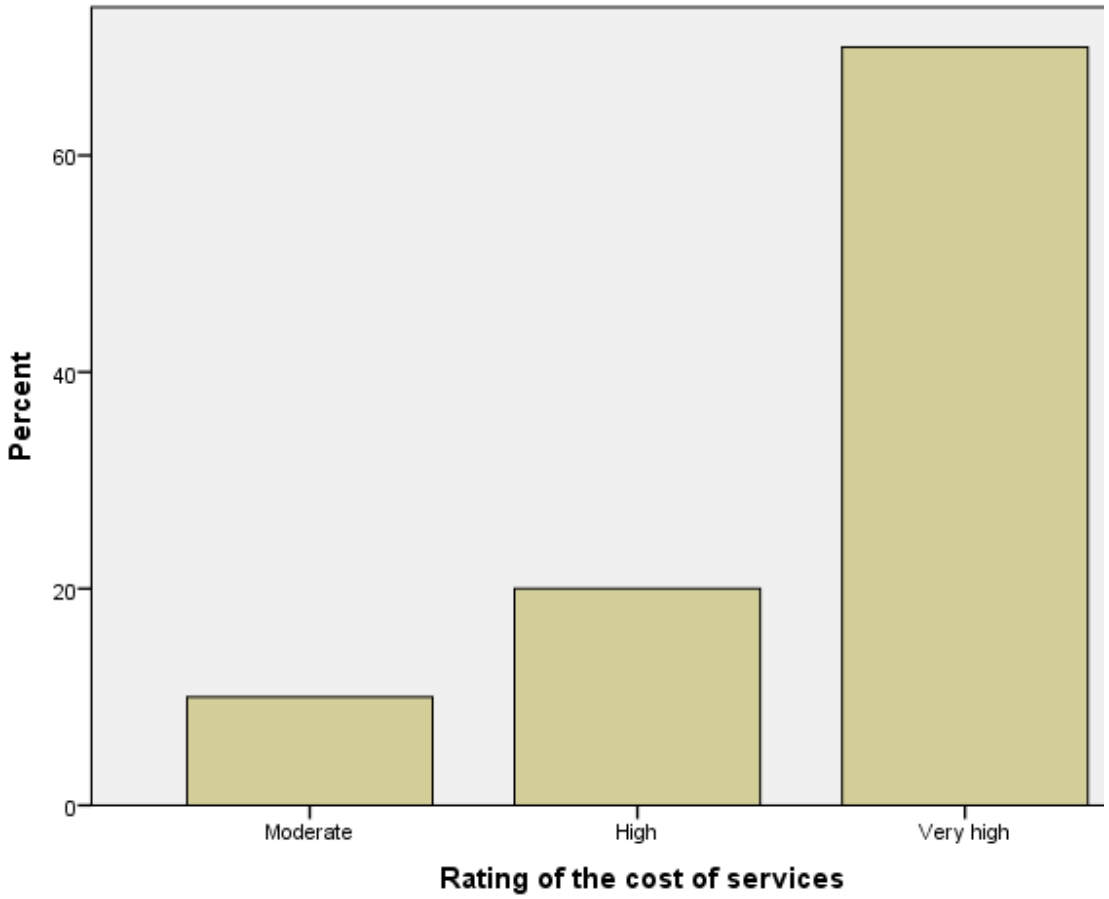


Source: Field Survey 2016

From figure 13, farmers were asked to rate the cost of veterinary health care services rendered to them by veterinary personnel. Out of the 100 farmers 48% rated the cost of treatment as being high, 32% said the cost was very high, whiles 20% indicated that the cost was moderate. From the above responses, farmers' perception about the cost of treatment is that, even though they are able to pay for some services, it is not easily affordable to them. They added that they are sometimes compelled to treat by themselves, sell out or slaughter their sick livestock when they look at the amount of money they have

to use to treat it. Turkson (2008) also reported that the high charges taken by private veterinary personnel cause some farmers in southern Ghana to go for self-medication.

Figure 4.9: Rating of cost of services by veterinary service personnel



Source: Field Survey 2016

On the other hand, when veterinary technicians were asked to rate the cost of services rendered to farmers, 7 of them representing 70% indicated that cost of services was very high and that farmers could not afford to pay, 20% of the technicians said the cost was high, while 10% indicated that the cost was moderate.

From these responses given by both farmers and veterinary technicians, it can conclusively say that, the cost of veterinary services is really on the higher side for farmers to afford.

4.12. Affordability of veterinary services

Table 4.9: Livestock farmers' ability to afford veterinary services

Response	Frequency	Percentage
Yes	27	27
No	73	73
Total	100	100

Source: Field Survey

The purpose of the affordability parameter is to assess the ability of peasant livestock to pay for animal healthcare. Obviously, an exact calculation is not possible, nor may it be necessary within the context of the research. Thus, the affordability parameter is meant to assess the capability of peasant producers to pay for adequate levels of both preventative and curative animal healthcare. Expenditures regarding curative animal healthcare are those surrounding the treatment of both specific and non-specific disease conditions, whereas, preventative care is defined as those treatments given in order to prevent disease conditions and includes vaccination, treatment with anthelmintics and tick control.

In assessing the affordability of the service by farmers, 73 of them representing 73% said veterinary services were not affordable to them due to the cost involved, this makes them resort to selling, slaughtering or just leaving their livestock to their fate. This agrees with

Illukor et al (2013) findings in Tolon-kumbungu and Savelugu districts of northern region which revealed that when farmers anticipate losing all of their livestock because the cost of service delivery is too high, they resort to selling their sick livestock rather than treating them, thus creating an informal market for sick animals, whiles 27 of them representing 27% indicated that affordability of veterinary services was not a problem to them. They, however, said they wished it could be reviewed downwards to enable them always cater for large number of their stock.

According to respondents, the cost of vaccination per animal ranged from GH¢1 to GH¢3.00 for public veterinary services whilst that of private veterinary services ranges from GH¢3.00 to GH¢5.00 depending on the kind of disease. For example, if an animal is vaccinated and dewormed by MoFA veterinary officers, they charge GH¢3.00; but if it is only vaccination they charged either GH¢1 or GH¢2 depending on the disease. The public veterinary services were lower in terms of cost than the private veterinary services because the personnel are being paid by government. However, farmers sometimes resort to private veterinary services because of limited number of government veterinary officers in the Bolgatanga Municipality. The total cost of vaccination which depends on the number of animals involved and the amount charged per animal ranges from less than GH¢3.00 to GH¢ 25.00.

During the research, farmers were asked to tell how they got funds to cater for the health care needs of their livestock. In response to this question, they intimated that sometimes sold some of their livestock to get money to treat or vaccinate the others, sold food crops

to raise funds or got money from family and relatives to be able to treat their sick livestock.

4.13 Access to veterinary services in your locality

Table 4.10: Access to veterinary services by peasant farmers

Responses	Frequency	Percentage
Yes	43	43
No	57	57
Total	100	100

Source: Field survey, 2016

During interactions with livestock farmers on the field, they outlined several challenges and constraints confronting them such as housing, feeding, and access to veterinary services.

Even though about 43% of the farmers say they have access to veterinary services, they lamented that they get them at the time when their livestock are dead or are deteriorated in their health status. This figure is slightly higher than that of Turkson (2008) whose findings identified that 40.4 percent of farmers interviewed treated their sick livestock by themselves due to their inability to access veterinary services from the government quarters. They indicated that even though they had access to veterinary services, they were dissatisfied explaining that when they use their services and nearby houses do not treat their livestock, there will not be any impact on their stock since they are on free range. Thus, there appears to be too groups of non-users, the unaware and the dissatisfied.

Majority (57%) of the livestock farmers who participated in the study did not use services provided by veterinary professionals. Reasons for the poor uptake were numerous. The majority of them were generally not cognizant that such services existed or even know that the veterinary personnel were to be called to treat their diseased animals. This was particularly true in the outskirt villages of the Bolgatanga Municipality, where many residents were unaware of nearby veterinary practioners and or indeed the need to buy or purchase drugs specifically for livestock.

Access to veterinary services plays a very important role in determining the affordability of the service to livestock farmers in the Bolgatanga municipality. With respect to veterinary services, respondents lamented their limited access to veterinary services due to limited number of government (MoFA) veterinary officers in the Bolgatanga Municipality. According to the Municipal Veterinary Officer, there are only a few veterinary officers in the Municipality, meanwhile they required not less than ten veterinary officers. This is further compounded by logistical constraint facing the veterinary unit. As a result, whenever an animal or animals are sick and farmers called on the veterinary officers, they either do not usually get their response or they respond very late when the animal or animals are dead because they are usually engaged somewhere. Some respondents even cited instances where they hired vehicles and carry their sick animals from the village to the veterinary office in order to secure treatment. In some cases, this effort could not still save the animal from death. In addition, respondents complained of the high cost of veterinary services particularly the private veterinary services which they sometimes resort to as a result of the limited access to public

veterinary services. According to FAO (2006), government-operated veterinary services have shown their limitations in providing comprehensive animal health services needed for livestock development, mostly because of issues related to under-funding. This has led to weak implementation of programs for disease surveillance and vaccine production, and control measures for epidemic diseases.

In finding out from the 100 farmers how regular they have contact with veterinary officers, 48 % of them reported that they have contact with veterinary officers while 52% reported that they have no contact with veterinary officers. This may be as a result of the few numbers of the livestock health care providers or poor working conditions particularly as it affects logistics, most of the time the veterinary officers' movement is limited because of poor means of transportation.

Those who had contact with veterinary officers were asked, how regular they have contact with veterinary personnel, 20 of the farmers representing 41.7% say that they have regular contact with them, 13 of them forming 27.0% said they occasionally get them while 31.3% of them reported that they rarely meet with veterinary officers. This can also be the fall out of inadequate veterinary officers either in number or by allocation; it could also be as a result of poor supervision on the part of government. This development reveals that Non-Governmental agencies are not actively involved in livestock extension services in the area of study.

4.14.0 THE RESULTANT EFFECT OF CASH AND CARRY ON LIVESTOCK OUTPUT IN THE BOLGATANGA MUNICIPALITY

Livestock is produced by peasant farmers for the purposes of feeding their families and selling the surplus for income to support the family in acquiring other things that the family may need.

4.14.1 Livestock Population in Bolgatanga Municipality

Assessment of the livestock population of respondents in the Bolgatanga Municipal showed that there has not been significant increase in livestock numbers of respondents from the previous year. In the previous year, 16 percent of respondents had between 1-5 of the various livestock, 48 percent of them had between 6-10 livestock, 26 percent had between 11-15 of the different livestock kinds, 7 percent had between 16-20 of the livestock kinds and 3 percent had 21 and above livestock but farmers livestock numbers have increased slightly. Those who had livestock numbering between 1-5 reduced to 11 percent during the period of the research work, those who had 6-10 livestock also increased from 48 percent to 50 percent. The number of respondents, who had 11-15 animals increased from 26 percent to 27 percent, whiles those who had 16-20 livestock remained unchanged. Also, the number of respondents who had higher livestock numbers (21 and above) increased moderately from 3 percent to 5 percent.

When they were asked to explain or give the reasons that accounted for the increase in their stock numbers, they mentioned several factors that came to play in increasing the

numbers such as vaccinations, treatment, feeding, watering and protection against rainfall (proper housing), however, this was done at a high cost.

For productivity to increase and be profitable to farmers, a lot of factors come in to play. Factors such as feeding, housing, health care and many others are very important in determining the productivity of livestock. Health care service is one of the major contributing factors to increasing livestock productivity.

Farmers may produce livestock in large numbers but when the health needs of the livestock are not met, diseases can cause serious losses to farmers. In the case of peasant livestock farmers in the Bolgatanga Municipal, losses due to diseases are very serious to them. In the research work carried out in the municipality, the hundred farmers in 2015 cumulatively produced 74 cattle, 3 donkeys, 407 sheep, 707 goats, 100 pigs, 2030 fowls, 1792 guinea fowls, and 71 other birds which included turkeys and ducks.

Out of these figures of livestock produced, the following numbers died as a result of diseases; 9 cattle, 157 sheep, 174 goats, 29 pigs, 778 fowls, 936 guinea fowls, and 36 other birds. However, no death was recorded for donkeys. This could be due to the fact that, donkeys are very resistant to diseases and perhaps the limited number of donkeys reared by these farmers.

According to the farmers, most of these deaths were recorded as a result of disease infections on their stocks which they could not treat or treated very late which had no

significant effect on their health. As to why they could not treat or treated late, they indicated that the cost of treatment was too high for them to pay since they were not rearing the livestock for commercial purposes. This finding agrees with that of Illukor, 2013 who stated that farmers, who are keeping livestock for cash or commercial purposes, positively influenced the use of veterinarian services. He further indicated that private veterinary system may not survive in pastoral areas where livestock is kept mainly for food rather than cash. During interactions with peasant livestock farmers in the field, they outlined several challenges and constraints confronting them in the areas of housing, feeding, and access to veterinary services. In terms of housing, many respondents explained that their pens were not in good condition to house many stocks because they leak whenever it rains, which affects the health of the animals. Most of these pens were built with local materials. Some respondents also indicated that their pens were too small and therefore the animals were usually crowded which could also affect the health of the animals because there would not be enough ventilation. Other respondents said their pens collapsed during the rainy season. All respondents expressed their desire to reconstruct the pens and roofed them with zinc; however, they were constrained by lack of funds.

With regard to feeding, respondents admitted that they were unable to buy enough feed for the animals due to inadequate funds and increasing prices of the feed. Besides, there is usually scarcity of leaves and pasture during the dry season due to burning of crop remains on the farm. These make adequate feeding of the animals during the dry season very difficult. This finding agrees with the report of FAO (2006), in which it was noted

that, feed supply constraint is more acutely felt in the drier regions, where the quantity of forage is often insufficient for the livestock, and where the availability of feed is subject to pronounced seasonal patterns.

With respect to veterinary services, respondents lamented their limited access to veterinary services due to limited number of government (MoFA) veterinary officers in the Municipality. According to the Municipal Veterinary Officer, there are only a few veterinary officers in the Municipality, meanwhile they required not less than ten veterinary officers. This is further compounded by logistical constraint facing the veterinary unit. As a result, whenever an animal or animals are sick and farmers called on the veterinary officers, they either do not usually get their response or they respond very late when the animal or animals are dead because they are usually engaged somewhere. Some respondents even cited instances where they hired motor tricycles and carried their sick animals from the village to the veterinary office in order to secure treatment. In some cases, this effort could not still save the animal from death. In addition, respondents complained of the high cost of veterinary services particularly the private veterinary services which they sometimes resort to as a result of the limited access to public veterinary services.

According to FAO (2006), Government-operated veterinary services have shown their limitations in providing comprehensive animal health services needed for livestock development, mostly because of issues related to under-funding. This has led to weak

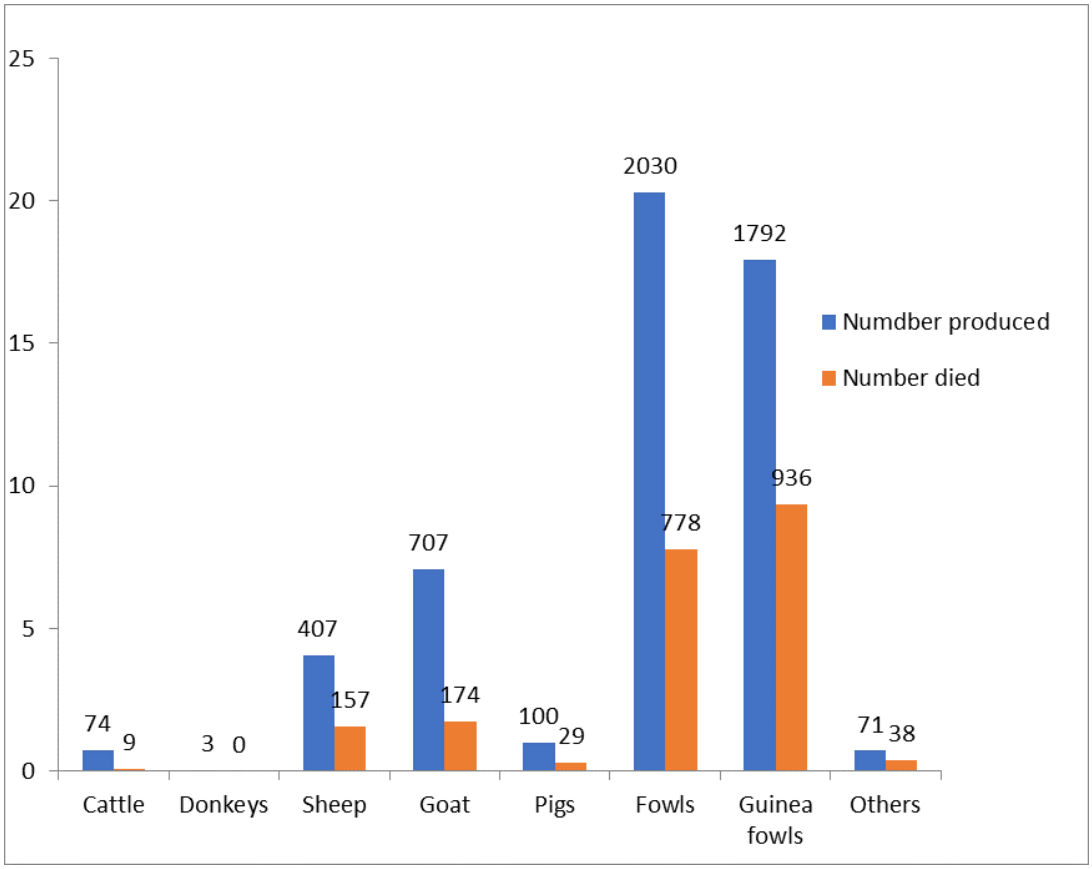
implementation of programs for disease surveillance and vaccine production, and control measures for epidemic diseases are inadequate.

4.14.2 Financial Loss due to Diseases

In the developing world, livestock serve an important livelihood factor and as a pathway out of poverty. The high costs of treatment and the limited number of veterinary service personnel have contributed to significant losses that peasant livestock farmers incur as a result of diseases. Discussions held with respondents revealed that they experience great losses in the market value of their livestock and stock numbers in times of disease outbreaks on their farms. From the histogram above, it was realized that peasant livestock farmers lost various sums of money due to disease incidence in the year 2015. About 69 percent of the farmers lost between Gh¢40.00 to Gh¢500.00, 20 percent of the farmers lost between Gh¢500 to Gh¢1000.00, 6 percent of the farmers lost between Gh¢1000.00 to Gh¢1,500.00 2 percent of the farmers lost between Gh¢2,000.00 to Gh¢2,500 and 2 percent of the farmers lost between 2,500.00 to Gh¢3,000.00. This finding is similar to the findings of Rich and Perry (2011) in which it was noted that livestock diseases disrupt markets, reduce household asset base, and increases vulnerability of livestock dependent households. This view has also been expressed by (Awa and Achukwi 2010; FAO 2011), in which it was stated that diseases such as contagious bovine pleura pneumonia (CBPP) and peste des petits ruminants (PPR) among others continue to affect livestock production and inflict losses to livestock keepers.

Discussions held with farmers revealed that when they anticipate losing all of their livestock because no qualified service providers are accessible and the cost of service delivery is too high, they resort to selling the sick livestock rather than treating them, thus creating an informal market for sick livestock. They also indicated that when they sometimes realize that the animal is so much emaciated, they slaughter it for meat for the family which could be dangerous to their health as highlighted by Oppong (1989) that, it is a threat to human life to consume unwholesome or infested animal products derived from sick animals. The distress sale of sick livestock after identifying early disease symptoms is an attempt to salvage household income. Although this practice appears rational, it has undesirable implications. Human health complications could result from consuming unhealthy livestock products. Beyond human health impacts, the distress sale of sick livestock could plunge livestock dependent households into serious malnutrition problems and extreme poverty. Distress sale of livestock is associated with increased poverty; thus, policy strategies should aim at protecting the livestock assets of the poor since the reason for which peasant livestock farmers keep livestock is to sell the surplus and get income to support provide other needs of the household, but the quantum of financial loss to them as a result of inadequate health care services affects their ability to provide the basic needs of their families especially the health and educational needs of their children.

Figure 4.10: Livestock produced/died in 2015 in Bolgatanga Municipality



Source: Field survey 2016

From figure 17, the 100 respondents had the following numbers of livestock produced cumulatively in 2015; out of a total of 74 cattle produced, 9 of them representing 12.2 percent died, there were only 3 donkeys produced and none of them died probably due to the resistant nature of the donkey, and 407 sheep were produced out of which 157 forming 38.6 percent died. For goats, a total of 707 were produced and 174 representing 24.6 died, 100 pigs were produced and 29 of them which forms 29 percent of the pig population died, 2030 fowls were produced and 778 which is 38.3 percent of them died, 1792 guinea fowls were produced and 936 making 52.2 percent died and for others such

as turkeys and ducks, a total of 71 were produced and 38 of them representing 53.5 percent died.

These numbers of deaths came about as a result of disease attacks which according to majority of the farmers, they could not treat or got treatment for them very late at their terminal stages that could not help them recover.

The research also sought to find out losses in terms of income farmers incurred as a result of diseases they encountered. According to the farmers, diseases that cause serious devastation to them that result in financial loss are New castle in poultry, Contagious Bovine Pleuro-pneumonia (CBPP) in ruminants, and endo and ecto parasites in pigs. Other causes of loss of income cited by respondents include stress, dystocia, eating of polythene, accident, food poisoning and miscarriage.

This finding agrees with the work of ILRI (2002), in which it stated that, the diseases with the highest impact on smallholder livestock keepers in Sub-Saharan Africa are ecto and endo-parasites, respiratory complexes, newcastle disease, trypanosomosis, Contagious Bovine Pleuro-Pneumonia (CBPP), Rift Valley Fever (RVF), and tick-borne diseases such as heartwater and theileriosis.

4.14.3 Challenges Faced by Veterinary Personnel in the Bolgatanga Municipality

During the work, interaction with veterinary personnel within the Bolgatanga Municipality revealed that, they were faced with several challenges as they went about rendering services to livestock farmers in the municipality. Among the numerous challenges they enumerated included; distance, drug storage issues, farmers' unwillingness to pay in full for services rendered to them, their limited number, risk of being bitten by pets and harmed by cattle that are not docile among others. This is not different from the works of Turkson and Brownie (1999), who identified similar challenges faced by veterinarians in private practice in other parts of Ghana, Eregae (2003), did some work in Kenya with findings not different from the above. Njorege *et al* (2000) and Wamukoya *et al* (1995) also did some work in other parts of Africa and came out with similar challenges faced by veterinarians in private practice.

4.15 Whether Cash and Carry Has Brought Any Improvement to livestock Health Care Delivery.

In finding out from Veterinary personnel whether privatization has brought any improvement into the Animal Health Care Delivery, all the ten personnel interviewed answered in the negative. This they explained that, the cost of drugs is too high and farmers cannot pay for their administration leading to preventable deaths of animals.

Also, some of the drugs need to be used immediately they are opened and since farmers are not willing to pay for their administration, the remaining quantity of the drug will be a waste after opening it and treating only a few animals. This discourages Veterinary personnel from purchasing drugs on their own for treatment. Rather, they asked farmers

to either buy the drugs for them to treat their animals or gather other farmers around so that they can use their own drugs to treat many animals in order to recover cost. This sometimes was difficult if not impossible for farmers to do.

The overall impact of privatization is thus negative on animal health as recorded by farmers.

According to the livestock farmers also, privatization has not improved animal health care delivery since they find it difficult to access services due the high cost involved and the limited number of veterinary personnel.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.0 Introduction

This chapter presents summary on the findings and conclusions of the study and then makes recommendations based on the findings, research objectives and questions. The findings are summarized according to headings or themes to reflect the objectives or purpose of the research.

5.1.0 Summary of Findings

5.1.1 Demographic Characteristics of the Respondents

The study revealed a dominance of the male population in livestock rearing in the municipality with those within the age range of 31-40 being the majority of them. In terms of education, a greater number among the respondents 38% have not had any form of education thereby affecting their knowledge in husbandry practices, 20% and 22% of the respondents had basic and secondary education respectively while those with tertiary education constituted 17% with 3% of them having been through Non-formal education.

As revealed by the research, majority of the people representing 54% are predominantly farmers engaged in peasant farming; crop production and animal rearing. 13% were engaged in the public and civil services, 16% were into trading while 17% were into other businesses such as carpentry, masonry, weaving and the like.

5.1.2 Disease prevalence on livestock farmers stock

From the research findings, it was revealed that, peasant livestock farmers lose most of their livestock, up to 80% at the peak of the rains, as a result of them suffering from diarrhoea and foot and mouth diseases if no intervention is employed to control the disease.

Additionally, animals of most farmers are increasingly becoming more vulnerable to diseases because of the cost, inadequate and unsuitable animal health and production inputs at the disposal of farmers. This then implies that the inadequate health care delivery system was also responsible for the prevalence of readily controllable livestock diseases.

5.1.3 Actions taken by farmers to control disease spread in their flock

From the research findings, it was realized that, most of the farmers, 54 % treated their diseased livestock immediately they detected ill health amongst them whiles the others resorted to slaughtering, selling or not even taking any action with the reason being that, veterinary services are expensive .

5.1.4 Access to Veterinary Services

One of the factors that determine the health of livestock is access to veterinary services. From the research carried out, less than half of the respondents had access to veterinary service but lamented that they get them with difficulty and at a time when their livestock are very weak or are deteriorated in their health status. Majority of them relied on community livestock workers for veterinary services. This was due to the fact that the community livestock workers services were lower in terms of cost than the government veterinary service personnel's services.

5.1.5 Affordability of Services by Farmers

From the research, it came to light that veterinary services were expensive for peasant livestock farmers to afford due to the cost involved. This made them resort to selling, slaughtering or just leaving their livestock to their fate. They, however, said they wished it could be reviewed downwards to enable them always cater for large numbers of their stock especially during vaccinations.

5.1.6 Challenges and Constraints Confronting Peasant Livestock Farmers

The major challenges confronting livestock farmers in the Bolgatanga municipality were in the areas of feeding and access to veterinary services. Livestock diseases remain a major constraint limiting livestock output of peasant livestock in the municipality. Farmers have limited access to veterinary services due to limited number of government (MoFA) veterinary officers in the Bolgatanga Municipality.

With regard to feeding, respondents are unable to buy supplementary feed for the livestock due to inadequate funds and increasing prices of the feed. Besides, there is usually scarcity of leaves and pasture during the dry season due to rampant burning of crop remains on the farms which make adequate feeding of livestock during the dry season very difficult. Farmers' inability to pay for drugs and service charges makes most of them resort to self-medication with either veterinary drugs or herbs whenever their livestock are sick.

5.1.7 Financial losses due to diseases

Livestock diseases caused financial loss to peasant livestock farmers in the Bolgatanga Municipality with the least hit farmer losing GH¢45.00 and the worse hit farmer losing GH¢ 2,650.00. The total value of livestock lost due to diseases in monetary terms for the period of the research amounted to GH¢37,170.00.

5.1.8 Challenges and Constraints Confronting Veterinary Personnel

Veterinary personnel are confronted with several challenges under the Cash and Carry policy of veterinary services. Notable among them are; inability to cover all farmers at the right time, farmers not willing to make full payment for services rendered, incurring losses from drugs that need to be used immediately after opening and the risk of being bitten by pets and harmed by nervous cattle.

5.2 Recommendations

The Cash and Carry policy is supposed to bring efficiency and quality improvement into animal health care delivery but this cannot be achieved if certain things are not in place. It is for the achievement of these goals that the researcher wishes to recommend the following;

- The Ministry of Agriculture through the Veterinary Services Department and its extension agents should organize livestock farmers into groups and go to educate them on health care issues for them to understand the need to implore health care services on their farms.
- Veterinary Services Department staff should always give peasant livestock farmers education to sell some of their livestock in order to get funds to vaccinate and treat the rest instead of resorting to self-medication or no medication at all.
- The Veterinary Services Department should liaise with government to institute an insurance policy for farmers to insure their livestock against diseases just like it is done for human health services.
- The government should help make veterinary drugs and vaccines affordable to farmers by taking off importation tax and other domestic taxes on their sale to reduce the cost to enable farmers adopt the system.
- The Veterinary Services Department should improve upon the accessibility of its services by peasant livestock farmers to stop them from resorting to self-medication and other dangerous practices in order to increase their livestock output.

- The Veterinary Services Department should train more community livestock workers to augment their staff to give health care services to peasant livestock farmers in the communities to reduce cost of transportation to veterinary clinics and delays in accessing their services.
- The Ministry of Agriculture and other development partners should equip the Veterinary Services Department with the necessary logistics and equipment that will enable veterinary personnel use them at a fee to give better and quality health care services to farmers to boost animal health.

It is hoped that when the above recommendations are adopted, the Cash and Carry policy of veterinary services will become successful and livestock health and output will be improved.

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APPENDIX A

UNIVERSITY FOR DEVELOPMENT STUDIES

Faculty of Integrated Development Studies

Mphil Development Studies

TOPIC: Effects of cash and carry on Peasant Livestock Farmers' output in the Bolgatanga Municipal.

Questionnaire for Livestock Farmers

The questionnaire below seeks views to help carry out a research on the above topic. The findings of this research are solely for academic purpose. Please provide the appropriate responses in the spaces provided and where answers are given; please tick (√) the appropriate response(s). Every information given by you will be treated as confidential.

Background Information of Respondent

1. Age of respondent
   a. Less than 20
   b. 20-30
   c. 31-40
   d. 41-50
   e. 51-60
   f. Above 60

2. Sex of respondent
   a. Male
   b. Female

3. Level of education
   a. None
   b.Primary/JHS
   c.Secondary/Vocational/technical

d. Tertiary
e. Non-formal

4. What is your major occupation?
   a. Farming
   b. Public/Civil service
   c. Trading
   d.Others (……)

5. Do you keep livestock?
   a. Yes
   b. No

6. What type(s) of livestock do you keep? List them.

7. Do you own the livestock you keep?
   a. Yes
   b. No

8. Why do you keep such livestock?
   a. Source of income
   b. Source of food
   c. Both food and income
   d. For pleasure
   e. Religious purposes

9. How long have you been producing livestock?
   a. Less than 5 years
   b. 5-10 years
   c. 11-20 years
   d. 21-30 years
   e. Over 30 years

10. Do you encounter diseases in your livestock?
   a. Yes
   b. No

11. What do you do when your livestock are ill?
   a. Treat
   b. Sell
   c. Slaughter
   d. Others (specify)

……

12. Why do you choose to do that in the above question?
    (i)…….
    (ii) ……..

13. If your answer to (11) is treat; how do you do it?
    a. Take them to veterinary clinic
    b. Buy drugs and treat by myself
    c. buy drugs for veterinary technician to treat
    d. Treat with herbs
    e. Other (specify)……

14. How much do you spend per year for the following services on your livestock?

Animal	**Cost (GH¢)**			
	Vaccination	**Surgery**	**Treatment**	**Castration**
Cattle				
Sheep				
Goat				
Pig				
Poultry				
Others (specify)				

What are the privatisation plans of government and their implications for veterinary services in the Bolgatanga municipality?

15. Were you given information/education concerning cash and carry of veterinary services?
    a. Yes
    b. No

17. Who provide veterinary services to you?
    a. Government
    b. NGOs
    c. Private veterinary personnel

18. Does government offer subsidies for livestock producers?
    a. Yes
    b. No

19. Does government provide loans for you to access veterinary services?
    a. Yes
    b. No

20. If yes, is it enough to cater for your production needs?
    a. Yes
    b. No

21. Does government participate in getting veterinary services to you anytime you need it?
    a. Yes
    b. No

22. Does government participate in marketing your livestock and their products?
    a. Yes
    b. No

23. In times of losses, do you receive compensation from the government? a. Yes b. No

24. Does government monitor services rendered to you by veterinary service personnel?

a. Yes b. No

What is the resultant effect of the cash and carry policy on livestock output in the Bolgatanga municipality?

25. How will you rate veterinary service provision in terms of cost?
    a. Very low b. Low
    c. Moderate d. High
    e. Very high

26. Some time ago veterinary services were free, are you aware of that? a. Yes b.No

27. If yes, comparing the free service era to the era of cash and carry, which of them provide quality services to your livestock? a. The 'Free service' system b. The 'cash and carry' system

28. Explain why you have chosen that answer in question (17) above.
……
……
……
……

29. Why do you think veterinary services are now cash and carry?
……
……
……
……

30. Do you have access to veterinary services any time you need it? a. Yes b. No
31. Are you able to afford veterinary services for your livestock? a. Yes b. No

32. How do you get money for veterinary services for your livestock?
a. Through the sale of some livestock
b. Through the sale of food crops
c. Through contributions from family members and friends
d. Through government support
e. Others (specify)

33. Why do you look for that source of funding for these services?
……
……

……
……

34. Does employing veterinary services on your livestock have any effect on your output level?
a. Yes
b. No
35. If your answer is 'Yes' to question (21) above, what is it?
a. Increases production levels
b. Prevents the spread of diseases
c. prevents/reduces death of livestock
d. Others
(specify)…….

36. How many of the various livestock kinds did you produce in 2014?
(i) Cattle …….. (ii) Sheep …….. (iii) Goats …… (iv) Donkeys …….(v) Fowls … (vi) Guinea fowls …….. (vii) Others (specify)……

37. How many each of these livestock did you lose to diseases?
(i) Cattle…… (b) Sheep…… (iii) Goats …. (iv) Donkeys….. (iv) Fowls…. (v) Guinea fowls…. (vii) Others ……

38. How much in monetary terms did you lose as a result of the death of these livestock?
(i) Cattle …. (ii) Sheep…. (iii) Goats … (iv) Donkeys….. (v) Fowls …. (vi) Guinea fowls…….. (vii) Others (specify)…….

39. Has the cost of veterinary service any influence on the number of livestock you keep?
    a. Yes b. No

40. Kindly explain your answer in question (23) above
……
……
……

41. What are the effects of this cash and carry system of veterinary service delivery on livestock output in your opinion?
……
……
……

Within this cash and carry policy, how can the livestock sector be made more effective and efficient as regards access and performance of veterinary services in the Bolga municipality?

42. Do you have access to veterinary services in your locality? a.Yes b. No

43. If yes, which of these services do you receive?
    a. Trainning
    b. Feed supplies
    c. Health management
    d. Improved breeding stock
    e. Financial assistance

44. If no why do you not have access?

    ……
    …...

45. How often do veterinary personnel visit you?
    a. Not Regularly
    b. Regularly
    c. As per need
    d. No visit

46. How will you rate your satisfaction on services provided by veterinary personnel?
    a. Not satisfactory

b. Satisfactory
c. Very satisfactory
d. Don't know

47. Can services provided to you by veterinary personnel be made better? a. Yes b. No

48. If Yes, how?
a. Increase number of personnel
b. Government subsidises cost of services
c. Government monitor services provided by veterinary service personnel
d. Insurance scheme provided for farmers
e. Others
(specify)……

49. If no, what can be done to ensure easy access to veterinary services when the need arises?
……
……
……

50. What is your main challenge with regards to access to veterinary services?
a. Finance
b. Distance
c. Unavailable veterinary service providers
d. Others
(specify)……

51. What should be done to ensure that farmers are able to afford for veterinary services?
……
……
……

52. In your opinion, how can veterinary services be delivered efficiently?
……...

APPENDIX B

UNIVERSITY FOR DEVELOPMENT STUDIES

Faculty of Integrated Development Studies

Mphil Development Studies

TOPIC: Effects of cash and carry on Peasant Livestock Farmers' output in the Bolgatanga Municipal.

Questionnaire for Veterinary Service Personnel

The questionnaire below seeks views to help carry out a research on the above topic. The findings of this research are solely for academic purpose. Please provide the appropriate response s in the spaces provided and where answers are given; please tick (√) the appropriate response(s). Every given by you will be treated as confidential.

1. Age of respondent……

2. Sex……

3. Station of work……

4. Number of years in the service……

5. Position of respondent in the service……

6. Were you in the service when veterinary services were provided free of charge?
   a. Yes
   b. No

What are the privatization plans of government and their implications for veterinary services in the Bolgatanga municipality?

7. Was privatisation accompanied by a change in resource allocation to veterinary service by the government? a. Yes b. No

8. If yes, did the resource allocation:
   a. Increase ( )
   b. Decrease ( )
   c. Others
   (specify)……

9. Has privatisation changed the number of employees of the government (state) veterinary service? a. Yes b. No

10. If yes, how? (a) increased (b) decreased

11. Has government given veterinary service personnel resources to go into private practice? a. Yes b. No

12. Has the demand for veterinary services changed:
    a. Remained the same ( ) b. Decreased ( ) c. Increased ( )
    d. Others
    (specify)……..
    ……
    ……

13. Are there price ceilings/control mechanisms for private practitioners to charge for services rendered? a. Yes b. No

14. Are there measures put in place to ensure effective delivery of veterinary services in the Bolgatanga municipality? a. Yes b. No

15. Will this policy of privatisation increase farmers' patronage of veterinary services? a. Yes b. No

16. What account for this increase or decrease in patronage by farmers?
    ……
    ……
    ……

17. In your opinion, which of these systems is the best system? (a) The Free treatment system (b) The privatised system.

18. Kindly explain your answer to the above question
……
……
……
…….

19. What are the reactions of farmers to the privatisation policy?
    a. Positive
    b. Negative
    c. Indifferent
    d. Others
    (specify)……

20. How much do you charge for the following services rendered to farmers?

Vaccine	**Animal**	**Cost (GH¢)**

Surgical operation	**Animal**	**Cost (GH¢)**

Type of treatment	**Type of animal**	**Cost (GH¢)**

Type of animal	Open Castration (GH¢)	Closed Castration (GH¢)

21. In your opinion, how will you rate the cost? (i) low (ii) moderate (iii) high (iv) very high
22. In your opinion, has the privatisation policy brought any improvement to veterinary services delivery? a. Yes b. No
23. If 'Yes', how?

    …….

24. If 'No', why?

……

25. In your view, what are the effects of the privatisation policy on livestock productivity in the Bolgatanga municipality?

……
……
……
…….....

26. In your view, what can be done to encourage farmers to patronize these services?

……

……

…….

27. What can be done to make service delivery more effective?

……

……

28. What can service providers do to be more efficient?

……

……

……

……

29. Is there any alternative health care delivery system you would recommend?

a. Yes b. No

30. If 'Yes', what is it? ……

APPENDIX C

FIELD SURVEY PICTURES

Pictures of discussion with respondents

Figure 6: A picture of a diseased goat

Source: Field survey 2016

Figure 9: A veterinary officer treating a sick animal

Figure 10: A veterinary technical officer

Source: Field survey

Figure 12: Samples of veterinary medicine

Source: Field survey 2016

Figure 15: Pictures of livestock

Source: Field Survey 2016