THE UNIVERSITY
of EDINBURGH

EXPANDING THE ONE HEALTH AGENDA- SUSTAINABLE LIVELIHOODS, ZOONOTIC DISEASE AND GENDER IN NIGERIA

BADEJO, ADEDAMOLA FOLASADE

CENTRE OF AFRICAN STUDIES

THE UNIVERSITY OF EDINBURGH

DOCTORAL THESIS

2017

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

DECLARATION

I declare that the research undertaken for the purpose of this thesis is, unless otherwise indicated, my own work and has never been submitted for the purposes of another degree or professional qualification.

Badejo Adedamola Folasade

January, 2017

ACKNOWLEDGEMENTS

Achievement of success is personal but it is not possible without the interplay of other factors like places, circumstances, environment and people to mention a few. Success gives joy and in times of joy one is bound to remember and appreciate people who have made the success possible. My research work and the preparation of this doctoral thesis would not have been possible without the contribution of some special and outstanding people. I owe a lot of gratitude to them all.

My immense gratitude specially goes to my supervisors, Professors James Smith and Sue Welburn for their unflinching support. Professor James Smith has been particularly helpful by encouraging me and instilling confidence into me in times of discouragement and even despair. He showed interest in my general wellbeing as well as that of my family. My profound gratitude also goes to Dr Pete Kingsley for his support, advice and encouragement. Their support, patience and suggestions in helping me to coordinate my work especially in writing this thesis are invaluable.

I would like to thank the BBSRC through the University of Edinburgh in funding this doctoral work. I also wish to express my gratitude to Pauline McManus and Dr Ayo Majekodunmi for their administrative support during my fieldwork. My profound gratitude goes to the men and women respondents in the study areas of Kachia Grazing Reserve and Bokkos, Jos Plateau. Without their cooperation, some of the findings would not have been possible. I wish to thank my fellow colleagues Vincenzo, Sola Olaniyan and Christine for their encouragement and assistance.

My Christian family, the Morning Star Parish RCCG, Edinburgh has contributed in no small way to the completion of my doctoral work and to make my stay in Edinburgh a pleasant one.

My profound gratitude specially goes to the Adebambos, the Ayindes, the Akinboguns and others for their love, prayers and assistance.

To my wonderful mum, Mrs Funke Badejo, I say a very big thank you. She has been of tremendous help and support. She proofread, edited, worried about this thesis, prayed and encouraged me to always believe that there is always a light at the end of the tunnel. My late, but very dear and loving father, Pa 'Bayo Badejo, deserves to be specially mentioned for appreciation. The sweet memories I have of him keep spurring me on in the hazardous journey of life. He wished me to be a medical doctor, an unfulfilled dream because of his death. I believe this doctorate degree would have equally satisfied his aspirations and ambition. I have been blessed by having him as my father. Special gratitude to my brother, Dr Goke Badejo, his wife Dr Bimbo Badejo, my other siblings, Segun, Femi, Taiwo, Idowu and Alaba for their prayers, encouragement and advice.

I would like to express my deep gratitude and appreciation to my darling husband, Ayotunde for his love, support, encouragement, patience, understanding and cooperation throughout this period. I also want to say a 'big thank' you to my very dear and peaceful sons, Fisayo Fela and Folawe for being good children throughout mummy's tiresome pursuit. They are a part of this story and success.

Above all, my whole being expresses praise and thanks to God for all He has done for me. He has been the source of my strength, wisdom, support and provision throughout the period of my doctoral work and stay in Edinburgh. Without Him, I could not have been able to achieve this much. To Him be the glory.

ABSTRACT

Livestock production is central to the livelihoods of millions of people in Nigeria, and indeed across the continent. Understanding how livestock based economies function and the issues that constrain them has long been an important task for actors interested in supporting rural development.

In recent years, the One Health agenda has provided a new impetus for studying and tackling the interconnections between human, animal and environmental. Whilst this is welcome, it tends to be selective in its modus operandi of intersectoral collaboration as advocated. This new risk repeats the tendencies of earlier scholarship in understanding rural animal production systems as a vertical system. In particular, gender analysis of addressing the growing threats of neglected tropical diseases (NTDs) is lacking in One Health as evidenced in the findings from the study areas of Kachia Grazing Reserve and the Jos Plateau. There is thus a need to illustrate the importance of integrating gender equality into the One Health concept of programmes especially in pastoralist areas.

Through the use of a qualitative approach of eliciting needed information by the use of a range of qualitative methods at the community and household levels, this thesis, based on three case studies provides substantial new empirical contributions to this debate. Specificially, chapter four, by exploring the strategies employed by the study population to cope with, as well as to build their resilience to the inadequacies of the Kachia Grazing Reserve, argues that these inadequacies affect gender, gender relations, and livelihoods. As a reinforcement to these assertions, chapter five explores the role of women self help groups in the KGR and argues that these self help groups could be used as instruments in propelling the One Health concept in pastoral areas like that of the KGR. Lastly, chapter six explores the effect of conflict and violence on gender, gender relations and livelihoods in the Jos Plateau and examines how timely and effective delivery of One Health could act as a conflict resolution in conflict and violence inflicted pastoralist areas of the Jos Plateau.

This thesis, in a way, gives possible explanation to the reticence of gender in One Health. Thus, in recognition of the potentials of the One Health concept, and in considering the realities on ground and the importance of integrating gender equality in its programme planning and delivery, the analysis of data from the three case studies of this thesis brings into focus the ‘how’ and ‘why’ of gender analysis affects delivery of One Health programmes in local pastoralists communities.

CHAPTER 1

1.0 Introduction

Gender egalitarianism has become a prominent topic in the agenda of development programmes set out to promote sustainable livelihoods. Similarly, development actors recognise that the development of the human and animal health sector is a major avenue through which sustainable livelihoods can be achieved. Yet, the importance of integrating gendered perspectives into programmes of human and animal health development has been largely ignored. 'One Health', a concept of synergy between human health and animal health has recently been gaining ground, promoting more collaborative forms of research and intervention in these areas. However, the scientific understanding of infectious diseases underlies the many 'One Health' interventions to prevent and control the diseases. It seems to be 'selective' in its modus operandi of intersectoral collaboration due to its lack in gendered analysis of addressing the growing threats of neglected tropical diseases (NTDs).

Pastoralism contributes to agricultural, economic and human development of developing countries. In spite of this contribution to development, it is a sector that often suffers from limited access to assets such as water, land, education, animal and health services, markets and community networks (Rass, 2006). The literature on pastoralism and livestock diseases in pastoralists areas in the Northern part of Nigeria focuses on the epidemiology, clinical control and treatment of livestock diseases but less emphasis on gender, gender relations and their implications on the prevention and control of the diseases. Without dispute, livestock diseases especially zoonoses have had significant effects on the livelihoods of pastoralists.

However, little information is available on the consideration of gender and gender relations in the implementation of One Health programmes in pastoralist areas.

It has become a commonplace practice for development planners, policymakers and researchers to base their argument on an understanding of pastoralism in terms of livestock development and management; as such deliberations on livestock development hardly feature poverty and marginalisation of pastoral groups. The significance of gender in pastoralism and livestock development becomes clearer if focus is more on 'people and livestock' than solely on the disease aspect of livestock.This research was funded by two projects (CIDLID and ICONZ) intended to provide qualitative evidence to inform planning and implementation of development programmes at the intersection of human and animal health. The specific research conducted in two pastoralist communities in Northern Nigeria aimed at: a) to investigate the factors affecting the control of neglected zoonotic diseases; b) to explore the roles of gender and gender relations in pastoralism and in animal and human health development and c) to analyse women's roles in pastoralism and identify the potentials of existing social networks in improving animal and human health development.

Inspired by the identified gap in pastoral research, this chapter, though not attempting to cover the wide range of aspects of pastoral livelihoods, identifies and reviews issues that relate to animal and human health development such as agricultural practices and shocks and threats to human and agricultural development. A review of these issues foregrounds the importance of gender considerations in One Health to promote sustainable livelihoods.

1.1 An Insight into Agriculture and Its Problems

In developing countries, agricultural practice is critical for human welfare and economic growth. In Sub-Saharan Africa, more than 750 million people who live in dire poverty

(earning less than US$1 per day) rely on subsistence agriculture as their major source of food and income, and about two-thirds of the people depend on farming for their livelihood (Diao *et al.,* 2007; Toenniessen *et al.,* 2008; World Bank, 2008). The contribution of agriculture to gross domestic production in African countries varies from 10 to 70 percent (Mendelsohn *et al.,* 2000).Yet, unlike India, China, and South America, Sub-Saharan Africa continues to show a decline in food security and agricultural productivity per capita and an increase in undernourishment since 1990 (FAO, 2006). Africa's poor agricultural performance has been attributed to a wide array of production-limiting constraints faced by resource-poor farmers, associated with the shrinking farm sizes and inequitable land distribution patterns, depleted soils and limited use of fertilizer and soil amendments, unreliable rainfall and lack of irrigation capacity, and limited access to improved varieties and seed distribution systems (Toward Sustainable Agricultural Systems in the 21st Century). Other contributing factors include lack of credit, labour availability and demands, unstable political systems, poor security, warfare, and underinvestment by national governments and other institutions in the physical, institutional, and human capital needed to support sustainable agricultural intensification (Diao *et al.,* 2007).

Pastoralist communities, a sector of agricultural practice in the Sub-Saharan Africa are mostly found in the arid and semi-arid areas. These regions are often prone to conflicts, food insecurity, rainfall variability and associated uncertainties with the spatial and temporal distribution of water resources and grazing for animals. In a way to overcome such difficulties, pastoralists have developed management systems based on strategic mobility, to adapt to these difficult conditions. A good example from a 2010 policy framework for pastoralism in Africa by the Department of Rural Economy and Agriculture, under the African Union Commission is the adaptation to trends such as new economic opportunities and access to better transportation. Numerous scientists, international organizations, political

bodies have analysed the challenging agricultural situation in many parts of Africa and have made many efforts to resolve or ease agriculture-related problems and to alleviate hunger. In July 2007, The African Union Commission in collaboration with the United Nations Office for Humanitarian Affairs, Isiolo, Kenya, initiated a pastoral policy with a view to developing a framework to facilitate the development and implementation of pastoral policies that could contribute towards securing and protecting the livelihoods and rights of pastoral people. The key principles of this initiative were in line with, and contributed to, the strategic pillars of the Commission, namely promotion of peace and security, cooperation, partnership and development, shared vision and institutional capacity strengthening. Yet despite the various policy initiatives employed to boost the agricultural sector, research has shown a decline in agricultural development in Sub-Saharan Africa (see Kherallah and Kirsten, 2002; Rosegrant and Cline, 2003).

Meanwhile, the last decade has seen a significant rethinking of the ways in which human and animal health are related. The sudden outbreak of the highly pathogenic avian influenza (HPAI), a threat to agriculture and human in the 21st century, brought an awakening call to international agencies, policy, research institutes, and pharmaceutical companies to rejuvenate and bring into limelight One Health. The awakening call was in recognition of the role of One Health in the control of the animal- human transmission of the diseases aimed at preventing the human-human transmission trait of the disease. The structures used in conjunction with One Health, employed to control the avian flu outbreaks included the technical/biomedical intervention frame, the societal intervention frame and the ecological conservation frame (Chien, 2013). While the biomedical intervention frame focuses on the scientific and technical aspects of the prevention and control of diseases, which the policy arena seems to attune to, the ecological conservation frame specifies the emergence and spread of the disease to degradation of the ecosystem. The societal intervention frame, on the

other hand, is 'people-centred' highlighting the effects of culture and social factors to disease transmission, its prevention and control measures. It recognizes that a control strategy that works in one culture might not function if employed in another culture. While the biomedical intervention frame and the ecological conservation frame, to an extent, have dominated research on One Health, the societal intervention frame is yet to get its bearing in the development field of One Health. The little attention given to the societal intervention frame despite its importance to the aetiology, prevention and control of diseases shows a lack of importance attached to it. This lapse compromises the effectiveness of One Health. Household health security, pastoralism and gender, are examples of social factors in the transmission, prevention, and control of diseases, which have been neglected in One Health. These factors are briefly discussed in sections 1.6, 1.7, and 1.8. The thesis focuses on the feasibility of One Health in rural pastoralist areas where research on household health security and livelihoods has equally ignored the analysis of gender and gender relations.

1.2 Situating the Research

This research was conducted as part of my role in two large-scale interdisciplinary projects: Combating Infectious Diseases of Livestock for International Development (CIDLID) and Integrated Control of Neglected Zoonoses (ICONZ). The CIDLID[1] project is designed to address the trial interventions against trypanosomiasis developed by past projects for use in the Nigerian context while the aim of the ICONZ project is to demonstrate the role that scientific innovation with public engagement plays in improving human health and animal production. While these projects included a range of study areas and thematic foci, both involved fieldwork in Nigeria. This thesis is built on the empirical data collected as part of

[1] A project set up by the BBSRC which is co-funded by DFID and the Scottish Government. This Ph.D is under the CIDLID project and therefore a recipient of one of the studentships funded by BBSRC

this fieldwork. Specifically, the areas of consideration for these projects are the Jos Plateau, in the middle belt of Nigeria (CIDLID) and Kachia Grazing Reserve in the Northern part of Nigeria (ICONZ). These projects demand meeting the following objectives:

- To establish current knowledge, attitudes and practices with regards to the presence, transmission factors, impact and control of neglected tropical diseases in Kachia and Jos.

- To characterise and facilitate the role of women concerning the control of neglected tropical diseases, not just as direct beneficiaries from improved livestock and human health, but also regarding their role in the success of local control programmes.

- To review all existing messaging tools in the media that are used to support disease control activities for the neglected tropical diseases.

- To identify appropriate tools and channels to reach target communities and affect health behaviour and environmental factors.

With the realisation that the two larger projects are both targeted at improving human and animal health, my thesis applied a unifying concept that relates the human-animal-social environment interface – One Health, aimed at controlling zoonotic diseases. There is a remarkable dearth of studies investigating the effect of gender on One Health issues – this thesis aims to demonstrate why such scholarship is necessary, and explore how it might be carried out. The issue of One Health was not categorically stated in the projects' objectives. However, the thesis goal, which explores the role of gender and other factors in One Health is pertinent to the ICONZ and CIDLID promotion of the One Health movement.

I found balancing the stated objectives of the two larger projects with my own research agenda very challenging. Various methodological choices, such as the selection of the two

study sites, were predetermined by other components of the projects. However, this provided easy access to the study sites. Also, the selection of some beneficiaries of the CIDLID intervention as study participants undermined the validity of this research (see chapter 2). This in a way acted as a confounder to the study as the projects' objectives were not directed to evaluate the programme intervention performance. Despite these contraints and compromises, participation in the broader projects was useful in many practical ways, and there was sufficient flexibility to allow me develop a coherent and distinct research agenda. Specifically, the thesis with a focus on One Health and Gender in the two study sites has tried to:

- Investigate the factors that affect the control of neglected zoonotic diseases
- Determine the role of gender and gender relations in pastoralism and in human and animal health development
- Analyse factors shaping women's and children's roles in pastoralism
- Identify the potentials of the existing social networks in improving human and animal health development

Following Manderson *et al.,* 2009, addressing the neglect of gender in health development, particularly in relation to livestock production and management, is the main purpose of this research. One of the primary arguments of this thesis is to address how the poor implementation of development programmes in rural communities has affected the acceptance and uptake of health services by both men and women and how gender is an integral aspect of development in every sector with culture as a determining factor in the role of gender in all facets of development.

1.3 One Health

The term One Health, which has grown increasingly popular among researchers and practitioners in the fields of animal, human and environmental health, is explained in different ways. According to the American Veterinary Medical Association (AVMA) (2008), One Health is a concept that recognises the need for a holistic and collaborative approach whose strategy will be able to understand and address the contemporary health issues created by the interconnection of the human, animal, and environmental domain. To Rabozzi *et al.,* (2012), it is an approach that recognises zoonoses as emerging risks in agricultural and animal breeding which needs to be addressed by specific preventive interventions by necessitating close cooperation and interaction between cross disciplines to promote all aspects of health care for humans, animals, and the environment. The One Health Global Network also views One Health more as an approach than a new concept which has metamorphosed into a movement to improve health and well-being through the prevention of risks and the mitigation of effects of crises that originate at the interface between humans, animals and their various environments (http://www.onehealthglobal.net).

From the foregoing it can be seen that One Health does not have an exclusive definition. However, the different descriptions of One Health are centred on interventions and initiatives employed in improving the health and wellbeing of animals, humans and the environment. In this thesis, therefore, One Health is thus discussed as a concept, an approach and at times a movement.

The prevalence of zoonotic diseases and its effect on the economic and social sector of a nation gave birth to One Health. One Health is therefore seen as a concept that has been in existence centuries ago, rejuvenated from the notion of 'One Medicine' (see Khan *et al.,* 2007; Saunders, 2000). The concept stemmed from the interdependence of veterinary

medicine and human health in relation to the recognised mutually transmitted diseases occurring both in animal and man. The One Health acknowledges that human and animal health and mental health (via the human-animal bond trend) are inextricably linked. It, therefore, proposes the indivisibility of health as a public good; the inextricable interdependence between the health of humans, animals and the ecosystem which justify a more open and intensive dialogue among all the relevant sectors. The discussion on zoonoses seems to form the bulk of publications on One Health. The focus on zoonoses is not surprising, given that 60% of human infectious diseases are zoonotic and that this proportion ranges up to 72% for emerging infectious diseases (Jones *et al.,* 2008). One Health also aligns with the Sustainable Livelihood concept which recognises that for poverty to be eradicated/alleviated, interventions should incorporate all relevant sectors rather than focusing on a particular area of entry point such as agriculture, health, environment, etc. However, most veterinary and health researchers and institutes seem to ignore the social issues such as gender, social exclusion and vulnerability involving animal and human health despite their relevance. Because of the nature of transmission of the infectious diseases and taking into cognisance factors that could increase or reduce the incidence of these diseases, the control and preventive measures need to be strategic. The One Health concept is recently receiving more attention because of its benefits in effectiveness of programme interventions. Given this, it can be seen as a concept through which many initiatives are derived in preventing and controlling infectious diseases.

Research in the last decade on One Health has recorded the success of One Health and its impact on the health of animals, humans and the environment. The cost –effectiveness of One Health has also demonstrated the benefits of interdisciplinary collaboration. Schelling *et al.,* (2005), based on their utilisation of One Health among nomadic pastoralists in Chad, reported of a success and cost savings of a joint vaccination campaign for livestock and people. This

success was achieved because the cultural, socio-economic and epidemiological approach to the diseases was taken into consideration. However, many researchers working with disadvantaged groups within developing countries fail to incorporate these cultural and socio-economic factors during their research but rather concentrate on the veterinary and clinical aspect of the diseases (see Abubakar *et al.,* 2011). In spite of the current focus on One Health, many authors (Gibbs, 2005; King, 2009; Zinsstag *et al.,* 2006; Fisman and Laupland, 2010) complain of the still existing divide between human and veterinary medicine. In short, a concentration on veterinary and clinical aspects of diseases and the failure to incorporate a cultural, socio-economic and epidemiological approach to disease prevention and control, contributes to the ineffectiveness of One Health interventions or initiatives in some areas.

1.4 International Efforts to Promoting One Health

One Health has become an increasing topic of discussion among researchers in academia and development agencies. In this section, I highlight some efforts made by highly recognised regulatory development agencies to show the relevance of One Health to the control of infectious diseases. The World Health Organisation (WHO), as evidenced in many of its infectious disease programmes, is a body that highly promotes One Health. As far back as the 1970s, the WHO initiated a platform for scientific discussion and acted subsequently as a supporting beam to work related to Research and Training in Tropical Diseases (TDR) and the Social and Economic Research (SER) in tropical diseases (Rosenfield, 1987). It also collaborated with other donor agencies such as the Food and Agriculture Organization (FAO) and World Organization for Animal Health (OIE) to curtail the social, economic, health impacts of the animal to human infectious diseases by involving the relevant and significant key players needed to make a valuable and sustainable impact. This partnership occurred in October 2008, when the FAO, the WHO, and the OIE drafted a document entitled

'Contributing to One World, One Health- A Strategic Framework for Reducing Risks of Infectious Diseases at the Animal-Human- Ecosystems Interface' (cited in Gibbs, 2014). Also, the World Bank, in a recently published report, acknowledges the past activities of health development and recommends One Health as a crucial investment for better achievement of the Millennium Development Goals (WorldBank, 2010).

The AVMA in a bid to propagate the merits of One Health also developed a task force to drive the cause of One Health. The AVMA recognised that multi-host pathogens caused a great percentage (60%) of the 1,461 diseases identified in humans (see Torrey and Yolken, 2005 cited in King *et al.,* 2008). The AVMA also recognised that 75% of new emerging human infections are zoonotic in nature (see Tailor *et al.,* 2001) and thereby recommended appropriate actions to reduce the menace. It moved the notion of a campaign to improve collaboration and cooperation among the key players involved in animal and human health such as academic institutions, developmental organisations, and other relevant stakeholders' groups.

While these policy statements, strategies, and recommendations are a reflection of the importance of zoonotic diseases to global health, caution must be urged against a stereotyped understanding of One Health as a policy process meant for some selected set of professionals if the 'collaboration of all relevant stakeholders' in One Health must hold. In other words, the control of neglected zoonotic diseases goes beyond policy programmes, processes, technologies and interdisciplinary collaboration. The complexity in events of the diseases, the ever emerging scientific evidence of the pathogens (Degeling *et al.,* 2015) demand that researchers and practitioners should reach consensus engagement with the political, social, economic and cultural sphere (Kingsley and Taylor, 2015). This demand extends to interventions aimed at reducing the impact of animal-human disease transmission in pastoralist communities.

1.5 National Response to One Health

Nigeria has a long history of dealing with zoonotic diseases, which influence current approaches to 'One Health'. In this section, I highlight several examples of tackling 'One Health' problems which prefigure the projects described in this thesis. The early 1980s saw the onset of control programmes targeted at specific neglected tropical diseases. Prior to this, series of vaccination programmes for the control of diseases such as rinderpest, contagious bovine pleuropneumonia (CBPP) and peste-des-petits ruminants (PPR) were implemented in the early 1960s and these vaccination programmes brought the incidence of the diseases to the minimal. Efforts geared towards the control of other diseases did not yield the same results. The production of rabies vaccines by the Nigerian Institute of Veterinary Research in 1956 was a welcome technology to control the spread of rabies. However, the impact was not felt as vaccinations of dogs were low (Adeyemi and Zessin, 2000), a result of the abandoned free mass immunisation of dogs declared in 1982 by the government (Adeyemi *et al.,* 2005).

An understanding of Human African Trypanosomiasis (HAT) from the biomedical point of view led to the application of technological solutions to the control of the disease in Nigeria within the periods of 1955 to 1964. These involved breaking the transmission cycle of the disease (from animal to animal, and animal to man) by the disease vector (the tsetse fly) through spraying of the natural habitats of tsetse fly with insecticides. With time, this technique was abandoned because they were problematic with regards to cost, labour and damage to fauna and flora. Also, the reinvasion of tsetse flies in sprayed areas further discouraged commitment of programmes (Davies, 1964). While the biological and environmental factors got considered in the control of the disease, the intervention programme failed to put into context the seasonal variations characteristic of the country. Management of the disease with drugs might be a welcome respite but met with problems of

drug resistance and toxicity (Onyeyili and Egwu, 1995). As pointed out by Hotez *et al.,* (2012), the diseases caught the attention of the government when it became apparent that the economy of the country might be adversely affected.

The economic crisis in the 1980s had the Nigerian government adopt the Structural Adjustment Programme (SAP). The SAP brought a change to the service delivery and organisational arrangements of government programmes to promote cost-effectiveness and strategic planning. This change is reflected in the Neglected Tropical Disease (NTD) programme[2]. This programme, under the control of the Federal Ministry of Health, was set up in 2012 to address all the NTDs. Although some community-directed interventions such as the distribution of generic drugs and health education got implemented, it was not easy to pinpoint programmes that applied the One Health concept.

Despite the inclusion of rabies and Human African Trypanosomiasis (HAT) in the diseases targeted for control, elimination and eradication in Nigeria, there is little epidemiological data available for these two aforementioned diseases (Nigeria Masterplan for NTDs). Poor coordination of activities and actions needed at the national level to effect viable change to disease transmission adversely affects the delivery of health services at the local level where a large concentration of infectious diseases exist. These problems are themselves part of the lack of collaboration of different disciplines and stakeholders needed to control these diseases. This lack of focus is a point of interest and concern as it relates to this project.

The convergence of people and animals within the environment has created a new dynamic in which the health of each group is inextricably interconnected. There have been growing concerns about the persistent threat to human health by the risk posed by the emerging and

[2] The NTDs programme in Nigeria addresses the following diseases; Onchocerciasis, Soil Transmitted Helminths, Lymphatic Filariasis, Schistosomiasis, Human African Trypanosomiasis, Leprosy, Buruli Ulcer, Trachoma and Guinea Worm Diseases

re- emerging zoonotic diseases demonstrated by the recent pandemic of H1N1 (Swine flu) and widespread epidemics of H5N1 (Avian/Bird Flu). The incidence of the HPA1 (Avian influenza) outbreak in Nigeria in 2006 led to widespread adoption of the One Health approach employed to curtail the epidemic. However, there have since been concerns about the sustainability of such collaborations (Okello, 2012). Recently, Nigeria was internationally commended for its efforts in controlling the Ebola outbreak and declaring it 'Ebola free.' The political will, dedication and the use of resources (both human and material) and the coordination of programmes incorporating all relevant stakeholders, highlighted Nigeria as a country to be emulated by other countries (developed countries inclusive), affected by Ebola virus. From the success recorded on the Ebola scourge, it can, therefore, be said that the failures of past health programmes in Nigeria resulted from the lack of political will and coordination of activities. As stated by Okello *et al.,* (2014), One Health in Nigeria shows good possibilities. However, these possibilities are yet to be realised because One Health policy is yet to be institutionalized and facilitated across all tiers of government. This situation has lead to lost benefits especially in the remote rural populations, where they could be of utmost significance. The non-institutionalization of One Health policy across ministries and all tiers of government have contributed to the re- emerging of zoonotic diseases in some areas in the country.

1.6 The Concept of 'Household Health Security'

The lapse in health care delivery could, however, translate into household health insecurity among the disadvantaged groups of people highly susceptible to zoonotic diseases. A pertinent research and policy question is how the existing system of animal and health care delivery in local areas can be developed to accommodate the One Health. To proffer an

answer to this question, this section highlights various opinions of what health security is and its relationship to promoting sustainable development.

Despite several kinds of literature on human security, health security, global health security and related topics (Aldis, 2009), there seems to be no definite definition of health security. According to Aldis (2009), review of the literature reveals that problems occur around the concept of 'health security' at the intersection of several fields or disciplines which do not share a common theoretical approach or academic methodology. There seems to be a significant difference in understanding the application of the concept 'health security' within the United Nations (UN), for example, between the United Nations Development Programme (UNDP) and the World Health Organization (WHO).

The UNDP's annual Human Development Report, titled New Dimensions of Human Security published in 1994, described human security with regards to the safety of individuals as well as nation-states, and as a platform for sustainable development. It further identified seven categories of threats to human security: economic, food scarcity, health, environment, personal, community and political (Nef, 1997; Reed and Tehranian, 1999; Thomas, 2001; Axworthy, 2001). This report was reinforced by a statement from the former United Nations Secretary-General Kofi Annan who declared that human security comprises of human rights, good governance, access to education, and health care. Furthermore, it ensures that each has opportunities and choices to fulfil his or her potential rather than basing it solely on the conventional linkage of human security with violent conflict (Annan 2000 cited in Iqbal, 2006). As several scholars have observed, health is a dominant force in the arena of human security (Chen, 2004).

In 2001, the World Health Assembly's Resolution 54.14 'Global Health Security: Epidemic Alert and Response' linked the health security concept to a comprehensive strategy for

prevention of movement of communicable diseases across national borders (Aldis, 2009). This linkage was in recognition that some infectious diseases such as anthrax and HIV/AIDS could probably be used as agents of bioterrorism (Chen and Narasimhan, 2003). Furthermore, in 2007, Health Security was selected as the theme of the World Health Day and of the annual World Health Report (WHR) which differentiated 'global public health security' from 'individual security'. Thus, the 2007 WHR focused only on 'specific issues that threaten the health of people internationally', with emphasis almost exclusively on global compliance with the International Health Regulations (IHR) (Aldis, 2009). This perhaps explains the reason why much attention is focused on biomedical interventions of communicable diseases rather than on the social aspects of the conditions.

In this study, infectious diseases, considered zoonotic diseases are disruptions to communities' survival which affect people's capacity to cope with and achieve a sustainable livelihood. Household health security could also be a basis for health system reform towards achieving a sustainable livelihood. It encompasses a range of health and social services that influence occurrences of illness or disease and the impact on individual and household finances. It could also be a strategy to carry forward the notion of integrated care. This strategy leads to a health-secured household which is a step in the right direction to achieving a sustainable livelihood. The successful implementation of One Health is the route through which this could be possible. Some in-depth understanding derived from the study of the partnership and ownership of economic strategies within the sectors of the people, the study of the utilisation of the available assets within their disposal for capacity strengthening and institutional reform have further informed this view. The existing strategic processes could be built upon to achieve desired goals rather than having new initiatives, which may have a catalysing effect on time, finances, and manpower.

1.7 Pastoralism and Livelihoods

The growing body of literature on pastoralism reflects its importance to the growth and development of the agricultural sector in Sub-Saharan Africa. Although some of these publications dwell on the economic, environmental, and political aspect of pastoralism, many seem to put the cart before the horse as the center piece of attraction is in livestock production and management. Though, most of these studies are anthropological, rarely do they place much emphasis on pastoralist's wellbeing and person as a whole. As Chambers (2014) describes it; it is a case of putting the last first. A review of studies has revealed that pastoralists contribute directly and indirectly to the national GDPs of countries with the dominant agricultural sector (Hatfield and Davies, 2006). Yet, they are a marginalised group in developmental processes (Kandagor, 2005; Young *et al.,* 2009; Rass, 2006).

The pastoralists are defined as a group of people whose means of income and livelihood depend mainly on livestock production. The primary requirements for pastoralist production are livestock, labour, and access to key grazing and water resources (Homewood *et al.,* 2012). Commonly favourable terms of trade for pastoral produce against grain make it possible for people to make a living selling milk or meat from even relatively low herd numbers (Swift 1986; Sikana *et al.,* 1993). The search for pasture and water for cattle and, to a greater extent, their vulnerabilities to threats and shocks to their livelihood determine, in part, their categorization into nomadic, sedentary and transhumance pastoralism. Pastoralists almost always combine these livestock-focused occupations with complementary livelihood activities (Homewood, 2008): farming, fishing, hunting and gathering, processing natural resources for sale, artisanal work, wage labour, salaried employment and/or investment in non-pastoral trade and businesses

The largest group of pastoralists is the Fulbe or Fulani that constitute about 95 per cent of the nomadic herders in Nigeria (Fabusoro, 2009). They hold over 90 per cent of Nigeria's livestock with the livestock sub-sector accounting for 3.2 per cent of the nation's Gross Domestic Product (GDP) (Tahir *et al.,* 2005). Despite their importance in the food chain, the Fulani pastoralists are neglected in health programmes and initiatives that are driven to fight poverty (see Brieger *et al.,* 2002; Metiboba, 2011). This neglect is further reinforced by an insight into the latest report of strengthening health systems by WHO, which reveals that most underprivileged groups of people, except the pastoralists, were considered in intervention programmes (WHO, 2004). Their geographical location, poor communication, civil status, low priorities (Cohen, 2005) tend to be some of the factors responsible for this neglect. Diseases of impact on both human and animal referred to as zoonotic diseases are either overlooked or forgotten. Thus, they are being called 'neglected diseases'. The 'forgotten' or 'neglected' groups in health programmes due to their involvement with livestock could be highly susceptible to the 'neglected' zoonotic diseases. This neglect is a genuine threat to the health status of both man and animal and contributes to the poverty status of such group of people. A further disturbing situation is that many studies on pastoral livelihoods seem to be somewhat out of step with gender relations within the patriarchal family system (Hodgson, 1999).

1.8 Gender Neglect in Neglected Tropical Diseases

In this section I highlight the neglect of gender in programmes addressing neglected tropical diseases and livelihoods and the influence of such neglect in sustainable development. Neglected Tropical Diseases have grave consequences on livelihoods, consequences that can either be reparable (if immediate necessary actions are taken) or irreparable (if necessary actions are delayed) in disease-prone areas. They are commonly referred to as diseases of the

deprived, irrespective of the abode of residence (urban and rural) (Hotez and Kamath, 2009). NTDs could be catastrophic to the high population of poor people characteristic of Sub-Saharan Africa (SSA). The multifaceted modes of infection of NTDs, apart from the physical harm to humans, are also of an economic burden to the tens of millions of people living in poverty in Sub-Saharan Africa (Hotez and Kamath, 2009). The incidence of NTDs leading to poverty, its cost effective control approaches and its sustainability effect on poverty reduction were an attraction to international funding bodies (Hotez *et al.,* 2007).

The commitment of global funds and the formation of a Global Network for Neglected Tropical Diseases in 2006 show an unrelenting approach to the control of NTDs affecting the tens of millions of poor people living in Sub-Saharan Africa. However, much is still left to be done. Classing the three big diseases: malaria, tuberculosis, and HIV/AIDs as diseases of control and elimination in the MDGs has downplayed the importance of other NTDs to development, one of the many reasons accounting for its 'neglect' in policies of Sub-Saharan African countries. The high prominence given to the three big diseases extended to the studies and research aimed at measuring as well as exploring the effect of such diseases on the social, cultural, economic, political and technological development of SSA countries. Invigorating intervention and radical approaches (both horizontal and vertical) employed in the control of the much prioritized diseases saw an increase in the attention to the prevention and treatment of such diseases. As illustrated in this thesis, investments in the control of the NTDs could achieve its hallmark of effecting change on poor people if the economic and social dynamics of the NTDs are targeted alongside the biomedical control of the disease (Sachs, 2008 cited in Hotez *et al.,* 2009).

The control of neglected tropical diseases has become a globalized issue which recognizes that the lack of adequate and timely action needed in curbing the incidence of the disease, commonly prevalent among poor people, could lead to a global crisis. The One Health

agenda in part responds to this problem, particularly focussing on zoonotic diseases, an important subset of neglected tropical diseases. One Health literature rarely discusses on the importance of women in the achievement of One Health. In various recent conferences and collections of paper which centre around One Health, gender is either a marginal topic, or ignored altogether. For instance, poultry production has often been proposed as a potentially positive development strategy for women, as the nature of the industry has great potential for female participation and leadership. Yet gender rarely played a role in the research response to the Avian flu crisis. Women, forming the greater proportion of the bottom billion poor people, are hardly given consideration during the planning and implementation of control programmes. However, during the panel discussion of the 'First Prepcam for the World Summit on Sustainable Development' on the 29th of January, 2002, the Executive Director, United, and Population Fund (UNFPA) remarked that sustainable development cannot be achieved without addressing poverty and gender equality.

Historically, women were relegated to the background as they are viewed as possessions owned by and thus subjugated to men. As consequences of this, many anthropologists base their presentation of men on gender differenciation and stratification occurring in society (Marini, 1990). Culture and power dynamics are sighted as some of the factors contributing to the lack of prominence of women in the pastoral system. The habitual productive and reproductive roles of women in pastoral communities have obscured their other potentials of impacting positively on the communities in which they live. Only a few studies have described accounts of women's other roles and responsibilities apart from familial roles in a pastoralist system (Assan, 2014; Dyson-Hudson and Dyson-Hudson, 1980).

The relegation of women, especially in pastoral communities of developing countries, has placed an enormous burden on them. As managers of the home front, the bulk of feeding the family, of providing home-based care and managing small livestock fall within their

responsibilities. Not supernatural beings themselves, the women also succumb to illness, and this poses the question of how the carer of the household will be cared for. In a study of settled and mobile pastoral mothers and children near Lake Chad, the prevalence of intestinal parasitic infection was 75% among women and 60% among children (Bechir *et al.,* 2012). In essence, their essential contribution to the wellbeing of the household signifies the importance of positioning pastoral women in developmental processes.

Dahlgren (1996), states that the traditional public health approach is top-down rather than bottom-up, with experts identifying problems and formulating interventions while the problems and solutions hardly perceived by those at particular risk constitute the base for action. Women are mostly affected because of their low representation in decision-making bodies and as a result, the top-down approach of health promotion programmes will not necessarily correspond to women's health needs. Because of power imbalances and because of the low representation of women in decision-making bodies, women seldom have the opportunities to make their voices heard. Health promotion policies and activities are most meaningful when target communities and groups are involved in all aspects of policy and programme development, implementation and evaluation. This approach is a bottom-up approach which is now frequently adopted by health researchers, policy makers, for effective health programming. Rahman *et al.,* 1996 (cited in Ostlin *et al.,* 2006) reported a successful project in controlling water associated diseases. The success of the programme was mainly attributed to women's role and participation. The relationship between gender and zoonotic diseases needs exploring if programmes targeting the breakdown of transmission of these diseases need successful implementation. Furthermore, strengthening the social and economic status of women can ensure policy formulation at the national, state and local levels of government system obtainable in Nigeria. An understanding of the constraints faced by women with particular emphasis on health, social and economic factors is needed in

achieving sustainable livelihood as household sustainability largely depends on women. The non-inclusion of pastoral women in health programming to improve livelihoods of pastoralists has been exacerbated by cultural practices that have shaped policy in affecting development among the pastoralist population.

For One Health to achieve its purpose of building sustainable livelihoods, especially in areas highly predisposed to zoonotic diseases, the planning and implementation of its programmes must capture the culture, gender relations, factors to disease occurrence and the knowledge, attitudes and practices of both genders on prevention and control of zoonotic diseases. One Health must endeavour to understand the roles of women and men in building livelihoods and reconcile them with the delivery of intervention programmes to promote sustainable livelihoods.

It is important to carry out a situation analysis of intervention sites to have an empirical understanding of the processes and the various dimensions to livelihoods. Livelihoods, understood in a conceptual manner, have influenced programme perceptions as well as practices aimed at building sustainable livelihoods of poor rural people (Carney, 2003). Though many disciplines, apart from those in the medical field, recognize the importance of empirical studies to set priorities and deliver effective services, the rhetoric has exceeded the reality (Lomas, 2000). Understanding the complex realities of diverse livelihoods through the commitment to local field work could bring about an emergence of approaches needed to unpack the complex issues surrounding livelihoods (Scoones, 2009). A gender analysis approach of understanding the constraints, challenges as well as resilience to livelihoods of poor people in rural areas, especially the group of people known to be in proximity to livestock, is essential to effective planning and implementation of the One Health concept of animal and human health care development. It is an entry point through which sustainable livelihoods could be achieved. Local evidence and local perspectives obtained through

empirical studies should be able to inform and drive policy and developmental programmes rather than the reliance on speculative assumptions characteristics of such programmes. Drawing from the empirical research, this thesis adopts a gender approach to analyse One Health at the local level and thus contributes to the body of work on pastoral livelihoods and development.

1.9 Thesis Structure

The study employed a multiple case study approach as a step in gaining knowledge from the scope of life understudied as opposed to conceptualizing on theoretical knowledge. The thesis concept has been structured around three empirical case studies detailed out in chapters 4, 5 and 6.

Chapter two of the thesis outlines the theoretical framework and a brief discussion of the key issues to the study. This chapter describes the components of sustainable livelihoods based on observations and responses obtained from the case studies. A health-secured household is crucial to achieving sustainable livelihoods. The feasibility of One Health approach to making health development in poor rural, remote areas is highlighted. The methodology employed in the case studies is also presented in this chapter. The reasons for the choice of the methodological approach adopted, the challenges and limitations encountered during the study are also presented.

Chapter three gives a contextual analysis of the conditions and trends in the case study areas. The analysis obtained from reviews of literature and findings obtained from other previous research carried out within the case study areas and other areas that relate to the scope of the study provide the basis for which knowledge of the case study areas, the study populations, and their livelihoods was acquired. This chapter, in a nutshell, provides the background

information on the vulnerabilities to livelihoods of the study population and an understanding of the strategies (political, social and institutional) employed as efforts to develop and maintain a sustainable livelihood.

This study, conducted in one of the few gazetted grazing reserves in Nigeria, Kachia Grazing Reserve, situated in one of the Northern States of Nigeria, forms the first case study which presents the inadequacies of grazing reserves in Nigeria and this is the focus of chapter four. It is argued that these inadequacies affect gender, gender relations, and livelihoods at the Kachia Grazing Reserve. Strategies employed by the study population (both men and women) to cope with, as well as to build their resilience to the inadequacies of the grazing reserve are explored. The chapter analyses the difficulties in implementing One Health approach in local pastoralist areas. From this detailed analysis, the thesis argues that environmental instability and a lack of consideration of gender issues in programme planning and implementation could deter as well as impede development programmes set to improve the livelihoods of poor people.

In chapter five, an overview of women self-help groups of the Kachia Grazing Reserve is presented. The chapter begins with a background description of different laid out approaches to gender and development and argues on the influence of such approaches to planning and implementation of One Health. It also argued that the inability of the women groups to effectively make a great impact on different segments of the development of the grazing reserve could be traced to the shortfalls of the laid out approaches and the negatively perceived roles of women in society. The chapter concludes that women self-help groups, considering their activities in the grazing reserve, could be used as instruments in propelling the One Health concept in pastoral areas like that of the KGR.

The last of the case studies of the research is related to chapter six and the focus is on conflict and violence in the Jos Plateau area, the effect of such crisis on gender, gender relations and livelihoods. Particular attention is paid to examining how the One Health concept of programme delivery could act as a conflict resolution in conflict and violence inflicted pastoralist areas as the Jos Plateau.

Chapter seven concludes the thesis, highlighting the insights got from the three case studies. The chapter concludes by pointing out that considerations of environmental factors as well as social and institutional support are essential elements that are needed for the successful implementation of One Health programmes in pastoralist areas of Sub-Saharan Africa.

In conclusion, this thesis, by identifying the neglect of gender in development programmes contributes to the existing body of work on gender and livelihoods as well as on One Health.

CHAPTER 2

Health Security and Sustainable Livelihoods Approach (Methodology)

2.0 Introduction

Being health secure is essential to achieving a sustainable livelihood. Sustainability is a top priority of actors involved in programmes to improve the health, livelihood, and welfare of populations. Programme sustainability seems to be a growing concern worldwide (Shediac-Rizkallah and Bone, 1998). Since sustainability is holistic in nature, a multi-sectoral approach is a plausible path for achieving sustainability (Wall, 1996). The integration of public health and medical care delivery in local health systems while neglecting the veterinary aspect seemed to be the increased interest in health programming years back (Leonard, 2000 cited in Leyland and Catley, 2002). However, in recent years there has been a shift towards the promotion of One Health as researchers and policymakers recognised the overlap in public health of the control of diseases transmissible between animals and humans (zoonoses). Therefore, it is necessary to try and understand how One Health could affect the sustainability of livelihoods especially within groups of people known to be near animals and are therefore highly susceptible to zoonotic diseases. It highlights the individual factors' (especially gender) role in moving One Health. This chapter, therefore, highlights the methodological approach taken in the research as well as the theoretical framework employed with which the methodology of the study is conceptualized and analysed.

2.1. Sustainable Livelihood Approach

The Sustainable Livelihood Approach is an approach that classifies a livelihood as a composite, which comprise of the capabilities, assets (including both material and social

resources), and activities required for a means of living (Scoones, 1998). 'Sustainability' as a word has generated a lot of controversy in the social sciences with regards to its definition (Lele, 1991). Sutton (2004) grouped the definitions of sustainability into different typologies: definitions based on 'essence', 'strategies', 'outcome' and 'movements'[3]. The policy concept of sustainability is derived from the 1987 Brundtland Report[4], which focused on the political issues of development and environment in the long and short term, taking it from the economic, social and environmental dimension. 'Durability,' 'reparability' and 'upgradability' are the key elements in achieving sustainability (Renner, 2000). Interventions or activities aimed at developing sustainability should consider these key elements before implementation. A wide array of literature on sustainability applied to societies, development, geography, economics and livelihoods, contributes to the high debate on its definition. The primary focus of sustainability in this thesis is on livelihoods.

Sustainable livelihoods approaches to poverty reduction are widely acknowledged in livelihood studies. However, its application has generated a lot of debates and discusses in the developmental field. The following sections, therefore, discuss its preference in usage to other approaches in poverty alleviation, its limitations in usage, its application in policy and development programmes and how inspite of its limitation, it best fits the line of inquiry of this research.

A livelihood is a means of making a living (IFRC, 2004). According to Chambers and Conway (1991), a livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. Livelihoods, according to Goeldner and Ritchie (2003), are also referred to those things (material and social) that allow a person to live well. It includes clean water, shelter, access to health care, access to

[3] See http://www.green-innovations.asn.au/
[4] See World Commission on Environment and Development (WCED) Our Common Future; Oxford University Press: New York, NY, USA, 1987.

education, freedom from abuse, access to credit facilities, virtually anything that would contribute to "quality of life". From these definitions, it can be deduced that livelihoods are ‘people centred’ and therefore focuses on the factors that contribute to the wellbeing of a person, what matters to people, their capabilities, incapabilities, assets, and activities. Therefore, in summary, a livelihood is said to be sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base (Chambers and Conway, 1992).

Discussion in reviews of literature states that development actors build their livelihood approaches to earlier development theories. These theories include aspects of the Integrated Rural Development Planning (IRDP) approaches of the 1970s, food security initiatives during the 1980s; Rapid Rural Appraisal (RRA); Participatory Rural Appraisal (PRA); and farming systems research. Others include gender analysis, new understandings of poverty and wellbeing, risk and vulnerability assessment (Ellis and Biggs, 2001). The development actors acknowledged that these earlier theories failed to encompass entirely vital aspects of poverty such as vulnerability and social exclusion but rather focused only on certain aspects or manifestations of poverty and operated more on a ‘top-down’ approach with barely any regard to local circumstances (Ellis and Biggs, 2001). In addition, many emphasized mainly on the inaccessibility of food as the main factor of poverty. In essence, they fail to pay attention to the various factors and processes which either restrain or develop poor people's ability to make a living in an economically, politically, ecologically and socially sustainable manner.

New livelihood approaches emerged as a response to the problems of the old rural development theories. These hold that livelihoods within communities can best be achieved by development changes based on local actors, capabilities and resources. The sustainable

livelihood approach and the endogenous approaches (participatory and empowerment) to development are examples of the new livelihood approaches to poverty alleviation. The sustainable livelihood approach offers a more articulate holistic approach to the study of poverty which fits more closely with the recent trend for participatory and empowerment approaches of development. It has fewer limitations in application to research projects of development than the participatory and empowerment approach to development. In a way, it encompasses the two approaches in one. The participatory approach is a concept that is widely applied in academic and project documents for development purposes. Its relevance is seen, as no project without provision for the participation of the people during implementation can be funded (White *et al.,* 1994 cited in Michener, 1998). It is a concept that has been in existence since the 1970's solely for meeting the basic needs of the people and by ensuring that projects aimed at achieving this feat reach the poor. However, despite its importance, it has its shortfalls; participatory projects do not necessarily meet the felt needs of the beneficiaries, as most funding agencies do not consider the perceived needs as important, and thus funding is not provided for such. Therefore, baseline survey to know the needs of beneficiaries before project implementation is seen as unnecessary. In participatory approaches, most of the recipients of project intervention are manipulated to meet the needs and objectives of leaders and donor agencies, rather than empowering them by having control over programmes policy and management (Michener, 1998). This approach deviates from its original objective of involving people, particularly the poor and powerless in making decisions and formulating strategies and policies to empower themselves. Empowerment approach, on the other hand, is described as placing autonomy on decision making for the community, building self-reliance and confidence. It is an approach that evolved into development from diverse sources such as pro-feminist groups, Christian right, New Age self-help manuals and business management (Moore, 2001). According to the World

Development Report of 2000/ 2001, empowerment approach entails expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control and hold accountable institutions that affect their lives. The approach is not a neutral process as it may favour some people over others because of social status, educational attainment, and cultural differences. The sustainable livelihood approach has a significant advantage over the other two approaches discussed above because of its holistic nature. It encompasses different entries of interventions, also allows analysis, planning, all stages of research, and not limited to any one field/discipline which is more suitable to One Health as all the different actors significant to development and poverty eradication programmes are accommodated in the approach. The other methods (participatory and empowerment) are limited to the intervention stage only.

Sustainable livelihoods have evolved in three clear ways: as a normative goal, as a framework for conceptual analysis and as a set of principles for action (Bryceson, 1999; Ellis, 2000; Ellis and Mdoe, 2003; Farrington, 2001). Seen as a part of a wider paradigm shift (Hall and Midgley 2004), the SLAs are based on a multidimensional understanding of people's lives and recognise the different assets and entitlements that people hold in the wider context of institutions, regulations, and cultural norms. An understanding of the intricacy and combined nature of livelihoods allows for a better understanding of vulnerability to external shocks and stresses. According to Krantz (2001), there are three insights into poverty which reinforce this new approach. The first is the realization that although economic growth is essential for alleviating poverty, one should also put into consideration that for this to be achieved, the poor need to be capable of making use of the opportunities of economic growth. Secondly, there is the realization that poverty, as alleged by the poor themselves, is not only of low income but also includes other dimensions such as bad health, illiteracy, lack of social

services, etc., as well as a state of susceptibility and helplessness. Finally, it is now recognized that the poor themselves often know their situation and needs best; and must, therefore, be involved in the design and implementation of policies and project intended to improve their status in life. The SL concept has an integrated approach to application. Rather than addressing a specific sector such as water, agriculture or land, it tries to encapsulate all other factors responsible for poverty. Bebbington (1999), states that the analysis of rural livelihoods goes beyond its linkage to agriculture and natural resources. Such analysis of rural livelihoods identifies with all factors that could hinder as well as promote a livelihood in a sustainable manner. However, there is the argument that the sustainable livelihood approach does not in any way set out to establish integrated plans, that it targets some areas of development such as agricultural production, income diversification and infrastructure with an emphasis on bottom-up approach (Carney, 1999). In as much as this approach may not undermine their natural resource base, attending to these areas of development could be regarded only as just meeting the perceived needs of local people.

Sustainable livelihood thinking sees policy and technical interventions as the obvious solutions to development. It assumes that increasing the resource base and promoting services for quality of life are the specifications for development as focus appears to be on the material and social aspect of resources. These specifications have in a way drawn development to the field of technical and economic specialists as seen from the analysis of rural development by researchers and field practitioners. Not surprisingly, most of the analysis is flooded with the language and concerns of technology and economy.

The analysis of development interventions tends to be critical rather than constructive. As seen from the anthropological point of view of development, the problem of development has a moral connotation as the concern to meet up to the 'modus operandi' takes a more prominent stand than to the responsibilities to deliver useful results. To address these

shortcomings, Giri and Ufford (2003), call for a movement that goes beyond the post-structuralist critique to that of a constructive critique of development which may reveal a new understanding for successful development interventions.

The sustainable livelihood approach gives many dimensions to factors that affect the livelihoods of the poor and diverse entry points of structures and processes through which to effect changes. Though it is not a concise approach, its usage or application in research is open to a lot of debate. Many studies on livelihood approaches tend to focus on rural localities as it is assumed that that is where the poor resides. The concept is only applicable in urban or peri-urban areas when technicalities relating to income, policy programmes or resource mobilization disrupts livelihoods. Though physical stability is common to both localities, the study areas of this research, regarded as rural and peri-urban areas have populations that constantly or periodically move from one locality to another (either rural or urban). The 'always on the move' population, most especially, during migration, has been given little attention in livelihood studies (De Haan, 1999). Migration is a livelihood strategy employed among the Fulani pastoralists in this research. This study, like other livelihood studies on pastoralists, understudied the sedentary pastoral population in both rural and peri-urban areas but failed to assess their livelihood conditions while on migration. However, migration, irrespective of its benefits to livelihoods was identified as one of the threats to the livelihoods of Fulani pastoralists in the study areas. Livestock keeping plays a significant role in the livelihoods of these groups of population. According to them, their livestock is susceptible to animal diseases; especially many are infectious during migration and this adversely affects their livelihoods. Most especially, it impacts on their health, financial and material resources. However, despite these shortfalls of the sustainable livelihood approach and in recognition of its flexibility in effecting changes to livelihoods, this research integrates

One Health into the sustainable livelihood approach to give an in-depth dimension of the livestock diseases of importance to the livelihood of pastoralists.

Most users of the approach also fail to emphasize on governance, power and rights of the poor and how these can effect changes in social relations despite the fact that the SL approach places great importance on involving people in both the identification of problems and the implementation of activities to alleviate the problems where appropriate. However, this research in capturing this failure looked into the existing system of governance in the study areas and the level of power and rights to making livelihood choices. It was discovered that these not only have effects on social relations but also caused a distrust of intervention programmes. It was also learnt that research with no background in economics or work experience with the private sector tends to downplay or altogether ignore the importance of market and economic issues in the analysis of the SL approach. Although, as a researcher with no background in economics, within my capability and knowing that markets influence livelihood strategies and outcomes, I tried to address the role of the market using the sustainable livelihood analysis by establishing the cost of acquiring assets such as physical assets and human assets (labour, health). Also, the sustainable livelihood approach being a model in the abstract can be difficult to apply in reality, considering the power relations and the issue of bureaucracy in most resource-poor areas. For example, the use of SL approaches in India, lent way to problem understanding such as power relations but does not compel a change (Farrington *et al.,* 1999a). A high number of poor people depend on the private sector for livelihood. However, most researchers and practitioners of the sustainable livelihood approach tend to give more attention to the public sector with no particular defined role on the livelihoods of the poor. They ignore the fact that the farm, which is a typical 'work place' for the many poor could be regarded as belonging to the public sector despite being private owned. Public-private partnership can counter balance obstacles that could hinder the poor

from making their way out of poverty. The One Health is a good example of this sort of partnership which this study expounded upon to illustrate its importance in making livelihoods sustainable.

The Sustainable Livelihood Approach became popularized during the Brundtland Commission on Environment and Development in 1987. The sustainable livelihood approach was further expanded at the 1992 United Nations Conference on Environment and Development. The conference advocated the achievement of sustainable livelihoods as a broad goal for poverty eradication. Most programmes have evolved following this advocacy. The Bolsa Familia Programme (BFP) in Brazil[5] is an example of a programme aimed at breaking intergenerational poverty. One of the strategies taken to achieve this objective was by stimulating the sustained empowerment of families living in extreme poverty by formulating laws that assure direct cash transfer to families in poverty or extreme poverty. Another example is that of the Zibambale Public Works Programme in KwaZulu-Natal, South Africa. This programme was initiated in 2000 with the goal of the creation of sustainable job opportunities for poor rural families through the maintenance of rural roads (KwaZulu-Natal Department of Transport, 2002). Another distinct initiative which was introduced by the World Bank and IMF in 1980 is the Structural Adjustment Programme (SAP). This initiative was set up to help countries reduce their current account deficit to more manageable proportions by supporting programmes of adjustment to strengthen their balance of payments while maintaining their growth and developmental momentum[6]. Ahmed and Lipton (1997) reviewed the impact of Structural Adjustment Programmes on the sustainability of rural livelihoods in countries like Malawi, Burkina Faso, Ghana, and Zimbabwe. They concluded that these programmes had no general improvement or decline in

[5] BFP is a programme initiated by President Lula of Brazil in 2003 as a strategy to eradicate hunger and fight poverty
[6] World Bank 1980 pp. 67-68

the quantity, quality or sustainability of rural livelihoods on adjustment measures as different marked factors and characteristics cut across countries and regions.

Other programmes which adopted the SL approach can attest to its uptake. Some examples are the Livelihoods and Diversification Directions Explored by Research (LADDER) Project conducted by the Overseas Development Groups of the University of East Anglia in Uganda, Tanzania, Malawi and Kenya. Others include the Livelihoods Options in South Asia project by the Overseas Development Institute and the Institute of Development Studies Sustainable Livelihoods in Southern Africa. The use of the approach enabled the use of findings obtained on ground to update and challenge established policies (Ashley *et al.,* 1999).

Three agencies, known for development activities, especially in programmes that have poverty eradication as one of their focuses, use the sustainable livelihood approach in different ways. These agencies are the UNDP, CARE and DFID. Depending on the agency, the approach can be used primarily as an analytical framework or tool for programme planning and assessment/analysis or as a programme in itself. The DFID sustainable livelihood is a fundamental framework with a set of principles to guide analysis of programmes, to set objectives of projects and identify entry points for interventions. While the DFID and UNDP work at the community level, CARE uses the sustainable approach to facilitate and plan projects and programmes at the household level. Though the three agencies focus on assessing the direct and indirect effects on people's livelihoods, they fail to identify the poor. The preference for the use of the DFID approach in many programmes over the other two agencies reflects its appropriateness in addressing poverty. Aware of the complexity in the identification of the poor, the DFID approach acknowledged that poverty and the identification of the poor in a locality are best determined during the process of analysing livelihoods. This opens the 'tool box' of 'how', 'who', and on 'what' basis is the

identification process. From such, problems associated with its application in programmes as well as solutions to the problems have evolved. One of the issues addressed in this study is how the issue of informal structures of social dominance and power affect livelihoods. Evidence has shown that informal structures of social dominance and power within the communities themselves influence the local distribution of resources and other livelihood opportunities (Krantz, 2001). Even though DFID includes power relations as one aspect of 'transforming processes' to be examined, it conveniently leans more towards the formal structures of transforming processes such as policies, organizations and legislations. Policies and organizations undergo reviews structured towards livestock management. Pastoral areas are often targeted with a stereotyped logic behind the interventions. Culture and the complexity in pastoralism are some of the factors considered during the planning and implementation of interventions. It is no surprise that the men are usually their focal point through which livestock management can be achieved. Problems arise in the study areas when women are secluded from livestock programmes. For example, poor knowledge on the prevention and control of livestock diseases impacts on women's household roles. Also, women are often categorized as poor people and as such the DFID sustainable livelihood framework relates gender to economic status. Intragroup axes of inequalities and differentiation which contribute to the vulnerabilities of pastoral women are neglected in livelihood approaches. Evidence reveals that differences in the educational status of women in the study areas, directly and indirectly, influence livelihood strategies that increase their resilience or vulnerabilities to shocks and threats to livelihoods.

Despite the stated concerns of the DFID SLA, the use of the DFID sustainable livelihood approach 'tool box' in this research guarded the research by examining 'what' poverty is, 'how' it can be understood, 'who' the poor are and 'why' they are in poverty. This cross-examination facilitated meeting the objectives of this research. Hamilton-Peach and

Townsley (2004) stated that the linkages between the different elements in the SL framework such as the connections between institutions and organisations, between assets and outcomes and between vulnerabilities and strategies cannot be fully described except perhaps in a qualitative and mostly cultural context. This study, also, by following this line of thought gives an in-depth explanation on the linkages between the different elements of the framework and identifies all factors that could hinder as well as promote a livelihood in a sustainable manner. Through this, some shortcomings of the approach were addressed.

The DFID framework:

• is an entry point to issues and therefore gives way on how these issues link to each other;

• draws attention to core influences and processes; and

• highlights the multiple interactions between the various factors which affect livelihoods

The framework is centred on people, especially the poor. It does not operate in a predictable manner and neither does it try to present a model of reality but operates according to the situation that presents itself. The framework summarises the main components of and influences on livelihoods; it does not provide an exhaustive list of the issues considered, rather it is adapted to meet the needs of any given circumstance.

The Framework is divided into:

Vulnerability Context: This frames the external environment in which people exist. People's livelihoods are affected by the external environment in which they live, over which they have little or no control, and it is dependent on policies, institutions, and processes. It could be as a result of trends, seasons and shocks that occur over time. Within the structure of this study, shocks will be limited to those experienced through the risks to people. Such risks include natural, health, social, economic, political and environmental. Sometimes the pastoralists

have little or no control over these risks that make them highly vulnerable to hardships and poverty. Minimizing or nullifying the effects of these risks depends on the efficacy of policies, institutions and processes that are in place to address them. Trend patterns also cause vulnerability among people. Such trends include migration (both of people and livestock) as practised within the study sites.

Migratory pattern of movement of pastoralists is characterized with uncertainties and complexies. Movement in the search of water, feed and markets defined the presence of pastoralists in any particular environment irrespective of geographical location. Migration analysis is based on their costs and benefits to livelihoods. However, as argued by Aina, 1995 such analysis of movement depends on its effect on the migrant himself, the host region and region of departure. Their presence in areas has been known to cause conflicts (Meier *et al.,* 2007) while at the same time has built relationships with host communities (Unruh, 1995). As revealed in one of the study areas, Fulani pastoralists in some parts of Jos Plateau have a cordial relationship with their host communities while in other areas of the Jos Plateau, reports of conflict between the indigenes and pastoralists abound.

In a changing world of development, pastoralism has been recognised as a process of enhancing the economy. Its economic growth rate (see Scoones and Wolmer, 2006) probably informed it been featured prominently in the AU framework (The African Union, 2010). The migration of pastoralists from rural areas to urban areas could be described as the market responsiveness to meet the demand for meat and dairy products of urban areas (Amanor, 1995). Opportunities to guide against the risk of loss of animals as well as to restock their herd arise while responding to these market needs (Adriansen, 2005). However, people (both from the region of departure and host region) might be predisposed to damaging chronic diseases (Scoones and Wolmer, 2006) as herds are highly susceptible to diseases during mobility (Basset, 1986). It is true that the process of integration of pastoralists in

communities (either intra-rural or rural-urban) has led to population growth, vulnerabilities to diseases, provision of essential nutrients, increase in prices of commodities, environmental instability, underemployment and unemployment. However, their economic importance to development makes an understanding of the complexities of pastoral migration necessary. As argued by Niamir-Fuller and Turner, (1999), an insight into the resource base, the resource users, their adaptive strategies and their common property systems should provide an understanding of pastoral mobility. This understanding could provide an entry point of intervention to minimize and maximize the demerits and merits of migration respectively. According to Waters-Bayer and Bayer (1992), livestock marketing could be encouraged within arid and semi-arid areas without the need to migrate to areas rich in resources if livestock producers are provided with grain to buy. In the two study sites, population growth of cattle and human prompted periodic movement from one place to the other, in search of water and feeds for their livestock. Sales of livestock are made only in dire need as herd structure, to them, is related to social status.

People's ability to cope and recover from vulnerabilities is mostly based on their capabilities and the available assets within their reach. For example, a person that earns an income will have the financial means for uptake of health services during a disease epidemic. The coping strategy against the trends, shocks and seasonality depend on the assistance of policymakers in making it possible for poor people to access assets and also in ensuring that policies, institutions, and processes are receptive to the needs of poor people. Most times there are available resources at the disposal of poor people but due to some issues and factors, they are not able to utilize these resources to minimize their vulnerabilities to trends, shocks, and seasonality of risks. Issues such as environmental instability are mostly overlooked by policy in the study areas. These issues most times militate against the capabilities of pastoralists in the study areas in using the available resources at their disposal to reduce their vulnerabilities.

Livelihood assets: The livelihoods approach is concerned with people. It seeks to gain an accurate and realistic understanding of people's strengths (assets or capital endowments) and how they convert this into positive livelihood outcomes. It also determines how people utilize their assets in the short and long term. The belief that people require a range of assets to achieve positive livelihood outcomes influence the approach; no single category of assets on its own is sufficient to yield all the many and varied livelihood outcomes that people seek.

Assets are crucial in attaining livelihoods. They define a person's strength in achieving a livelihood (Bebbington, 1999). Chambers and Conway (1992), in their definition of 'livelihoods' state, that assets are stores, resources, claims, and access while that of Carney (1998) reports assets as those including both material and social resources. An all-encompassing definition of assets from Bebbington (1999) gives a person's assets, such as land as not merely the means with which he or she makes a living: they also give meaning to that person's world. Assets are not simply resources that people use in building livelihoods; they are resources which make them act in the capability that will be beneficial to them. It also gives them a sense of responsibility and worth (Bebbington, 1999). Assets enable people to cope with shock and stresses that might occur. Assets should not be understood only like things that allow survival, adaptation, and poverty alleviation; they also give people the ability to act and to reproduce, challenge or change the rules that govern the control, use, and transformation of resources (Giddens, 1979). The Kachia Grazing Reserve is an asset for the pastoralists. Despite it being devoid of some essentials necessary for livelihood, the pastoralists were able to cope and adapt to their environment. The feeling of having a place of their own and a sense of identity gave them that capability to take up different coping strategies to make a livelihood in the grazing reserve.

Assets can be divided into tangible and intangible assets (Swift, 1989). Tangible assets are stores and resources while intangible assets are claims and access (Chambers and Conway,

1991). Stores include food stock, jewellery, woven textiles and cash savings in banks of thrift and credit schemes while resources include land, water, trees and livestock, farm equipment, tools and domestic utensils (Chambers and Conway, 1991). Tangible assets are assets that could also be referred to as measurable and quantitative in nature. Intangible assets are claims and access, which cannot be quantified. Claims are demands and appeals made for material, moral and practical support. Access is the opportunity in practice to use a resource, store or service to obtain information, material, food or income. Review of literature has also shown that there are communities that exclusively rely on a variety of intangible assets, such as traditional knowledge, skills, traditional customs, practices, belief systems and social institutions to support their livelihoods (Arizpe, 2004; Kirshenblatt-Gimblett, 2004). From the above classification of assets, it can be seen that intangible assets sometimes influence the acquisition of tangible assets. There are five components of assets, otherwise known as capitals. They are human, social, natural, physical, financial and political capitals.

Human capital comprises health, education and labour of household members (Ellis, 1999; Narayan *et al.,* 1999). As stated by Goldsmith *et al.,* (1997), it is the total of human resources, capabilities and traits that people use to achieve goals and other resources and to invest in human capital is a lifelong goal of households and communities. Formal academic education and workplace skills training or non-formal education are essential components of human capital. They are significant for improving livelihood prospects (Ellis, 1999). The deficit in this capital affects attainment of the other capitals. Skills, knowledge, health status and ability to work efficiently can be classified as human assets. The human capital enables people to pursue different livelihood strategies to achieve their livelihood objectives. The classifications of human capitals are intrinsically linked. Skills acquisition enables one to acquire knowledge and application of this knowledge enables one to make an appropriate

decision regarding the health of both human and livestock. Chapters 4 and 5 explain this intrinsic linkage.

Ellis (1999), states that social capital is the social networks and associations to which people belong. Social resources, informal networks that facilitate co-operation in economic activities are social capital that could assist in meeting livelihood objectives. Uphoff (2000), also describes social capital as an accumulation of various types of "social, psychological, cultural, cognitive, institutional and related assets that increase the amount (or probability) of mutually beneficial cooperative behaviour". The social capital is an important capital that best determines the effectiveness and economic performance of governments. This capital varies from one region to another. Putnam (1993) argued that areas that are more efficient, effective and inclusive of government and economies could be attested to by the 'horizontal' social relationships and higher levels of participation in social organisations and networks. From the empirical data of this research, most of these social networks and associations are hardly involved in programme rolled out by the government for development. Many a times these social networks act on their own by making decisions and carrying out projects that they feel will be beneficial to their livelihoods[7].

Natural capital comprises the natural resource stocks (soil, water, air, genetic resources, etc.) and environmental services (hydrological cycle, pollution sinks) provided by public and private organisations/institutions. The natural capital also comprises of the resources flow and functions useful for livelihoods. The natural capital is a crucial component for the achievement of livelihood. For example, the agricultural system relies heavily on natural resources for it to thrive. However, despite this dependence, little is done by institutions and policies in minimizing the risks ensuing from these natural resources to livelihoods. Thus, poor people are highly vulnerable to shocks and threats. The poor people are therefore left to

[7] See chapter 5

their own devices to cope with these vulnerabilities.These coping devices could either be effective or not. A good example of different coping mechanisms among the pastoralists of the study sites is the digging of wells for water supply.

Physical capitals are human-made assets. These include the infrastructure, such as the road network, electricity, medical clinics and hospitals, schools, markets and so forth. Land, agricultural equipment, household and other productive equipment, housing, and other personal or household property are physical assets converted into resources at the household (Narayan *et al.,* 1999). Accumulating physical or material assets is considered to be one of the primary strategies for dealing with deprivation and household livelihood insecurity. It is documented that people often choose to retain a few scarce assets during times of hunger, illness or other hardship (Narayan *et al.,* 1999). The women in Kachia Grazing Reserve store water during the rainy season for use during the dry season to combat the hardship of environmental conditions.

Economic or financial capital include the capital base (cash, credit, savings, and other economic assets, including necessary infrastructure and production equipment and technologies) which are essential in the pursuit of any livelihood strategy. The assets, which the household can convert to cash in some ways, are referred to as tangible assets (May *et al.,* 2000). Households without assets are extremely vulnerable to any loss of income. They have no safety nets of their own, and they lack any possible resource, which could be used as security against credit (May *et al.,* 1995).

Transforming structures and processes: These are the institutions, organisations, policies and legislation that shape livelihood. According to FAO, they effectively determine: access (to various types of capital, to livelihood strategies and decision-making bodies and sources of influence); the terms of exchange between different kinds of capital; and returns (economic

and otherwise) to any given livelihood strategy. To buttress this, the DFID also stated in its framework that the policies, institutions and processes embrace complex issues concerning participation, power, authority, governance, laws, policies, public service delivery and social relations as influenced by gender, caste, ethnicity, age, etc. Change is needed in these structures to bring about the desired change in livelihoods. Most people erroneously term institutions, organisations, and policies as government directed, not taking into account that these are also present in other spheres such as community leaderships and social networks, an observation which DFID tried to incorporate into its framework. The women self help groups in the Kachia Grazing Reserve were able to distribute resources among its members for the purpose of promoting livelihoods despite the many challenges they face. Internal as well as external support to these groups would enable the groups to achieve more in developing their community.

Structures and policies laid down to effect a change in the livelihoods of people, especially in developing countries are not usually effective. Before embarking on setting out policies to make the desired change, some perspectives are not taken into consideration; thereby making an intended good cause going bad. Often, factors that shape the livelihoods of the poor, especially in pastoral systems in Nigeria, are not understood. During the planning and implementation of programmes, it is important to know the factors and take them into consideration; as the knowledge could give a better understanding of issues in the area. It could help in understanding the evolution of the present crisis between the pastoralists and farmers in northern Nigeria and could also help to identify ways in which this could be curtailed. As part of my study objectives, relevant data towards understanding these factors amongst a purely pastoral community (Kachia Grazing Reserve) and mixed pastoralist and farming communities (Bokkos LGA, Jos Plateau) were collected. Knowledge of the factors

will help to understand pastoral livelihoods, the different factors affecting their livelihoods, especially the control of zoonotic diseases and the influence of competition and conflict between farmers and pastoralists. This understanding will enable us to recommend successful interventions. The SLA allows mapping of the resources obtainable within a pastoral system which can be used to build their capabilities and resilience to shocks and threats. It also affords various entry points for institutional processes and organizational structures to formulate and implement successful intervention programmes aimed to improve and at the same time sustain the livelihoods of this group of people.

The study of livelihood resources is important in this study because it highly contributes to the standard of living. In particular, livestock, as an important source of livelihood for the study population, determines the attainment of some of the capitals (financial, human, social) that are essential to make a sustainable livelihood. Chapter four deals more with this aspect. These issues are given attention and consideration in the study because health and security demand that resources through strategies influenced by organizational structures and institutional processes be put in place. 'Health for All' identified by the World Health Assembly in 1998 can be accomplished if health professionals work in conjunction with the community. The participation of the community in health programmes encourages and supports the sustainability of rural communities. It also extends to playing a vital role in other developmental activities that contribute to sustainable livelihoods, such as the building of structures for example health centres, educating and empowering the community on measures of disease prevention, etc.

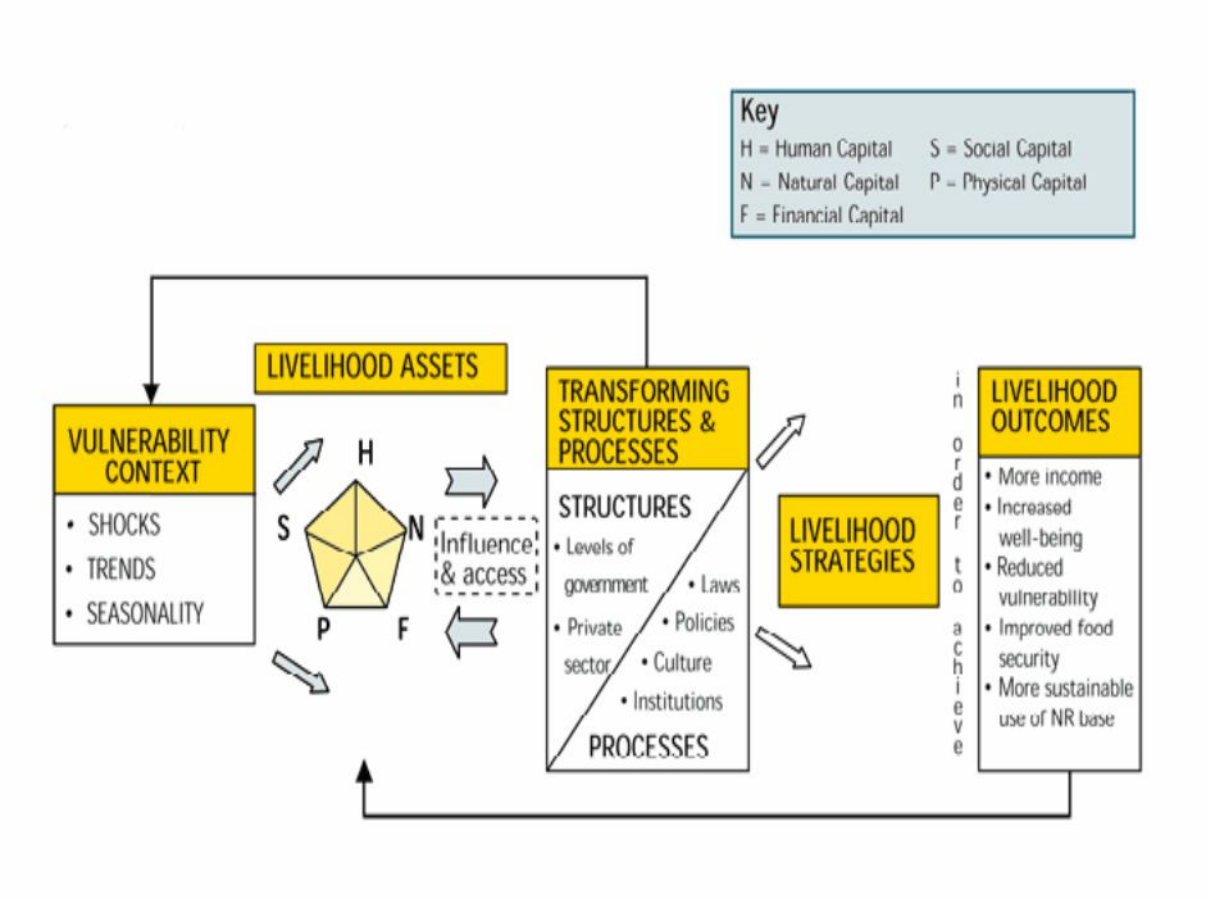

Fig 2.1: DFID Sustainable Livelihood Framework, 2001

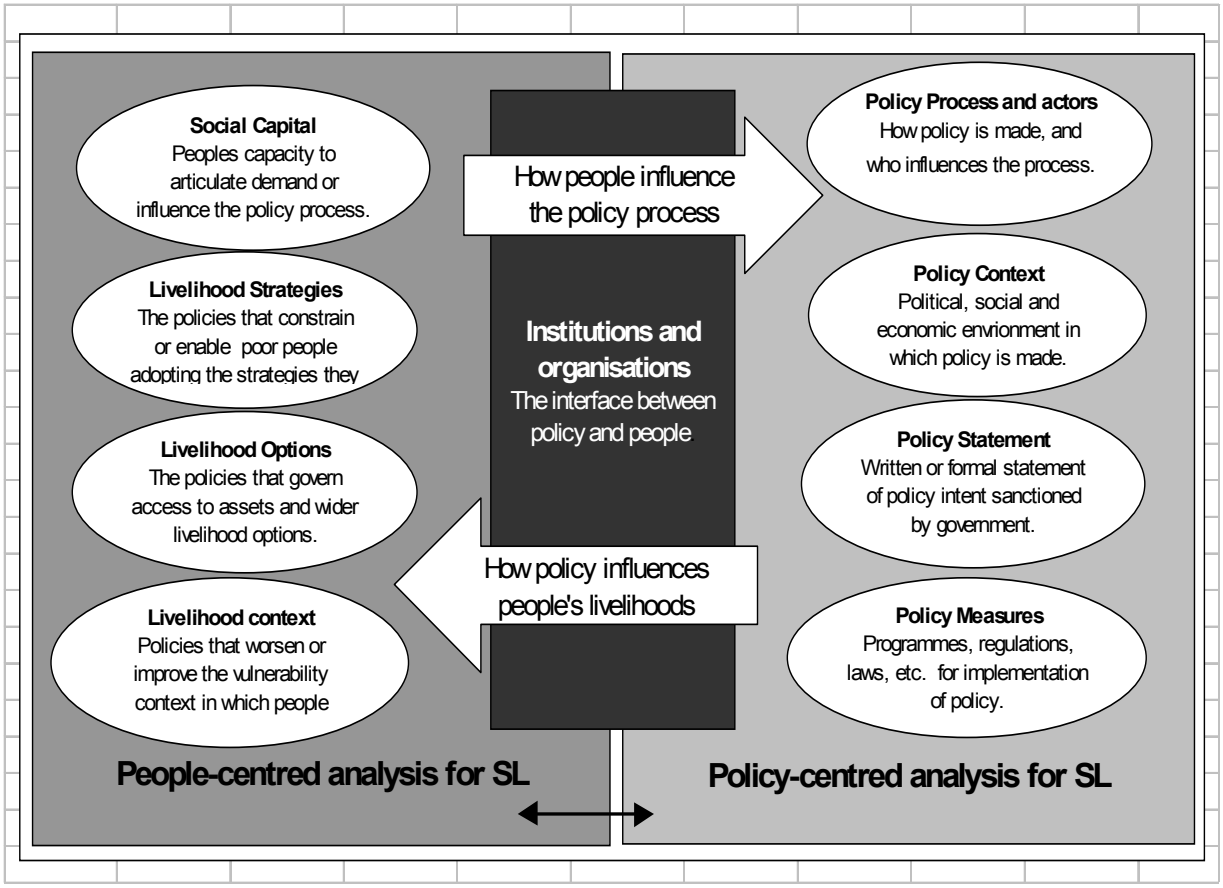

Fig 2.2: The Components of Policy Analysis for Sustainable Livelihoods (Coined from Kath Pasteur, Institute of Development Studies 2001)

2.2. Health Security

The World Health Assembly's Resolution 54.14, describes health security as the global strategy for the prevention of movement of communicable diseases across national borders. Health security has no accepted definition as it is a concept that crosses along several fields and disciplines which do not share a common theoretical approach or academic methodology. The health status of a country in a way acts as a proxy for the level of development within the country. The World Health Report of 2006 reported that 24% of the global health burden is in

Africa. The MDGs, therefore, target the poverty-linked diseases affecting the poor in Africa, by focusing on maternal and child care and control of malaria, HIV/AIDS, and tuberculosis. Recently, attention has been given to address the chronic diseases (non-communicable) that affect the rich and poor populations. In Sub-Saharan Africa, most health funding has been channelled towards the 'big three' diseases of HIV/AIDS, malaria, and tuberculosis. The international health regulatory board, the WHO, in recognition of the importance of prioritizing the control of neglected tropical diseases in health programming, developed the first report in the year 2010 on neglected tropical diseases. Neglected tropical diseases as reported, were ranked low in international and national health agenda as the causalities (number of deaths) are few compared to the casualties resulting from the 'big three' diseases. However, due to the consequences of the diseases on societies (such as physical impairment, loss of human labour) and health cost, health development has created space for addressing and controlling neglected tropical diseases (part statement of the Director-General of WHO, Dr. Margaret Chan).

In Nigeria, the depressing health indices reveal that the country could be regarded as 'health insecure' a situation that contributes to its being called a developing country. The health indices of a nation determine how developed that country is. The government, often, with the aid of international donor agencies, pump in a lot of money to carry out intervention programmes, that could improve these health problems. However, such efforts have made little difference as shown in Table 2.1.

Table 2.1: Health Indicators in Nigeria. Source: NDHS 2013, ** FMOH 2010 Report.

Health indicator	Year		
	2003	2008	2013
Infant mortality	100/1,000 LB	75/ 1,000 LB	69/ 1,000 LB
Child mortality	112/1,000 LB	88/1,000 LB	64/ 1,000 LB
Under five mortality	201/1,000 LB	157/1,000 LB	128/1,000 LB
Maternal mortality ratio	800/100,000 LB	545/100,000 LB	
HIV Prevalence	5.0%	4.1%**	

The introductions of user fees for health care (Creese, 1997), distance of health care facilities (Bronstein and Morrisey, 1990), attitude of health care providers and poor availability of drugs (Uzochukwu and Onwujekwe, 2004), are some of the many factors that deter people from accessing health care services. These factors contribute to the poor health indices in Nigeria. For example utilization of antenatal care from a skilled provider is 41% in the Northwest and 49% in the North East (NDHS, 2013). This low utilization of antenatal care contributes to the maternal mortality index in Nigeria. The Integrated Disease Surveillance System (IDSR) in Nigeria was set up as a means of strengthening communicable disease surveillance and response. Most infectious diseases including zoonotic diseases affecting the pastoralists and their livestock are not among the prioritized diseases of importance as seen from the list of priority diseases (see Table 2.2) that were declared by the steering committee of the IDSR (IDSR Steering Committee, 2001). Review of literature shows that zoonotic diseases have been in a state of neglect in Nigeria, despite the high prevalence of the diseases as evidenced from the number of cases presenting in Nigerian hospitals (Coker *et al.,* 2002).

Although there has been some research on the epidemiological aspect of these diseases, nothing much has been done to translate research findings into useful implementation to improve public health in Nigeria. In Nigeria, the zoonotic diseases for control are rabies, tuberculosis and brucellosis which have been on the increase over the years (www. Ministryofagric.gov.ng/upload/livestock.pdf). The question one may ask is: Are these diseases under control? Fagbami *et al.,* 1981, carried out a hospital study of human rabies and anti-rabies prophylaxis in Nigeria from 1969-1978, and revealed that rabies infections both in animals and humans in Nigeria are grossly under reported. This is further corroborated by the information from annual reports of the Nigerian Veterinary departments, WHO statistics and survey conducted which give two cases each of rabies in humans and dogs in 2007. A major factor in the failure of rabies control is the low level of political commitment, partly arising from a lack of quantitative data on the true public health impact of the disease (WHO, 2002) and the cost-effectiveness and cost benefits of controlling it (Bogel and Meslin, 1990).

Bovine tuberculosis which is another zoonotic disease of importance in Nigeria currently poses a major concern in the human population (in developing countries) as humans and animals are sharing the same microenvironment and dwelling premises, especially in rural areas (Shitaye *et al*., 2007) and as seen in nomadic Fulani settlements in Nigeria. It is estimated that approximately 85% of the cattle population and 82% of the human population of Africa are in areas where bovine tuberculosis exists (Ayele *et al.,* 2004).

Surveillance and control activities are often inadequate or unavailable, therefore, many epidemiologic and public health aspects of the infection remain largely unknown (Cosivi *et al*., 1998). It is of highly public health importance because indirectly, man acquires the disease from animal sources by ingestion of meat and meat products from slaughtered infected cattle and consumption of unpasteurised infected milk (Cosivi *et al*., 1998; Thoen *et*

al., 2006) and directly through contact with materials contaminated with nose and mouth secretions from an infected herd of cattle (Beals, 2007). Various studies, across Nigeria, show the prevalence of bovine and human tuberculosis which calls for public health concern. Abubakar *et al*., (2005), in their work showed that there is a high prevalence of both bovine and human tuberculosis amongst herders in the Federal Capital Territory, Abuja.

Brucellosis is an infectious disease caused by the bacteria of the genus *Brucella*. These bacteria are primarily passed among animals, and they cause disease in many different vertebrates. Various *brucella* species affect sheep, goats, cattle, deer, elk, pigs, dogs, and several other animals. Humans become infected by coming in contact with animals or animal products that are contaminated with these bacteria. In humans, brucellosis is difficult to diagnose. This difficulty could be due to other diseases with similar clinical symptoms that are endemic and hence often diagnosed. Such diseases are, typhoid fever, malaria, and trypanosomiasis with symptoms of acute recurring fever, chill, headache, fatigue, night sweat and anorexia (Chahota *et al*., 2003). This similarity of signs has often led to under diagnosis or misdiagnosis of brucellosis in humans. The disease, when left unnoticed, can lead to malaise, orchitis, infertility, stillbirth, abortion with their consequent socio-economic implications. Brucellosis in animals leads to abortion, reduces fertility and chronically lowers milk yields in affected animals and sometimes causes deaths in livestock – usually cattle. Its public health significance consists, according to Alausa (1979) of two main factors: firstly the direct or indirect transmission of the disease from infected animals to man, resulting in illness and loss of manpower, and secondly, the serious reduction of much needed animal proteins in human nutrition.

Table 2.2: Priority Diseases in Nigeria. Source: National Policy on Integrated Disease Surveillance, FMOH, 2005.

Priority Diseases

Epidemic prone diseases

- Cerebral Spinal Meningitis (CSM), Cholera, Measles, Lassa fever and Yellow Fever.

Diseases targeted for Elimination and Eradication

- Neonatal Tetanus, Leprosy, Lymphatic Filariasis, Guinea worm and Poliomyelitis.

Other diseases of public health importance

- Diarrheoa without blood
- Malaria
- Plague
- Tuberculosis
- Pertussis
- Onchocerciasis
- Pneumonia
- Diarrhea with blood
- HIV/AIDS
- Sexually Transmitted Infections.

Trypanosomiasis is a zoonotic disease which from the above table is not included in the list of priority diseases for control in Nigeria. However, epidemiological studies carried out in the

study sites of the Kachia Grazing Reserve (ICONZ) and Jos Plateau ('Stamp Out Samore' Project) revealed the prevalence of trypanosomiasis in the study sites.

Trypanosomiasis is known to be a complex, debilitating, zoonotic protozoa disease of man and animal (WHO, 1998). It is one of the public health problems affecting both man and animals. According to Mulumba, 2003 and Abenga *et al.,* 2004, trypanosomiasis is responsible for 3 million livestock deaths and 55,000 human deaths annually. Available reviews on the disease, shows that data on the prevalence of animal trypanosomiasis and Human African Trypanosomiasis (HAT) is low in Nigeria, given the lack of active surveillance in the country.

The control of communicable diseases has been integrated into primary health care (PHC) (FMOH, 2001). PHC was instituted as a cornerstone of health care delivery in the country following the 1978 Alma Ata declaration and resolution. The main aim of its establishment was to bring health care as close as possible to where people live and work as a continuing health care process (Akinsola, 1993). It is the first level of contact of the individual and community in the health system, signifying its importance in health care delivery. The ten components of the PHC delivery system (see Table 2.3) shows that it is an encompassing scheme developed to effect a change in the health care delivery of the nation. However, studies carried out to evaluate the services of PHC in Nigeria (Adeyemo, 2005; Khemani, 2005; Babalola and Fatusi, 2009; Ehiri *et al.*, 2005) reveal that the goals of the PHC are still far from being realized in Nigeria. The PHC system of care delivery is poor in rural areas especially among the pastoralist population. The pastoralists are a marginalized group in health care service delivery due to a number of reasons. The PHC system generally in Nigeria is poor and most PHC centres hardly have the resources (man power, drugs, and equipment) to provide the adequate, needed care to the sedentary community. They seem not to see the

need to extend this 'inadequate' service to these far-to-reach groups of people. Also, the limited availability of demographic and medical data of the pastoralists contributes largely to the ineffective and costly efforts (Ailou, 2010; Imperato, 1974) taken in the past to provide health interventions for this group of people.

Table 2.3: Ten Components of PHC

1. Education concerning prevailing health problems and the methods of preventing and controlling them
2. Promotion of food supply and proper nutrition;
3. Adequate supply of safe water and basic sanitation;
4. Material and child health care including family planning;
5. Immunization against the major infectious diseases;
6. Prevention and control of locally endemic diseases;
7. Appropriate treatment of common diseases and inquiries
8. Provision of essential drugs
9. Community mental health care; and
10. Dental Health.

Animal health services which include preventing disease in both animals and humans and curing diseases in livestock are absent in health system delivery in Nigeria (Umali *et al.,* 1994) as both disciplines (medicine and veterinary) are involved in the vertical programming of health services. Despite these vertical programmings of health services, veterinary clinics

are absent in areas where pastoralists are predominant and where such care is in high demand. Most developing countries, Nigeria inclusive, have a shortage of veterinarians and those that have a considerable number of them are often reluctant to work in rural areas (Umali *et al.,* 1994).

2.3. One Health of Improving Animal Health Services

A vast majority of the indigent keep livestock to supplement their livelihoods (LID, 1999; FAO, 2009). Experts, therefore, have connected livestock keeping to poverty, and this connection could be in two ways: as a pathway out of poverty for some and an expression of poverty for most; a benefit and a potential to harm (Perry and Grace, 2009). The analysis of this connection is limited and thereby hinders the formulation of policies and plans that could positively affect the livelihoods of the livestock dependent population (See Pica *et al.,* 2008; Tsigas and Ehui, 2006; Barrett and Luseno, 2004; Imai, 2003; Kazianga and Udry, 2006). Livestock diseases over recent years have generated a lot of concern as 60% of these diseases are zoonotic in nature (Taylor *et al.,* 2001). It hampers economic growth as research in recent years show that the livestock sector promotes the economy (Pica, Pica-Ciamarra, and Otte, 2008).

Control of zoonotic diseases is multifaceted. It requires a multidisciplinary approach. It involves collaboration and cooperation between the professional fields that link health, people-animals-environment such as veterinarian departments, public health officials and actors in agriculture, environment and livestock. This collaborative concept gave rise to One Health, which refers to the collaborative effort of multiple disciplines working locally, nationally and globally to attain optimal health for people, animals and the environment (Schwabe, 1984 cited in Khan *et al.,* 2007). The concept of One Health was a renewed

interest in the notion of 'One Medicine' from Calvin Schwabe in 1976 (see Khan *et al.,* 2007; Saunders, 2000). Calvin Schwabe identifies the interdependence of veterinary medicine and human health in relation to the recognised mutually transmitted diseases occurring both in animals and man. Rather, studies conducted in Nigeria on zoonotic diseases show a negligence of the Nigerian veterinary medical and human medical professions in the area of cross-disciplinary interaction and collaboration. Emergence of zoonotic disease prompted many countries to develop policy frameworks through which programmes can be planned and implemented to address the problem. The IDSR in Nigeria mandated the development of a sustainable framework among the three tiers of government to facilitate the implementation of effective integrated disease surveillance system in the country. Coker *et al.,* (2011), criticized a conceptual framework that was formulated to support the One Health research for policy on emerging zoonoses. They realised that the framework did not address policy timelines or the essence of evidence research for it to be acknowledged and translated into policy making processes. Furthermore, most programmes designed by international agencies, government agencies to control and prevent zoonotic diseases are often implemented without the involvement of the end-users thereby engaging in the 'top-down' (centralised) approach of programming. Although this type of approach has a dominant role in moving the public health community forward, without 'true-bottom' (decentralised) local support and enthusiasm, the initiatives falter (Muraskin, 1996). Furthermore, top-down approaches are appropriate for the control and prevention of epidemic diseases when only scarce technical resources are available for use. As Chambers (1992), noted standard solutions require standard programmes and that centralised structure could best produce this; the early success of state services in disease eradication as well illustrated this point. He further stated that a different approach (decentralised) is required when livestock services attempt to address the needs of smallholder farmers. This method is necessary because the production systems of

small-scale farmers are typically complex, diverse and risk-prone and thus diverse choices that will enable them to exploit a varied and unpredicted ecosystem is required (Chambers, 1995; Scoones, 2010). However, a comparison of these approaches of programming reveals that the bottom down approach has more benefits and is likely to succeed more than that of the top-down approach.

One Health seems to be a good concept on paper but can be ambiguous during actualization. Priority settings in achieving a policy goal can be difficult to define especially those that are relevant to local needs. In a study conducted by Kakkar and Abbass (2011), in India, a consultation with a broad range of stakeholders from different disciplinary backgrounds to identify priority zoonotic diseases in India and classify the research options in identifying knowledge gaps in One Health was carried out. They noted that health policy and system research and research to improve existing interventions were ranked higher than basic epidemiological research and research for the development of new interventions. Also, research options related to social, political, economic and ecological factors were ranked higher than those concerned with the physical and environmental factor. Some studies (carried out by experts) reveal the small interest in epidemiological research of zoonotic diseases. The studies also show there is a lack of reliable qualitative and quantitative data on disease burden in endemic countries (Maudlin *et al.,* 2009), and that there is little knowledge of zoonotic causes of human diseases by clinicians and policy makers (Jones *et al.,* 2008). Such studies also point out the inadequate availability of reference laboratories for diagnosis of many endemic zoonoses (Kunda, 2006). In Nigeria, epidemiological research on emerging zoonotic diseases to create evidence base information for policy research is very poor due to inadequate funding and laboratory facilities. The latter factor is visible in rural areas especially amongst the pastoralists where social amenities like water, electricity, health

facilities are practically non-existent thereby making epidemiological research laborious to conduct in such areas. The sustainable framework that is employed in this study in analysing the social, political, environmental, economic, physical and ecological factors that indirectly and directly affect the incidence of these emerging zoonotic diseases brought into limelight the resources which can be utilised to cope with these diseases despite their increased vulnerabilities. It also looked at the feasibility of One Health within a local poor resource area of a pastoralist system putting into perspective the factors on ground.

In some pastoralist communities, One Health was adopted to bring about a change in the health of animals and humans. For example in Chad, because of the higher vaccinations coverage on cattle than on nomadic children, a joint livestock and human vaccination campaigns evolved through by inter-sectoral cooperation between the Expanded Programme on Immunization (EPI) and the veterinary services. Also in Chad, the combination of post-exposure treatment (PEP) of rabies-infected human patients with a dog vaccination campaign broke even with the cost-effectiveness of PEP after five years only and was more cost-effective after seven years. Adoption of One Health will expand coverage for essential health interventions for people and livestock in remote rural areas where a large percentage of the pastoralists live. It is cost effective with quicker response time. It also brings about effective programming, greater awareness and training for practitioners. Furthermore, interdisciplinary research through the One Health approach requires assessment of the impact and variability of all individual factors, rather than focusing on the elimination of diseases only. This evaluation gives room for the identification of social, gender, behavioural and health system dependent differentials (Tugwell *et al.,* 2006). In a pastoralist system, women involvement in One Health could contribute highly to its success. Added to the fact that women are responsible for the maintenance of household flocks (Nwanta *et al.,* 2006), they also provide

all they can to ensure a healthy household. They are seen to be the 'first care provider' (informal) in the provision of health care in such poor resource areas. Thus, women need to be involved in the planning and implementation of health programmes. Their involvement will advance One Health. A vast bulk of responsibilities falls on women in ensuring that their households are health secure as they provide the access, availability and utilisation of food supplies and see to the healthcare of the household especially the children. Women are hardly involved in programmes designed to benefit them or the community as a whole and sometimes most of these programmes rarely see the need for women participation. According to Christofides (2001), gender issues are often neglected during planning and implementation of health promotion and disease prevention strategies. Thus, assumptions are always placed on interventions being effective for men as well as for women. The internationally agreed Millennium Development Goals (MDGs) identified 'gender equality and empowerment of women' as the third of eight goals and a condition for achieving the other seven; thus, much research has been undertaken that addresses the implications of gender-based inequalities in health. Different stakeholders of health, for example, health professionals, researchers and policymakers are highly aware of these inequities. For example, until recently, the magnitude and health consequences of domestic violence on women have been neglected in research and policy (Garcia-Moreno, 2002). According to reports of WHO/WHD, 1996; WHO/WPRO, 1998; Astbury and Cabral, 2000; WHO, 2002; ARROW, 2005; WHO, 2005, it is now clearer that gender-based violence causes physical and psychological harm. Also, because of their lack of knowledge and lack of access to information on animal diseases, women and their livestock are highly at risk to diseases especially zoonotic diseases such as trypanosomiasis, brucellosis, anthrax. The impact of these livestock diseases on the livelihoods and food security of poor livestock producers and processors, particularly women, is a serious concern. The impact is a grave concern because they are less resilient to disease-related shocks such as

market loss, loss of animals, and domestic animal diversity and because they have less access to compensation and restocking programmes (WorldBank, 2005). Unfortunately, it seems that these issues are not considered as being important as most programmes set up to address these problems exclude women. Community development is only possible when women are involved in the change process of development. For example, the joint livestock and human vaccination campaigns in Chad by the expanded programme of immunisation (EPI) and the veterinary services would not have been successful without the involvement and co-operation of the women. This success also shows their contribution to the advancement of One Health.

Most women in pastoralist system are involved in many activities that contribute to sustainable livelihoods. Such activities include processing and cooking food, weaving mats, spinning cotton into thread, making of household decorations and collecting herbs and vegetables. They also buy food from the market, milk the cows, churn the milk, make the butter, sell milk and butter, and do craft work such as decorating calabashes (Riesman, 1977 and Fricke, 1979). Agriculturally, they grow vegetables, raise poultry and non-ruminant stock. They also look after disabled animals, fetch water, and collect firewood and wild-food (de St Croix 1945; Vengroff 1980; and Awogbade, 1983). However, a great margin exists between women and men involved in agricultural production. The margin occurs in areas of land ownership, extension services, technology, finance, time, mobility, education and training (World Bank, 2008). These factors contribute largely to achieving sustainable livelihoods for women. The ability of women to diversify into many income generating activities shows they are equipped to cope with the vulnerabilities that might arise as a result of shocks and stress to the environment. They, therefore, within their capacity contribute towards making livelihoods sustainable. Women also play a vital role in community development by addressing issues that affect their livelihood and could be of benefit to the

community (see chapter five). Knowledge and skills on livestock management are usually restricted as mainly male preserves while women are involved in keeping small ruminants, milking cows, poultry. They are thereby deprived of the opportunities to acquire the skills which are equally useful to them. They are marginalised. Women are also affected by migration, a consequence of climatic factors that enforce a change in the pastoral management system. They become de facto household head while the men are away. The women are responsible for the household, crop cultivation, and livestock keeping, and thus having no real authority, skills and experience to do the job becomes a burden on them.

The use of the SL framework to analyse the role of women in pastoral system, will inform policymakers and programmers on the pivotal role of women in such communities. Such information will hopefully ginger stakeholders and policymakers to involve and target women in developmental programmes aimed at promoting sustainability in resource poor areas. For this to be achieved, analysis of the SL Framework requires research methodologies that could be used to collect data that will bring into limelight the details in realities of how gender and various components of the framework influence and contribute to sustainable livelihoods.

2.4. Research Methodology: The Qualitative Methodology

This research is a sociological research using a qualitative approach. Joseph Maxwell, in his description of qualitative research, identifies it as an interactive approach to conducting research. The study places an emphasis on the people that are studied. This method will best give an understanding of the perspective the study population has on their livelihoods and the physical, social, economic and cultural context that underlie these perspectives. The approach tries to identify the processes and structures that could be adapted to change or sustain these

observable facts. The qualitative approach will provide a platform through which issues are discussed within the SL framework and also a pathway through structuring analysis. Although most research in the assessment of livelihoods uses a combination of quantitative (especially on measures based on income) and qualitative approaches, there is a range of pros and cons for each approach. They equally pose some challenges (Greeley, 1994). The qualitative approach provides an exploration of themes without prior assumptions, something that is hard to achieve taking a quantitative approach. The qualitative methods also have the ability to produce a wealth of detailed information, which is necessary to investigate in an exploratory manner the factors contributing to sustainable livelihoods. Unlike quantitative research methodology which does not recognize the individuality of research subjects or respondents, qualitative methodology identifies subjective ideas, experience and perspective of individual respondents thus making the production of richer insights and more precise generalisations. Producing or generating rich data is made possible by adopting a qualitative approach because it accepts a wide variety of data sources such as people, objects, and documents, and it offers diversity in data generating methods. The in-depth nature of qualitative study promotes the generation of richer data, even though the number of respondents could normally be smaller compared to a quantitative study. It has been argued that triangulating the qualitative and quantitative methods of research affords the researcher an understanding of people's individuality and spatial-structural experience (Yusuf and Ukoje, 2010). However, the use of the stand-alone qualitative method of research from a situational point of view (Onwuegbuzie and Leech, 2005) affords me the opportunity to gain more insights to the objects of research.

According to Creswell (2007), there are five types of qualitative research approach: narrative research, phenomenology, grounded theory, ethnography and case study. One way to decide

on the right approach is to assess the type of research questions posed. Yin (2003) suggests that the case study approach is the most appropriate when undertaking research which asks mostly 'how' or 'why' questions. It allows the researcher to explore individuals or organizations, simple through complex interventions, relationships, communities, or programmes. It is a form of research which can help provide evidence information in the clinical and policy realm to develop theories and interventions. Qualitative studies are in an epistemological position of realism (Bhaskar, 1978) that is, stating the cases as they are. As a researcher, I wanted to find out and understand how the lifestyle of the pastoralist communities affects the control of zoonotic diseases, how they cope with challenges to livelihood, why gender has a role in controlling zoonotic diseases and promoting livelihoods, how measures taken within such communities have contributed to improving livelihoods. The information obtained will hopefully inform policy in developing theories and interventions for these groups of people. A multiple case study methodology was used to collect empirical data in two contrasting pastoralist communities in Northern Nigeria: one in a settled[8] pastoralist community and another in a mixed farming[9] community. A comparison between these two similar at the same time contrasting communities is interesting and informative in regards to applying the sustainable livelihood framework. The sustainable livelihood framework enables a critical analysis of sustainable livelihood indicators (economic, environmental, social, physical, political, cultural) that could especially impact on the livelihoods of the poor.

Most research of this nature use a combination of qualitative and quantitative methodology. The LADDER Project (Livelihoods and Diversification Directions Explored by Research) by

[8] The pastoralist community was established as a settlement for the cattle farmers but at some period of the year they move their cattle out of the community in search of food and water

[9] The area is made up of nomads and the indigenes of the area. They both keep cattle and grow crops thus terming it a mixed farming community

Overseas Development Group (ODG)(in Uganda, Tanzania, Malawi and Kenya) and the Livelihood Options in South Asia by the Overseas Development Institute are examples of projects using the combination of the methodology. The Institute of Development Studies' Sustainable Livelihoods in Southern Africa was based largely on qualitative research approaches. Policy makers and stakeholders 'feel at home' with quantitative data as figures are believed to reflect the sustainability indicators which could inform policy to move development. It is found that insights into behavioural changes, social justice, power structure, negotiations and domination can be conceived and understood using the qualitative approach. However, its combination with that of quantitative methods especially in community economy and assets (Simpson, 2009) will result in cheaper and rigorous data and at the same time inform policy. The use of only the qualitative methodology for this research identifies the poor in relation to vulnerability and marginalization, gives a good explanation of the causal effect of processes and relationships among variables and provides accurate information facilitated by a conversational setting. The quantitative methodology was not used in combination as the study provided less detailed quantifiable analysis of livelihood resources of the study population.

2.5. The Study Areas

The study areas for research were Kachia Grazing Reserve (KGR) and Bokkos LGA, Jos Plateau. As earlier stated in the previous chapter, the study areas were the project sites of ICONZ and CIDLID projects. The study areas are both within the Northern geopolitical zone of Nigeria. The Kachia Grazing Reserve was established by the Nigerian Government for the settlement of Fulani pastoralists (Guidelines on the Development of Grazing Reserves,

1978)[10]. The grazing reserve is situated within the Kachia Local Government Area of Kaduna State, Nigeria. The Kachia Grazing Reserve comprises six contiguous 'Blocks'. These are geographically-distinct administrative regions. The Blocks contain 581 farmers (heads of households) and 5,252 people. The KGR was a study site chosen by the ICONZ project to trial a public – private partnership model for delivery of veterinary services to the farmers and to observe its uptake and usage by farmers in the reserve.

The villages in Bokkos LGA of the Jos Plateau are located in the north of Plateau State, North Central Nigeria. The Jos Plateau is highly populated and a heavily cultivated area (Freund, 1981; Morrison, 1977). The Jos Plateau is a highly populated cosmopolitan area, with inhabitants from across the country with a significant Muslim/Hausa presence (Blench, 2004; Fricke, 1979; Awogbade, 1983). The rural areas and some peri-urban areas of the Jos Plateau is inhabited by farmers of the original plateau tribes and are normally referred to as 'indigenes'. A significant minority of settled Fulani herders abide in the rural areas. The Jos Plateau was a study site of the CIDLID project, chosen to trial interventions against trypanosomiasis developed by past projects for use in the Nigerian context.

2.6. Data Collection and Analysis

This research was a part of a multisectoral research project which integrated technologists, veterinarians, a social scientist, epidemiologists, and entomologists. Though with a science background, my qualification in Public Health and working experience in local communities of Nigeria must have influenced my status as the social scientist of the group. Before the actual field work, the coordinator of ICONZ had already held meetings with the local partner

[10] Though it was established as a settlement for the Fulani to curb the incidence of diseases of cattle and also of human, some still migrate at certain times of the year which predisposes them and their cattle to diseases which counteracts the reason it was established at first

organisation and the opinion leaders of Kachia Grazing Reserve to intimate them with the various projects of intent, the duration of the projects and the necessary arrangements to be made for successful fieldwork. This move helped to have a smooth take off. Research assistants who also acted as translators were employed to help me communicate with and interview people for my data collection. The research assistants were employees of the Nigerian Institute of Veterinary Research (NIVR), Vom, the local partner organisation of the CIDLID and ICONZ projects in Nigeria. A vehicle was also available to take me around for my field work and accommodation (in Bokkos, Jos Plateau, and Kachia Grazing Reserve) was provided for all field researchers. Living in a communal environment with other researchers from different disciplines within the natural science distinctively contributed to the achievement of the objectives of this research. Progress report to the research team at the end of each fieldwork trip provided an avenue to discuss limitations encountered. Different views of opinions were constructively given to proffer solutions to such limitations. Although from all accounts, the study can not be classified as ethnography, my stay within the vicinity of the study areas afforded close observation and interaction with the study respondents, and this gave me some insights into their livelihoods.

The empirical data for the two case studies in Nigeria was obtained from a series of qualitative data collection methods through review of documents, focus group discussions and participant observation. A literature review was conducted to have background information about the study sites and the issues that are to be researched. The main method of data collection used in the research was the focus group discussion. It is otherwise known as the unstructured in-depth interview. It is a qualitative interview technique that is utilized within a homogenous group of participants (6-12) to discuss selected topics assisted by a moderator (Tynan and Drayton, 1988). The health and medical research employ this technique (Wong, 2008). I wanted to obtain information on the cultural issues and practices

of the people, the prevailing health conditions (both humans and animals) and their health seeking behaviour. I also wanted to know their knowledge and perception of zoonotic diseases, the preventive measures taken in controlling diseases, their gender roles and finally I wanted to know about their source of livelihoods, factors' affecting those sources and the coping mechanisms of these factors. These issues of interest helped me to develop a focus group discussion guide to initiate talks with the participants.

The focus group discussions conducted in Kachia Grazing Reserve was through a facilitator/translator fluent in the Hausa and Fulfude languages, a language spoken within the community. However the facilitator had no veterinary background, so asking questions and discussing issues relevant to zoonotic diseases was a problem as I, the researcher also had no veterinary background. Fortunately, another female researcher with the veterinary background (who was part of the large research), involved in the fieldwork to collect data for her research was able to chip in when questions were asked about zoonotic diseases. Most of the focus groups, except one, were homogenous in nature; the school teachers who were a mixture of males and females. Before the start of the FGDs, the facilitator explained the research and reasons for gathering the participants and obtained verbal consent for participation and recording of the session. The discussions lasted about ninety minutes on average.

The schedule of the focus group was as follows:

- Age group 10-24years (males)
- Age group 10-24years (females)
- Age group 25-64years (males)
- Age group 25-64years (females)
- Ages 65 years and above males
- Ages 65 years and above females

- Opinion leaders (block heads and ward leaders)
- Co-operative society leaders (males)
- Co-operative society leaders (females)
- School teachers (both males and females)

Focus Group Discussion Guide

- Cultural issues and practices
- Behaviour and environmental messaging
- Gender issues
- Household health security
- Agricultural Production
- Animal health
- Human health

The conduction of the FGDs in Kachia Grazing Reserve was a success in that data required for analysis of the study were collected, although there were few hitches. They were conducted in school classrooms and meeting centres of leaders of the community. The participants were given no incentives to participate. At my first entry at the KGR, negotiations and agreement had to be made with the heads of block and permission given to conduct the FGD. At the onset of the FGD, the older group of women (65+ years) were interviewed and from their responses, they were very enthusiastic about the discussion. However, gathering participants for subsequent discussions, especially the other age groups of women proved difficult as they were being told to be 'wary' of the strangers in their midst. A meeting with some opinion leaders like the representative of the district head, ward leaders with the inclusion of the community doctor revealed that the men were not comfortable with

the women discussing with us without them being present. They were reassured with reasons and explanations on why the women had to be interviewed without the men being present. The men were told that having a female view of livelihood issues would reveal an insight into their challenges and needs that could inform policy on programmes targeting women. This information, as explained to the men, will not be forthcoming if the men were present. Even then, after this, getting responses from the women remained quite difficult. The male participants, on the other hand, were enthusiastic about the discussion as revealed by their responses.

This challenge experienced in the KGR prompted me to work out another method of eliciting information from the Bokkos participants. I therefore switched to interviewing respondents within their households instead of inviting participants from different households to converge in a meeting place for discussion. I thought that this method will reduce 'suspicion' on the part of the participants, and it did to an extent, although the responses from female participants were not as forthcoming as expected. The participants were not interviewed by age stratum, unlike the KGR FGDs, but by sex (male separate from female). The FGD guide used in KGR was also adopted for use in the study areas of Bokkos LGA, Jos Plateau to provide a distinctive level of comparison between the two study sites. The households chosen for discussion were households from five villages of Bokkos Local Government Area (LGA) of Jos Plateau. The five villages were Hurti, Daffo, Mbar, Maiyanga and Bokkos. The households interviewed were that of the Fulani households and the indigenous households. The indigenous household was chosen to be part of the study because they live in proximity with the Fulani pastoralist, and also, I need to have an idea of the livelihood of the indigenes and have an understanding of how their livelihood affect the Fulani and vice versa. Bokkos LGA was chosen for the study because, at the time of the study period, it was one of the LGA

that was safe considering the prevailing security situation on the Jos Plateau. It was also part of the LGA benefiting from the trial biotechnological interventions of the CIDLID project.

There already existed a cordial relationship between the other researchers of the CIDLID projects with the Fulani pastoralists; as a result, I was able to enjoy a warm relationship with my study respondents. This researcher, being a woman, enjoyed a certain level of respect from the respondents who are not used to seeing a Nigerian female studying for a Ph.D. This respect also strengthened the cordial relationship with them. However, the actual interview of the indigenes of Bokkos LGA, Jos Plateau was not without some problems. The indigenes were excluded in the CIDLID trial biotechnological intervention which targeted Fulani pastoralists' cattle. This exclusion, in no doubt, accounts for their attitude towards this research. The indigenes displayed a lack of enthusiasm towards my part of the research. Their attitude shows that they were not ready to spend their time in responding to questions. I planned to visit and interview five households each of the Fulani and indigenes from each village, but due to this display of attitude by the indigenes, the intended number of households could not be attained.

On the other hand the interview with the Fulani pastoralists of Bokkos LGA, Jos Plateau was more interactive. They were more open based also on a previous relationship[11]. They took time in responding to questions and were equally prone to ask questions from the researcher. The non-involvement of the indigenes in CIDLID trial biotechnological intervention and their reaction towards this research made it difficult for me to achieve the objective to interview an equal number each of the Fulani pastoralists and indigenes. The experience of the inclusion and the non-inclusion of the Fulani pastoralists and the indigenes respectively in the CIDLID

[11] Dr Ayodele Majekodunmi, the CIDLID co-ordinator came in contact with some of the households interviewed during her PhD research, and thus were beneficiaries of the CIDLID intervention rolled out for control of trypanosomiasis in the region.

trial biotechnological intervention exposed me to the dilemmas of researching (Tolich and Davidson, 1999:89 cited in http://www.socscidiss.bham.ac.uk/responsibility.htm):

'the politics of doing research are real and they are unequal'

Table 2.4: Structure of Jos Plateau Household Interview

Village	Fulani Household	Indigene Household
Bokkos	5	3
Daffo	3	4
Mbar	5	4
Hurti	5	4
Maiyanga	5	2
Total	23	17

An average number of between 5-14 people of each sex was interviewed per household. The translator/facilitator (male) was fluent in both Hausa and Fulfude languages spoken within the community, but he did not understand the Run language spoken by the indigenes. He had a veterinary background (a veterinary technologist) thus he was very helpful when it came to discussion on animal health and diseases. During the discussion, while facilitating and translating, jottings were made, and a tape recorder was used too. Depending on the number of households that could be interviewed in a day, conversations recorded were usually transcribed at the end of the day. Limitations are bound to occur in the process of carrying out research. Such limitation could be beyond the control of the researcher or could be monitored depending on the situation. Some of the limitations experienced during this research included the inability to get direct first-hand responses from the participants. Responses which should be captured in verbatim might be skewed by the time they are interpreted back to me. As a

way of minimising these effects, during the interview, some of the responses were translated to me and jotted down. Also at the end of each fieldwork day, the recorded responses were transcribed. This recording was done immediately to corroborate the data with a fresh memory of what was obtained in the field and to document appropriately the observations made on the non-verbal responses. The jottings during the interview are compared to what is transcribed at the end of the day. Another limitation was the lack of a female translator/ facilitator; having one could have made an enormous difference in obtaining interesting information from the female Fulani participants. A distinct limitation was the inability to translate the focus group discussion guide into Fulfulde language (a major language of the Fulani pastoralists) which could have reduced the error of precision considerably. As corroborated by Salvaing and Hunwick, (2003: 503-4), it's hard to do this as slightly educated folk are capable of reading and writing Fulfulde. Finally being part of a larger project as a researcher was tasking as it demands that the objectives of the project must be addressed during the field work while also ensuring that data towards my contribution (apart from the set objectives) to the larger project is captured during analysis. Data obtained during the FGDs in KGR and the household interviews in Bokkos LGA, Jos Plateau included data on the risks encountered by the population, their vulnerabilities and coping strategies against these risks. Data on the cultural issues and practices and how these affect their livelihoods were also obtained. The role of women in the study sites, their contribution to livelihood, their constraints were also obtained. Data on different sources of livelihood, factors affecting these sources, the social networks available, the animal and health seeking behaviour and policy surrounding animal and health service delivery were obtained. Data collected were analysed using the thematic analytical technique. This method was used to identify, analyse and report patterns within the data that was collected and not theoretically bonded (Braun and Clarke, 2006). Thematic analysis was chosen as the analytical technique in this research

mainly because of its ability to highlight similarities and differences across a data set thus making it appropriate for making comparisons between two case studies as is the case in this research.

2.7. Conclusion

The empirical data of this study was collected using the case study approach from two pastoral regions of Nigeria: Bokkos LGA in the Jos Plateau and the Kachia Grazing Reserve. The study examines the various challenges and opportunities to achieving a sustainable livelihood. The Sustainable Livelihood approach was chosen to understand the micro world of family, network, and community (Johnston, 1993:229) by focusing on issues such as vulnerability, poverty and power relations which influence the livelihood of people. The SL approach also integrates the use of other methods in its application. This study, however, capitalized on this by examining One Health as an important factor to be considered in achieving sustainable livelihoods in areas that are vulnerable to zoonotic diseases. Qualitative methods were used to elicit information as a basis to examine and analyse data that relates to the culture of the people, the role of gender, the animal and health service delivery, attitudes, knowledge and practices to infectious and zoonotic diseases and how these relate to the household health security within the communities. It is felt that this information and knowledge will draw out the intricacies of the linkage between animal and human health and will help to propose suggestions on how to promote One Health to close the gap between the human and veterinary medicine in local communities as well as its contribution to sustainable livelihoods.

CHAPTER 3

Contextual Analysis of Conditions and Trends within the Case Studies

3.0 Introduction

The previous chapter highlighted the sustainable livelihoods approach as the conceptual framework of the study thereby providing a foundation for understanding the contextual issues of the study. This chapter begins by giving background information about the study sites, the history of the Fulani pastoralists, their characteristics, and their social relations. These provide a platform to unpack the issues that determine the extent to which an enabling or facilitating environment for livelihoods is in place, compared to an inhibiting one. The livelihoods of the Fulani pastoralists depend on their access to some assets and the social, political, economic and environmental factors that affect attainment of these assets. The driving force of policies, processes and institutions within these factors need to be understood. The chapter thereby elaborates on this by giving an insight into the risks and vulnerabilities of the Fulani pastoralists, the effect on pastoral livelihoods and institutional and policy responses to these threats and vulnerabilities. Coping strategies taken up by Fulani pastoralists in mitigating the risks to their livelihoods are also highlighted. In summary, the chapter provides the theoretical base to achieving sustainable livelihoods through consideration of natural, political, environmental, economic, social, cultural and material strategies. This chapter, therefore, forms a background to understanding the strategies that were employed in the case studies to develop and maintain a sustainable livelihood.

3.1. Study Areas

3.1.1. Jos Plateau

The Jos Plateau is located in the Northern part of the Plateau State. Plateau State is in the North Central geopolitical zone of the Federal Republic of Nigeria. Plateau State as a whole is situated between Nassarawa to the south, Kaduna State to the north, while Bauchi State is to the north-east. Plateau State is administratively divided into seventeen local government areas[12] (see Fig 3.1). The capital of Plateau State is the city of Jos also known as the 'Tin City' which was established in 1915 as a tin transportation camp. The city was historically known for its prosperity from the tin mining industry.

Figure 3.1: Map of Jos showing the Local Government Areas

[12] The three tiers of government in Nigeria, the federal, state and local government levels were formally established in 1976.The evolution of the three tiers of government was as a consequence of the country's political development in the 1960' especially the advent of military rule (1966) and the civil war (1967-1970). The establishment was as an impetus to unite the country.

3.1.2. Ecology and Land Use

Jos Plateau, a much larger region of Savannah lowland falls gradually to the valley of the Niger-Benue confluence, which covers an area of about 8600km^2 in the central part of Nigeria. Jos town is situated on an elevated plateau composed of undulating hills known as the Jos Plateau in Nigeria. This upland mass stretches for approximately 104 kilometres from north to south and 80 kilometres from east to west, covering an area of about 8,600 square kilometres. It has an average elevation of 1,200 metres (4,000 ft) above sea level, and reaches its highest peak in the Shere Hills where it stands at 1,766 metres (5,829 ft) (Plotnicov, 1967; Danfulani and Fwatshak, 2002).The Jos plateau has isolated rocky hills separated by extensive plains. The city is well known for its beautiful landscape and it enjoys a near temperate climate, averaging 22°C (75°F) daily. The serenity of the environment has given it the name 'Home of Peace and Tourism'. Recent outbreaks of violence within the state have undermined the reasons behind the acquisition of that name as discussed later on in the thesis. The Plateau was formerly open savannah woodland but now is almost entirely grassland (Keay, 1953), and most of the trees presently growing are exotics, such as eucalyptus, or imports from the lowland. Agricultural activities such as overgrazing and extensive farming practices have destroyed the land surface through the occurrence of erosion. Tin mining activities in the past contributed to farm land reduction ranging from soil erosion problems, swampy nature of neglected mined excavation, mine dump, pits and industrial use of the arable land (Adegboye, 2012). The mean annual rainfall in Plateau State is 1260mm, with annual temperature of 22.8^{0}C (Alexander and Kidd, 2000; Pasquini, 2002). The lowest rainfall is in the east around Bashar, and the highest is in the south and west of the Plateau in the region adjacent to Kaduna State. The length of the rainy season varies from 160 days in the north to 220 days along the Benue River. However, Plateau State is not well supplied with

groundwater. During the wet season, crops grown are rain fed, while they are usually irrigated with mechanical pumps through the lake and ponds during the dry season.

3.1.3. Agricultural Production

On the Jos Plateau, crops such as irish potatoes, cabbages, carrots, lettuce, spinach, peas, green beans, onions, celery are widely grown as their production is favoured by the climatic conditions of the Plateau which are difficult to grow successfully elsewhere in West Africa (Porter *et al.,* 2003). The crops are not seasonal in nature as they are grown throughout the year, encouraged by the strong market for foodstuffs and availability of water (Porter *et al.,* 2000), which may be part of the reasons that attracted the pastoralists to the Plateau. Other crops grown include yams, maize, millet, cocoyams, and acha (Hungary rice), cereal, not commonly seen elsewhere in Africa (Olowolafe and Dung, 2000). Often seen in the Plateau is a plant known as euphorbia which is grown to serve as a fencing to ward off livestock from getting into the cropped fields. Potato is a major cash crop in Jos usually intercropped with maize. The potato and maize residues are not palatable for the cattle. Thus, the Fulani often go in search for places where millet and sorghum grow as the residues from such crops are beneficial to them (LeValley, 2003). Irrigation farming was started by the Hausa during the dry season (Frayling, 1943), using the mine ponds and the river valleys which were not put in use then for growing vegetables such as peppers, tomatoes. Dry season farming is commonly practised in areas that are close to small lakes, streams and pond (Porter *et al.,* 2003). In areas that are farther from the sources of water, farmers divert streams to form small lakes using petrol powered water pumps for the purpose of watering their crops (Adepetu, 1985).

Livestock reared include goats, cattle, pigs, chickens, turkeys, sheep, etc. For the indigenous household, a Fulani man is usually employed to take care of their herds as they have little knowledge on cattle herd management. The animals reared within the homestead are small

ruminants like sheep and goats. Unlike the Fulanis in Kachia Grazing Reserve, there is no particular division of land located for livestock and crop farming among the indigenes and the Fulanis of Bokkos LGA, Jos Plateau. Studies have shown the presence of some livestock diseases in the Jos Plateau. Such diseases include Newcastle diseases in poultry (Mai, Ogunsola *et al.,* 2004), trypanosomiasis in cattle (Kalu, 1996; Majekodunmi, Fajinmi *et al.,* 2013), bovine fascioliasis in cattle (Fabiyi and Adeleye, 1982) among others.

3.1.4. People

People from diverse ethnic groups live in Plateau State. Thus, it is a state known for its multi-ethnicity (Blench, 2004). Two reasons account for this; firstly, the high ethnolinguistic diversity in the state and secondly the influx of ethnic groups from other parts of Nigeria such as the Yorubas, Ibos and Edos in Jos city. Establishment of the tin mining industry attracted skilled workers and traders from across the country and since the collapse of the tin mining period, they remained in the city and are involved in commercial activities, thus making Jos one of the most industrious cities in Nigeria. The high altitude of the Jos Plateau in addition to the absence of tsetse and mosquitoes and unlimited grass in the early nineteenth century attracted large numbers of pastoralists to inhabit the Plateau. From the recent 2006 National Population Census, the population figure for Plateau state was given as over 3 million, 2.82% of the whole population in Nigeria. Primary occupation practiced among the indigenes[13] is farming. Livestock keeping which is another occupation practised by the indigenes was an influence through the influx of Fulani cattle rearers in the Plateau during the pre-colonial era.

The Fulani is an ethnic group of economic importance in the Jos Plateau, contributing to livestock production in the state. Their origin, way of life and their identity help to

[13] The indigenes as defined by the Plateau Peace Conference are: "People who are the first to have settled permanently in a particular area and who are considered traditional natives"

understand their presence and attraction to the Jos Plateau and other places of migration, which is given herein.

3.2. Fulani Pastoralists

The Fulbe are the largest pastoralist group in Africa that herd cattle and small ruminants from across the Sahel to the West African Savannah. Myths ascribe the origins of the Fulani to the West (Senegal) and East (Egypt, Arabia) (Adebayo, 1991). In Mali, they are known by the term 'Fula' while they are known by the term 'Peul' in Senegal. In Nigeria, they are referred to as the Fulani. The language spoken by the Fulani is Fulfulde.

The Fulani presence in Hausaland, Northern Nigeria, was recorded as early as the thirteenth century (Adebayo, 1991), and by the 15th century, their presence had been fully established in the region. Their infiltration into Nigeria is believed to be due to the attraction towards the climatic and vegetation features of Nigeria which was highly beneficial to the welfare of their cattle with respect to the abundance of water and pasture and the absence of tsetse flies. Because of the suitable climatic conditions they chose to migrate within Nigeria region. With time, two types of Fulani groups emerge. The Fulbe ladde otherwise referred to as bush Fulani, focus mainly on cattle rearing and move from place to place. In their movement, some establish settlements around Hausa populations. This group referred to as the Fulbe wuro or sedentary Fulani intermarried with the Hausa and adopted their language. With time, some merge with the Hausa ruling class. Thus, by the 15th century, the Fulani became integrated into the Hausa ethnic group. Adebayo, (1991), is of the view that the Fulani introduced Islam to Hausa land. History recalls that in 1804, Usman Dan Fodio, an Islamic cleric claiming dissatisfaction with the religious conduct of the Hausas waged a holy war,'jihad', with the aim of reasserting Islam as the religion in Hausaland and, in the process, establishing political

control in what later became Northern Nigeria. It was through the jihad that the dominance of Islam was thus established in Northern Nigeria by the Fulani. The Northern territory taken over by the Fulani included Zaria, Katsina, Kano, Sokoto (Stenning, 1959). Sokoto was made the administrative centre of the Hausa states (Nwabara, 1963) and became the capital and headquarters of the Sultan, who is the spiritual head. Financial needs of the new administration for local administration and development required the Fulani pastoralists the payment of the 'jangali' tax (cattle tax) which could either be made in cash or kind. The evasion of 'jangali' was another factor responsible for the dispersal of the pastoral Fulani into other areas of Northern Nigeria, with hope of fair treatment from their host. The tax rebates and exemption introduced by the administration of some of these areas encouraged the settlement of nomads in towns and villages. The migration of the Fulani to other Northern areas was accompanied by the spread of Islam.

After the conquest, a hierarchy of leadership was established in which a Fulani was placed as the head of each state, as a way of establishing authority. Each kingdom became an Emirate, under the control of an Emir. Emirs served as the political and religious heads and appointed identifiable Fulani leaders to be full or partial decision-making authorities. The following officers form part of the administration- a Wazir who was the Emir's Chief Adviser, an Alkali,a judge, the Chief of Police whose primary duty was to obtain justice for the weak from the strong, the tax-collector who was enjoined to discharge his duties and not oppress the subject and lastly the Immam or Priest (Tignor, 1993). Administratively, the responsibilities of the officers were purely local and were under the control and authority of the Emir. At the village level, the settled Fulani have the Lamido as the head. The Lamido in fulfulde is equivalent to the hausa 'sarkin' which means Emir, a title that has remained since the Fulani conquered Northern Nigeria. The Emir confers power on the Lamido. The Ardo is the chief or lineage head at the clan level. He has responsibilities over the lineage. A lineage

consists of up to three or more generations. A socio-political structure is evident in this type of leadership. While an Ardo does not own land, a Lamido on the other hand is regarded as a source of land for his people[14]. The hierarchy of leadership practised among the Fulani seems to have influenced the British 'Indirect Rule' of administration in Northern Nigeria during the colonial administration. The colonial administration made use of the Fulani hierarchy of leadership in an attempt to get them involved in the political administration of Northern Nigeria. The Fulani leadership have since, even up till now enjoyed considerable importance in Nigerian politics. The Sultan of Sokoto, who occupies both religious and political position, has always been highly esteemed and considered relevant by any serving, past or present, head of state or president. Their participation in politics now is more direct as can be evidenced in the case of the new Emir of Kano, Sanusi Lamido Sanusi, who was formerly the Governor of the Central Bank of Nigeria[15].

3.2.1. The Social Structure of the Fulani

The household is the basic economic unit of the Fulani (Hampshire and Randall, 2000). Many units of household form the household camp characteristic of a semi sedentary or sedentary Fulani society. A standard Fulani family is patrilineal in nature (Hampshire and Randall, 2000). The family is constituted of a household head, the wives, children and his married sons' wives and children living together in the same compound. Communal work used to be the common practice in such families but the colonial administration brought a change[16] to such a highly cherished tradition. The authority of the household then became decentralized when the responsibility of meeting the increasing needs of the family with respect to nutrition

[14] Land disputes are common source of conflicts between herders and farmers and this has a profound effect on their livelihood. The Lamido can use his vested power as custodian of land in reaching out to the appropriate authorities for land allocation which in a way reduces land disputes

[15] Governors of the Central Bank of Nigeria are political appointees.

[16] See Michael Watts 1983 , Silent Violence

and the payment of the high fees of cattle tax and commodities fell on each married son. Such needs were becoming too heavy for the household head alone to bear. Colonial integration also brought change in literacy attainment, agrarian practices, etc.

3.2.2. Educational Level

Formal western literacy was introduced during the colonial period. The formal literacy levels amongst the Fulani are low at 0.28% in contrast to the migrant fishermen communities in Nigeria of 20% (Aderinoye *et al.,* 2007). These low rates can be attributed to several factors; first, the association between Western education and Christianity which makes western education detestable to the Fulani, who are staunch Muslims (Salamone 1985). Secondly, the educational policies of the colonial government were viewed as a means to prevent the emergence of Muslim intellectuals (USAfrica, The Newspaper, posted December 19, 2009). Thirdly, the recurrent movements of Fulani families, a defining feature of their pastoral lives which prevents regular school attendance (Ezeomah, 2002). There have been several efforts by the Nigerian government to improve education amongst the Fulani, including the establishment of a Nomadic Education system which aims to offer flexible schooling to fit the pastoral lifestyle (FME, 1987). Despite these efforts, uptake has remained low. The effects of these poor education levels are significant as they form part of the main reasons why the Fulani have not been able to take full advantage of various development programmes.

Despite their reluctance to embrace Western Education, the Fulani are happy to reap some general benefits of education to society. For example, they embrace advances in veterinary medicine that allow them to protect their animals from diseases and prevent catastrophic losses such as those experienced during the rinderpest epidemic of the early 19th century

(Frantz, 1975).The underlying principle seems to be that if they can be second hand beneficiaries of education, why bother to get educated themselves.

3.2.3. Mobility

The movement and living conditions of the Fulani pastoralists depend on the availability of water and forage for their cattle. Most researchers tend to base this explanation of the movement of the pastoralists on the scientific understanding of the drylands while they fail to put pastoralists' view of nature into consideration (Adriansen, 2005). From discussion, the change in season (wet and dry) and vegetation dictates the movement of the pastoralists in the study areas. Conflict is another factor for the movement of the Fulani pastoralists from one place to another as discussed in the thesis.

Migration and site of location spurred by economic pursuits and the need to keep cultural identity differentiated the Fulani into groups. The categorization of pastoralists into various groups' description is based on the pattern of movement (Fricke, 1979; Stenning, 1959), distribution and tribal identity (Blench, 1994) and alternative livelihoods (Omotayo, 2003, Fratkin, 2013; McCabe *et al.,* 2010). The integration of the various groups could be seen in many pastoralists' communities, the study areas inclusive. They are in many ways interwoven and connected as cattle rearing are a common feature of all groups. This situation might account for researchers regarding Fulani pastoralists as a homogenous collection of people (McPeak *et al.,* 2011) as most intervention programmes targeting the Fulani pastoralists fail to distinguish between these groups (Van den Boogard, 2006 cited in Catley *et al.,* 2013).

The Fulbe ladde, referred to as the cattle or bush Fulani are very mobile and mostly reside in the bush. They minimise any form of interaction with the host's communities. Tending to and keeping cattle is their preferred way of life. A traditional system of education called

'pulaaku' is inculcated in their young ones to know and be familiar with the virtues of nomadic life from an early age. For the Fulbe 'sire' or 'wuro', known as the city or settled Fulani, the threats, and shocks to constant movement and the survival drives in them, force them to adapt to other cultures and religious practices of the host communities they migrate to. Many have intermarried with other ethnic groups, have been influenced by some of the practices of the host communities and have had the opportunities to education, vying for political posts, taking up of other income generating jobs, etc. Many, in addition to keeping cattle, are cultivators. Through this, improvement is effected in herd management, livelihoods of pastoralists and conflict management (Niamir-Fuller, 1999).

As a result of the constant movement, the bush Fulani are disadvantaged regarding communication, education, and infrastructure and power dynamics. Mobility increases the resistance of livestock to diseases but also decreases their vulnerabilities to outbreaks and natural disasters (Roeder, 1996). Movement of pastoralists from Northern Nigeria towards the south occurs during the dry season. Availability of water, vegetation and forage are an impetus to the movement despite the proneness of the area to diseases, e.g., trypanosomiasis (Blench, 1994). In spite of this threat to the health of the cattle, there has been a gradual expansion to the south, a situation encouraged by the advent and availability of veterinary drugs and control mechanisms against the occurrence of the disease. Barren female cows, calves and bulls tend to be moved towards the south for sale while the milking females are left in the North, which is less prone to diseases during this period (Blench, 1994). Herd structure is managed through this strategy (Amanor, 1995). Little is known about the sex and age differentiation of the herd structure in the study areas as most were reluctant to divulge information about their herd.

The fact that the Fulani pastoralists enjoy some rights to land on access, utilizing and deriving income benefits from its use demonstrates a relatively peaceful relationship with the farmers

in the south (Fabusoro and Oyegbami, 2009). This situation further encourages the Fulani pastoralists to move and sometimes settle in the south. Market demand and an increase in market value of cattle in the south are also a motivation for such movement. Due to the complexity of livestock trade in Africa (see Scoones and Wolmer, 2006), it**'s** sometimes hard to actualize the gains of this motive of movement to the Fulani pastoralists as studies have revealed that pastoralists and livestock are susceptible to diseases during such movement.

3.2.4. Gender

Fulani girls and women hardly benefit from social, political, and economic structures that can be of utmost importance to their livelihoods (Rossiter *et al.,* 1985). They are known for and relegated to their domestic and household chores. Fetching of water for household consumption and small livestock is an example of household responsibility performed by the women (van Hoeve and van Koppen, 2005). Other activities carried out by women include milking, herding, childcare, care of the household and small livestock (Curry, 1996).

Though there are studies on gender and pastoral livelihoods, such studies, as observed are viewed to have placed more emphasis on the roles of women in processing and marketing of milk and milk products, thereby ignoring the other roles of importance they play in ensuring livelihoods of the household. Roles in institutional building, health care and management techniques, information dissemination are some examples of these roles of importance. For example, though the women contribute financially to household expenses through sale of milk and milk product, very few account of gender studies in pastoralist system fail to consider their other roles in livelihoods and the effects of these roles in meeting their financial and familial obligations.

Pastoral women are ranked inferior to men based on the philosophy of dominance as social, economic power and influence are monopolized by men (Flintan and Beth, 2011). Properties rights are biased against women, as ownership of livestock is consigned to men. Pastoral women in Africa own few animals or none at all. Those who own animals such as goats, sheep, chicken, rear them around the homestead. Dahl (1987), however, argued that ownership of livestock by women does not change the main gender-based structure of the property, for such ownership retreats back to the male line through inheritance (Flintan, 2010). Marginalization of pastoral women by men inhibits them in taking control of situations and activities that are pertinent to their livelihoods and the livelihood of the household as a whole (Flintan, 2010). In Kachia Grazing Reserve and in Bokkos LGA, Jos Plateau, male dominance is reflected in the position of authorities. The male dominance defines the relative gender responsibilities of the female with its cultural connotations. To a casual observer, the women may appear being marginalized by the men but a critical look shows otherwise attimes.

3.2.5. Assets of the Fulani

Livestock is the major, common asset that is typical of the Fulani. Other assets of the Fulani include social assets such as kinsmen and religious group, land, water, etc. Livestock can be categorized as a natural, financial, physical, human and social assets that provide a means to an end of issues peculiar to livelihoods of the Fulani (see Table 3.1). It is regarded as a buffer regarding need (Dorward *et al.,* 2001). It is an asset that determines the status of a Fulani household. It formed the basis on which tax was collected from the Fulani pastoralists during the colonial government. The more cattle one owns, the more tax one pays. Because of this many were and are still reluctant to disclose the number of cattle owned.

Successful management and productivity of the asset is highly dependent on the availability and utilization of some of the other assets. For example, without land for grazing and availability of water points for drinking, the productivity of the livestock is affected. Also, lack of skills acquisition in animal health and welfare affects the efficient management of livestock. Table 3.2 give examples of other assets that are characteristics of the Fulani. Although these assets are critical towards building a livelihood, the pastoralists do not have access to some of these assets. Examples include lack of access to and ownership of land for grazing and cropping, low accessibility or poor physical infrastructure to drive livelihood activities and access to cash income to satisfy nutritional and other needs (Rass, 2006).

Table 3.1: Relationship of Livestock with other Assets

	Physical	Financial	Natural	Social	Human
Livestock	Draught power Transport services	To purchase grains, pay school fees	Livestock droppings as manure for crop production	For hospitality, payment of dowries, religious ceremonies	For employment e.g employment of herd boys

Table 3.2: Categorization of Fulani's Typical Assets

Natural	Social	Physical	Human	Financial
Land	Kinsmen groups	Health care facilities	Skills	Cash Savings
Access to land, water etc	Local organizations such as cattle rearers' groups, milk producers' association group	Market exchange	Knowledge	Livestock
	Co-operative societies	Cereals	Labour	Loans
Grazing reserves	Religious groups	Transport	Good health	Gifts
Water points, rivers		Shelter		Investments
Livestock		Water		
		Energy		
		Communication		
		Farm equipment		

A land is an asset apart from livestock that is essential to the Fulani. Due to their immigrant status, they lack rights to land use and ownership. The pastoralists sought for permission to settle, plant and graze on land belonging to indigenous ethnic groups. Agro-pastoralists (who sometimes practice transhumance) and the non-pastoralists are the classes of Fulani pastoralists whose livelihood demands a fixed settled home base. The pastoral Fulani need for land use is limited to grazing. The pastoralists negotiate rights to the use of the land with the indigenes. They are all given the opportunity to lease land from the indigenes, a temporary agreement as the Fulani are not given the opportunity to purchase and own land. In time past, a mutual relationship was in existence between the pastoral Fulani and the indigenous farmers. This relationship entailed the exchange of raw materials to meet the needs of livelihood. For example, dung from cattle is used by the farmers as manure to improve the nutrient status of arable soil for an increase in food production and use of stubs and crop residues as feeds for pastoral livestock (Moritz, 2010). However, this is not always the case. The dung from the cattle, though cheap to obtain and seen to improve the nutrient status of soil also influence the growth of weeds (Liebman and Davis, 2000); a strain on farm input and an increase in demand for organic fertilizer. Accordingly, the relationship is not considered as important to the farmers, which to the pastoral Fulani is important as they depend highly on the farmers for stubs and residues from their crop production, as feeds for their livestock.

The extensive use of land by farmers for cultivation in the North (Mortimore and Wilson, 1965) leaves the Fulani herders little land to graze upon. Crop damage through the encroachment of land by cattle herds have been the common cause of conflict between farmers and Fulani herders (Turner, 2004). Natural resources (forage and freshwater) essential to the survival of the pastoralists and livestock are highly dependent on availability, quality and access to land. Therefore, it is almost certain that these frequent clashes between

farmers and pastoralists are mainly due to land use and ownership as pastoral Fulani are known to be persistent in their search for water and feed for their animals, and nevertheless 'stepping on toes' of farmers cannot be avoided.

In his study of the Pastoral Fulani of Western Bornu Province, Northern Nigeria, Stenning (1959), gave a good explicit explanation on ways through which the settled Fulani pastoralists access financial aid. A member of a lineage group, whose stock could be deficient as a consequence of disease, can seek help from another fellow herd owner of the lineage group. The herd owner is expected to provide stock if asked by the member whose stock is deficient. The Fulani cattle rearers, having no access to financial institutions, depend mainly on family sources (80%) and friends/co-traders (20%) (Mamman, 2005). Inability to provide collateral needed by these financial institutions leaves them to source credit and assistance from friends, families, cattle traders and social network formed within their locality. Most of these social networks are established within the communities as a sort of 'self-help' project to meet the felt needs of its members and the community as a whole. Likewise, distance, lack of education and information are inhibiting factors to accessing these financial institutions.

The pastoral Fulani or the bush Fulani are very mobile and see no need to access and own physical assets such as shelter, communication, and education. For example, despite the provision of nomadic education for pastoralist children by the Federal government of Nigeria, school attendance is low, a finding that is attributed to the constant movement of the Fulani (Ezeomah, 1985). On the contrary, it was discovered that Fulani children attend established nomadic schools in the study areas. However, they have limited access to communication, production equipment and facilities, transport and energy. This situation is attributed to the remoteness of their settlement to urban and sub-urban areas which provide resources such as health care, market exchanges, cereals, water, among others, especially during critical times such as drought, epidemics, conflict (Nori, *et al.,* 2005). From personal observations, road

networks to most of the settled Fulani communities in the Northern part of Nigeria are poor which makes accessibility to health care and markets difficult for the pastoralists. A large number of the agropastoralists and non-pastoralists in the study sites own motorcycles for ease of movement but there is a limit to the number of people and the amount of goods that a motor cycle can carry. Also, electricity power supply is non-existent in the study sites. The use of transistor radios powered by batteries is the common channel of communication for the Fulani pastoralists.

3.3. The Fulani in Jos

The highland area of the Jos Plateau attracted Fulani pastoralists to the area. They are thought to have moved into the Jos Plateau around 1910. The many advantages of the terrain, such conditions being free grazing ground, abundant water and pasture, were seen as very beneficial for the welfare of their cattle. Opportunity for marketing their dairy surpluses among the growing tin mining industry of that time was also a determinant to settling in the Plateau. In addition to these favourable factors, the lax in collection of 'jangali' tax in the area was an attraction that contributed to the high influx of pastoralists in the Jos Plateau (Adebayo, 1995).

Furthermore, the conducive environment for cattle rearing and the open market system for income and grains in the Jos Plateau influenced pastoral Fulani (or bush Fulani) in settling. This group of Fulani forms the settled Fulani, otherwise called the city Fulani. They are referred to as the non-pastoralists and the agro-pastoralists. Some of the non-pastoralists undertake occupations such as entrepreneurship, wage fetching jobs, etc. The majority of these are Fulani who own cattle and employ the services of Fulani herd boys in herd work, a practice that reflects a status of wealth. These herd boys could be regarded as those Fulani

that belongs to the lower caste, as their wage for herd work is in form of cattle which contributes towards building their own herd. The agro-pastoralists, on the other hand, practice both semi-nomadic and sedentary production and management of livestock. They are farmers, but also maintain herds of cattle. This group is believed to have emerged during the aftermath of the Rinderpest epidemic. Its emergence was as an alternative source of livelihood and an opportunity to recoup in cases of future cattle loss. The agro-pastoralists are concentrated in villages around the Plateau such as Bokkos, Barkin Ladi because of the presence of water and river grasses all year round (Hickey, 1978). The pastoral Fulani equally referred to as 'Fulbe ladde', depend on and concentrate fully on their cattle for subsistence, and attaining the survival of these cattle, entails constant migration and continuous transhumance. The dense population of the Jos Plateau and the pressure of the cattle population on pasture in the Jos Plateau force the pastoral Fulani to move to the lowlands during the dry season (Stenning, 1957). A large number of these cattle are seen in the Plateau during the wet season for grazing[17].

The Fulani are known to be the main source of meat and dairy production in Plateau State and Nigeria in general (Blench, 1999). A significant measure taken to cope with the threats of diseases to the production of meat and dairy products in Plateau State and Nigeria, in general, was the institution of a veterinary laboratory known as the Nigerian Veterinary Research Institute (NVRI). It was established in 1924, in Vom, Plateau State. The establishment of the research institute was as a consequence of the Rinderpest disease that led to deaths of 90 % of cattle populations in the early 20th century. It was established mainly to conduct livestock census, disease surveys, and disease control by isolation and quarantine (www.arcnigeria.org). Other different forms of policy have been developed to improve

[17] In order to avoid tsetse flies, most pastoral Fulani migrate to the north during the wet season as the topographic terrain in the South during this period makes a favourable habitat for tsetse flies. See Stenning, 1957

livestock management through the allocation of land and other resources necessary to develop the livestock sector. During the colonial era, African ranches were established but it later became what Dunbar (1970) referred to as the 'ill-fated stock raising enterprise in Northern Nigeria' as pastoral Fulani were not receptive to the programme. The postcolonial era saw the introduction of the grazing reserve which is discussed here.

3.4. Evolution of Grazing Reserves in Nigeria

Mortimore and Wilson (1965) observed that as early as the 1960s the bushland in northern Nigeria was extensively grazed. Intensification of grazing in Nigeria occurred, due to several factors. Two of such factors are the clashes between Fulani pastoralists and farmers (Watts, 1985), resulting from agricultural intensification and an increase in population of cattle herd (Bates and Lees, 1977). To prevent, most importantly, the risks of conflicts between farmers and cattle rearers, the Nigerian authorities in 1965 passed the Grazing Reserve Law. Other reasons the grazing reserve law was passed include prevention of environmental pollution and animal diseases, and improved cattle production (Omotayo, 2003). The law was exclusively formulated to favour the pastoral or bush Fulani. The government resettlement scheme that was established due to mechanization, sanitary concerns and irrigation (Bonneuil, 2000) was abandoned by farmers; and this was converted to the grazing reserve scheme (Oxby, 1984). In Malaysia, the grazing reserves were established for purposes slightly different from that of Nigeria. They were created solely for the prevention of further deprivation of the traditional grazing areas used by cattle, buffaloes and goats, due to the rapid expansion of crops as well as for peri-urban and urban development (Yuen, 1989). Gains from the establishment of grazing reserve areas, however, include easing of seasonal migration, improving the quality of herds, and enhancing access to extension and social services (Rohde *et al.,* 2006). The grazing reserve could therefore be described as a piece of

land that the government owns, develops, and allots to the pastoral Fulani for use to achieve some gains.

Despite this initiative of the government, the grazing reserve scheme in Nigeria is not meeting its intended objectives as less than 1% of the total land area targeted for grazing reserves had been gazetted in the northern states (Gefu, 1998).This grazing reserve is insufficient to accommodate the growing cattle herd in northern Nigeria, a population which is estimated to be 15.3 million (FAO, 2006 cited in Aregheore, 2009). A likely failure of the grazing reserve is attributed to the non-involvement of the service user (the Fulani) of the scheme (Laven, 1991). Given this, one may say that most governmental projects set up for development employ the "top-down" approach to programme planning and implementation, hardly focussing on the 'end user' of the programme. Participation of 'end user' in programme activities is limited as the deployment of programme activities is usually within the government sceptre. Oba *et al.* (2000), are of a view that failure of grazing programmes in Sub-Saharan Africa was based on the assumptions from equilibrium systems of climate stability, management and development implications which do not conform to plant production patterns and land use in such regions (see Breman and de Wit,1983). Another significant failure of the grazing reserve is the confinement of ownership, development, and management of grazing reserves to the government alone. Government monopoly in all the areas impedes the development of outside initiatives to foster livelihood. A good example of an outside initiative is the Common Property Resource Management (CPRM) (Noronha, 1997; Adhikari, 2005), which in a traditional setting enhances grazing reserve development. CPRM, as argued by Hoffmann (2004), can only be successful if the group is relatively small and homogenous concerning needs and preferences. Thus, from this argument by Hoffman, the growing population of pastoralists in the grazing reserve could make it difficult for

CPRM to be effective. It then follows that there is a need to explore other initiatives that could accomplish and at the same time enhance grazing reserve development.

Other failures of the grazing reserve scheme include the low agronomic potential of land (Goldschmidt, 1980) on which these grazing reserves are situated, a situation which leads to some questions; is the government in the know-how of the poor state of land? If so, why the establishment of grazing reserves for settlement of pastoralists on such land? However, from a personal point of view, it is believed that the establishment of these grazing reserves is solely based on the consideration of interests of the government alone , not prioritizing the needs of the 'end users' of the scheme, which are the pastoralists. Rather than the land lying fallow, putting it to use through the settlement of pastoralists benefits the government regarding revenue generation as well as provides a solution to the constant land conflict between pastoral Fulani and farmers. It is also a means of avoiding civil unrest which affects the economy development of the nation. Ecologically, due to the poor land quality of the grazing reserve, settled pastoralists practice transhumance, a situation where Fulani herders take their herds in search of feed and water in towns, villages where they can get forage for the animals. Kachia Grazing Reserve is a good example of a grazing reserve established on an ecologically impoverished land area. Because of its topography, it hardly meets the needs of the pastoralists, most especially with regards to feeds and water.

3.5. Kachia Grazing Reserve, Kachia

The Kachia Grazing Reserve (KGR) is situated in Kachia Local Government Area of Kaduna State (see Fig 3.3). The State shares common borders with eight other states of Nigeria, Abuja, the Federal Capital Territory inclusive (see Fig. 3.2). The State has an area of about

48,473.2 square kilometres. The Northern Kaduna are mostly Muslims and the Southern Kaduna are mostly Christians with pockets of Muslims.

3.5.1. Ecology and Land Use

The Kachia Grazing Reserve lies within the subhumid zone of Nigeria. It is a relatively flat land covered with trees and shrub with few low-lying fadama areas suitable for dry-season grazing. It was established in 1970 by the Nigerian Government of the Kaduna State Ministry of Animal and Forest Resources, for the settlement of Fulani pastoralists (Guidelines on the Development of Grazing Reserves, 1978). Kaduna State experiences a tropical continental climate, characterized by two distinct seasons of dry and wet. The dry season starts in October and lasts till April while the wet season starts around late April and last till October. The average annual rainfall is 1250mm with maximum rainfall between July and August (Adewuyi and Baduku, 2012). Kaduna temperature is high throughout the year with mean minimum temperature at 23^0C and mean maximum at about 34^0C.The diurnal range of temperature is sometimes as high as 12^0C which is good for crop growth throughout the year (Adeleke and Leong, 1981).The total annual evaporation transpiration rate varies from 1,560mm in the northern part to 1,490mm in the southern part of the State, which by extension leads to increased rainfall, a situation that is favourable to plant growth (Chima, Ijioma *et al.,* 2011).The State falls within the Northern Guinea Savannah zone, which comprises two Savannah types namely; Guinea and Sudan savannah. The Savannah is characterized by woodland with grasses of different species. Mainly undifferentiated complex igneous and metamorphic rocks underlie the state. The soil is developed from the above parent materials. Most topsoil are therefore of medium coarse texture while the subsoil is usually of finer texture. The combination of the topsoil and subsoil coupled with reasonable organic matter enhances the fertility status of the soil most especially in the southern part of

the state. The soils in the northern part of the state are however of sandy parent materials. Their physical properties are moderately good (Okogun *et al.,* 2005), allowing for continuous cropping. An exception to this is the Kachia Grazing Reserve which situated within the southern part of the state has poor land which affects cultivation density at 5% or less (Waters-Bayer and Taylor-Powell, year unknown). Such conditions inhibit crop growth, and this leads to a low yield of the harvest of crops produced. Apart from the negative impact on the yields of crops, there is an increase in the risk of crop diseases and pest (Chancellor and Kubiriba, 2006). The grazing patterns of animals are affected during the dry season as the environment becomes bare and dry.

The grazing reserve because of its location within the tsetse belt was sprayed in 1967 and declared tsetse-free (Oxby, 1984). In 1985, the reserve was abandoned, due to the prevalence of trypanosomiasis which affected livestock and farming production system (Enwezor *et al.,* 2009). Developmental organisations initiated some control measures such as importation and multiplication of trypanotolerant cattle, evaluation of animal health services (De Haan, 1994) to encourage resettlement of the pastoralists. However, disease survey carried out in the reserve in 2004 and 2005 still shows an 8.4% prevalence of trypanosomiasis (Enwezor *et al.,* 2009).

Figure 3.2: Map of Nigeria showing the Location and Boundary States of Kaduna State

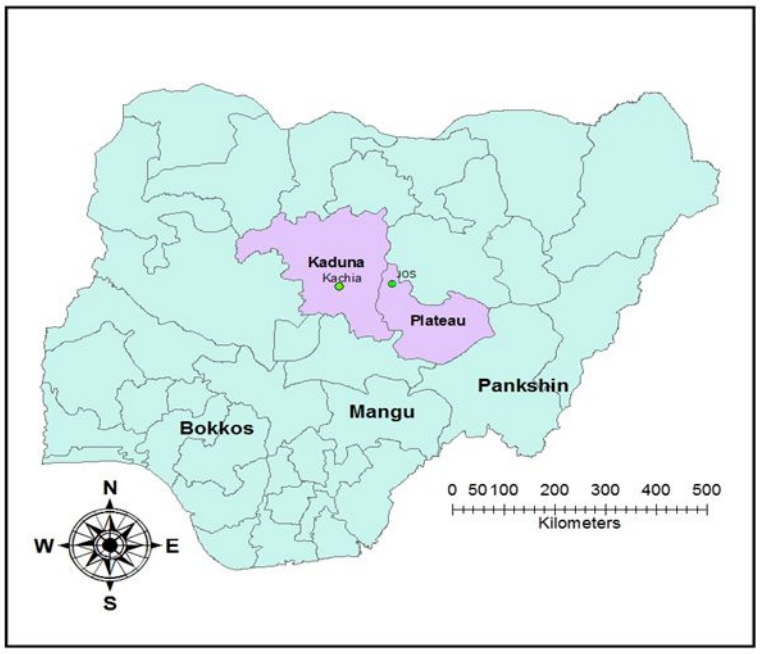

Figure 3.3: Map of Nigeria Showing the Location of the Two Study Sites.

Source: CIDLID/ICONZ Nigeria Planning Document, 2010

3.5.2 Structure

Six contiguous 'Blocks' make up the whole of the grazing reserve, otherwise known as the district of 'Ladduga'; a predominantly Muslim community, which has within its locality mosques with no evidence of a church structure in place (personal observation). In contrast to Oxby (1984), who stated that developmental efforts such as building of roads, dams, nomadic schools, construction of more boreholes, community health centre were established as a step towards encouraging the Fulani to settle and establish a permanent base; the grazing reserve, from personal observation and assessment, is socially disadvantaged in terms of education, health services, good road structure. Concerning the expanse and population of the grazing reserve, the number of schools (primary and secondary) is not adequate for the growing population of pupils and students. One community health centre and a non-governmental health clinic are not sufficient for the whole populace. The existing road network to the

reserve is poor. It was observed that this becomes even worse during the rainy season. A likely explanation for the poor state of infrastructure in the grazing reserve is that, though the government might have provided the available infrastructures for the comfort of pastoralists as affirmed by Oxby (1984), lack of commitment, management and sustainability of resources contributed to the inadequacies of and in some cases the breakdown of these infrastructures.

3.5.3. Agricultural Production

In the grazing reserve, settlement sites are chosen on the basis of suitability of land for cropping, since cattle can be herded more widely as it is general knowledge that places avoided for ecological reasons are where the reserves get situated. It is likely that for this reason, ten hectares per herding unit are apportioned for each herder and are measured as follows: four hectares for grazing, two for settlement, two for farming of legumes, and two for fallow (Oxby, 1984). Crops grown are maize, sorghum, yam, cassava, cocoyam, beans, rice, millet, groundnut, okro and sweet potatoes. The majority had no fodder bank as crop residues generated are not enough to feed the cattle. Thus, movement of herd outside the reserve for grazing mainly during the dry season is inevitable. The practice, therefore, conforms to the recommendation of Bayer (1986), that agricultural management can be effective if grazing reserves be used for wet season grazing and cropping by pastoralists and remain as dry season residences for only part of the family and herd. Livestock reared include sheep, goats, cattle, chicken and turkey. From the literature review, studies have shown the prevalence of trypanosomiasis, helminthiasis in cattle within the reserve (Enwezor *et al.,* 2009; Nnabuife *et al.,* 2013).

3.5.4. People

In 1979, only four Fulani households were known to have settled in the reserve (Phillipson, 1979). In 1984, 34 Fulani households were recorded to have settled in the reserve, keeping herds ranging in size from 4 to 125 head of cattle (Waters-Bayer and Taylor-Powell, year unknown). Presently the Blocks contain 581 heads of households and 5,252 people (Nnabuife, Dakul *et al.,* 2013). This shows the progression of the reserve as evidenced by the increase in population from year to year. The increase in Fulani settlement in KGR is believed to have arisen as a consequence of the conflicts and crisis between pastoral Fulani and farmers during the quest for water and feed for their animals. Most settlers came from Kaduna, Plateau State, Bauchi, Adamawa, etc. The Fulani pastoralists in KGR are primarily cattle rearers. In addition to cattle rearing, they also rear sheep and goats. Most of them are agro-pastoralists. They plant small fields of cereals to supplement household food supply and to limit the sales of animals to buy staple grains. These small fields of grains, however, do not generate enough crop residues to feed their cattle, thus most practice transhumance.

3.6. Policy, Political and Institutional Constraints to Pastoral Development

The Fulani ownership of livestock accounts for one-third of the agricultural GDP in Nigeria and 36.2% of the nation's GDP (Central Bank of Nigeria, (CBN), 2004). Despite, a large number of Fulani pastoralists in the northern part of Nigeria, development programmes or projects set up for improving livelihoods in such areas barely target the livelihoods of the pastoralists. According to Ibrahim (2012), within the years of 1996 to 2006, none of the eight environmental/rural development projects implemented in Katsina State, northern Nigeria targeted the pastoralists.

As explained earlier, the Federal government establishment of grazing reserves was a scheme to settle the Fulani pastoralists. The main goals of livestock policy in Nigeria since independence have been to raise the supply of animal protein and to improve rural incomes derived from livestock production and processing (Federal Ministry of Agriculture, 1988). Attainment of these goals is believed to be the purpose for the establishment of the grazing reserves without the consideration of pastoral livelihoods. Despite the written policy of 1965 to implement the grazing scheme, unsatisfactory progress has been recorded. In 1980, less than 1% of targeted grazing reserves had been gazetted in the Northern States. Eighteen years later, Hoffmann (2004), reported that 52 (20%) of the 313 grazing reserves acquired were gazetted; a situation attributed to instability in programme implementation which stems from a lack of commitment to policy statement. This case conforms to the statement of Onibokun (1998), that 'Nigeria is good in the formulation of policies but poor at implementation'. However, of recent, efforts have been made to address the problem of access to grazing lands. One of such is the proposed bill on grazing routes and reserves. This bill is still under discussion at the Nigerian House of Senate. Such bill requested that power is granted to a federal commission to acquire lands from all the state governments in Nigeria and the Minster of the Federal Capital Territory to establish grazing routes and reserves for Fulani herders (Okeke, 2014). The bill anticipates that subject to the directives of the commission; Fulani herdsmen would have a right to such lands, irrespective of the wishes of the owners, or despite the wishes of the state governments. However, this bill is still in contention, with a likelihood that it might not go through.

Above all, the agricultural research in Nigeria is very poor evidenced by the poor allocation of funds to the agricultural sector. The Department of Agricultural Sciences (DAS) of the Federal Ministry of Agriculture, responsible for all the aspects of research in Nigeria, has been incapacitated in advancing agricultural research in Nigeria. Funds allocated to

agricultural research are 0.85% of the national GDP (Enete and Amusa, 2010).The agricultural sector's budget between the years 2001-2005 was slightly less than 1.8% of the total budget (Enete and Amusa, 2010). In the year 2014, only 1.4% of the total budget was allocated to the agricultural sector (Daily Independent March 17, 2014). This budgetary allocation falls below the 10% Maputo declared commitment to agriculture, food security and gender equality (Fan and Rosegrant, 2008).The rationale for the low budget allocation to the agriculture sector, according to the government, is to expand opportunities for the private sector to drive the Federal Government Agricultural Transformation Agenda (ATA) programme to benefit new fronts in 2014.There are some pertinent questions asked here: can this be a catalyst to drive agriculture forward? Will this improve the public-private partnership in agricultural production? Answers to these questions can only be provided as time goes on. However, the passable explanation for this initiative is that it could have evolved from the success story of the 2003 Presidential Initiative in Cassava Production and Export (PICPE).This project was launched to promote cassava processing and commercialization through a public-private partnership. The project brought about an increase in cassava production and successful pest control (Adekunle *et al.,* 2012). A thorough research, however, shows that such initiative was not extended to the livestock sector of agricultural production in Nigeria.

The traditional institutions of leadership and chieftaincy in Nigeria used to be the custodian of communal land. This role has, however, shifted to the State Government. The Land Use Act enacted in 1978, is a legal document that states that all land in the state should be vested in the office of the governor of each state (Soludo, 2000). Also, the Act permits the local government to grant the right of occupancy to land to anybody or organisation for agricultural, grazing and residential purposes. Despite this provision in the Land Act, decree, as reported by Omotayo (2003), land accessibility both for grazing and crop production, is

still a major challenge to agropastoral Fulani. However, from arguments put forward by some scholars, Williams *et al.* (1999); Arua and Okorji (1997), the customary tenure system of land use is still in existence in most parts of the country. This situation is seen mostly in the northern part of Nigeria, which still sticks to the precept of the old colonial land law for Northern Nigeria. Such law states that agricultural land is not owned by individuals but by local communities, represented by village heads, chiefs, and emirs (Udo, 1990). It is believed that these opinion leaders allocate land to favour the indigenes and rather lease land on a tenancy basis to the Fulani. It is a practice believed to reassert their ethnic identity and at the same time enact control over their land.

According to Sylla (1994), the uncertain environmental conditions of the pastoral Fulani need fine-tuning and adaptation which are best provided by local level institutions. Agrawal (2010) lists information gathering and dissemination, resource mobilisation and allocation, skills development and capacity building, leadership, and means of connecting with other decision makers and institutions as the institutional functions of local institutions. Regional administrations within local government are responsible for implementing policies on pastoralism (Tonah, 2002), though such policies are often driven by donor conditionality as African states are perceived to be weak and incapable of carrying out the policies nor possess the resources to implement effectively (Homewood, 2004).Their inefficiencies could, therefore, be attributed to the inadequate allocation of public funds from the central and state government (Omiti and Irungu, 2002). For example in Mali, efforts to develop a land charter from tenure land observatories failed as implementation proved difficult due to lack of leadership from government agencies (Le Valley, 2003).

Donor agencies and non-governmental organisations (NGOs) are widely known to channel financial aid towards socio-economic development, especially in resource-poor areas. However, the future looks bleak for pastoral development in Nigeria as most donor support

for livestock and pastoral development has strongly dwindled. The World Bank, from the 1980s, has cut its support for programmes in Sub-Saharan Africa from about $150 million per year to $25 million per year in 1996 (De Haan, 1994). A possible explanation to the halt in support from donor agencies is the disappointment from the failure of past developmental projects that were set up for improving the livelihoods of the pastoralists. The USAID, however, supported a limited number of community resource management projects after discontinuation of support for national livestock development projects in the mid-1980s. An example of such programmes backed by USAID is the Integrated Conservation and Development projects in African countries (see Alpert, 1996).

Some of the problems outlined above (for example issues on land use policy, lapses in agricultural policies) contribute to the prevailing crisis in the Jos Plateau. Such lapses in agricultural policies have also been the cause of many conflicts in Kaduna, Kano, Jalingo, Taraba States of Nigeria. The following details other reasons behind the Jos crisis and their effects on security of the nation, which relates to the main subject of this thesis.

3.7. Jos Crisis

Civil unrest in the form of riots, destruction of properties, threats to life and loss of lives constitute the current crisis experienced in Jos. Competitions, religious and political affiliations seem to be the underlying factors to the crisis in Jos. According to Osaghae and Suberu (2005), the crisis in Jos could be described as ethnoreligious and intergroup economic clashes. An example of the ethnoreligious economic disputes is the conflicts in Jos and Bukuru between the indigenous communities and settlers which culminated in the explosions of the April 1994. Others include the Mangu-Bukkos conflicts of 1992 and 1995, the Bukuru Gyero Road conflicts of 1997 between the Birom and Hausa communities, the Mangu-Chagal

conflicts of 1997 (Osaghae and Suberu, 2005). The Birom ethnic group was mostly affected by tin mining as mining activities were conducted on the largest portion of land populated by Birom communities (Higazi, 2013). Thus, the Birom communities became protective of the land not affected by mining. Grazing on such land is met with restraints from the Birom ethnic group, making it the prominent group in conflict with the Fulani (Higazi, 2013).The indigenes monopolise their resources as they see the large population of people with origins in other parts of the country as a threat to their control of the economy. There is also the fear of the settlers taking over the reins of the community because of their large population. The issue of indigeneity as illustrated by Higazi (2013) has generated a lot of animosity between the indigenes and settlers of the Jos Plateau. He argued that it was a reasonable ground for concern and grievances on both sides.

The clashes in Jos, however, intensified from ethnic-group to ethnoreligious conflicts with a political undertone. A political appointment of a Hausa Fulani as Director of a poverty alleviation programme in Jos North Local Government Area (LGA) in 2000 raised a lot of controversy from the Jos Plateau indigenous Christians who felt that the Hausa Fulani appointed will favour his Muslim Hausa-Fulani group. The controversy escalated into a cascade of crisis which rages on till present. The conflict spread from the urban areas of Jos Plateau to the rural areas bringing about tensions and insecurity. It is likely that this crisis provided an opportunity for the group 'Jama'at ahl al-suma li-'l dawa wa'l-jihad' widely known as 'Boko Haram '[18] to in surge itself into the conflicts and violence taking place in Jos. Bombs by this militant groups have been detonated in churches and public places killing and injuring Christians. As at present, the Jos Plateau has lost its former glory of tranquillity for which it was known. Since the onset of the crisis many properties and thousands of lives

[18] The 'Boko Haram' translated as 'Western Education is sinful' could be described as an Islamic terrorist group believed to be fighting for the cause of Islam by killing and destroying anybody and anything they believe represents Western Education.

were lost, and as a result, international countries have advised their citizens against visiting the State.

As a consequence of this, the State has lost a lot of revenue that could have been derived from tourism. The declaration of emergency in the state has not helped in solving the problem as the state continues to witness increased tensions and conflicts. Insecurity has also discouraged farming in many areas and severe food shortages for human and livestock have occurred (Blench, 2004). Cattle rustling took place during these times of crisis (Higazi, 2008) further aggravating the tussle between the Hausa-Fulani and the indigenes of Jos Plateau. The prevailing circumstance demonstrates a situation which if not controlled, constitutes a lingering risk to the livelihoods of the inhabitants of the state, pastoral or non-pastoral alike.

3.8. Risks to livelihoods

Risks are manmade or natural events that could destabilise the livelihood of people. Risks can be categorised into three types the 'common' or 'covariate', the idiosyncratic or individual and the 'clustered' risks. The covariate or common risk is that which affects all members of a community or region. The idiosyncratic risk on the other hand or the individual risk is a type of risk that affects individuals within a community or a geographical region, and the clustered risk is the occurrence of other risks (Hoogeveen *et al.,* 2004). Examples of covariate risks faced by pastoralists include drought, harvest failure, deforestation. The idiosyncratic risks include human illness, death, disability, livestock and crop diseases. Pastoralists also face 'clustered' risks of riots, political unrest, theft and epidemics. Idiosyncratic risks are best managed by the individuals affected while the covariate and clustered type of risks are best managed by public sector engagement and investment (Rass, 2006). Identification of major risks and comparing the effects of the risk to various livelihood dimensions could be difficult

to analyse which could explain their omission from most livelihood studies based on the sustainable livelihood framework. Examples of such risk are the economic risks (e.g., market exclusion), health risks (e.g., access to health care for both animals and human) and environmental risk (e.g., climate change). It is assumed that most of the risks pertain to the welfare of human and livestock and thus necessitate appropriate action in controlling such risks.

3.8.1. Risk to Accessibility of Health care for both Livestock and the Fulani

The harsh conditions of living experienced by the Fulani predispose them and their animals to diseases. The Fulani pastoralists are marginalized in respect to health service delivery as the health facilities are not adapted to extend services to these 'always on the move' group of people (Ailou, 2010). For example, the nomadic Fulani settlements were left out during a distribution of ivermectin in the control of onchocerciasis (Brieger *et al.,* 2002). Child immunization within some Fulani population is low, as less than 3% of children below two years benefit from full immunization compared to an estimate of 40% of all children in the same area (Dao and Brieger, 1995).

Before the arrival of the colonial masters, the Fulani resort to using of native methods of treatment for human and animal disease (van Veen, 1997; Kofi-Tsekpo and Kioy, 1998). They used medicine locally made from plants to treat or prevent diseases that could hinder animal production. The colonial masters see these traditional practices as primitive and thus were banned (WHO, 1990). They introduced the orthodox means of human and animal health care; however, access to these services provided was very low (Sheik-Mohamed and Velema, 1999). The issue of user fees (Lagarde and Palmer, 2011) might be an undermining factor to the low access to orthodox health care. The traditional methods used by pastoralists in

treatment of human and animal health inspired Calvin Schwabe[19] who focused on the harmony of human and veterinary health. He observed that the veterinarians are the most extensively distributed highly educated human resource in African rural areas (Majok and Schwabe, 1996). Thus, they strongly advocated for the intersectoral collaboration between the health and veterinary services and when appropriate, with other sectors; an idea also advocated for implementation in African communities. However, to date, a gap still exists between the medical and the veterinary industries in Nigeria (Ehizibolo *et al*., 2013). According to Ehizibolo *et al.,* (2013), the general lack of resource commitment to health issues hampers this collaboration which could foster public health surveillance and disease control.

3.8.2. Risk of Market Exclusion

Agriculture can be termed as the primary economic activity in Nigeria which contributes significantly to the livelihood and welfare of people. The market could, therefore, be described as an avenue of activities and also a social outlet through which agricultural produce and by-products yield economic gains to agricultural producers (in this case the rural producers). It is an important aspect of livelihood activity for rural people. For the Fulani pastoralists, the market represents an institution through which livestock, a major marketable asset (Turner and Williams, 2002), could be converted into cash and for grain. It could also be seen as an avenue for depletion (as insurance against loss resulting from disease and natural disasters such as drought) and replenishment of livestock (post-drought). However, pastoralists are at risk of market exclusion because of the unstable position (locality and market prices) of markets and high marketing costs. Pastoralists are known to trek long distances to the available local market to sell their cattle and price negotiations are made

[19] Calvin Schwabe fully recognised the close relationship of humans and animals for nutrition, livelihood and health

through a professional intermediary who receives a small commission (Muazu, 2005).The money realised from the sale of livestock might be below the amount the seller expected of the livestock, but the cost of going back home without the sale of the livestock after all the long trek gets weighed against selling at a lower price.

Travelling long distances and sometimes under harsh climatic conditions sets back the health of the pastoralists and their livestock. At times, the livestock is inflicted with diseases, which deplete their market value. The development of land markets within easy reach of pastoralists for the sales of cattle is a likely venture that could be pursued in finding ways to address the inherent health problems of both the cattle and the cattle traders; with a view to improving the market value of the cattle and also as an opportunity of side-lining the middlemen in the sale of cattle. However, as it is seen in the next chapter, such endeavour is unlikely as the Fulani grapples with land use. Other factors that contribute to unstable market prices include sellers' limited access to information (Bellot, 1982) and breed of livestock. The lack of transportation and increase in the cost of transporting cattle from a place of production to place of sale contributes to high marketing costs of livestock (Muazu, 2005).

3.9. Vulnerability

Vulnerability is the reduced ability to forestall, cope with, resist and recover from the impact of a natural or man- made hazard. Such hazards include drought, floods, deforestation, diseases, etc. The vulnerability is therefore determined by the state of weakness or strength of livelihood accessibility (Smit *et al.,* 1999; Luers *et al.,* 2003) to a range of assets and the willingness of different social institutions to offer social protection (Moser and Holland, 1997). It is sometimes erroneously linked to poverty. In the absence of risk, a household can be in poverty while in the presence of poverty, exposure to risk may not have an effect on the

well-being of a household due to the coping strategy or resilience to the occurrence of such risks. Using the study sites for example, the indigenes of the villages in Bokkos LGA, Jos Plateau who keep cattle are vulnerable to livestock diseases and due to their lack of herding skills might experience a great loss in cattle herd, while their Fulani counterpart on the other hand as a result of their constant association and preoccupation with cattle have developed coping strategies or resilience over periods of time to manage livestock disease. The vulnerability could also arise as a result of isolation and insecurity concerning stress, shock or risk as people's exposure to risk and their responses to such exposures depend on their social status, ethnicity, gender, age, health status, wealth and, in some cases, educational status.

According to Canon (2000), five key components of vulnerability are identified: initial well-being, livelihood resilience, self-protection, societal protection and social capital. These are essential components needed to cope with vulnerabilities in a pastoralist community. For example, vaccination of human and livestock is a self-protective measure taken to protect oneself against diseases. Building social capital with a political will of networks and institutions will set a conducive and good environment to provide hazard precautions and support people's rights to express their need. Seasonal migration, a form of cattle management technique promotes the wellbeing of cattle by avoiding diseases, although in some cases it predisposes the cattle to diseases. Seasonal migration also facilitates trade (influenced by the pattern of migration), the disposal of barren cattle, calves, and old bulls through sales and it also replenish herd size through the purchase of milking young calves. Collective actions through institutional change are effective in the management of livelihood resources (Ngaido and Kirk, 2001), especially in a pastoralist community. However, due to the Fulani population's lifestyle of constant movement they have weak networks and institutions that could bring about a change in their livelihoods (Turner, 1999). For example, according to Sylla (1995), experiences from Africa suggest that attempts to confine

pastoralists to defined territories nearly always fail; a situation which weakens established networks and institutions. Strong networks and institutions of pastoral communities will influence and drive public, civic and private sectors in planning and effecting changes in such communities. This contributes to livelihood sustainability and reduces vulnerability. The idea behind One Health is an example of the gains that could accrue out of this collective action among institutions.

Vulnerability to shocks, diseases, and natural occurrences are usually high among the Fulani pastoralists (Azuwike and Enwerem, 2010), a consequence of their mobility, their exposure to harsh climatic conditions, the level of knowledge, mobilization of resources and their stance in policy as previously discussed. During the episode of a drought, poor pastoralists are vulnerable to the risk of human illness and animal diseases, notably due to lack of knowledge to avoid risky behaviours and insufficient resources for procurement of drugs. Animals are sold pre-emptively before emaciation occurs. Pastoralists are also vulnerable to the risk of animal diseases, which, depending on the type of disease, could turn into the risk of an epidemic. The vulnerability to the risk of diseases depends on access to medical treatment for humans and veterinary services for animal care. Other risks to which the pastoralists are vulnerable to include the potential for violent conflict and political unrest, conflict over natural resources such as water, land (Halderman *et al.,* 2002; White and Nackoney, 2003) and conflict caused by the marginalization of pastoralists (Little, 2003). These conflict situations lead to displacement, loss of properties, death, suffering and a halt to developmental processes (Rass, 2006). Although, pastoralism is highly vulnerable to shocks, diseases and natural occurrences, collective action among the Fulani places them in a capacity to cope with livelihood challenges (Fabusoro and Oyegbami, 2009).

3.10. Coping

There are various ways through which people adapt to and cope with the situations in which they find themselves for livelihood purposes. These coping strategies differ among people of different tribes, ethnic groups, social status etc. Socio-political and environmental factors predetermine the coping strategy of an individual. Coping strategy is also a behaviour which one takes up to function adequately in a given situation. Carver and Conner-Smith (2010) defined coping as the process of attempting to reduce distress associated with harm or loss. Coping can also be termed risk management. According to Carver and Conner-Smith (2010), coping strategies comes in two forms: problem-solving and emotion-alleviation. Both forms are usually employed to alter the traumatic situation as well as make efforts to normalize the emotional distress associated with the situation. Problem-solving coping is normally used to alter the distressed person-environment by working on the environment or the person. Carver *et al.* (1989) reported that behaviours or thoughts that work to remove whatever negative event a person may be facing are the main concerns of problem-focused coping. Such behaviours include seeking information, planning and taking action (Smith and Kirby, 2009). In Northern Kenya, Environmental Management Communities' (EMCs) were formed in pastoral settlements by a German Aid Agency. The roles of the EMCs were to work out rules and sanctions for water use, grazing pressure and tree protection (Berger, 2003). However, Fulanis' lifestyle and custom could be a stumbling block to taking appropriate action to cope with a problem, for example, some diseases such as hernia and vesicovaginal fistulae (VVF) are regarded as shameful and thus are not declared for treatment administration (Gordon, 2000). Emotion-alleviation coping involves changing a person's perception or thoughts on handling a situation. This invariably means working on the person's mental strength. Seeking emotional social support, denial or approval of it are some of the responses to emotion-alleviation copying strategy. A study conducted in Kwara State, Nigeria among

farmers and pastoralists using their mutual conflict as an appraisal show that the use of emotion-oriented coping strategies such as appeasement, prayerfulness, pretence, vengeance and drug/alcohol intake were more prevalent among pastoralists (Adisa, 2011).

The Fulanis strive to curtail any natural hazards that might have an impact on the general welfare of their animals by taking up coping strategies such as engagement in frequent movement, resource circulation, social cooperation, and pre- and post-drought herd enlargement when vegetation conditions are splendid (Dahl, 1980; Azeze *et al.,* 2002). For example, some actions are taken in the period of drought for the survival of family and lineage and also to preserve family livestock. Most of the men send the women, the elderly and children to kinsmen in areas not affected by drought. Livestock are also divided into smaller specialised units and taken to kinsmen in drought-free areas to be tendered temporarily (Cassanelli, 1982). Pastoralists, in coping with drought related stress also become urban migrants for the purpose of deriving income from non-farm activities (Barrett and Reardon, 2000; Ellis 2000). Also, the Fulani in coping with the effects of marginalization to land use and natural resources move from place to place hopefully seeking for host communities that will give them access to land use and natural resources.

The government of Nigeria, in her response to the occurrences of drought and famine, provided aid in the form of food relief, the building of dams and boreholes. In some places, they have planted protective windbreaks to retard desert advancement (Farshad *et al.,* 2002). These policies hardly involve pastoralists. Policy issues related to impact of climate change and adaptation have not drawn on the fact that adaptation to climate change depends on the people affected, the environment in which they live and the relationship between the two. This oversight contributes to the non-utilization or rejection of some of the strategies initiated for enhancing people's ability to cope with problem of drought (Blench and Marriage, 1999). Active participation by concerned parties, aimed at ensuring actions match with local needs

and resources is one of the many conditions listed for enhancing adaptive capacity as stated in the third report of the Intergovernmental Panel on Climate Change (Smith *et al.,* 2003). The guideline in the IPCC report has, however, not been adopted for use within most local level context. This situation does not recognise the fact that local participation in planning for hazards is of utmost importance in generating support for the implementation of the disaster risk reduction initiatives (IFRC, 2004). Although many critics (Rydin and Pennington, 2000; Cooke and Kothari, 2001; Davos and Lajano, 2001) have arisen with regards to the 'need' for active participation, an empirical view[20] will shed more light on the basis of some of these criticisms. Other constraints contributing to non- implementation of strategies initiated by the government for pastoralists to cope with natural disasters include lack of information (Mukheibeir and Ziervogel, 2007; Crabbe and Robin, 2006), institutional constraints, leadership, competing priorities and planning processes[21].

3.11. Resilience

Increasing resilience and decreasing vulnerability reduce negative outcomes of exposure to risks. Coping is also known to be interconnected with resilience and the ability to cope with shocks and stress shows a high resilience to such shocks and stress. In a nutshell, resilience is the ability of groups or communities to resist disturbances by maintaining its function and controls. Resilience is also termed as an outcome of the coping strategies undertaken to withstand and recover from the vulnerabilities that is experienced through the occurrence of shocks and stresses. To be resilient one must be equipped with assets and have the capacity to withstand shocks and stress. Resilience building strategies are usually adopted to build resistance within the household against hazards. Such resilience building strategies include

[20] See chapter 4 and 5
[21] See Measham *et al.,* 2011. A practical research conducted to understand and address climate vulnerability at the local level.

learning from the crisis, developing coping strategies and building livelihood options. Resilience involves managing change. An individual, a household or community exposed to shocks, can transform or maintain the available assets within their disposal to withstand shocks or stresses. In the same vein, resilience building entails putting into consideration certain elements such as the nature of the shock/stress, the population that is exposed and accessibility to assets and services. It also entails an understanding of the shock/stress, and the methods through which the available assets and services are put to use to overcome such shock/stress.

The pastoral Fulani, because of their nomadic nature, low educational status, cultural characteristics and environmental conditions, have low resistance to shocks/ stress (Nori *et al.,* 2005).These factors contribute to their incapacitation in building up resistance to shocks/stress to their system. Notwithstanding, as custodian of livestock and the fact that their lives revolve mostly around cattle, they have developed some coping strategies from times past that enable them to have resilience to shocks that might affect their livestock. In the event of environmental instability such as drought or floods, the cattle are usually divided into two or more herds. A part of the herd are sent to families or friends residing in environment that is stable with regards to ample water and grasses for grazing while other parts are taken for grazing in search of water and feeds.

Cattle seem to be the only recognised asset that could help with coping with stress/shock. Despite the fact that most pastoralists are in possession of large herds of cattle, they are reluctant to part with their cattle through sale; as they treasure them. Sale is made only when they have no option as in the time of illness due to diseases, and when they are in urgent need of cash. Other assets that can be utilised to cope with stress/shock include skills acquisition, information, veterinary care services, etc. but unfortunately, the pastoralists are in lack of these. Pastoral Livelihoods Initiative (PLI) in Ethiopia was a programme developed to

support the resilience of pastoralists exposed to severe drought. Through it, funding was disbursed to pastoralists for destocking, animal health, transport subsidies, border harmonisation and water development (Aklilu and Wekesa, 2002).There are some resources which pastoralists have no control over such as land, market and politics (Peluso, 1993; Turner, 1993; Klopp, 2000) which adversely impact on their welfare and livelihood. Their resilience to shocks from these is low. Many indigenous techniques were developed by the pastoralists as seen from reviews of literature to build up their resilience to situations that might impair their livelihood and social wellbeing. Such techniques include traditional herd management (Fratkin, 1997; Winter, 1984), traditional range management (Ostberg, 1987; Jacobs, 1980; Maliki *et al.,* 1984), traditional well management (See Putman, 1984; Helland, 1982) and traditional formal and informal social controls (See Little and Brokensha, 1987; Artz *et al.,* 1986). However, such indigenous techniques are on the decline giving way to modern technology of herd management and development. Other distinct examples of resilience in a pastoralist system include rearing of different breed of livestock e.g trypanotolerant and practice of agropastoralism.

3.11.1. Breed of Livestock

Picking a breed of livestock to rear is a strategy that pastoralists adopt to cope with and be resilient to natural hazards and diseases that might affect their livestock. The breed of cattle that are kept by the pastoralists are predominantly ‘zebu’, ‘muturu’, ‘keteku’, ‘n’dama’ and ‘kuri’ (RIM, 1992). Factors that predetermine the livelihoods of the Fulani pastoralists influence the breed of livestock they keep. Such factors include ecology and feed availability, disease, animal traction, marketing systems and cultural preferences (Blench, 1999). Some breed of cattle such as the Sokoto Gudali, are known to thrive well in places that are considered overgrazed. They are not restricted to a particular diet and feed, but feed on a

wide range of food. In a way they can adapt to drought and are good for fattening; and a good source of money. A breed, to the Sokoto Gudali, is the 'muturu' breed which can digest a wide spread of feeds. A distinct difference between the two is that the 'muturu' is disease-resistant while the Sokoto Gudali is not. Due to its disease-resistance characteristic, it is highly in demand. The common 'zebu' breed of cattle feeds only on appropriate pasture composition, thus is often stall-fed and is highly prone to diseases, because of these they cannot live at all in the southern part of the country except they are kept in stall (Davies, 1977 cited in Blench, 1999). Small ruminants like sheep are also kept by the Fulani. The Yanakasa sheep, according to Aganga *et al.,* (1988), do not need daily watering in the wet season and survives well during the dry season. On the other hand, the Uda sheep are adapted to long distance transhumance, though less popular for fattening. It is also known to resist high humidity pathogens (Blench, 1999). The underlying principle to the keeping of different breeds of livestock by the Fulani pastoralists is to ensure that their livestock does not diminish due to diseases and drought and also with a view of increasing the market value of their livestock. Keeping such breeds is a way of ensuring that threats to their livelihoods will be greatly reduced.

3.11.2. Agropastoralism

Agropastoralism (on the other hand), is the practice of mixed farming, that is, integrated crop and animal production (Amezquita *et al.,* 2004). It could also be referred to as a form of livelihood diversification for the settled Fulani. The pastoral system practised by the Fulani herders fall into three categories, exclusively nomadic pastoralists who are mainly livestock producers and therefore do not grow crops, thus they depend on the sales of their livestock and milk products to buy grains (Blench and Marriage, 1999), semi-nomadic or transhumance pastoralists who rear a high proportion of cattle, many sheep and goats. Grains and other

needs are purchased with proceeds from sales of livestock. The difference between both groups is that the transhumant pastoralists have permanent homestead and base while those of the exclusive group are always on the move. The third group is the agro-pastoralists and they are found in many parts of northern Nigeria. Sedentary system of livestock production is commonly practised among this group of pastoralists. However, there are many that practice transhumance during the dry season, when they take their cattle grazing from their homestead and get back at the onset of the planting season. They grow crops such as cassava, yams, and cereals such as rice, sorghum, maize and millet. The crops grown are mainly (for grains) for household consumption. Fulani cropping system is less diversified than that of the neighbouring crop farmers (Powell and Taylor-Powell, 1984). Their growing of crops in Bokkos LGA is more for consumption, in contrast to the crop farmers who grow crops mainly for economic gains. This finding from the study is in contrast to Swift (1988) who in his description of the agro-pastoralists, ascribed that a greater percentage of their livelihood is derived from crop production rather than livestock. In the past, the Fulani used to sell cattle to buy grains for the household consumption. Therefore, this system of farming enables them to have grains and at the same time keep their animals. The average herd of cattle owned is smaller in comparison to the other pastoral systems, but this is due to labour shortage and seasonal forage scarcity (Perevolotsky, 1986).

Residues and agricultural by-products from harvesting of crops provide most of the herd's diet. Subsequently, dung from an animal is utilised as manure for agricultural purposes. According to Bourn *et al.,* (1994), agropastoralism is one of the impressive changes that have taken place within local systems of agriculture in Nigeria. They are also of the view that further integration of livestock production within local farming systems will become one of the major strategic goals of livestock development in Nigeria. In addition, the marked reduction in pastoral nomads, the widespread sedentarisation of pastoralists and their

adoption of crop cultivation in addition to keeping livestock, the adoption of animal husbandry and fattening of livestock by arable farmers, and the utilization of crop residues by livestock farmers in exchange for dairy products and/or manure (Bourn and Wint, 1994) are all indicative of a progressive and widespread trend towards mixed farming (Tarawali *et al.,* 2011). The sedentary Fulani in Futh and the Mambilia Plateau in Adamawa are good illustrations of mixed farming practice among pastoralists in Nigeria.

A risk related to agro-pastoralism is that of climate change. Climate change has a covariate risk that affects the high percentage of people whose means of livelihoods such as crop and animal production depend on environmental factors. Climate change, directly and indirectly, affect the health of animals and human and shapes vegetation positively or negatively. A discussion on the effect of climate change on health and agricultural production with the ensuing problems of agricultural production and activities is given thereof.

3.12. Climate Change and Sustainable Livelihoods

Climate Change, according to United Nations Framework Convention on Climate Change, is a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability, observed over comparable time periods (UNFCCC, 1992). Nigeria is affected by climate change. For example, in Jos Plateau and the Mambilla Plateau, erosion and overgrazing are major impediments to agriculture in the area. In the Jos Plateau, grazing and mining activities have led to increased erosion attributable to loss of soil fertility as a consequence of short fallow periods (Hall, 1971). In the Mambilla Plateau, erosion was characterized by collapse of river banks and deepening of river beds due to collapse of the vegetation cover as a consequence of overgrazing (Hurault, 1998).Weather conditions in both areas affect cropping

patterns and also bring about pests and diseases. In particular, it also affects the agro-pastoral system as animals have to go long distances in search of green grass and water (De Chavez and Tauli-Corpuz, 2009).

3.12.1. Non agricultural Climate Change Impacts

Human health which is essential for provision of labour for agriculture is affected by climate change variations, for example, changes in vector, seasonality. These variations in climate change could be referred to as the direct causal effect of climate change on health outcomes. The significance of these climatic variations on health outcomes is emphasized in the number of publications on the subject (Gouveia *et al.,* 2003; Patz, Campbell-Lendrum *et al.,* 2005; McMichael, Woodruff *et al.,* 2006; Kovats and Akhtar, 2008). The public health implications of climate change such as incidence of malaria, dengue, brought about a formulation of policy framework such as the Adaptation Policy Framework (APF)[22] that countries could adopt as a supporting tool to protect and develop the human well-being in the advent of these climatic changes.

Natural disasters such as floods, drought, storm, heat wave are consequences of climate variations, and these affect the health of pastoralists (Ahern *et al.,* 2005). An episode of a flood could bring about immediate physical injury, mortality and, to some an extent, long term psychological effect on health. Due to displacement after an episode of a flood, diseases such as diarrhoea and respiratory diseases could occur because of the close proximity arising from overcrowding which aids the transmission of these diseases. Drought is another example of a natural disaster that affects the health of pastoralists as it aids the spread of infectious diseases (Epstein, 2001; Heymann and Rodier, 2001). Indirectly, drought affects

[22] See Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures, UNDP, 2004

food production, a consequential effect on the nutritional needs of people, hence reducing people's immunity to diseases (Alderman *et al.,* 2006).

3.12.2. Agricultural Climate Change Impacts

The agricultural sector, despite its significance in development, also has some demerits, for example, its livestock production is said to contribute to about a fifth of total greenhouse gas emissions (IPCC, 2007), thus, contributing to climate change and a subsequent effect on health. The insufficient supply of green grass and water for the wellbeing of livestock could arise as a change in climate condition which invariably impacts on the goods and services on which livestock keepers are dependent. The conduit through which climate change affects the availability of feeds for livestock is the land use and system change (Thornton *et al.,* 2007). It also occurs through changes in the primary productivity of crops, forages and rangelands (Johnson and Thornley, 1985), changes in species composition (Morgan *et al.,* 2007) and quality of plant material (Taub *et al.,* 2008). Studies have, however, proved that the use of climate sensors provides ample information about land surfaces and atmosphere that could potentially stimulate crop yields (Thornton *et al.,*1997; Hansen *et al.,* 2006). The effect of climate on livestock could be equally direct or indirect (Rowlinson, 2008). A direct effect of climate on livestock is the change in environmental temperature, relative humidity, and wind speed on livestock bodily processes. For example, intakes and performance of cattle can be impaired when exposed to high temperature (Rowlinson, 2008). The indirect effect of climate on livestock, on the other hand, its impact on the source, quality and quantity of forage component of livestock diet is due to changes in environmental temperature and rate of rainfall (Rowlinson, 2008). For example, changes in temperature above 23.4^{o}C reduce conception rate in cattle (Amundson *et al.,* 2005); changes in atmospheric CO_2 concentrations and temperature affect feed crops and grazing system (Hopkins and Del Prado, 2007).

Apart from the effect of climate change on livestock production, livestock production itself has its impact on the environment. According to Steinfeld and Wassenaar (2007), livestock production is associated with the release of carbon dioxide, nitrous oxide and methane. Studies have also affirmed the association of vector-borne diseases in human with that of climate change and livestock (Mayer, 2000; Randolph, 2008; Rabozzi *et al.,* 2012). A change in temperature, for example, an increase in temperature, predisposes an expansion of the vector population, a situation which promotes the occurrence of malaria and tick-borne diseases, especially in higher altitude systems. The effect of livestock on climate is relatively modest when compared with the contribution that livestock make to the livelihoods of people (Herrero *et al.,* 2009).The pastoralists are profoundly affected by the effects of climate on their animals.

Changes in land use as a result of agricultural practices (crop production and animal husbandry) have been reported to account for about 18% of global greenhouse-gas emissions (FAO, 2006). Such changes in land use include deforestation, soil carbon loss due to grazing and release of gases from the use of fertilizers and animal manure (US EPA, 2006).The importance of freshwater to human wellbeing and livelihood cannot be overemphasized as it is used for cooking, washing, personal hygiene, drinking and agricultural purposes. Its scarcity directly endangers human health, food production and indirectly affects economic development. It has been reported that land use could also interrupt the surface water balance as surface runoff and river discharge increase when natural vegetation, for example, the forest is cleared (Costa *et al.,* 2003), most especially for agricultural purposes. Irrigation for agricultural purposes (which makes up 85% global consumptive use) (Gleick, 2003), reduces the flow of water in some large rivers while at times, some dry up (Postel, 2000). The greenhouse warming, an effect of the emissions of CO_2 and methane gas into the atmosphere, also affect water supply (Arnell and Reynard, 1996).The WHO Millennium Ecosystem

Assessment panel revealed that water-associated infectious diseases claim up to 3.2 million lives each year, approximately 6% of all deaths globally. Also, the rate of diseases contracted from inadequate water, sanitation and hygiene accounts for approximately 1.7 million deaths and the potential loss of more than 54 million healthy life years. Emission of poisonous gases into the atmosphere could affect lakes, rivers and thereby harmful to aquatic life. This emission has its health consequences and a substantial effect on economic growth. It could also lead to political unrest in places where such incidence occurs. Though, from the preceding, literature has pinpointed that significant environmental limitations to Fulani pastoralist are water and grass shortages, studies, as explained above, have equally revealed the impact of agricultural practices of crop production and livestock on climate and its consequent effects on water and vegetation. The question could be asked as to what efforts and steps relevant authorities, such as government, private and the public institution could evolve, to build the capacity of pastoralists so they could improve agricultural practices that can reduce environmental limitations that affect water and vegetation. To effectively minimize the effects of climate change on livelihoods, government and stakeholders of agricultural production need to develop a conceptual framework that researchers and stakeholders can work with in developing coping mechanisms against climate change. The use of climate instruments to forecast any change in weather needs to be promoted. It is necessary to train and educate herders and farmers on effective usage of the instrument. Information sharing among all stakeholders of agricultural production is important as this enables prompt action to be taken to prevent or alleviate any adverse effect of climate change. Herders and farmers also need to be involved and carried along with programmes designed to mitigate the effects of climate change on the ecosystems, food production, agriculture and water supply.

3.13. Conclusion

This chapter has established the contextual issues that could promote or inhibit achieving a sustainable livelihood. It provided a critical analysis that reveals the pertinent entry points of providing interventions. It also exposes the different ways in which the pastoralists are marginalized in services and resources relevant to their livelihood. The underlying principle of the crisis and unrest between pastoralists and farmers are also revealed. Although this does not justify the loss of properties, lives, and resources occurring from the crisis, it is a call to action for the policy leaders, institutions and stakeholders to address the issues that undermine the Fulani pastoralists. Improving access to natural resources may be a step in the right direction of putting a stop to this crisis. Building the resilience of pastoralists through the provision of physical infrastructure, veterinary care services for their livestock, health care services for themselves and building their capacity in herd management and technology will set a platform for achieving sustainable livelihoods.

It is evident, that to adequately sustain livelihoods in rural areas which largely depend on agriculture as a source of livelihood, contextual analysis of issues with regards to agriculture that might impact on achieving such a goal must be undertaken. This gives an explicit and clearer picture of what could be obtainable on ground and the means of devising coping mechanisms for overcoming or being resilient to circumstances that might constitute an impediment to their livelihood. The available assets, strategies employed, the role of internal and external bodies, such as institutions in combating poverty, steps taken towards sustainable livelihood and development, feasibility of One Health in the Northern part of Nigeria, using the case studies of the Kachia Grazing Reserve and Bokkos LGA, Jos Plateau are the vital matters addressed in subsequent chapters.

CHAPTER 4

Permanent Residency for Fulani Pastoralists in Kachia Grazing Reserve: A Gender Perspective

4.0 Introduction

In this chapter attention will be given to the reality on the ground; to the case study community of the Kachia Grazing Reserve (KGR) and the constraints to achieving a sustainable livelihood looking at it from a gender perspective. This chapter will focus on the coping mechanism of both men and women of the KGR developed to build their resilience to the environmental, physical and institutional constraints of the KGR. This chapter begins by reinforcing the significance of livestock production to the economy, giving background information on the mobility of the Fulani pastoralists, their reasons for their movement, and effects of the movement on the components of livelihood with the main focus on human capital. These set the pace for understanding the formation of grazing reserves for the exclusive use of the Fulani pastoralists. The chapter, based on the environmental and institutional constraints of the KGR given in the previous chapter, also argues that the limitations of the grazing reserve constitutes a significant impediment to the implementation of the One Health concept of animal and human health care development instituted for sustainable livelihoods of pastoralists. It tries to proffer ways through which the One Health concept can make an effect on the livelihoods of the Fulani pastoralists in the KGR through intellectualizing on their resilience to shocks and threats.

4.1. Livestock Development

The contribution of agriculture to the economic growth of a country differs from region to region. In agricultural producing countries, agriculture contributes to a significant portion of the economic growth as compared to industrialized and transforming countries (Pica, 2008). Livestock, a subsector of agriculture, apart from its economic value, is also essential for human nutrition. In the tropics, the livestock sector is threatened with resource and environmental degradation, thus, productivity is not on par with the growing population, an occurrence characteristic of most countries of the tropic region, which is home to many worlds' poor countries (Jahnke, 1982). The literature on livestock production provides a little insight as to the nature and extent of poverty. However, a recent World Bank report disaggregates poverty into areas such as 'health and education', 'income', 'vulnerability' and 'voicelessness and powerlessness'(World Bank, 2000). The function ability of livestock is a reflection on income generation, health status and a measure of the vulnerability and power a livestock owner possesses (Jahnke, 1982). In developing countries, 30% of livestock production is lost to diseases (Upton, 2004).

Literature reviews on Nigeria's pastoral system point out that the major environmental limitations to pastoralism are water and grass shortages (Mortimore, 2000; Blench, 1994; Awogbade 1983; Adefolalu 1986; Von Kaufmann 1986). Thus, the success of livestock well-being and development is linked to the availability of water and vegetation at the right time, place, quantity, and quality. Given this, most of the Fulani pastoralists are forced to move from one place to another, looking for better conditions, health wise for themselves, and in particular the livestock. Mobility according to Prothero (1977), is an important determinant of health worldwide; nomadic populations in Sub-Saharan Africa inclusive. Literatures from different countries of Sub-Saharan Africa give reasons why the Fulani pastoralists move. The

Fulani in West Africa moves southwards into the Savannah, where water and forage are abundant but which is also infested with vectors like the tsetse fly, only when they are forced to do so by drought (Prothero, 1963). On the other hand, Afar pastoralists migrate to surrounding uplands to escape mosquitoes during the inundation of the Awash floodplains (Kloos, 1990). Fulani nomads can transmit diseases into the communities they move into. For example, in Nigeria, the majority of Fulani settlements found infected with Guinea worm were not covered by routine surveillance. It was reported that they were affected by the movement of some of the Fulani nomads from the Republic of Benin (Brieger *et al.,* 1997). Another example is that of the first Guinea worm cases found in Kenya, which were among Turkana nomads; three of the cases probably contacted the disease in Sudan and imported it into Kenya (Macpherson, 1981). Nouri and Mahdavi (1993) found that the incidence of *cryptosporidiosis* in one town increased during the season when nomads moved close to the town and decreased when nomads moved away. Given these occurrences and in recognition of the potential the diseases has on human health, markets, livelihoods and food security, livestock production system in developing countries has attracted a global concern. Strategies devised were tied to location and environmental stabilization (Swallow, 1994; Ellis and Swift, 1988).

In addition to controlling the spread of human and animal diseases, the establishment of a grazing reserve for pastoralists was a globalization response to the frequent conflicts between pastoralists and farmers. The objective of the grazing reserve was to serve as a place of refuge for the pastoralists from the challenges of moving from place to place in search of feed and water for livestock. Legal rights to graze as well as the provision of the title of land were extended to pastoralists in the hope that livestock production is promoted. Creation of a grazing reserve was, therefore, a form of a sedentary model enacted to promote the livelihoods of pastoralists. Grazing reserves thus became a policy directed innovation after

the failure of ranches established during the pre-colonial era. The study of the family structure and the system of communal grazing among the Fulani pastoralist, according to Awogbade (1987), influenced the formation of grazing reserves. The location of the grazing reserve depends on the natural availability of pasture and water. However, most grazing reserves in Nigeria are situated on poor agronomic land (Goldschmidt, 1980), thus causing difficulty in the provision of pasture and water. Physical infrastructure such as dams, boreholes and fodder banks in the reserve were thus offered as palliative measures to cover up for the poor site of the grazing reserves. The question arises as to whether these palliative measures are enough to reduce the environmental limitations in regards to water and vegetation when one takes into consideration the climatic conditions in Nigeria.

Six grazing reserves under the auspices of the National Livestock Project Department of the Federal Ministry of Agriculture were established and are functional while over a hundred are proposed in most of the Northern states of Nigeria. There are arguments that the grazing reserves are not meeting the purposes for which they were established. The general perception is that the resources provided are overstretched with the growing population of pastoralists moving into the grazing reserves in Nigeria. Awogbade (1987) stated that due to lack of block grazing as a result of no demarcation, pressure is exerted on the natural environment, resulting into overgrazing around watering points. Although there is no substantial evidence to show that gains derived were the results of pastoralists operating in an enclosed area, studies have however revealed that the gains received can be related to the socio-economic status of households vis-a-vis the number of herds owned (Toulmin *et al.*, 2004).

The Kachia Grazing Reserve was one of the six grazing reserves established and gazetted in the 1970's (see Chapter 3 for a full description of the area).The large expanse of land with low population compared to urban areas and the agricultural production, a feature of rural

areas, are some of the compelling factors that attract pastoralists to such area. For the Fulani pastoralists in the Kachia Grazing Reserve, movement into the reserve was prompted by a need to have a sense of identity and in addition, to avoid conflicts which have become a common incidence between farmers and pastoralists in the Northern zones of the country. As much as this movement may guarantee security for the pastoralists in the grazing reserve, it contributed to the vulnerability of such group of people, as shown by prevailing situations, earlier indicated, of the grazing reserve. However, from all indications, the need to make a living devoid of conflicts and to maintain their identity overrides the challenges of living in a grazing reserve. One may therefore ask, are men only, and based on the characteristic patriarchal family system, affected by the prevailing situations in the grazing reserve?

4.2. Land and Agricultural Production

The low agronomic potential of land in the KGR is a challenge to agricultural production as well as health. It affects cattle production and farming activities. Cultivation produces foodstuff for food security to be achieved. Crop production in the KGR proves to be a difficult task for the pastoralists because of the poor quality of the soil. There is difficulty in accessing fertilizers. This difficulty in turn affects the quantity and quality of crops produced; a situation which clearly explains why crops produced are mainly for consumption rather than for sale because of low production. Farm produce only gets sold to have cash in hand to meet some daily needs. The sale of farm produce is an alternative means of accessing money as they rarely sell their cattle. The women, who are the custodian of small livestock, have no choice but to sell their livestock to meet some needs of the household. Also, sales made from milk and dairy products by the women also form part of the income which the household depend on for livelihood. Men spend their income more on the purchase of feeds, salt lick, drugs, transportation and other miscellaneous like ropes and wires. Money is reported to be

spent more on feed and drugs, followed by transportation and lastly veterinary fees. More feeds are bought during the dry season while drugs are procured more during the wet season. It appears, from the breakdown of expenses (though not on a numeric value), that a considerable percentage of household income reverts to livestock production. This finding on women meeting some financial needs of the household is not only peculiar to pastoral women. Gender analysis studies in Sweden and India revealed that the women expend their income on household needs while the men withhold their income in times of stress (Arora-Jonsson, 2011). The authority exerted over women and their income makes one wonder what strategies women employ to cope with stress or shocks.

The low agronomic potential of the land coupled with the high influx of people and animals into the reserve makes it difficult for an increase in crop production to be achieved. The pastoralists struggle for grazing land for their cattle. Households with a large herd of cattle, therefore, are forced to practice transhumance especially during the dry season when land degradation is felt more. Despite more allocation of land for grazing in the reserve (see chapter 3 pg. 100), the pastoralists of the KGR demand for more grazing land for their cattle because their focus is more on cattle production than crop production. The women, irrespective of farm ownership, are prohibited from farming activities. According to the women, money is given to the men for procurement of seedlings and hiring of farm laborers for cultivation. It is logical to conclude that this focus on cattle production more than crop production coupled with non-involvement of women in farming activities could lead to food insecurity in the KGR and also induce an increase in household vulnerabilities to diseases as food insecurity has grave consequences on health.

Cow dungs are used as manure for crop production by the men to improve soil quality, as the cost of fertilizer is beyond their means. For the women, the cow dungs serve as fuel used in cooking as fuel is expensive and difficult to come by at the reserve. The local by-product,

cow dung thus serves as a means used by men and women to cope with the unreliability and scarcity of what globalization has provided (i.e fuel and fertilizer) to ease livelihoods activities aimed at maintaining the environment and increasing crop production.

For regeneration of pasture in KGR, pastoralists practice bush burning. Many claim that bush burning especially during the dry season enables the soil to quickly spring up new growths at the onset of the wet season thereby aiding pasture for their herd. In a study conducted to determine the environmental impact of bush burning in one of the Northern states of Nigeria, the majority of the study respondents revealed that the practice led to a lack of pasture for their livestock (Jamala *et al.,* 2012). Further reviews of literature show that the negative implications of such practice on the environment are many. These are deforestation (Bush *et al.,* 2000; Casse *et al.,* 2004), loss of soil nutrient (Juo and Manu, 1996; Kotto-Same *et al.,* 1997) destruction of habitat (Bowman, 1998; Kwapena, 1984), death of small animals (Eriksen, 2007; Esque *et al.,* 2003; Osemeobo, 1998), etc. Unfortunately, the pastoralists in KGR are not knowledgeable about the negative implication of such a practice. Bush burning is perceived as a coping strategy to reduce the vulnerabilities that arise from living on such poor agronomic land. However, this practice could end up in producing negative results. This practice conforms to the claim that harmful practice for immediate gain could lead to long-term complications and could also set back the expected gain. Despite the plea by international bodies to all countries for action against climate change, little is done to control the activity of bush burning by pastoralists in Nigeria (see Cline-Cole, 1998). The detriment of the activity to their environment and health is caused by policies that deprive them of equal opportunities for livelihood as situations compel them to settle in a poor agronomic land.

4.3. Weather Variability

The weather variability in the grazing area has a great impact on livestock production; this is another problem the pastoralists face. For the pastoralists in the grazing reserve, the problem of weather variability has crumpling effect on livestock and livelihood. Though climate change has been receiving a lot of attention both globally and nationally, it appears nothing much has been done to reduce the effect in pastoral areas. The effects of such a change are far-reaching, and it is a known fact that the poorest and most vulnerable people are worst affected (Bohle *et al.,* 1994). Climate variability contributes to poverty (Goh, 2012). The quality and quantity of by-products of livestock rearing such as dairy, meat are affected by climatic conditions of grassland (Hopkins and Del Padro, 2007). In the FGD with the Fulani pastoralists, it was revealed that most times some cattle refuse to feed when the weather is hot. This finding is in line with the report of Rowlinson, (2008), that reduction in the rate of animal feed intake is as a result of heat distress suffered by animals which consequently leads to poor growth performance. It was also revealed that the shortage of water supply also has a considerable effect on the feeding pattern of livestock during this period. Weather variability is a challenge to humans, the men and women alike. Provision of water supply is a 'feminized' responsibility, as the provision of water for livestock and household use is part of the domestic chores of women. Despite the provision of a borehole by the government, women, and young girls spend a considerable amount of time at the borehole water point. Other domestic activities suffer as a result of the long hours spent at the borehole water points. The men dig wells to augment the borehole water supply. The wells hardly produce water and the little quantity of water produced at times is muddy. Such muddy water is what is available for cooking and carrying out other domestic activities. This situation in the grazing reserve predisposes the population as well as cattle to intestinal helminthic and parasitic infections (see Ikeh *et al.,* 2006; Slifko *et al.,* 2000).

Individually, women devise coping strategies in an attempt to reduce the burden and time spent on sourcing for water every day. Fetched water is stored in earthenware pots and plastic bowls. Rainwater is also collected and stored on roof tops during the rainy season for use later on during the dry season. For the men with large herds of cattle, transhumance seems the best alternative for cattle management and production.

The seasons, dry and wet according to the respondents pose some challenges to their livelihood such as loss of household income through livestock diseases, depletion of their asset base, short time separation of families during transhumance, low school attendance for the herd boys that take the cattle grazing, etc. Most livestock diseases within the study area were climate related. Disease emergence such as vector-borne diseases thrives on varying degrees of temperature in higher altitude areas with the occurrence of tick-borne diseases (Randolph, 2008). Cattle in the grazing reserve are highly affected by these tick-borne diseases. The study population revealed that clouding of the eyes, anaemia, listlessness and low weight are some of the health effects of these tick-borne diseases on animals. Fulani pastoralists are also affected in the sense that a considerable amount of time is spent on hand picking these ticks from the cattle. In addition to tick-borne diseases, *trypanosomiasis* is another livestock disease. Climate change influences its emergence. It affects the herd composition and health in the study area. Tsetse flies that transmit the disease *trypanosomiasis* thrive well in humid areas (Blench, 1994). The KGR is located within the tsetse belt of the country; hence, it experiences the prevalence of *trypanosomiasis*. Despite the fact that the reserve was sprayed and declared tsetse- fly free, epidemiological studies carried out in the reserve still show an incidence of the disease. One then wonders why, despite the prevalence of this disease, migration of Fulani pastoralists to the reserve is on the increase. Different views on the growth in population were given in an attempt to analyze this phenomenon. Some analysts argue that a large number of cattle have developed some degree

of tolerance to the disease due to their prolonged exposure to tsetse flies. Others are of the opinion that frequent bush burning has the effect of reducing the impact of tsetse flies on livestock. These arguments tend to explain that people are at a low risk of contracting the disease caused by tsetse flies; hence, they felt not deterred from migrating into the region. Acceptable this maybe, the mass migration of Fulani pastoralists to the KGR can also be attributed to the frequent conflict over land use between cattle- herders and farmers as reported in this study. It would, therefore, appear that their choice of settlement is influenced more by the need to avoid conflict which has adverse effects on their livelihood.

Natural phenomena such as weather variability cannot be avoided by the pastoralists (both gender) but their ability to recover depends on their resilience to such incidences. All the same, their ability to absorb or cope with shock or ability to anticipate or manage risks also comes with some risks. For example digging wells to augment the borehole water supply in the case of the Kachia Grazing Reserve predisposes the cattle and human population to risks of diseases as earlier stated.

4.4. Power Dynamics in the Household

The population structure of the KGR from observation reveals a higher younger population (10-64 years) especially of the productive age (25- 64 years) and a low proportion of the older population (65+ years). Women, however, constitute a high number of the population of people at the grazing reserve as discovered during the focus group discussions. Early marriage and high parity bring vulnerability to the women because they can be linked with poverty and ill-health. In addition to the influx of pastoralists into the reserve, new births contribute to the population growth of the reserve. The women give birth at a young age, and one could have up to 12 children. At times, a woman and her young female child could be

reproducing simultaneously. Early marriage is commonly practiced among the pastoralists and most times young girls, even at age two, get betrothed mostly to a relative of the family. This conjugal alliance within the extended family serves to protect as well as ensure that wealth base is maintained within the family as cattle are given as bride price. The breakdown of marriages is hardly witnessed among the Fulani pastoralists of the study area as conjugal relationship is highly respected. The religion of Islam practiced by the Fulani pastoralists, though it allows polygamy, does not encourage divorce. These cultural practices enhance strong social relations in Fulani communities.

From the perspective of the Fulani pastoralists, the number of wives depicts their wealth status. Just as the number of wives one has is linked to wealth so is the number of children. They believe that children contribute to labour to drive agricultural production. As Salih *et al.*, (1995), pointed out, child labour is an important aspect of pastoral production for the Fulani pastoralists. As a result, the boys who are taught herding skills from an early age do not attend schools, and the attendance of those who go to school at all is irregular as shown by a visit to one of the schools in the grazing reserve which revealed a low percentage of male students in attendance.

While it is evident that the women have no control over decisions made on the future of their children, there are times when the men expect the women to give needed information on their children. As one said *it is only when information is needed about the child; that is when the men come to us'*. All aspects of child welfare are the responsibility of the women. Activities which include ensuring the children are ready for school, feeding, clothing, and mentoring are the responsibilities of the women. These activities reinforce the view of researchers and health planners that women are key instruments to achieving child health (Nyaruhucha *et al.,* 2006). The women within their ability strive to keep up with the responsibilities expected of them in the care of the children.

The complexities of living in a disadvantaged environmental area devoid of social amenities place an enormous burden on the workload of women. In addition to their domestic activity of cooking and looking after the household, the women are also involved in cattle management as well as small livestock management. They are solely responsible for the care of small livestock such as sheep, goats and chickens. Many were knowledgeable about the different livestock diseases affecting their small livestock but were helpless when it came to drug specificity and procurement, thus such responsibility is shifted to the men. The drugs, however, are often administered to the livestock by the women. This situation clearly shows that women are capable of taking up some activities/responsibilities identified as men's. Concerning cattle management, women milk the cows early in the morning before they are detethered and taken for grazing and in the evening when they return from grazing. They are, however, given the power or the mandate to trade with the milk or milk products. One expects the presence of a milk society in such area, but surprisingly there is none from the responses given by the women. The availability of high supply of milk in the grazing reserve made them not to see the need for the establishment of one as *'milk is always there whenever you want to use it,'* they claimed.

4.5. Diversification of Economic Activities

Livelihood for the Fulani in the Kachia Grazing Reserve is defined by livestock especially cattle production. Though quite a number of them are agro-pastoralists, concentration is more on livestock production than crop production as the latter serves more for subsistence than for trade. The majority of the study respondents diversify from their primary source of income to other sources to complement the income derived from primary sources. Relatively few respondents derive income from non-agricultural activities such as carpentry and trading in small commodities. Incomes from such sources are to augment that gained from agricultural

activities. It is rare to see households that depend solely on income from non-agricultural activities for livelihood. Both men and women are involved in generating income for the household despite the patriarchal system of family. Income from non-farm activities is most times obtained by the women. The majority of the women in the grazing reserve are housewives whose economic activities are mostly restricted to the sale of milk, milk products and small livestock. This feature is common to other pastoral communities in Africa. However, a significant number of them as gathered from responses from the focus group discussions are small artisans such as tailors, weavers, and petty traders. It is important to note that this diversification in economic activities is possible because of the confinement nature of the reserve which dissuades relationship with people from other tribes and culture. Though men engage more in informal wage earning occupations, there were quite a number of women who earn wages from formal activities such as teaching in schools and being cleaners in the health centre within the reserve. The responsibility to household expenses causes most of the women to engage in different income generating activities. Many claimed that such activities reduce some of the household duties of men. The men, because of this appreciate the women:

> 'if not because of women in this community we would not have developed like this. Women are trying in this village. Whenever the males go to their various place of work, so also the women go out, cook for their children and send them to school, so women are really trying'.

4.6. Problems of Infrastructural Development in the Grazing Reserve

Infrastructure such as transportation, markets, schools, roads, and electricity are examples of physical assets which are essential for human survival. Responses elicited during focus group discussions with both men and women revealed that the social amenities provided by government are poor as well as inadequate for the growing human and herd population. Many

of the constructed boreholes are non-functional, and those that are functional are low in water supply during the dry season. Inadequate physical infrastructure such as bad roads also impacts negatively on their occupation. Respondents reported that they lack good road structure for transportation to move their goods. They realized that good roads aid exchange of goods and services, which contribute to their economic development. The bad roads affect transportation. Hence, the sale of cattle and other livestock like goat and sheep is not carried out in the only market of the grazing reserve. To minimize this problem, the 15 male registered co-operative groups, for example 'Nagge Beldum Suppo' (meaning 10 important cows); 'Lawal Bote'; 'Mayo Drobe'; 'Hamri Hela' and 'Ndarde Ballal Hore' come together under one umbrella called 'Nbela' (knowledge sharing) to patch roads during the wet season to ease movement in and out of the reserve. The group recognized that the poor state of rural roads contributes to the poverty level experienced within the grazing reserve. The poor condition of the road is also a contributory factor to their inaccessibility to markets, increase in transaction costs of commodities and a decline in household income. According to the women movement of goods and services is a big ordeal as:

> 'there is no good road structure especially during the dry season when we want to get some products into this area and we normally don't make profit on the supplies due to cost of transportation'.

4.7. Barriers to Social Services

The Reserve has health facility and schools (quaranic, nomadic government-owned schools). There are ten nomadic governments owned primary schools within the reserve. The only secondary school within the reserve was established in 1996 and has grown to a student population of almost two hundred. The establishment of formal education as revealed by the respondents has made a remarkable contribution to the economy and welfare of the community.

Although there is a health facility established by an NGO within the reserve, it lacks basic equipment for optimum uptake of health services, and the environment is not conducive for patients or visitors. A respondent made a remark concerning this;

> 'There are beds but no chairs for visitors in the hospital. Visitors always stand in hospital or go there with their own mat to sit'.

A discussion with the only doctor in the reserve revealed that lack of laboratory and electricity supply, made it impossible to diagnose detectable diseases. The lack of medical laboratories resulted in misdiagnosis of diseases which led to needless suffering and fatalities. This situation is common among pastoralist populations in Sub-Saharan Africa. For example in a remote part of Kenya, the outbreak of acute febrile illness was not diagnosed until several months after the first cases occurred because of difficulty in accessing the remote location of the pastoralists and lack of nearby adequate diagnostic facilities (Ari *et al.,* 2011). The study case respondents mentioned malaria as one of the diseases affecting them. However, there are some diseases with non-specific clinical signs that can be misdiagnosed and confused with typhoid fever, malaria, rheumatic fever, etc. An example of such a disease is *brucellosis*, a disease that affects livestock and people in proximity with livestock. Such disease when left untreated is associated with increased morbidity and mortality. Though *brucellosis* was not among the diseases mentioned affecting the study population, it was one of the diseases reported to affect livestock.

Antenatal and post-natal cares were not included in the services provided by the health centre. Though child delivery is taken in the health centre, the women are taken to the hospitals in Kachia town or Kaduna when complications arise. Child delivery at the reserve has witnessed an improvement from the time the grazing reserve was established. According to an older woman's response:

> 'When a woman wants to deliver a baby, we used to find some sticks; stack them together and put the woman on top and carry her on our head and go into Kachia town to deliver her baby'

This was and still an ordeal for them because to access antenatal and post-natal care, they travel to Kachia town or Kaduna. The men recognise the hurdle women face during child birth as a consequence of *non-availability of a maternity clinic and personnel that could handle implications arising from child delivery.*

Access to child health is poor in the reserve. According to the medical doctor at the health centre within the grazing reserve, children suffer from communicable diseases like measles because vaccines against vaccine-preventable diseases such as tuberculosis, measles, whopping cough, etc. are not administered in the grazing reserve. The mothers travel to Kaduna city to access these services. Polio vaccination is the only health programme sponsored by the government that is made available for people within the reserve. The discussion also revealed that the main illness presenting in children within the reserve is anaemia as a consequence of malnutrition. The doctor attributed it to poverty in the household, a consequence of multiparity which makes it hard for the children to get the required nutrients at various stages of their lives. Because of multiparity, many children were made to compete for the available nutrients especially the limited animal food protein, most of which is sold rather than consumed. The non-consumption of animal-sourced foods could lead to under-nutrition and nutritional deficiencies (see Neumann *et al.,* 2002).

Despite the problems associated with provision of health care, responses received revealed a preference for health facility care to traditional and spiritual care as *it is only in the hospital that one can be given blood transfusion or drips which is not done in the traditional system'* . The ease of usage, storage and the effectiveness of drugs are some of the reasons given for the preference of the orthodox system of care. There are times traditional remedies prepared

at home and through consultation with traditional medicine practitioners are used to treat some ailments which, from their point of view, cannot be effectively treated with the orthodox medicine. Such ailments, according to them, occur seasonally. A respondent cited an example of such sickness called 'jonte' or 'jinjirabe' which occurs during the farming of millet:

> 'the boy presents with a stunned look, so tree bark will be taken from the bush and soaked in water and given to the boy to drink and after sometime, he gets well'.

Just as the orthodox system of health care has some limitations to its accessibility and utilization, so also it is with the traditional medicine. Such limiting factors on traditional medicine, as reported by the respondents, include travelling a far distance to procure the herbs, difficulty in identifying the appropriate herbs to procure from the bush, correct measurement for use and difficulty in storage of the herbs. Preference for the conventional system of health care delivery in the study areas shows that the people are receptive to technology-driven innovations and interventions.

Veterinary services, an essential component of livestock production and management, are conspicuously missing from the grazing reserve. However, in spite of this grave mismatch, the men are knowledgeable on the preventive measures and the drug administration of controlling livestock diseases as revealed by the responses given on the various drugs and the dosage in the treatment of *trypanosomiasis* and other livestock diseases. Despite the wealth of knowledge displayed by the respondents on the diseases affecting their cattle, majority of them were unaware that diseases could be transmitted from cattle to man. *Brucellosis* commonly known as 'bakale' to the study population, posed a serious threat to their source of livelihoods. Symptoms of *brucellosis*, as reported by the respondents, include abortion and weight loss in cattle and goats. The disease according to them reduces livestock productivity

and the market worth of livestock, especially that of goats. As earlier related, the study respondents were unaware that 'bakale' had zoonotic potentials via contact with animals or animal by-products such as milk. Unconsciously women take preventive measures against this disease, as milk according to them is sometimes boiled to make it 'taste better'. A review by Ducrotoy *et al.,* (2014) reveals that there is no clear status of the disease in Nigeria. This view might have arisen from the misconception and misdiagnosis surrounding the disease. This review necessitates a need to educate and build the intellectual capacity of people that come in close contact with animal or animal products on the disease. The men, in trying to cope with these diseases adopted the strategies discussed below:

***Preventive Veterinary Medicine*:** Preventive veterinary medicine is a process through which early warning, detection, and response are employed in preventing and controlling livestock diseases. In recognition of the enormous expenses on curative medicine, people embrace and practice preventive medicine because of its socio-economic impact on the livelihood of households. One of such control and preventive measures adopted is biological pest control. The ability and commitment of the respondents to prevent disease occurrence are supported by the painstaking and time-consuming measures employed. Such include the use of 'pour-on' on cattle against tsetse flies bites and the hand removal of ticks. As expected, no one reported the use of vaccines against the occurrence of such diseases. There is no likelihood of the use of vaccines for infectious diseases by communities such as that of KGR given the present controversy among developmental actors with regards to developing countries gaining access to vaccines against infectious diseases (see Lakoff, 2010). During the military rule in Nigeria in the 90's, a national vaccination programme for Blackleg disease was carried out in the reserve but this seems to have faded out with the advent of democratic rule. This situation brings into attention the feasibility of programme sustainability in most African countries where there is lack of continuity of programmes due to the *'new dispensation' 'new*

programme' and 'new ownership' culture, a feature that is characteristic of many African governments of today. Fulani pastoralists are willing to embrace rolled out vaccination programmes to improve the welfare of their livestock. They considered the fact that such programmes are cost and time saving. Public health campaigns and vaccination of human against vaccine preventable diseases could be simultaneously undertaken with livestock vaccination programmes. A clear example of such joint programme as given in most reviews of literature on One Health is the joint campaign of animal and human vaccination in two Chadian provinces. The joint campaign reduced costs and showed the feasibility of simultaneous vaccination (Zinsstag *et al.*, 2006).

Regulation of Animal Husbandry: Hygiene, sanitation, containment of animals and security are important for the total well-being of animals. In the reserve, pastoralists who go on migration as a result of climate change are mandated to quarantine their animals to prevent contamination of other animals that were not on migration. Risk factors vary with animal production subsectors and systems. People with occupations that entail proximity to animals, such as veterinarians, butchers, abattoir workers and agricultural workers are predisposed to zoonotic infections. For example, case study respondents that handle the carcass of aborted calves are at a greater risk of being infected with brucellosis. The likelihood of zoonotic diseases having public health implications in the study site cannot be overlooked as there are no regulatory bodies, as observed, to check appropriate feeding activities, husbandry techniques and the hygiene and quality control of animal products. Apart from the producers of animal and animal by-products, final consumers of the products are also at higher risk of infection to zoonotic diseases. Proper hygiene in pastoral areas, such as appropriate disposal of animal waste and carcass, would help check the spread of zoonotic and other diseases, and this will go a long way to curtail human exposure.

Prophylactic use of drugs for the treatment of animal diseases without consultation with a veterinary doctor is highly common in the grazing reserve. This situation may be due to the difficulty of accessing the services of one. During a visit to the market on a market day in the reserve, it was observed that pastoralists patronized drug vendors at the market. It was made known during the focus group discussion with the older age group, that the drug vendors were also cattle rearers. Interestingly, it came up in one of such discussions that the drugs used in treating livestock are sometimes used for treating diseases in man.

> 'There was a time, when a man is having a particular disease; they used to give him drugs, the same drugs that we are giving our animals. So that makes us think that there are some diseases common to man and animals'

This case reveals a disconnection between the client and provider of services, a situation which is compounded more by the provision of services by unqualified personnel against the laid down policy on veterinary services in Nigeria. Drug quality control in its usage and distribution if not adhered to could constitute a public health hazard to local communities and further exacerbate the challenges livestock keepers face in livestock management. A regulatory animal control body if present in the communities will give a check on this and ensure that disease- specific quality drugs, at the right quantity and at the right time are provided by qualified personnel for treatment of animal diseases.

Social Resilience: Community empowerment, as well as social relations, plays a significant role in coping with shocks and threats that result from climate change and other threats to the source of livelihood. This community empowerment is important in rural areas where harsh climatic conditions mostly prevail as evidenced in the study area. Male co-operative groups in Kachia Grazing Reserve come under one umbrella called 'Nbela' for the common goal of the community. They act as mediators between the veterinary doctors (who are sparsely available) and cattle herders for procurement of drugs for the treatment of the cows. The

institutional relation evidenced within the reserve could be described as strong given the initiative and dedication to create an enabling environment for livestock management and development. Communication and flow of information are encouraged through this medium. The male co-operative societies relate with the village heads and the three tiers of government as illustrated in the quote below:

> 'if the activities deals with the local government, we go to local government chairman at Kachia. I told you, if something happens within this our community we report to the district head. If it concerns the local government, we report to the chairman (of Kachia local government). If it concerns the state (Kaduna), we report to the governor. If it concerns the federal government, we look for a representative that will go and tell the federal government. This is how our societies carry out their projects'.

This statement clearly reveals that the Fulani pastoralists within the Kachia Grazing Reserve are knowledgeable on decentralization and the fragmentation of public activities amongst the three tiers of government. It also shows that the community can identify its need and ready to seek appropriate sectors for help to drive development in the community.

4.8. Education

In the grazing reserve, attainment of formal education is of high priority to the family. Quranic schools are also within the reserve as it is compulsory for all children (both girls and boys) to attend to learn the injunctions of the Islamic religion. Attendance at the school is usually in the evening when the children might have returned from schools offering formal education. The high value placed on education is reflected in the construction of school structures to augment the government owned nomadic schools to accommodate the growing population of children. The increase in student enrolment also reveals the education landmark in such a population as compared to the negative perception the pastoralists had in the past

about formal education. In 1996, the first secondary school was established with an initial class of 6 students which has now grown to a student population of almost two hundred.

Education to the pastoralists in the grazing reserve is believed to be highly beneficial:

> 'Yes our children have been going to school. I told you that we have a doctor in this town so our children go to school every time. Look at the gains of education; because of the school we have our own doctor so we know the importance of education'

Such a response reveals that they are delighted in having a doctor, who is one of them and giving back selflessly to the community. The doctor acts as a voice for the community and his opinions are always sought for and respected.

Interestingly, girl-child education in the grazing reserve is promoted as evidenced by findings from a visit to a primary school where the majority of the pupils were females while the males were few. Economic dictates in the reserve aids girl-child education. Male children take the cattle out for grazing while most of the female children are at home. To avoid having them stay at home *'not doing much'*, they are sent to school. The majority of the girls are sent to school till the marriageable age of 12-15 years. Their continuation to the secondary and or tertiary levels after marriage depends on their husbands. Another explanation for the high enrolment of Fulani girls in school is the need to keep them busy to prevent them from getting involved in behaviours that are not allowed in Islam religion. It could also be a strategy to keep the girls chaste before marriage. The enclosure of the school within the grazing reserve could be a contributory factor to the high school attendance by girls as it aids a close watch over the girls. This finding is different from other studies on girl child education in pastoralist systems, which reveal the low percentage of school attendance by girls. For example, in a study conducted in a pastoralist community of Turkana, in North-western Kenya, it found out that the male students outnumbered the female students in

schools where data was obtained (Johannes, 2010). However, not all the male children in a household go grazing:

> 'In a household of ten (10) children, nine of them will go to school while the remaining one (a male) takes the cattle for grazing'

Thus, in practice, there is a description of duties/responsibilities within a household. In the long run, it is seen as profitable to the household; the practice of having educated children in the family and at the same time experiencing no disruption of the grazing routine. This kind of practice is achievable in many Fulani pastoralist households because of the characteristic high proportion of children in such households. Despite the provision of nomadic schools by the government in the grazing reserve (which is supposed to be free), respondents revealed that as part of their efforts to send their children to school, part of the proceedings from the sales of their cattle goes towards the payment of tuition especially for those in tertiary institutions. The women also play a significant role towards ensuring the education of their children. Proceeds from their economic activities go into the purchase of school uniforms, stationeries, and they also contribute to the payment of school fees; especially that of the girl child.

4.9. Discussion: Implications for One Health

The problems as well as gains associated with living in a grazing reserve resulting from its isolation, confinement and poor topography and its implication on the livelihoods of both man and woman have been documented. There are challenges to pastoralist livelihood of livestock production which compels them to diversify to other income generating activities. There is a need to understand livelihoods in agricultural communities using a gender perspective, especially pastoralist communities who constitute a significant number of poor

people involved in agricultural production. Also, the need to understand how gender is affected by the challenges of living in a grazing reserve devoid of most commodities and services essential for sustainable livelihood is important. There is also the need to consider the working system of grazing reserves, the environmental and gender constraints and most importantly the feasibility of One Health concept which draws upon the animal-human-environment interphase in such poor resource areas in relation to pastoralist limitations to access health and social services.

It has become the practice for most intervention programmes designed for improving the livelihoods of poor people to fail to monitor as well as evaluate and measure the degree of success and failure of the intervention programmes. Perceptions of pastoral ecosystems (Ellis and Swift, 1988) coupled with the assumptions that pastoralists are 'desperate' and will readily accept 'any help' in maintaining and improving their livestock production could be responsible for this lapse. These assumptions are not applicable in the case study area as it is evidenced that the pastoralists are capable of building resilience and are always very careful in accepting and adopting any new measures that may infringe on their livelihoods. For example, before the commencement of the case study in the reserve, the district head had to call a meeting with the representatives of the six administrative blocks in attendance to express their opinions and ask questions about the study.

According to Meinzen-Dick *et al.,* (2011), agricultural development programmes hardly acknowledge gender differences on the control of assets or assets accumulation during delivery of programme inputs for general wellbeing. For pastoralists' development programmes, the focus is rather on the development of livestock production rather than people. Projects which did not incorporate gender differences in planning as well as an adaptation in its programme and only focused on specifics such as public health, policy, technology, and infrastructure are set to decline in success over periods of time (Chambers,

1997 and Oakley, 1991 cited in Mog, 2004). The need to identify as well as analyse the gender differences in asset accumulation and livelihood strategies in resource-limited areas is crucial to the planning and implementation of pastoralist development programmes like One Health concept of animal and human health service delivery. In order to renew the interest of research organizations and funding agencies in pastoralism in African countries and cause them to have a change of mind about the 'difficult' nature of pastoralists, it is necessary to understand the perceived problems of pastoralists, through a gender lens of observation and empirical investigation (Ellis and Swift, 1988). It is feared that One Health may not realise its objectives in an area of similar characteristics with the study area of KGR if there is little understanding of the problems of pastoralists as shown in the case study.

In contribution to other articles on pastoralism and development, this article reveals many factors that might be overlooked during intervention programmes developed to improve the livelihoods of the custodians of livestock who contribute to the economic growth of agricultural producing countries. The problem of land is a policy issue that seems to be lingering on without any visible solution. As earlier discussed in Chapter 3, land acts have not positively impacted on the rural communities especially those whose livelihoods depend mainly on land use. In the Nigerian context indigenous right to land seems to take pre-eminence over the Land Use Decree promulgated by the Federal Government of Nigeria in which the control of land is vested in the government of each state. It is, however, unfortunate that government allocation of poor agronomical land as grazing reserves for Fulani pastoralists appear to have further aggravated rather than alleviated the challenges to livelihood.

Whereas, land and its natural resources are crucial environmental factors that could influence disease management, the human and animal health physicians often disregard environmental health assessment and interventions (Conti and Rabinowitz, 2011), despite the inclusion of

reducing 'environmental degradation' as part of the One Health strategies of combating human and animal diseases (Kahn *et al.,* 2008). Given the disregard for environmental health assessment and interventions by human and animal health physicians, one can say that One Health may not be effective in such poor agronomical land area like the KGR. A disregard of the many environmental degradation problems posed by the poor agronomical land area of the reserve by development actors may equally affect implementation of One Health.

The environmental and operational challenges of the reserve seemed to have influenced the evolvement of the present patriarchal system of family. The women are allowed to get involved in different income generating activities. Quite a number of them are educated and earn formal income. Taking into consideration the challenges of livelihood in the grazing reserve, the awareness that the subsistence of the household cannot solely depend on livestock production spurred the men to encourage women to take part in diverse economic activities to contribute to the needs of the household. The fact that the men acknowledged the women efforts reveal the great impact the women have in the household and the community as a whole. The readiness to take up men's roles in a patriarchal household and the women being appreciated for such roles show that the conjugal bond in African farming systems is traditionally strong (see O'Laughlin, 1995).This development may be a step towards the formulation of developmental programmes as well as a policy to constructively strategize revolutionary changes (Davids *et al.,* 2014) to gender inequality in African rural farming systems. Blumberg (2005) argued that before gender equality could be achieved in developing countries, women need to be empowered through income generating activities. As much as this argument is tenable, it has failed to understand the intricacies in the economically interwoven activities in the household that necessitates men's involvement in programmes targeted towards empowering women. His postulations on women empowerment could, however, be strengthened if men are involved in the planning,

implementation and monitoring of empowerment programmes for women, a situation that can promote gender equality. Furthermore, it is noticed that the 'collaboration' interlock emphasized in One Health seems to stop with the clinical and veterinary profession. Despite the recognition of the fact that such partnership is crucial to the success of One Health (King *et al.,* 2008), the non inclusion and involvement of men and women, the targeted beneficiaries of One Health intervention programmes in the collaboration interlock will render One Health intervention a top-down implementation programme. Thus, this chapter adds voice to the call of Rock *et al.,* (2009), for a 'syndemic' approach of prevention of zoonotic diseases in One Health, as the approach advocates connections among health-related problems and consideration of social and other conditions.

The low school enrolment of Fulani children as revealed is attributed to the constant movement of pastoralists from one place to another (see Aderinoye *et al.,* 2007; Usman, 2006; Umar and Tahir, 2009). The provision of nomadic schools in the grazing reserve served as an impetus for pastoralists to adapt to the sedentary lifestyle of herding. Free Universal Basic Education (UBE) programme was declared by the Federal Government for public primary schools, but it seems that this has not been implemented here as shown by the payment of tuition fees by pastoralists. This payment of school fees, in the long run, could bring a setback to the educational attainment of Fulani children. More so, there is a political mistrust in a government that makes policies but fails to meet people's expectations at implementation stages. The social and political marginalization of pastoralists (see Kratli, 2001) is evident in the delivery of education services to the study population. This situation is in contrast to the objective of the Universal Basic free education programme. The One Health concept, as postulated by Cetto (2000), that could act as 'the new commitment of science' is unlikely to have any bearing on the delivery of education in the study area as none of the

needs of the study population expected from government and development programmes included good delivery of education in the grazing reserve.

Community wise, acquisition of education is seen as an achievement, an attainment of goals, a fulfilment of a life ambition, and a route to a higher social status (Dyer and Choksi, 1998) in the grazing reserve. One can rightly assume that the increase in enrolment of the children in schools is influenced by the elevated status of the doctor in the reserve and his representation in development matters. Apart from the fact that education gives them a voice in society, especially in politics, it also stands as an image-making process as it builds up the level of confidence they have in themselves to impart positively on their environment. Active participation of those imparted with educational skills in intervention programmes could dispel the 'suspicious' notion of Fulani pastoralists who doubts the intent of developmental projects brought into the community. For example in this case study, two young male students of animal health technology were involved in the application of 'pour on' on cattle and also assisted in bleeding of cattle during the ICONZ survey project. Their involvement in the intervention procedures encouraged the pastoralists to be receptive to the programme. In another programme illustrating the One Health concept in Chad, it was discovered that the success of the programme produced subsequent programmes initiated by the nomadic communities as a result of their trust in the programme (Schelling *et al.,* 2008). From the preceding, it has been discussed as well as argued that due to the environmental constraints, social and infrastructural limitations in the grazing reserve, One Health may be difficult to implement or be effective in improving the livelihoods of the study population. However, the involvement of the two male students of animal health technology in the intervention procedure of the ICONZ survey project of which this study is a part indicates that partnership is crucial to an effective implementation of a One Health programme. This finding reveals that imbibing the 'partnership' culture that the ICONZ project employed in its programme

delivery in the grazing reserve could aid effective implementation of One Health programme in the grazing reserve.

The health of human and livestock was affected by inadequate healthcare facilities, lack of skilled health personnel and lack of veterinary services. This is evident in the health status of women and children in the reserve. A lack of behaviour change campaigns on nutrition coupled with the lack of awareness about family planning prevented women from being responsible for their health as well as that of their children. The high rate of multiparity and subsistence living on crop production with low contents of animal products can be said to have arisen from the above factors. Paradoxically, livestock production and development which necessitated the establishment of the grazing reserve is very poor. Lack of veterinary services in the reserve prompted the men in devising coping strategies for building resilience to threats; strategies which could be highly beneficial to the animals and the livestock keepers and at the same time are harmful to both. This situation points to some institutional weaknesses in the grazing reserve. If veterinary services which are essential and paramount for livestock development are not in place, one, therefore, wonders why the pastoralists are encouraged to live a sedentary life. As Zinsstag *et al.* (2006), noted, for effective equity, health and social service policy should be elements of an overall framework for sustainable use in semi-arid areas. Despite the challenges of living in a grazing reserve, the need to make a living and to make it meaningful led the Fulani pastoralists (both men and women) in the KGR to adapt to the environmental and institutional limitations of the grazing reserve. They were equally open to the idea of innovation towards coping with these challenges in their enthusiasm in maintaining an identity of their own.

One cannot help but to commend the pastoralists in trying to make a living in the grazing reserve despite the challenges. However, they fail to notice the reserve's potential in creating jobs. This failure is an exemplary insight to the state of underemployment that is

characteristic of agricultural producing rural areas. The extent to which employment is explored within agricultural production in rural areas will determine, in part, the population's level of resilience and ability to cope with situations that might affect their livelihoods. The multifaceted problem of underemployment in agricultural producing areas is one major policy problem that calls for intervention. The non-availability of a milk society in the grazing reserve is a reflection of the non-recognition of the economic potential of milk production on a larger scale by the women. This situation could be attributed (from literature reviews) to the emphasis on the promotion of meat production for commercial purpose as milk production is perceived to be a 'subsistence' source of livelihood for the pastoralists. Through recognition of the market potential of the milk producing areas by public offices and private enterprises especially those that are agricultural related, the establishment of milk societies can be encouraged with the ultimate aim of benefiting producers and consumers alike. Establishment of milk societies within pastoral communities could lead to small enterprises for production of milk and milk products, thereby providing a means of employment for both men and women alike. Through this scheme, quality control of the production of milk and milk products can be ensured, which in return serves as a measure towards reducing the rate of zoonotic infectious diseases (e.g., brucellosis). A study conducted by ILRI in 2001 in rural areas of three countries namely Kenya, Bangladesh and Ghana revealed that employment was created through small-scale dairy marketing and processing. According to the study, employment creation contributed to the reduction in poverty of the study areas (Omore, 2004). Building the capacity of people in rural pastoral communities particularly that of the women through job creation will not only reduce their vulnerabilities to poverty but also build up the capacity to be resilient to shocks and threats to animal and human wellbeing.

Finally, there is a tendency for programmes targeted for agricultural areas especially in pastoral communities to be 'gender-blind' (Kabeer, 2010). It could be because of avoidance of entanglement within the web of culture. As FAO (2012) stated, the household power dynamics embedded in socio-economic contexts are diverse and complex which makes it difficult to make predictions on the impacts of livestock promotion on gender. From this case study, it is evident that the enclosure of their environment as well as their need for survival brought about a slight relapse in adherence to values and norms which in a way affected power dynamics of the household. Contrary to the assumption that pastoralists are only concerned about their livestock, this case study has shown that they are as much concerned with their wellbeing and health. The problem to livelihoods in the grazing reserve which partly has to do with policy is also reflected in programmes developed for the welfare of livestock and human. The pastoralists reported that none of the epidemiological interventions of cattle carried out in the reserve addressed other vulnerabilities to their livelihoods in a bid to improve their well-being. As discovered from this study, it appears that state ministry of health through the health department of the local government area of the study area are failing in their duties of reaching out to rural areas on information that could benefit the livelihoods of members of the communities. In the same vein, researchers conducting epidemiological studies on cattle in such communities do not optimize such opportunities in asking them questions about their health in other to proffer health promotion messages that could be of benefit to their livelihoods. During this research, the study population were encouraged to ask questions of concerns regarding their health and that of their livestock. From this case study, it was found out that being equipped with the right information from a reliable source reduces one's vulnerabilities to diseases. Thus, strong communication strategy cannot be overlooked. This case study reflects that gender-sensitive multidisciplinary, as well as participatory intervention programmes that prioritize the needs of people as well as meet

the challenges of livestock production will be highly embraced by the pastoralists of the grazing reserve. The adoption of this strategy could be the first step taken towards poverty reduction as a means of achieving sustainable livelihoods. Given the need for a holistic and collaborative approach, the One Health concept is a strategy that could promote and sustain the livelihoods of the pastoralists in the grazing area if factors affecting livelihood in the KGR are taken into consideration.

4.10. Conclusion

This chapter in exploring the challenges of living in a grazing reserve from a gender perspective in one of the grazing reserves established and gazetted in the Northern part of Nigeria also underlines some difficulties, if overlooked that could make One Health difficult to implement locally. Despite the topographical layout of the reserve, coupled with weather variability and poor infrastructures, this study shows that men and women take up different livelihood strategies to be able to withstand the challenges of living in the grazing reserve. The chapter also highlighted a couple of areas through which the One Health concept can make a transformative change in the prevailing conditions of pastoralists living in such resource-poor areas as that of the grazing reserve. Through a participatory approach of eliciting information from the study population, the chapter showed that the problems to livelihood are programme driven. Programmes for pastoralists and their livestock seem to focus on only the diseased state and rather ignore all other aspects of livelihood which could have an adverse effect on disease emergence. This emphasis could blind programmes using the One Health concept to see the essentials of providing the basic services and structures needed by pastoralists for the optimal achievement of livestock production.

The chapter is also a confirmation of the top-down approach of development programmes. Gender consideration during programme planning and implementation in development programmes targeting pastoralists are often neglected and overlooked because such programmes are often directed mainly on livestock rather than encompassing the various aspects of livestock production as a whole. In examining the grazing reserve system of herding, the findings here reveal the need to incorporate the gender dimension of livelihoods into structures and programmes such as the One Health laid down for livestock and human development.

CHAPTER 5

Pastoral Contemporary Women's Social Networks: A Tool in Promoting the One Health Concept in Kachia Grazing Reserve

5.0 Introduction

In the previous chapter, a situation analysis of the factors militating against the livelihoods of both men and women of the Kachia Grazing Reserve has been documented. Issues bothering on programme planning, implementation and evaluation have also been explicitly elaborated. In consideration that the contributions of women especially in rural areas of developing countries are often unrecognized in the development of a community, this chapter thus seeks to explore in more detail the role the women groups play in the development of the KGR. In this chapter, effort is made to provide a general idea and the background approaches which inform the various empowerment activities the women self-help groups in KGR are involved in. Several approaches have emphasized the role of women groups in economic development but have tended to ignore the roles that they could play in other areas of development such as health. In view of this, this chapter considers the various debates on gender and development in literature and provides evidence based narrative that conforms or disputes some of the assertions on gender and power imbalances. This chapter by focusing more on the women groups of the KGR, seeks to emphasize their roles and responsibilities, constraints and challenges, resources available to them and their ability to organise and make effective use of such resources for sustainable livelihoods. It begins with the income generating activities the women groups are involved in, what prompt them in taking up such activities and the constraints and challenges to the economic activities. It also outlines the civic roles played by women groups to effect a change in society by promoting the components of livelihood

conceptualized by Carney (1999) as 'capital' (health, financial, physical, natural, and social).This chapter intends to assess the familial roles of women in households of the KGR by identifying how such roles influence the health outcomes of the household (both human and livestock). By assessing the various activities of the women self-help groups in the KGR, this chapter will argue that their roles are not limited to the economic development of the community only but to other areas of development in the community. Based on this precept, it will also show that the women self-help groups could be used as instruments in driving forward One Health in poor resource areas like the KGR.

5.1. Background to One Health, Gender and Development

The Beijing Platform for Action, in advocating and encouraging the empowerment of women, has been a great impetus towards achieving gender equality that is essential for development. The Platform recognised gender as an integral aspect of development and considered that a neglect or inconsideration of it in policymaking, programme planning and implementation could be an immense contributor to the failure of developmental programmes of countries. However, it is disturbing to note that available statistics on women in health, environment, economy, technology and social development in developing countries indicates the deplorable state of women in developing countries. It also points to the fact that not much progress has been made since the Beijing Platform. This view is confirmed by the fact that women constitute a staggering 70% of the poor bottom billion of people living below the $1.25 threshold of poverty (Denton, 2002). The situation is disturbing. As a result of this gloomy situation, one is burdened with a few questions – what interventions could be employed to disassociate the women from their deplorable state of poverty? How long will the process of dissociation take? Are women themselves capable in initiating the first step in dissociation based on their social, economic, cultural inclinations and influences or is help

needed in effecting this dissociation? How far are they given prioritized positions in programmes instituted to alleviate poverty in developing countries?

It is discovered that the development sector often integrates gender into development programmes as an 'afterthought' to fulfil all righteousness. This is not in the spirit of Beijing. The zeal in effecting a change in women's status seems absent in most development programmes. Even the policy approaches structured out to improve the situation of women in society at different stages through Women in Development (WID), Gender and Development (GAD) and gender mainstreaming, have not been able to take women out of their state of poverty. It is a credit that such policies have been instrumental in bringing to limelight the relevance of women in development. They have equally sensitized women to their importance in society and development, thereby advancing the cause of women in politics, economy, health etc. However, these approaches have failed to achieve the desired effect as a result of some internal and external variables in promoting the cause of women. The processes either missed its mark at the initial stage of planning or is rather 'overambitious' in its delivery of programmes. The WID approach of the 1970s, for example, recognised the productive roles of women in developing countries and advocated for their inclusion into the economy. However, such approach tended to focus less on men and the power relations between men and women (Razavi and Miller, 1995), thus neglecting the cultural, gender and social influences in most developing countries. The realization that women's choice or involvement in economic activities could be restricted by gender relations informed the WID approach transmuting to the GAD approach which advocated for gender equality and the need to include men in women's development interventions and vice versa. The GAD approach though active in policy and planning could not have achieved much in implementation because of lack of clarity of gender term. In fact, according to El-Bushra, (2000), gender and development policy seemed to have been failing in its workings through

the confusion in the discourse of gender. She also pointed out that the GAD approach overemphasizes the economic aspect of women's empowerment and oversimplified other complex issues. A global strategy known as gender mainstreaming was thus launched to address gender inequality and other flaws in previous approaches (see Davids *et al.,* 2014). The gender mainstreaming sort of clarify more meaningfully the significance and importance of having a gender perspective to every stage of development intervention, right from planning to implementation and evaluation stages. The adoption of gender mainstreaming was undertaken by institutions to modernise policymaking (Parpart, 2009) and also to align with the global agenda (Cornwall *et al.,* 2007). The gender mainstreaming approach has the potential to effect transformative role in power relations (Davids *et al.,* 2014; Parpart, 2014). However, it has been observed that the transformative role in power relations anticipated in gender mainstreaming approach laid too much emphasis on institutional input rather than a vibrant, efficient operational and implementation of the programmes (Moser and Moser, 2005). Gender mainstreaming approach as adopted by institutions seems to be more or less a paperwork approach.

The One Health concept of programme intervention is on board and is instituted towards the alleviation of poverty in developing countries. The One Health concept is a multidisciplinary approach set out to address the neglected tropical diseases through the collaboration of the clinical and veterinary medical fields. It has been reported that the One Health concept utilised in health programmes is cost effective and time-saving. The multidisciplinary nature enhances diverse but unified collective action and ability to cover more grounds in fighting poverty health wise, socially and economically. The fact that the epidemiology, as well as the biomedical control and intervention of neglected tropical diseases, are important issues in global health research cannot be disputed. However, it has failed to identify that social and ecological context also plays an important role in the emergence or persistence of the diseases

in population (Allotey *et al.,* 2010).The gender analyses distribution of neglected tropical diseases especially those zoonotic in nature are found to be missing out in most One Health discourses and literature. In fact the word 'women' as mentioned in the study of Hotez *et al.,* (2007) can be interpreted to refer only to the biological makeup of women exclusive of the social notion and aspect. Even the neglected tropical diseases mentioned are mainly related to the reproductive system of women as observed. Some of the shortcomings in the previously listed approaches can also be observed in the delivery of One Health programmes. The problem of effective implementation and evaluation is equally inherent in One Health programmes.

The above name checked approaches seemed to have failed to take into consideration the cultural context of livelihood of target populations. Many scholars have identified the cultural contextual aspect of livelihood as one of the enabling or inhibiting factors for development. Ignoring this fact will definitely hinder development. Chua *et al.,* (2000), recognised the importance of culture to the livelihood of women. The place of culture helps to give a better understanding of the issues of inequalities, powerlessness and voicelessness of women in society. As Chua *et al.,* (2000) pointed out; the cultural domain should be seen as significant as that of the economic in improving women's condition. It is interesting to note that while many feminist scholars and advocates clamour for women's development; some see development as a process that can further nose dive women into poverty. Vandana Shiva, for example, in her book Staying Alive, argued that the development process in a third world country like India threatened rather than improved productivity of women. To her, development seems to be focused on 'modernizing' the patriarchal economy without a thought on the cultural context which could affect women's life and livelihoods. The implication is that even in modernization, there is still inequality of gender. However, the findings from the KGR in Nigeria shows that the formation of the grazing reserve has helped

to modernize the patriarchal economy of the pastoralists and at the same time opened avenues through which women can earn incomes from other sources than the sale of milk and milk products hitherto a cultural endeavour of pastoralist women.

The flaws or shortcomings of structures and processes instituted towards women's development can even be identified in the globalization of health. Sen and Ostlin (2008) discussed in detail the global health shortfalls of effecting a change in gender inequality. According to them, some of the structural processes have failed to take into consideration the interplay of gender system and the role of norms, practices and behaviours in health matters. This disposition in structural processes will further widen the gap in health outcomes for both men and women. Though many reforms in the health sector have been implemented in many countries, the focus is rather general. The consequences of such reform on gender equality, health care seem not to have been discussed or considered during planning (PAHO, 2001 cited in Sen and Ostlin, 2008). Integrated and multisectoral approach to health programmes is a new concept which is gaining momentum in the global world of research. It is however observed that gender, as a social phenomenon, is yet to find its place on the agenda of interdisciplinary research as also indicated by this case study of the KGR. As it is, the gap between intention and practice is large (Ravindran and Kelkar-Khambete, 2008), as top down approaches seem to have dominated the scene of health programming.

To address the constant reliance on the state and government in meeting their needs, collective action- groups or self-help groups cropped up in rural communities in developing countries. It is believed that there is power in numbers. Their agency as a group is propelled by the needs which may challenge existing structures and contribute to change and transformation. Self-help groups were therefore formed to fill the institutional vacuum required to protect the interests of the poor at the grassroots level (Galab and Rao, 2003). Women self-help groups (SHGs) seem to form a front line for protecting women's interest

and an avenue for assembling their meagre resources by setting up income generating activities (Matsepe-Casaburri, 1983). Formation of the groups is a classic rejoinder to self - confidence and self- worth which could help to build power within and give a push to exercise the power to initiate changes in their livelihood. In South India, women self- help groups were formed to strengthen the communities through empowering the women socially, economically and through capacity building (Tesoriero, 2006). Taylor (1999), in his paper, *Gender Processes in Women Self-Help Movements*, described the women self-help groups as a social movement which draws the attention of the government to their challenges.

Many studies have recorded the success of women self-help groups in promoting the development of their communities (Swain and Wallentin, 2009; Kabeer, 2005; Mayoux, 1998). Governments and funding bodies are gradually buying into the idea of involving them in development programmes. For example, in Andhra Pradesh, India, the government provided an enabling environment for women self-help groups to function effectively and contribute to poverty alleviation through the allocation of funds and resources (Galab and Rao, 2003). According to Borkman (1997), critics have downplayed the relevance of women self-help groups, describing it as being too emotional and lacking in skills to advocate for a transformation of the structures that had brought about the challenges to their livelihood. The concerns of the critics are well understood from the view that the groups are of closed networks with low bridging potentials (Putnam, 2001). The women self-help groups in the KGR are no exception to this. The men groups and developmental programmes hardly collaborate with them.

The Special Program for Research and Training on Tropical Diseases developed by the WHO sees the importance of gender in tropical diseases by funding research on the gender dynamics which support or hinder exposure to disease, access and ability to seek health care (Vlassoff, 1997).It is observed that the multidisciplinary approach of One Health programmes

has failed to key into this area of interest of the WHO. The non-involvement of women groups in One Health programmes might be due to the policy assumptions that women groups are only beneficial in promoting economy and in playing familial roles (Rathgeber and Vlassoff, 1993). It is equally assumed that the groups are under the shadow of continuous reinforcement of existing male-dominated power structures (Akin *et al.*, 1985). It could not be wrong to attest that One Health exclusive focus on pastoral men, based only as the custodians of livestock has influenced their policy assumptions.

5.2. The Groups

In the Kachia Grazing Reserve, the women come together to provide economic and social support for their families by engaging in various economic and social activities. Realising that collective group work will achieve more than individual input, the women come together to pool their human and financial resources for income generating activities which also promote services for their well- being and that of their families. Many women groups sprout up to face the challenges posed by the many economic, health, environmental and political related breakdown in the grazing reserve. Discussion with the women in the grazing reserve, reveal that there are six functioning female cooperative societies in the reserve, namely 'Wuro Nyako' (House of Nyako), Wuro Fulbe (House of Fulani), 'Mayo Borno' (River Borno), 'Wuro Lobi' (House of Lobi), 'Wuro Tale' and ' Habbanaye' (We have tightened one). The women's co-operative groups come under one society known as 'Bige Weti' (We are enlightened). The 'Bige Weti' coordinates all the activities of the groups. It is not a registered society. It was learnt that there was only one criterion to group membership; a prospective member must be married. Any interested married woman only needs to indicate her intention to join the group of her choice. She could join more than one co-operative group. Each group is organised on hierarchal manner. There is a group leader who is

expected to be educated at least to the primary level. There is a group secretary, a treasurer who is in charge of financial matters of the group and two or three other members who form the administrative body. The majority of the members of these groups are young and middle-aged women. Attendance at meetings is mandatory. This mandate is to enforce and ensure discipline and commitment. No particular time is fixed for meetings, though they meet most times on market days. Special meetings are called if the need arises. Members get notified of such meetings through emissaries. On meeting days, the women have the opportunities to see and relate to one another and exchange experience mutually. The group system in the grazing reserve is seen to have enhanced group identification, cooperative spirit, self-confidence, interpersonal relationship and confidence in the group members. In fact being a group member of the society is a sign of prestige and social status uplift. Single ladies look forward to being married so they could become members of any group of their choice.

5.3. Activities of the Groups

The groups are involved in various activities that contribute to social, economic, health and physical development of the women, their households and the community as a whole.

5.3.1. Economic Activities

Group members are taught to acquire skills in soap making, making of body cream, groundnut cake and locust beans (a condiment) and *chinchin* baking. These empowerment programmes are on a small scale. Funding, from investigation, is procured from external resources. Some NGOs through interpersonal connection to some women within the group have aided in the financial funding of the group and donated items like goats and sewing machines. Thus, the women are also involved in animal rearing and sowing. Unfortunately,

the goats reared were lost probably to the intake of cassava peelings by the goats as speculated. Sheep were then purchased to replace the goats and distributed among the members of the groups to rear. A multiplier strategy of returns is encouraged and practised in the groups. For example, if a sheep has a young ewe, the ewe becomes the property of the member who has reared the sheep. This initiative serves as incentives for commitment and hard work. The mother sheep remains the property of the group. Invariably the society still has sheep for distribution at any time. This practice aids the earning income of member groups as a single ewe can become the foundation of a herd. This practice boosts the economic situation of group members. Financial assistance is also available to group members. Group members make weekly contributions into a common pool and from this pool members can access financial loans. Sanctions against defaulters are taken to ensure regular payment of contribution. For example, a deliberate delay in the granting of loans could be applied to any defaulter. A designated person is appointed to go round to collect money from group members. Another measure taken to get the women to pay regularly is to make them pay each market day. It is expected that some sales could have been made at the market, and the excuse of not having money will not be acceptable. This practice indicates that these women are capable of managing their resources and therefore can influence impoverished communities economically. In a study accessing the capacity building of pastoral women in transforming impoverished communities in Ethiopia, it was found out that the women's collective action group successfully managed thousands of microloans (Coppock *et al.,* 2011).

5.3.2. Supporting Household Activities

Maintaining conjugal ties is often economically and socially advantageous to all members of the household (O'Laughlin, 1995). Educating younger newly married women on the expected

roles of a wife within the household is also one of the many social activities taken up by the women groups in the reserve. Activities aimed at building and strengthening these young women's conjugal relationships are put in place. It was discovered that majority of the women married at a relatively young age and as expected are naive about some important women's issues and the intricacies of household maintenance. The younger women admitted that going through and adhering to the tutelage of the older and more experienced married women in the groups help to build their knowledge and confidence in meeting the needs of their husbands and the household as a whole. The desire to please their husbands and maintain the household underlies many of the economic and social activities the women are involved in. In the group, all women are taught to ensure that food is available at all time and at all cost. They are aware that doing this contributes to the health security of the household. To ensure the availability of food at all time and all cost, the women are encouraged to preserve perishable food products such as milk, meat and maize by boiling, roasting, salting, frying and drying methods. These are coping strategies taken to minimize the effect of drought on food security for the household. This storage of food for future use gives the assurance that the household will not be adversely affected during the time of drought.

The groups emphasize the importance of three square meals each day. Though the women are aware that consumption of food provides ample energy to carry out livelihood activities, they are not knowledgeable on the types of food that constitute a balanced diet. They rarely sell their farm produce which forms a large percentage of the daily consumption of the household. Most of the farm produce are carbohydrate in nature. The diet mostly consumed by the household is from maize. Food prepared from maize are pap, known as 'kunu', and 'tuwo'(solidified grounded maize). Dishes prepared from the farm produce form the basic daily diet with scarce addition of vitamins, protein and other classes of food. Animal source foods like milk, meat and eggs which are nutritional source of protein, energy and

micronutrients are sold rather than consumed. Small ruminants like goats and sheep are only slaughtered and consumed at special occasions such as religious festivals and naming ceremonies. This finding is corroborated by Scoones (1992), who reported that livestock and their products are more likely to be sold for income than consumed by the poor household. Though regular food is assured daily, studies carried out in Nigeria show that malnutrition is highly prevalent among Fulani children (see Ekpo *et al.,* 2008; Glew *et al.,* 2004). It stands to reason to expect that any aim to reduce the rate of malnutrition among Fulani children should take into serious consideration the education of pastoral women on the importance of the inclusion of animal source food in the diet of the household through the existing women groups.

Despite the impressive accomplishments of the women's collective action societies in the grazing reserve, meeting the need of water supply for the household has been a great challenge to development. Water is a scarce resource in the reserve especially during the dry season. Supply of water for household and agricultural needs poses a big burden to the women. This is a task which the men have relegated to the women. The women are forced to go in search of water for domestic needs of drinking, cooking, washing clothes, watering farm crops and also for livestock production. Women, as well as young girls in the grazing reserve, are seen carrying bowls and pots on their heads, trekking a considerable distance from homesteads to water points in search of water. Despite the provision of a borehole by the government, women and young girls spend a considerable amount of time at the borehole. Water from these boreholes comes out in trickles. According to the women, at times, members of the household go about without bathing. Because of the scarcity of water, they are compelled to wear same clothes for days without undergoing any washing.

It is of interest to note here that women inhabitants of block six of the Kachia Grazing Reserve, are forced to fetch water from the nearest water body, River Kaduna. The safety of

the water for use and consumption is not verified. The women inhabitants of block six are not members of any women groups. They are far away from other areas of the reserve. Though they would have liked to be members of groups and benefit from the opportunities available in the women groups, they could not.

Lack of water is seen to have affected the sanitary facilities and latrines in the reserve. The environment of the sanitary facilities is dirty and unhealthy. In an attempt to prevent or limit the spread of diseases that occur as a consequence of the lack of water, the women groups are forced to work out amongst themselves health procedures to be involved in. For example, they resort to boiling their water for drinking.

The fact that the groups are not registered made it impossible for NGOs to work directly with the women. Some representatives of the women groups only had the opportunity to work in collaboration with the men groups which are registered during a HIV/AIDS campaign organised by a NGO. According to the women, NGOs that work in the community only do so in partnership with the men groups which they considered *well grounded*, *stronger* and *more influential*. Two other NGOs, as reported, worked to mobilize the community on preventive health measures such as personal hygiene of washing of hands after use of toilets and boiling of water for drinking. They gave health talks on malaria and vaccine for preventable diseases among children. The women were introduced to the use of insecticide treated bed nets as a preventive measure against malaria infection. They were also encouraged to cultivate a particular type of local plant known to have the effect of keeping mosquitoes away. This community mobilization is of great help for the women who are expected to shoulder the responsibilities of ensuring healthy living within the household.

5.3.3. Livestock Production

The groups are involved in livestock management. Cattle are a source of *'mineral resource'*. They found this, as a significant valuable asset to them. Goats, sheep, and poultry, are set aside as capital for savings as they are disposed of easily in times of need. Goats and sheep, kept around the homestead are for closer monitoring. The women know of the various livestock diseases affecting their livestock. However, they lack the knowledge about the cause of such diseases, their prevention and treatment and this affects livestock production. One feels that this was responsible for the loss of goats which they thought died as a result of the ingestion of cassava peelings. Their awareness of the disease of liver fluke in sheep helped them to seek for the men's assistance in measures to take in rearing of sheep. The women are only opportune to information on human diseases such as malaria, typhoid fever, and HIV/AIDs, but they lack knowledge on the spread of animal diseases to humans. However, one of the women claimed that from observation people contract infection when exposed to animal cough. As they are involved more in the production of milk and milk products, the women are therefore at high risk of diseases especially those that are zoonotic in nature such as *brucellosis* and *anthrax*. It is important that they are equipped with the necessary information on the need to maintain the hygienic measures for this production.

Studies have shown that livestock diseases could be transmitted through ingestion of contaminated milk (Mangen *et al.,* 2002; Ayele *et al.,* 2004). It is encouraging to note that the women groups have been taught and encouraged to boil milk before consumption, and they are complying. The idea of boiling milk for consumption was initially strange to the women who were used to suckling directly from the breast of the cattle after the young cattle might have sucked, without them contacting disease as they claimed. The women have come to realise that the effect of livestock diseases is felt more in the household than in the

community. They also learnt that livestock diseases increase cost of production; reduce the productivity of livestock and lower milk production for household consumption and sale. It is therefore very necessary that the women should be equipped with adequate information on livestock diseases- their spread, prevention and treatment in order to prevent them from being placed at high risk of zoonotic diseases.

5.3.4. Ensuring Knowledge

The women desire to have their children attend formal education. This also motivates them in getting involved in income generating activities in the grazing reserve. The women groups are seen to be playing a significant role in the educational system of the grazing reserve. It was learnt that the primary school used as the venue of FGD with the women groups was the project of the women groups. The women lament the takeover of the school by *'some people'*. Irrespective of this, the women realise that the only way to ensure that their children receive the desired education is to pay for it.

> 'We women, we are the ones paying the school fees for our children and most of the salaries of teachers from this school are paid for with our own money from this society. If you want your children to go to school you have to pay'.

Girl -child education is important to the women. They strive to see that their girls receive education at least to the secondary school level and if possible proceed to the post-secondary school level. They are the ones responsible for the payments of fees because according to them, the men are not willing and ready to pay for the education of their daughters.

5.4. Challenges to Groups Activities and Effectiveness

The women groups complain about the lack of capital needed to carry out various economic activities. The remoteness of the grazing reserve from towns makes it impossible for them to access loans from microcredit financial institutions. Lack of property to stand as collateral will be an impediment to obtaining of loan or credit assistance even if such microcredit financial institutions are within their environment. Support, in the form of government aids, is unlikely for the women as the government has not been forthcoming in delivering any programme of development to the community.

Lack of antenatal and post-natal services for the women in the reserve make it difficult for women groups to get enlightened on the needed care for women and children to live a healthy life. Child malnutrition was prevalent in the study area as observed. Their diet is mostly of carbohydrate content. Though the rate of infant mortality in the grazing reserve could not be readily ascertained, studies in West Africa report that in hospitals, children with severe malnutrition have a mortality rate of 20% compared to 4% of those who are not (Brockerhoff and Hewett 2000). Therefore, antenatal and post-natal services to educate the women about all aspect of child health and development are essential for women in resource poor areas, as research has shown that the mother's education increases the child's survival of diseases (Pitt *et al.,* 1993; Guilkey and Riphahn, 1998).

As a result of the non-registration of women groups and non-collaboration with other agencies, the women groups have missed many opportunities that could have helped them accomplish many tasks significant to the agency of women. They are denied full participation in the social, political and economic life of the community. They are also limited by societal and institutional processes and prejudices. They tend to be in social exclusion. The women's groups are considered to be the weaker groups which might not be the ideal group for

collaborating or networking. There is thus a preference for the men groups. Generally, the women groups appear to be in the shadow of the men groups. The status quo of gender inequality is therefore maintained. Inability to cut through the barriers of social marginalization restricts access to opportunities and could lower the drive of the women groups to utilize their human capital and potentials in achieving desired goals.

5.5. Discussion

Gender inequality cuts across all aspects of assets acquisition be it human, financial, physical, natural and social. Institutional processes and policies realise that the social capital is necessary and central to development programmes, and thus taken into account during programme planning. However, the gender aspect of social capital is rather reticent in most scholarly literature to date (Molyneux, 2002). This is further complicated by the little research documented on the relationship between social capital and health in developing countries (Harpham *et al.,* 2002). From the point of view of the findings of this case study, the neglect of gender which could arise from lack of understanding concerning culture and power dynamics is likely attributable to these gaps in the scholarly literature. The low concentration of literature on the relationship between social capital and health in developing countries could be attributable to the non-commitment of unpacking the complexities of realities of gender and livelihoods from local level analysis which this case study made judicious use of in connecting social capital to health. This has implications on identification of networks and community ties needed to effectively control the neglected tropical diseases that affect the poor in developing countries. Social capital could be a 'win' 'no win' situation in the field of public health depending on how it is applied. Szreter and Woolcock (2000), belong to the school of thought that social capital, if well understood and applied, could contribute significantly to public health theory, policy and research. The formation of women

self-help groups was seen as an empowerment strategy which women can build on to pull themselves out of poverty. Most literature on women self -help groups place emphasis on their success in microcredit schemes, seen as a contribution towards economic development of the societies they live in (Rankin, 2001; Copestake *et al*, 2001; Reddy and Manak, 2005).

The women groups are not given much attention in the context of health. To policy as well as health development programmes, health empowerment seems to be a context, way out of women's capability and control. Despite the recognition by development actors that community organizations and participation are relevant to promoting health in rural communities, women groups are hardly singled out for participation in health programmes that could benefit them and subsequently impact on the welfare of the household. It is not surprising that most poor health indices are among women and children in developing countries because of poor perception about feminine structure and identity. However, the impact of female groups in public health outcomes cannot be pushed aside. Rosato *et al.,* (2008), in their paper *'Community participation: lessons for maternal, newborn, and child health'*, described the difference in outcome of neonatal health in two districts. In one district, the mobilization of the community through women groups was cost effective in reducing neonatal mortality rate despite the remoteness of the villages from health care centres. In the other district where general community mobilization was employed without involving the women groups, it was less efficient in reducing the neonatal mortality rate. Sen (1999: 116) notes the capabilities of groups receive less attention than individual skills, though its influence on individual capabilities is not in question (cited in Stewart, 2006).

Understanding the policy issues surrounding One Health is paramount to the One Health approach to disease control, treatment, and prevention (Kahn *et al.,* 2013). This chapter within its capacity tried to elaborate on the policy as well as other issues which limit the activities and the promotive roles of women groups within the community and the

effectiveness of the One Health approach to disease control, treatment, and prevention. It is distinctively clear that the environmental limitation of the grazing reserve could be an impediment to the individual and collective achievement of their economic and social independence. The responsibilities of maintaining the household while men concentrate on livestock management coupled with the environmental instability of the grazing reserve also influence women to diversify into other income generating activities apart from the sale of milk and milk products. They hardly get income from farming activities as crop cultivation is mainly for consumption. This finding holds that the amount of land owned does not determine income as seen here in the grazing reserve. Their role as household managers and the risks involved in living in the grazing reserve has increased the burden placed on women. However, coping strategies, as a means to make livelihoods meaningful within the limitations of the context and resources of the grazing reserve, were embarked upon unmindful of the effects of such strategies.

The low supply of water in the reserve affects their economic activities as well as their psychological and physical wellbeing. Health wise, fetching of water is a physical task that if engaged in for an extended period of time, affects the physiological well-being of an individual. Such activity can leave the women with feelings of lethargy, which can affect their ability to meet other roles of livelihoods. Infections also result from drinking, washing, bathing and cooking of food with water from poor sources. Education of the children especially the girl- child could be affected by lack of water. For example, the time spent in search of water, water-borne diseases and other hazards related to lack of water keep them away from school. Interestingly, poor health as a consequence of the scarcity of water, in return affects the constant supply of water to the household as sick people are unable to go out in search of water. This view shows the rippling effect of the scarcity of water on health and vice versa. In addition to the effect of waterborne disease on human capital, the financial

capital of the household is also affected. A lot of money is spent on treatment of these diseases and because caring for the sick is the responsibility of the women, the women who are involved in economic activities experience income loss during periods of illness.

According to Prus-Ustun and Corvalan (2005), a WHO research shows that 25% of the global disease burden is directly attributable to environmental causes while a larger percentage (over 80%) is due to indirect environmental causes. This study case of the KGR supports the view that pastoralist women because of their vulnerability, weak political status, geographical location and being of a disadvantaged group are directly and indirectly affected by environmental factors to achieving sustainable livelihoods (Marmot, 2007). Unfortunately, because of exclusion of women and non-participation of women in One Health initiative, the gap of the animal-human-environment interphase is further widened.

Water usage in the reserve is on the scale of importance as a result of water scarcity. The problem however of this scale of relevance gets echoed in the statement of DFID, (1998) which argues that low and lack of appropriate sanitation facilities or no chance to develop good practices predispose people to diseases, spread through contamination of water or the home environment. The women, as had been indicated earlier experience inadequate and inappropriate sanitation facilities as a result of water scarcity; hence, they have taken some actions which have negative consequences on their health. It therefore stands to reason that they need to be enlightened through health education. This research shows that the women groups' commitment to promoting the wellbeing, building and strengthening of the conjugal relationship of the household has produced a culture of efficiencies. This culture will be better enhanced through health education enlightenment. Through this, the value of health education to the development of their household and the community will be recognised as a whole. Within the One Health concept, there is a need to value, prioritize and engage with multiple knowledge cultures. An engagement with the women groups could help initiate a

social change within the context of environmental management, public health and health promotion, community development and sustainability (Parkes *et al.,* 2005; Few *et al.,* 2007, Guehlstorf and Hallstrom, 2005). But unfortunately, this engagement with women groups is not considered in One Health as seen from the neglect of gender and gender relations in One Health discourse.

Reardon (1995), reported, in the findings of his study, that the strength and the direction of poverty-environment links in rural areas are different, and this difference depends on the assets within the disposal of the rural poor and their risk to environmental problems. Thus, to reduce this incidence of poverty (ill health, loss of manpower, financial loss) among women and also to control the risks to the environment, policy programmes which aim at improving the environment of rural people through the provision of water should incorporate women. Such programme should specifically target existing women groups as a sort of institutional arrangement if One Health initiative is to be effective within such a setting. It is argued that supply of water in some rural areas has become a political issue in which people vying for political positions give promises of the provision of water supply if voted into office. But most of the time the promises are not fulfilled, or even if fulfilled, sustainability of the project is unsure. Therefore for sustainability of water supply, the Common Property Resource Management recommended for the sustainability of natural resources in rural areas should target women as the direct consumers of the natural resources and as the leading group in control of the scheme. In India, the government initiated a project to improve water supply in villages. They incorporated the women groups during the planning and decision-making stages of the project, showing an example of the bottom-top approach. The women were mobilized to pay for water and maintain the new water supply scheme. Through this project, the women were empowered and their social networks were strengthened (O'Reilly, 2007). A policy paper of the Overseas Development Institute shows that government, due to political

and technical reasons, resists charging for water from public sources such as borehole (Nicol, 2000). According to World Bank (1993), there is evidence that poor people are ready to pay a substantial amount for water supply as long as regular supply is assured.

In the grazing reserve, based on evidence showing the capabilities of the women groups, women would readily welcome the opportunity to pay for, manage and sustain stable water supply provided by government or private bodies. To the women in the KGR, payment for water supply will be more convenient than the stress, efforts, and energy expended on searching for water to fetch. The cost effect of water scarcity on the household outweighs that of the payment for water supply. This finding is a clear indication that any implementation of water project involving the women groups and the community will be appreciated. A project known as the HALI (Health for Animals and Livelihoods) funded by the USAID assessed the impact of zoonotic diseases on human, livestock, and environmental health in a rural area in Tanzania, where water is scarce. Findings from the project showed that local stakeholders embraced the One Health intervention. One of the factors that contributed to the success of the project is the inclusion of the women cooperative groups as part of the local stakeholders. The project recognized the significant role women play in the water supply scheme. The project shows that implementation of One Health is possible in poor resource settings. Unlike the Tanzania example, no such projects, except the ICONZ survey project which tried to use the One Health approach has evolved in the grazing reserve.

The vaccination of children is carried out outside the reserve as vaccination programmes are not available within the reserve. This situation gives added burden to the women. Polio vaccination seems to be the only health programme provided for the children. It is unfortunate that policy is not giving enough attention to the vaccination against other communicable diseases of children in remote rural areas as given the polio eradication programme. One is tempted to feel that the government of Nigeria is mandated to take the

polio eradication seriously because of the global call for polio eradication and the pressure placed on countries to implement this programme. But this is done with less attention to other vaccines for preventable diseases of equal concern. There is also the global interest, emphasis and focus on the three big diseases, HIV/AIDS, Tuberculosis (TB) and Malaria. With regards to TB, which can be zoonotic in nature, intensification of the BCG vaccination programme could produce the same success story as that of the polio eradication programme. From reviews of literature, it is shown that it is practically challenging to differentiate the M. *Bovis* from the M. *tuberculosis* given the logistics and technical ability of the laboratories in developing countries. However, M. *Bovis* could be contacted through ingestion or handling of contaminated dairy products (Miller and Olea-Popelka, 2013). Since the diet of most children in pastoralist areas is mainly dairy products and studies have shown that M. *Bovis* has a higher mortality rate in humans, the need to prioritize BCG vaccination programme in pastoralist areas cannot be overemphasized as non-intensification could be grievous with great implications on public health. The World Bank recognises that child immunization is one of the most cost-effective procedures of all intervention (World Bank, 1993), however, nothing much has been done to ensure that the EPI is implemented in remote areas such as that of the grazing reserve.

Appropriate information on nutrition ensures healthy living. The women groups educate each other on nutrition. They contribute towards promoting food security in the household and community. Nutritional services which provide dietary guidelines for healthy living are absent in resource poor areas. As a result of the absence of these nutritional services, food related infectious disease and chronic debilitating diseases will continue to be in the increase in resource poor areas. The diet of the study population is high in carbohydrate content, and this probably explains the prevalence of diabetes and pile among the study population. Coulston *et al.,*(1987), revealed that high carbohydrate dietary intake result in an increase in

hyperinsulinemia while Trowell, (1985) in a study also revealed that high carbohydrate intake low in dietary fibre increases the occurrence of pile (haemorrhoids). In response to questions on the type of diseases prevalence in the case study area, many declare that they suffer from hypertension, but they are unaware of its link to diet. The fact that the women are not knowledgeable of the effect of diet on diseases has implications on the prevalence of non-communicable diseases among rural communities. However, up till date, there is a dearth of data on the incidence of non-communicable diseases in pastoral communities. Also, knowledge, attitudes and practices of pastoralists on the effect of diet on non-communicable diseases are lacking in literature (to the best of my knowledge). This gap in research which is out of the scope of this study needs to be filled. Policy needs to address the role women play in the risk factors of these diseases by identifying interventions that could control the diseases.

The construction of a school structure by the women groups signifies how important education is to them. They recognise that educating their children demands commitment and sacrifice. The groups' involvement in the educational project would not have been possible if nomadic education, initiated by the government in pastoralist communities had not positively impacted on livelihoods. The institution of nomadic education has changed the perception of Fulani on education (Nkinyangi, 1980). As Uphoff (1992: 273) recognizes, contradictory though it may be, "top-down" efforts are usually needed to introduce, sustain, and institutionalize "bottom-up" development. Such is the case with the nomadic education of Fulani pastoralist communities. Some top-down efforts have been enforced to bring a cohesive change in a system (Talbot and Verrinder, 2009) as seen in the establishment of nomadic schools in Fulani communities, despite their negative perception of education (Nkinyangi, 1980). This study reveals that top-down approaches influenced the women groups in initiating self-help development programmes. Promoting the educational status of

the pastoral community is also echoed in the reports of a project in Tanzania in which the Pastoral Women Council groups raised funds to pay teachers' salaries and build new primary schools (Ngoitiko, 2008). The major challenge with the top-down approach of intervention programmes is the delivery of intervention programmes in a way that the benefits of the interventions are well understood and made known to the beneficiaries. Therefore, the findings here suggest that intervention programmes need to take into consideration the local environment and devise ways through which the intervention programme could make a considerable impact in the community. An acceptance of this suggestion could encourage sustainability of the programme within the local context. It is however sad to note that from reviews of literature on One Health, the local environment and its context are not considered during its implementation.

The non- registration status of the women groups in the reserve, the non- recognition of their roles in the development of the grazing reserve, and their groups considered as *'inferior'* to the men groups are factors, amongst others, that have worked to undermine the bridging social capital. To the women groups, their empowerment activities are an end in itself, but their non-participation in development programmes has a no salutary effect in maintaining the means to an end (see Sen, 1997). Another confirmation that women are marginalized in development activities is the preference of NGOs and civil societies working with the men groups rather than with the women groups. It appears that other prejudices are at work in denying the women groups active participation and involvement in developmental projects of the community. One would have expected that the men groups, the NGOs working in the grazing reserve and other interested bodies would have taken steps to assist in the registration of the women groups. One would have expected, in the spirit of solidarity and genuine advocacy for the eradication of poverty amongst poor people especially in the rural areas, concerted efforts by these other groups should have been taken to encourage the women

groups rather than frustrating their efforts. From their oratories, no help or assistance is extended to them from the men groups which are considered stronger and highly influential. Avoidance of competition, fear of threat from the women groups because of their capabilities and abilities could probably account for the attitude of the men groups. Some studies in Nigeria, especially in the Northern part document that cultural and religious practices are major barriers to women's access to extension services (Chale, 1990; Mijindadi, 1993 cited in Lahai *et al.,* 1999). In fact, this research reveals that *'competition'* of capabilities between men and women is one of the factors militating against women's involvement in agricultural extension programmes. Their participation in the HIV/AIDS campaign exclusive of other programmes shows 'selectiveness' of programmes for women. The notion of linking men synonymously with livestock production and management predisposes agricultural policy programmes to target men and sideline women especially on livestock production and management. According to a study in Tanzania, 51% of the women interviewed did not receive the required information on small ruminant production as the extension agents were only interested in and focused on cattle which is predominantly for men (Kristjanson, 2010). Also according to FAO (1993), provision of extension services is conducted mainly by men for men as only 15% of the world's and 7% of Africa's extension agents are females, which shows an imbalance in gender equity (cited in Lahai *et al.,* 1999).This imbalance in gender equity could also be seen in the Southwest part of Nigeria where a field survey revealed that 82.9% of the agricultural extension personnel interviewed were males (Olaniyi *et al.,* 2013).This finding would amount to a non –existence of female agricultural extension staff in the Northern part of Nigeria, due to 'cultural' and 'religious' factors. This situation has serious implications for service delivery especially to females engaged in agricultural practices, in that research has revealed that female extension agents are more effective than male extension agents in reaching out to women (see Lahai *et al.,*1999) As stated in an

earlier chapter, one of the limitations of the study was the inability to get a female field assistant, knowledgeable on animal health and fluent in both Hausa and Fulfulde languages to assist with the FGD discussion especially when discussing with the women. Furthermore, periodic visits to Nigerian Institute of Trypanosomiasis Research (NITR) offices in Jos and Kaduna, reveal the existence of few women working in the research institute. The margin in the number of male to female workers within the institute was wide. This finding establishes the claim that there is only a few number of female agricultural extension personnel in the North of Nigeria. The women in agricultural practices in the North of Nigeria especially the Fulani women, due to cultural, religious and ethnic differences need female agricultural extension workers and para-vets to educate and inform them on issues relating to agricultural production. They also need to be advised on strategies to be employed when faced with shocks and threats to their source of livelihood.

Apart from the fact that men with the exclusion of women are only involved in livestock programmes and other programmes in the KGR, it is interesting to note that differences within a particular group could also contribute to access to social services and activities. As previously discussed, there are six blocks within the KGR. According to the respondents, the first five blocks are inhabited by the 'high and middle class' within the reserve because the land is of average quality while the sixth block is said to be inhabited by 'slaves'. This land is very poor, far from the five blocks and is devoid of social amenities such as schools, clinic and borehole water. Women, living in the sixth block, because they are socially disadvantaged with regards to locality and caste, are not part of the women groups and therefore could not partake of the activities carried out by the women groups in the reserve. Also the placement of educated women in posts of decision-making in the women's groups and the others, as ordinary floor members is a differentiation of caste and class in the grazing

reserve. The high enrolement of the girl child in schools to promote rank is the reaction to the differenciation of caste and class among groups in the grazing reserve.

The issues of structural and institutional breakdown, as well as 'social inequality', are not peculiar to pastoralist communities only, but rather a common phenomenon of resource poor areas. These breakdowns are reflected in programme insensitivity and the tendency of programmes to be result-oriented rather than person-oriented. Though One Health seeks to be community oriented rather than focusing exclusively on the individual or disease centred approach (Mersha and Tewodros, 2011), studies on One Health are more inclined to biomedical research rather than social research which could be all embracing of the biomedical as well as the social conditions. One Health researchers are attracted to the study of the routes of transmission of infectious diseases, reservoirs of diseases and the progenitors of diseases. Thus, there is the likelihood of the tendency to sideline the human requirements needed to prevent the occurrence of diseases. Without collaborating with appropriate persons or groups in a community, the objective to eliminate or eradicate neglected infectious diseases which are the primary focus of the One Health will be difficult to accomplish. The women groups' activities and achievements, like their involvement in livestock management, the role they play in increasing the awareness of women on their responsibilities towards the welfare of the household, adjustment to changes arising from natural occurrences such as drought and their ability to identify problems should convincingly attract One Health. Educative programmes on preventive measures against infectious diseases, early recognition of symptoms and signs of infectious diseases and timely report of diseases to the relevant authorities for early treatment will reduce the health burden placed on women as primary health carers. Also, it will equally reduce the incidence of diseases if women groups are involved in programmes targeting the wellbeing of animals and humans.

The One Health concept aimed at promoting animal and human health can conveniently work with women groups in effecting a positive change to such community whose livelihoods depend mainly on livestock. A project that utilized the assistance of women in achieving a One Health concept of programme implementation was employed in two provinces in Chad. Collaborative work between the affected population and national authorities initiated a joint human and animal vaccination campaign to provide health service delivery for humans and animals (Zinsstag *et al.,* 2006; Schelling *et al.,* 2005). The full cooperation of the women solicited for contributed to the success of this project. The initiative reduced the incidence of diseases and at the same time reduced costs. This initiative could also be reciprocated in other communities where women's societies could be included in the consortium of economists, ecologists, engineers, sociologists, public health and veterinary practitioners, all working together to improve sanitation, water, and food safety, for the purpose of reducing the occurrence of diseases in our communities.

5.6. Conclusion

In this chapter efforts have been made to discuss the various supporting roles of the women self-help groups in promoting the social, financial and human capital of the community. It is also an attempt to illuminate the reasons for the neglect of women groups in many development programmes including programmes of the One Health approach. It is my view that in pastoral communities, where women also contribute towards livelihood, provision of One Health initiative which employs interdisciplinary research approach aimed at promoting development in areas highly susceptible to infectious diseases and environmental degradation is of utmost necessity. It would cooperate and work with existing women groups in such highly at-risk environment. Some clear insights can be drawn from the information presented in this chapter.

A person's ability and strength are enhanced or limited by the rules and regulations of the system, his environment and prevailing circumstances in which she finds herself. The enclosed nature of the grazing reserve, its remoteness from town and essential social amenities have all affected in one way or the other the lives of the people socially, economically and health wise. The interplay of the identified variables is responsible for the area being regarded as disadvantaged and predisposed to poverty. The need for survival everywhere, as always, informs and determines people's responses and actions. Men and women of all ages have evolved systems and got involved in human activities that can improve their lots and conditions. Thus, in response to challenges to life faced by women in the grazing reserve, they needed to embark on activities that could generate income in cash and kind. The realization of the importance of group work in rural Nigerian communities must have informed the formation of women self-help groups in the grazing reserve. The group must have started as relatively small groups comprising few women of diverse socioeconomic backgrounds having a common goal of making a livelihood albeit with different interests. Such women groups, especially in the Fulani pastoralist communities, must have operated with little or no support from the men as a result of cultural, religious and gender biases. The women groups, though, wider in scope and better organised are still faced with the same cultural, social, religious and gender biases. These biases at play limit women groups' ability and strength. They continue to inhibit the women self-help groups, frustrate their efforts, deny them participation and involvement in some service delivery interventions. However, it is a thing of joy to note that in spite of the odds against the women self-help groups they remained resilient and determined by embarking on income generating activities to empower themselves and contribute to community development.

This study has discovered that the women groups are not discouraged despite their marginalization from development programmes. Their commitment to making a living,

building, supporting and maintaining active households coupled with the strong desire to have their daughters receive formal education are factors that propel them to embark on self-help projects like the building of school structures. There is no doubt that their prioritizing of their daughters' education and determination to pay for it is a long-term investment whose dividends will bring about social, economic and developmental changes to the women self-help groups, the households and the community as a whole.

The ability to access and utilize available resources by the women of the KGR to drive livelihoods is worthy of note. The groups were determined to effect a change to household livelihood by engaging in activities, even though handicapped by cultural, social, economic and health considerations. The responsibilities of providing food at all time and all cost, and of being the primary health carer of households could serve as points of interest for successful operation of One Health intervention in the reserve. The groups exhibit some inherent cohesion which aids their cooperative action in developmental projects. The women groups are always willing to acquire and accommodate new ideas, information, knowledge that can help them improve their livelihoods. A One Health approach could tap into and utilize these areas of interest efficiently for development in the reserve.

As revealed by the study, cultural practices are fundamental inhibiting factors that influence policy and prevent the women from developing and utilizing their potential to the full in community development. The women groups' activities are casually acknowledged as the usual routine of familial roles. Publicly, they are not declared as having any significant effect and contribution to the development of the community. This situation is a cultural practice that seeks to keep the women groups permanently in the second class position at all times. It is a practice that has the effect of dampening the ambition of women groups as observed in the grazing reserve. Many developmental projects see women as the pathway through which some specific developmental goals like child survival and family planning can be achieved.

However, the views and the perspectives of women are not sought for in the development of disease control strategies (Vlassof and Bonilla, 2008). This argument reiterates the case in the grazing reserve as evidenced by the utilization only of the representatives of the women groups for the HIV/AIDs programme only.

One can conclude that men or men groups alone are not to be the exclusive focus in the livelihoods of pastoral communities; women also are a vibrant force to be reckoned with. This chapter has tried to highlight the findings from this study. Among other things it has shown that institutional support is needed in promoting any approach especially the One Health concept and that such an approach is skewed if it fails to involve women groups in programmes or activities aimed at improving the overall development of human in poor-resource areas.

CHAPTER 6

Gender and Conflict in the Jos Plateau: Implications on Livelihoods

6.0 Introduction

This chapter focuses on the case study area of Bokkos LGA of the Jos Plateau. The chapter explores the gendered aspects of conflict and violence relating to the Fulani pastoralists living in some selected villages of Bokkos LGA of the Jos Plateau. This chapter highlights and discusses the conditions in which the Fulani men and women suffer the consequences of conflict and violence. Literature review argues that little is known about the effects of conflict and violence on the livelihoods of pastoralists as well as on gender relations.

Drawing from the field experience and the qualitative data obtained from the study participants (both Fulani pastoralists and the indigenes of the studied areas of Bokkos LGA, Jos Plateau), this chapter identifies and highlights the various effects which the conflict and violence in the Jos Plateau have on the educational and social status of the study areas. It also highlights the consequences of conflict on economic activities, knowledge, attitudes and practices of livestock management and accessibility of health services of Fulani men and women in Bokkos LGA. Insights from these highlights illustrate the Fulani pastoralist vulnerabilities and their strategies of building resilience to the conflict and violence of the Jos Plateau. The chapter concludes by proffering an alternative to conflict management as against that proffered by the policy which from most accounts is ineffective. A One Health approach to programme planning and implementation if efficiently and sensitively delivered ought to produce a remarkable change in the conflict and violence of the Jos Plateau.

6.1. Conflict and Violence in the Jos Plateau

Conflict has always been a normal phenomenon in pastoral life since the pre-colonial era in some developing countries. However, modernization has altered ways in which men and women react to conflict. Men are often at the receiving end of violent conflict; its effect on women, however, hardly gets attention. From a general view, women in conflict areas also suffer as victims of the conflict; they could be combatants, peace builders, and breadwinners (Dietrich and Quain, 2014). Though immense attention is placed on the effects of farmer-pastoralist conflict on livestock production, little documentation has been made on its implication to livelihoods and gender relations in pastoralist communities (see El-Bushra and Sahl, 2005).

In the Jos Plateau, apart from farmer-pastoralist conflict over access to land and natural resources such as feed and water, ethnoreligious differences seems to be another reason for the constant conflicts within the area. The ethnoreligious factor has intensified the farmer-pastoralist conflict within the area. In response to farmer-pastoralist conflict, transhumance as well as diversification into crop production seems to be the concept employed in crisis prevention by the pastoralists, while attacks on property, human life, and cattle rustling are the common reaction of both farmers and pastoralists to ethnoreligious conflict. The turbulence in Jos is attracting immense attention as the number of deaths from the Jos crisis forms half of the 13,500 deaths that arose from communal clashes since Nigeria returned to civilian rule in 1999 (HRW, 2010a cited in Krause, 2011). According to Higazi (2011), 7,000 deaths have been recorded from the Jos conflicts within the years 2000-2010. More than 220,000 people have been displaced (IRIN, 2005 cited in Krause, 2011).

Some current issues other than the ethnoreligious differences have further added to violence and conflict in the Jos Plateau. Some have viewed the intensity of the conflict as resulting

from the marginalization of the pastoral population in politics and access to natural resources. The land act law (see chapter 3) favoured the indigenes, who are mostly farmers at the disadvantage of the pastoral population. The indigenes were allotted most of the slots in political positions of the state while the pastoralists were underrepresented in politics. These policy issues resulted in a shift in the cordial relationship that existed between the farmer and cattle herders in the precolonial era of the tin mining period. Suspicion, mistrust, as well as fear instinctively, replaced the 'cordial' relationship that existed between the indigenes and the pastoralists. In the Jos Plateau, the case of the Hausa-Fulani ethnic group seems to be what Posner (2004), termed as being 'politically irrelevant' within the community (see Chapter 3 for a detailed discussion on the genesis of the crisis in the Jos Plateau). This view is further corroborated by Raleigh and Urdal (2007), who from a review of studies on environmental security, stated that political and economic characteristics of a country are risk factors of conflict.

International organisations, scholars, human rights groups, peace missions and the public office recognise the dilapidating, psychological, social, physical, economic and health implications the crisis in the Jos Plateau has on the development of the community. Several studies on the Jos Plateau crisis had been carried out and documented. Recommendations towards crisis resolution have been proffered. However, from evidence, no meaningful resolution has worked. In looking for a lasting solution, the political strategies of involving the local, state and federal government working together for a permanent solution have been employed. The Federal government deployed troops to the conflict affected areas to maintain peace and order. Even then, this has not achieved the desired objective.

Given the preceding and as reported in national newspapers, international journals, scholarly research, the impact of the Jos crisis on sustainable livelihoods of the people cannot be overemphasized. Drawing from the suggestion of El-Bushra and Lopex (1993), that a gender

approach to conflict analysis might stimulate understandings of the reasons behind men and women support, involvement or stand against violence, this chapter thus seeks to describe the impacts of the Jos Plateau crisis on the men and women living in Bokkos LGA. While chapter 3 gives an account of the history of conflict in the Jos Plateau, the focus here is on the factors promoting the crisis in the area, its effect on livelihoods and how it affects the possibility or practicality of the One Health concept in Bokkos LGA, Jos Plateau. An attempt will be made to look at this from a gender perspective.

6.2. Natural scarcities, conflict and livelihoods

The increase in demand for land by the Jos Plateau indigenes shows an increase in agricultural activities[23], a decrease in grazing land and cattle herd size for the Fulani pastoralists (Siedl *et al.,* 2001). The uncultivated land of woodland, grassland and shrubland in the Jos Plateau (Silviconsult, 1991 cited in Phillips-Howard and Lyon, 1994) which Fulani pastoralists have been using for grazing are being reclaimed for cultivation by the indigenes. An increase in population density among other factors resulted in demand for land by the indigenes. Fulani pastoralists in Bokkos LGA bear the major brunt of the increase in population because the demand for and occupation of more land by the indigenes reduces the grazing area needed for feeds and water for their cattle. This situation in return results in low herd productivity, reduction in milk production and an increase in the incidence of diseases. These, no doubt, affect the economic activities and pose a threat to livelihoods. These also tend to promote poverty among the Fulani pastoralists. The need to secure livelihood leads to increased movement from one area to another in search of grazing land.

[23] See Phillip-Howard and Lyon, 1994; Stone et al, 1990

Both groups feel the effects of the demand for access to land and the land use act on livelihoods. Some Fulani lease land from the indigenes in Bokkos LGA for crop production while others migrate away from the Plateau in search of grazing land. The lease of land from the indigenes, however, is not a guarantee to permanent settlement /length of stay in the community. As one pastoralist stated:

> 'We don't know our fate, as an indigene might come and meet us and say my child is getting married and needs the land to build upon for settlement'

The thought of the possibility of being uprooted from what has become home to them for years and of being deprived of the source of their livelihood must be worrisome to the Fulani pastoralists. Transhumance, as a coping strategy against this uncertainty, is thereby practiced by the Fulani pastoralists. A majority of the indigenous respondents claimed that inability to bequeath land to their children has a consequence on their livelihood. Despite owning and cultivating farm lands on the greater land space of the community, land for the indigenes still remains inadequate for crop production. Just as livestock is important to the pastoralists so also is crop production essential to the livelihoods of the indigenes. The demand for more agricultural land by the indigenes is further hastened by the unemployment status of their youths in towns and cities. As a result, the youths are forced to take to farming as their last resort. There are steps the indigenes take in creating opportunities for their children. Most times land already leased out gets reclaimed for use for the needs of their children. The end to the demand for land among the indigenes is not in view as long as there is high rate of unemployment among youths in the country. The study area of the Bokkos LGA reveals some cordial relationships between the Fulani pastoralists and the indigenes residing in the villages. The fear is that this relationship could be threatened by possible reclaiming of land from the Fulani pastoralists. In fact, a few weeks after the completion of the field work in the study area, reports were received that conflicts and violence erupted between the Fulani

pastoralists and the indigenes. Cattle rustling seem to be the cause of the conflict as the indigenes claim that their cattle were stolen by the Fulani pastoralists (personal conversation). Cattle rustling by the Fulani pastoralists as claimed by the indigenes could be their reaction against the indigenes possible reclaim of land.

Lack of access to water is another issue of conflict between the indigenes and the Fulani pastoralists. Fulani pastoralists complain of the lack of water supply for their cattle. Irrigation farming is very common in the Jos Plateau, and most irrigation farms, owned by the indigenes are near streams and ponds, thus making it difficult for Fulani pastoralists to lead their herds to the stream for water. Many had to resort to fetching of water from wells every day, and this could be laborious and time-consuming. Issues like this further aggravate the conflict and violence between farmers and pastoralists in Nigeria, an occurrence characteristic of most pastoral areas of Africa (see Hussein *et al.,* 1999). Many of the pastoralists from Bokkos LGA are forced to migrate to other areas where they could have easy access to water and land for grazing and crop production. Others practice transhumance which, though to the Fulani pastoralist is beneficial to their livestock production, could be damaging to the livelihoods of the settled Fulani household.

6.3. A Likely Cause of Conflict: Political Marginalization

The political structure in the study areas of Bokkos LGA puts the Fulani hierarchy of leadership under the traditional leadership of the village heads. The village heads of the villages in Bokkos LGA are under the jurisdiction of the local government and cannot carry out any programme for the development of the community without approval from the local government area. Many a times such approvals come with fund allocation assistance. Such government assisted programmes include patching of bad roads and construction of

classrooms. From the discussion with the indigenes, it was learnt that a local festival (called 'karum') takes place yearly every March. It is a platform through which the traditional leaders address the community members on issues relating to the development of the community. A review of successes, achievements, challenges and failures of the year is given during the festival to which dignitaries such as government officials and those in private industries are invited. The occasion serves as a forum during which they could air their complaints, worries, and anxieties to the hearing of the invited dignitaries in recognition that political power and influence are crucial for social and economic advancement. According to the Fulani pastoralists, their participation in such forum is mainly by invitation. The fact they are part of the community does not guarantee that they are free to participate in development programmes of the community. The Fulani leaders have to receive approval from the village heads to give instructions or undertake programmes that affect communal living. This political structure must have been strange to the Fulani, who are used to some freedom of action in determining issues that pertain to their livelihoods.

6.4. The Impact of the Crisis on Fulani Men and Women

The crisis in the Jos Plateau has both positive and negative effect on the livelihoods of both men and women of Bokkos LGA. It has affected educational attainment, economic activities, health care, social life, political life, food security, power identity, etc. Responses from the respondents reveal that the effect of the crisis on their livelihoods is damaging.

6.4.1. Effects on Education

The crisis has helped the Fulani pastoralists to see the importance of education. They see education as an escape route from their marginalization in politics and access to services and

resources. As one of them indicated *'education fights illiteracy, and it makes you earn government work'*. The Fulani girl-child is encouraged to go to school and made to complete her secondary school education before getting married. It is assumed that the girls, by the end of their secondary school education, would have been equipped with information on the intricacies of marriage and would have developed an identity of their own. Girl-child education is seen as a *'necessity'*, and based on this, household heads encourage the education of a girl child to any desired level depending on proper conduct, performance, and availability of fund. It was also revealed from discussion with the Fulani men that their girls are encouraged to go to school and study animal health related courses to obtain the knowledge and skills needed in the care of their livestock. It is believed that this will save costs on veterinary fees and also help towards the quality control of drug administration. This finding is an example of a distinctive deviation from the usual Fulani perspective that girl education is a waste of time and resources.

A Fulani woman, interviewed had the desire to attend an adult education school, but unfortunately, there was no provision for adult education in her community. The FGN/UNICEF (2003), conceives non-formal education as literacy, post-literacy, or vocational education provided in formal educational settings for adults and youths who did not have the opportunity to go to or complete primary education. This type of education caters for adults, the disadvantaged and the physically challenged. One of the points that Kratli (2001) brought forth in his literature review on *'Education Provision to Nomadic Pastoralist'* is that non-formal education has proven to be more successful and cheaper to implement than the formal approach to education. The focus of non-formal education on providing a service to improve the livelihood of pastoralists, rather than transforming them makes the approach receptive to them. Formal education processes can capitalize on this

mode of learning as it is possible to meet the educational needs of adults by imparting formal education during the skills acquisition training of non-formal education.

The level of educational attainment, especially among the Fulani pastoralists within the Bokkos LGA, differs from one household to another. A particular Fulani household in one of the villages in Bokkos LGA had nearly all the children of the household in schools. Many of the older children, females inclusive, were in tertiary institutions studying animal health related courses. This particular household had a large herd of cattle from which they made money to pay school fees. Cattle management was not disrupted by the educational pursuit of the children. The holidays or break from school were spent on cattle management within the household. The household was able to cope with threats to their livelihood especially when their cattle got inflicted with diseases. Productivity in livestock was thus increased in the particular household. Though there might be a periodic loss in family labour as shown in the cited example due to educational pursuit, the gains of attaining education at the end outweigh the loss. The periodic loss in family labour sometimes necessitates hiring herd boys, thus leading to more expenses. Despite these additional expenses, it is worth noting that the people were determined to get their children educated. The educational accomplishment of some of the indigenes as doctors, nurses, police officers, teachers, civil service officers in cities and towns as well as the social and political gap existing between the Fulani pastoralists and the indigenes appears to compel the Fulani pastoralists within the villages of Bokkos LGA to embrace education.

6.4.2. Effects on Access to Health Services

The crisis in the Jos Plateau affected accessibility of health services for both indigenes and the Fulani pastoralists of the villages of the Bokkos LGA. As a result of the absence of health centres within their vicinity, the inhabitants of the study areas travel a considerable distance

to the nearest primary health centre[24]. Some, depending on the severity of the health issue, go as far as Barkin Ladi and Jos University Teaching Hospital (JUTH), Jos for treatment. Unfortunately, at times *'the person might die on the way'*. Primary Healthcare is free but is not easily accessible by both indigenes and the Fulani population as most health care facilities are concentrated in urban areas. This situation contributes in a large measure to the low health care utilization usually seen among pastoralists (see Omotayo, 2010). Going by the urban and rural discrepancy, a study conducted by the World Bank/FMOH in 2005 reveals that 80% of households in urban areas were within 5 kilometres of a PHC compared to 66% in rural areas. Attitudes of health care service providers to delivery of services also affect accessibility to health care facilities as *they are nowhere to be found when their services are needed especially after closing hours as they prefer staying in towns or cities.* Fear of the crisis erupting anytime in the villages may account for this. Just as lack of primary health care centres can be a problem to accessibility of health care, so also the crisis and cultural issues could also affect access to health care. The Fulani women are not allowed to go to the clinic alone without being accompanied by men. Thus, a female member of a household as well as a child needing medical care might not receive it at the appropriate time, most especially when the men are out grazing. This finding has a lot of health implications on the household.

The problem of HIV/AIDS could not be ascertained because of the respondents' knowledge about the disease. According to them, a person presenting with unusual loss of weight is said to have HIV/AIDS. The little information they get on HIV/AIDS is on the radio. In recognition of the high vulnerabilities of rural communities to the menace of HIV/AIDs due to lack of knowledge, campaigns on HIV/AIDS in rural communities in Nigeria had been recommended by government and international organisations. Disappointingly, no community mobilization and awareness programmes on HIV/AIDS by the government have

[24] Despite Bokkos being a local government area, it does not have a general hospital.

been given in any of the study areas in Bokkos LGA as revealed from discussion. Interestingly, the political and environmental instability as a result of the Jos crisis has affected the traditional methods of preventing diseases among the Fulani population in Bokkos LGA. For example, the indigenous women, as shown by their responses, give herbs to the children to build up their resistance to diseases. This study does not reveal that the Fulani women in the study areas administer herbs as preventive measures to their children contrary to many studies on Fulani pastoralists that reveal that Fulani women are accustomed to giving their children traditional preventive medicines (see Castle, 1995; Akogun *et al.,* 2012). The Fulani women take other measures in preventing illnesses. For example they try to keep the children warm and dry during the rainy season by dressing them up in appropriate clothings.

6.4.3. Effects on Economic Activities

The heterogeneity classification of women that could act as guide in structuring programmes aimed at gender equality (Davids *et al.*, 2014) is played out in the study areas of Bokkos LGA. The Fulani women '*have no other thing to do apart from cooking food for the household members and rearing of small animal; no specific income earning activity'*. Fulani men, from the accounts by the women, see keeping of livestock by the women as being in competition with them. Fulani women are prohibited from any farming activities, though some own farmlands. Their men buy grains for the household, an activity taken to prevent their women socializing with the indigenes. On the contrary, the indigenous women are highly industrious. The indigenous women, unlike their Fulani counterparts have no right to any inheritance such as livestock. However, they are free to engage in farm and non- farm activities that will provide income for the household. Some indigenous women, who own farmlands either through purchase or as gifts from their husband, use them solely for

cultivation while small livestock such as goat, chicken and sheep are bought and reared on the homestead to be sold later to generate income for the household. The indigenous women engage in the trade of buying and selling farm produce to generate extra income. A few indigenous women in cattle-owning households also buy cattle to add to that of the husband's herd. Because of the freedom given to the women to generate income, the women are overburdened, and this takes a toll on their time and human labour resources as they s*pend more time on the farm planting, weeding and harvesting crops'.* The freedom enjoyed by the indigenous women seems to have influenced the wish of the Fulani women to be allowed to socialize like their indigenous counterparts.

One of the non-economic, as well as materialistic ways (Chua *et al.,* 2000) through which the effect of culture is demonstrated, could be seen from the constraints on the potentials of the Fulani women in Bokkos LGA and the existing weak relational social capital with the indigenous women. The Fulani men feel that their women socialising with the indigenous women interferes with the normal expected role of a typical Fulani woman. Despite the sedentary lifestyle of Fulani women in the study areas and their exposure to social and physical amenities, the environment, culture and probably religion seemed to have suppressed the capability of most women in generating income from other activities apart from the sale of milk and milk products and small ruminants (which many are reluctant to sell). As one of the Fulani women stated *'we mainly depend on our husbands in terms of financial needs and otherwise. Our needs are never satisfied all the time'.* In contrast to the findings in the study areas, a study of pastoral women in a town in Northern Kenya revealed that pastoral women pursue different kinds of income generating activities (Nduma *et al.,* 2001). This study in Kenya relates the ability of pastoral women to adapt to opportunities as well as challenges of settling in towns nearest to markets. Apart from the cultural and religious factors that suppress the capabilities of the Fulani women in the study areas of

Bokkos LGA, the political and civil unrest of the Jos Plateau as seen from this study seems to be the factor that underlines their restrictions from pursuing different activities that could provide and add to the income of the household. Thus, political and social interventions to address these factors are required to empower pastoral women of communities affected by civic and political unrest if the aim of improving livelihoods is to be achieved. The Fulani pastoralists diversify into crop production. Many go on transhumance during the dry season to return at the start of the rainy season to cultivate. This finding is seen as a survival strategy to gradually break away from the dependence on indigenes for grains. Many equally sell the harvested crops at the local markets, and there is a likelihood that trading of farm produce in the local market will be more within the same ethnic group (i.e Fulani to Fulani) than to different ethnic group (Fulani to indigene or vice versa).

6.4.4. Effects on Social Capital

The Fulani community institutions in the study areas of the Bokkos LGA are 'kautal hore' and Miyetti Allah Cattle Breeders Association. The Miyetti Allah Cattle Breeders Association is a public pastoralist organisation in Nigeria, with branches in most Fulani pastoralist communities. The Fulani community institutions regulate grazing activities by minimizing or avoiding conflicts. Promoting the welfare of cattle and cattle rearers is also among the objectives of the institutions. The indigenes belong to different community groups. For example, there is a group known as 'alheri' meaning 'working together towards the achievement of a particular goal'. In this group, activities include the contribution of money towards the purchase of fertilizers to sell at subsidized rates to others, construction of buildings, e.g., classrooms within the community, and road construction management. Another group with similar activities is called 'kafuruhai kabumhai' (coming together to help ourselves). The Fulani are not beneficiaries of the activities of these community groups

because they are not members. It is likely that the indigenes feel that involving the Fulani in activities of the community groups is an opportunity for the Fulani to exploit their resources as they perceive their large population as a threat to their economy. From discussions, the Fulani pastoralists wish to be beneficiaries of the activities of the indigenes community groups as their own community groups are ineffective. Apart from being a marginalized group in politics and developmental programmes, the Fulani are also socially marginalized within the community they live. Access to female co-operative groups is further denied the Fulani women. It forms part of the pressing needs of these women, as there is no avenue to air their views and constraints. It is tough for this group of women to access information as they are further excluded from gaining entry to mosques or village meetings.

6.4.5. Effect on Knowledge, Attitudes and Practices of Livestock Management

Local knowledge on livestock management among the Fulani in the study areas revealed the rudimentary knowledge of livestock disease- epidemiology, treatment, and intervention. Common diseases mentioned were FMD ('Boru') which according to them, is transmitted from animal to animal, trypanosomiasis ('sammore') is caused by flies attack and liverfluke ('hanta') whose epidemiology seems to be unclear. Though brucellosis ('bakale') and some diarrhoeal diseases are not common, it is known that they affect both animals and humans. A woman who finds it difficult to get pregnant could be suspected of being infected with brucellosis. For the animals, several times of mating without conception, spontaneous abortion or production of weak calves are linked to brucellosis.

The lack of veterinary services in the communities hampers the management of livestock diseases. This situation is further compounded by the high cost of service delivery and the distance to available veterinary centres. The people are forced to use, at times, traditional medicines for the treatment of animal disease despite the high preference for orthodox

medicine which is effective and whose fast acting rate in curing diseases is high. Many, however, attributed the emergence of livestock diseases to the shortage of water and lack of grazing areas which is further worsened by the blockage of cattle routes by arable farmers in the Jos Plateau. Hence, transhumance seems a certain practice among the Fulanis in the study areas. The majority of the pastoralists see disease emergence in their cattle as a threat to their livelihood. Apart from the reduction in the production of milk, the net value of meat is equally reduced. Transhumance for the pastoralists is practiced as a last resort and not as a result of drought as stated by Scoones, (1995) and Solomon *et al.,* (2007). It is practised as a consequence of the dwindling natural resources for the survival of their livestock which is attributed to the tussle for land use among the pastoralists and the indigenes of Bokkos LGA, Plateau.

Quite a majority of the indigenous households interviewed in this research owned cattle. However, it is secondary to farming for the indigenes. Not knowledgeable about livestock management, the indigenes are obligated to the Fulani boys that are hired as herd boys to care for their cattle. As one indigene said, having a large herd of cattle which necessitates hiring Fulani herd boys is problematic to them. The hired Fulani herd boys thus constitute a case of *'necessary evils'* for the indigenes. There is thus a dilemma for the indigenes either to do away with the services of the Fulani herd boys or to lose their cattle. Although there is no evidence to show that the Fulani herd boys capitalize on the ignorance of the indigenes on cattle management, the mistrust and apprehension brought on by the general conflict between the indigenes and the Fulani pastoralists of the Jos Plateau could account for the fear of the indigenes in the study areas of Bokkos LGA.

The Fulani women due to other roles in the households as shown in the study and as earlier narrated are not knowledgeable about livestock management. They expressed inadequacy when it came to caring for the sick small animals they keep. To them, it is the men's

responsibility. This reliance on men could have a negative bearing on their coping mechanism as one stated:

> 'men hardly stay for long at home, so the responsibility of bringing up a child, training a child and taking care of them lies on us'. Though we sell cheese, milk and butter to earn money to take care of some household expenses, our problem is that milk is not always available'.

The Fulani women especially those that are involved in the production of milk, for consumption as well as for commercial purposes, are not aware of the implications of their lack of knowledge on livestock diseases. This situation constitutes a public health concern.

6.5. Discussion: One Health as a Crisis Resolution Approach in the Jos Plateau

Violence and conflict either precipitated by a crisis or not has a profound effect on health and health services. In recognition of this, the issue of violence was included for discussion on the global public health agenda by the World Health Assembly in 1996 (Krug *et al.*, 2002). The relevance of violence and conflict in the development world is also reflected in the call for papers from three prominent journals in the development field. They are the *Social Science and Medicine*, *The Lancet* and the *Journal of the Danish Medical Association* to highlight the promotion of interdisciplinary and international collaboration based on the themes of conflict, violence and health (Panter-Brick, 2010). In one of the publications of the *Social Science and Medicine*, on violence and health, the reviews of evidence- based studies revealed that research and intervention frameworks for understanding the relationship between violence, wellbeing, gender-based and social adversity need to go beyond the usual limitations in service delivery (Panter-Brick, 2010). This recommendation indicates that prevention or control of violence entails an approach that will employ a strategy suitable to the context of conflict. Despite the globalized attention on violence and conflict and its subsequent effect on

the general well-being of the affected people, one cannot help but feel that such approach without a sensible move is just adding to the body of scholarship. The situation in the Jos Plateau needs an implementation of a strategy that will be effective in preventing or bringing a stop to the violence and conflict in a bid to promote sustainability and health equality.

Analysing the determinants of violence and conflicts is the first rung on the ladder of resolution. One only needs to know the grave consequences of violence and conflict to realise the importance and the necessity of finding a well-established solution to the problem. Within the context of this case study, all indications reveal that conflict and violence in the Jos Plateau are attributed mainly to disputes over natural economic resources and of land use. This finding affects different facets of livelihoods, health, social and environmental. It is, therefore, necessary that the strategy needed to dissipate the conflict and violence should be able to address nearly all the facets of livelihoods affected by the crisis. Bornemisza *et al.,* 2010 expatiated upon the 'categorization' of health intervention programmes in conflict-affected areas, with particular emphasis on gender and its influence on effective health care service delivery. One Health, described as a global public health response to the emergence of diseases transmitted through vectors from animal to man, could have an overall impact on the effects of conflict and violence in affected pastoralist areas if programmes are delivered in an unbiased manner. Effective delivery of One Health programmes could assuage the parties in conflict by getting them to collaborate and co-operate for a peaceful environment to be able to carry out activities important to their livelihoods.

There were clear differences in the way the indigenes and the Fulani pastoralists carry out daily livelihood activities. The indigenes seem to be favoured by the system, although there are some instances when the failure of the system has an effect on both the indigenes and the Fulani pastoralists. The lack of health care facilities affects both animal and man in the communities. In the realization that the problem of land use is linked to policy, One Health

programmes can cause advocates of its delivery system to confront inherent problems to livelihoods, problems like the political marginalization of pastoralists and conflict (Grahn and Leyland, 2005). A good example of a programme that utilized the One Health concept of service delivery was the Community Based Animal Health Workers Systems (CAHW) employed in the Horn of Africa. The success of the concept was recorded in its role in conflict resolution. As peculiar to most developmental programmes, the weakness of the CAHW is its failure to involve the communities fully in problem analysis and solutions (Grahn and Leyland, 2005).

The Fulani pastoralists recognise that education can bridge the social gap that exists between them and the indigenes. Education is also seen as a key to open doors that could liberate them from political marginalization, health and social service inequality, economic instability and poverty as a whole. Conrad *et al.,* 2009, recognises that relevant training needs to be carried out by universities as a first step towards promoting transdisciplinary collaboration in other to improve global health. However, from this case study, it is seen that education at the basic level especially in pastoralist communities will not only be the first step in building the confidence of people in taking responsibilities for their health but will nurture that inherent ability to develop initiatives to promote health and wellbeing for themselves and their livestock. An example of such an initiative that could be developed is the Community Based Natural Resource Management. Such efforts are noted to have resolved conflicts in areas where conflicts are instigated by competition over natural resources such as land and water (see Buckles, 1999; Warner and Jones, 1998; Warner, 2000). Support of the girl-child education as observed and documented in the case study is a significant developmental movement towards gender equality in pastoralist communities. Though underrated and underutilized in many approaches to development, women have been known to be instrumental in resolving conflicts in conflict-affected areas (Kirk, 2004; El-Bushra, 2007).

For example, in Somalia, women groups took stringent measures such as employing threats to neglect their children, to shave their hair and walk nude on the streets as methods of protest against conflict to ensure peace (see Elmi *et al.,* 2000 cited in Hodgson, 2000). Other activities carried out by the women include organising peace meetings among the women, fundraising, and holding of peace festivals. Though such measures at promoting peace building by women in Somalia achieved some success, it is not applicable in the pastoralist communities of the case study due to differences in culture, power relations and social values.

The social condition of women makes them vulnerable to many risks. It is logical to assume that majority of the Fulani women that were interviewed were not educated as indicated by their economic status and their lack of knowledge on livestock diseases. The encouragement of the Fulani girl child education by the Fulani pastoralists in the study areas as previously indicated reflects the socio-economic differences among the Fulani women of the study areas. Households with educated Fulani girl child are more liable to take some measures that promote their livelihood than those households with no educated girl child. All the same, it was not that the Fulani women are unmindful of the conflict and violence around them, but culture curtails them to take any conflict resolution step. Conflict resolution seems to be male dominated, and as such women remain as 'bystanders'. Education, however, can play a prominent role to effect change, as educated women knowing the importance of peace to the development of an area, could be brokers of peace.

Alienation of the Fulani pastoralists in community development projects in the study areas seems to tend towards an upstart of conflicts and violence in the area. From the responses of the Fulani pastoralists, it seems they are disposed to collaborate with the indigenes on any community development project that would promote their livelihoods seeing the success of community activities taken up by the indigenes. External intervention programmes, especially those using the One Health perspective, need to understand the needs of all different

segments of the population so that such requirements can be structured into development programmes. Participation in community development projects builds relationships and promotes intersectoral problem-solving techniques (Brown and Ashman, 1996). One Health programmes could capitalize on the common livelihood activities of both indigenes and Fulani pastoralists, (activities of cattle rearing and crop production) to plan and implement programmes that could bring both the Fulani pastoralists and the indigenes to work together towards the achievement of goals common to both parties. Such goals include the development of livestock production and management, improved crop production and sustainable livelihoods. Women could equally be encouraged to participate in such programmes to contribute to community development. Such co-operation in addition to building social relations could also promote capacity building for the women in breaking the chain of transmission of diseases from animal to man.

Although this requires commitment, hard work, time, resources and institutional support, and at times discouragement might creep in; the many advantages available in a conflict-free area should propel development programmes to move ahead. Understanding the context of conflicts and the impacts on the livelihoods of men and women is very paramount and mandatory for programmes that aim to promote animal and human welfare in conflict afflicted pastoralist communities.

6.6. Conclusion

This chapter has explored the impacts of violence and conflicts on the livelihoods of the Fulani pastoralists in Bokkos LGA, looking at it from a gender perspective. The One Health concept of development programme has also been discussed in this chapter as a probable tool in conflict resolution in pastoralist communities. The chapter has argued that for One Health

to work effectively as a tool in conflict resolution, it needs to understand the root causes of the conflict between the concerned parties to prevent biased programme service delivery that may favour one side at the expense of the other. Full participation of the aggrieved parties, women inclusive, in programme planning and implementation, could build a relationship and promote peace needed to improve their source of livelihoods as well as their health.

CHAPTER 7

Thesis Conclusion

7.0 Introduction

In emphasising the importance of gender in controlling neglected zoonotic diseases, this research has explored how pastoralists live, their roles in human and animal health in the communities. It has also discussed how the information gathered could be utilised in moving forward One Health in local environments of African countries. Empirical evidence from the study implies that consideration of gender and gender relations should be a permanent feature of the intersectoral collaboration interlock of One Health programmes from the planning, implementation and evaluation stages, if sustainable livelihoods are to be achieved.

This thesis adopts a qualitative case study approach to challenge programme biases through examining the gender relations in the study areas and the roles gender play in animal and human health development. It reveals the vulnerabilities faced by pastoralists and the social and political environments that inhibit or facilitate efforts in making a livelihood. Arguments from three empirical case studies developed reveal that despite the recent embrace of One Health approach in the control of HPA1 and Ebola crisis in Nigeria, the non-consideration of gender and other factors in the planning of future programmes of the One Health approach in Nigeria could adversely affect the control and prevention of other neglected tropical diseases. It further reveals that the role of gender in health and livestock development in the study areas negates the view of pastoral women and men only as producers of milk and milk products and custodians of cattle respectively. However, the gender inequalities and differentiation observed within the study areas undermine the capabilities to effectively operationalise these roles. These arguments reinforce gender as a part needed among other

factors to form a comprehensive intersectoral collaboration of 'One Health'. In conclusion, the inextricable position of gender in human and animal health is a pointer for a refocus of policies and programmes on livestock development and management. This conclusion has been structured around a short summary of each empirical chapter. Lastly, the thesis highlights its contribution to the growing literature on One Health.

7.1. Pastoral Livelihoods in a Grazing Reserve

In chapter four, I explored various factors surrounding the control of neglected zoonotic diseases in Kachia Grazing Reserve taking into view the establishment of a grazing reserve as a policy process set up to improve the livelihoods of pastoralists. Though not conceived as an evaluation of government policies or programmes, the analysis of this case study identifies institutional arrangements that influence the livelihoods of pastoralists. The environmental and social limitations of the Kachia Grazing Reserve show that provision of a grazing reserve for pastoralists is not a clear-cut solution to the challenges of pastoralism while its impact on household health security is questionable. These limitations in the Kachia Grazing Reserve, however, influenced the ability of pastoralists to take up coping strategies to disease control. The absence of veterinary centres in the grazing reserve challenged the pastoralists to engage in strategies that could prevent as well as minimize the effect of livestock diseases on their animals and their livelihoods as a whole. The case study showed that however appropriate these strategies were, the non provision of essential services needed to promote livestock development influenced some actions taken that hindered effective management of livestock diseases.

One of the main arguments in this chapter is that women should not to be sidelined in

development programmes. However, there is a paramount need to involve men in all development programmes targeting the women, taking into cognisance the cultural as well as the religious environment in which the women live. Despite the fact that the establishment of the grazing reserve was an attempt taken to resolve the farmer and pastoralist conflicts on resource use; rather than alleviate the problem of land use for the pastoralists, the grazing reserve further aggravates the problem. Because of this, the women in the grazing reserve take up different income generating activities to cope with the hardship of living in an environmentally limited area. The women indirectly are saddled with the responsibilities of meeting other household financial needs. The consideration of women in development programmes is based mainly on their financial responsibilities coupled with their normal familial roles and domestic activities. The case study showed that despite their positions as custodians of small livestock, they are side-lined in livestock disease control mechanisms. Most programmes for livestock development follow the same line of action, which have an effect on the implementation of such programmes as seen in the case study. These findings demand that actors in development need put reality first to identify factors needed to aid successful implementation of programmes.

The high enrolment of children, particularly girls, in the KGR contrasts with the findings of studies that report low school attendance among pastoralist groups in Nigeria (Iro, 2006). The factors behind the progress of schooling in KGR would merit further exploration, as they may hold policy lessons that could be scaled up.

A critical consideration of the above insights could lead to and help in the formulation of achievable targets and deliverables in blueprints of poverty alleviation programmes. The implementation of One Health, structured as a poverty alleviation tool, could work successfully in a particular setting and might produce little or no effect in another setting. Identification of social, gender, behavioural and health system dependent differentials

peculiar to each intervention setting could identify the most sensitive determinants of intervention effectiveness as reported by Tugwell *et al.,* (2006). The identification of these differentials through participatory processes with the communities, taking into account the cultural factors, facilitates further identification of sensitive determinants of health of animals and humans and also influences the effectiveness of programme implementation as articulated by Schelling *et al.,* 2007 and Zinsstag, 2007.

The application of One Health has recorded success in some developed countries, but it is not popular in African countries as observed, particularly in Nigeria. One can attribute this reticence to the national focus on other sectors of the economy like the oil sector whose contribution to the national GDP is greater than that of the agricultural sector. In addition to the marginalization of the pastoralists in political and social activities, the relatively small number of studies on gender and pastoral livelihoods clearly indicate a likelihood of the non consideration of gender in One Health programmes developed to improve livestock management in pastoralist areas. One of the main issues addressed in this case study is that developmental programmes still follow the 'top down' approach, characteristic of most development programmes which have failed to leave a mark in global health as the approach seems to ignore active participation of the beneficiaries of the development programmes.

7.2. Social Networks and One Health

Chapter five reveals that social networks such as the women self-help groups seem an effective channel of health message to control neglected zoonotic diseases if they are involved in health development programmes. Despite their absence in development programmes, the need to promote their social, physical as well as their psychological health serves as motivating factors for the activities of the women self-help groups in the Kachia

Grazing Reserve. These activities show their commitment to effect a change to their livelihood despite environmental, cultural and religious factors.

The non-registration of the women groups limits their involvement in any development programmes brought into the grazing reserve. This situation leaves them in the shadow of the men groups, which the women regarded as 'strong' and 'influential' due to the men groups registration status. In the pursuit of gender equality, it is vital to identify partners for programme planning and implementation such as the women self-help groups, which have the potential to empower as well as build up the confidence of women. It is necessary to support activities of the women groups as they are likely to advance women's empowerment and rights.

The increase in mortality or morbidity in a community is linked to the low integration of social networks in development programmes. For example, the findings of this case study on women self- help groups in the grazing reserve have shown that, though the self-groups play significant roles in encouraging women on the promotion of healthy living in households, children within the grazing reserve suffer from cases of malnutrition. The women as the primary healthcare providers give health aids before seeking for regular health care. In recognition of this, the women groups should be part of health development programmes to improve the health of households. Therefore, any health development programme aimed at promoting the health of households, should realise that neglecting women in development further widens the social capital gap which ought to be closed for the enhancement of healthy living especially in poor rural communities.

With regards to breaking the transmission cycle of infectious diseases, the identified issue here is that women are seen as being incapable of developing skills needed to control livestock diseases. Women are seen to be responsible for keeping the home front while

livestock management is the responsibility of men. This feminization of roles hardly provides the opportunity to discover the abilities or capabilities of what women as a group could do to control relevant diseases of economic importance. The inclusion of health talks on the agenda of meetings of the women groups in the grazing reserve shows that zoonotic diseases in pastoralist areas could be prevented as well as its incidence reduced to the barest minimum if women groups are involved in livestock development programmes. The roles of women groups in livestock development and management need to be identified and enhanced to achieve this.

Taking into consideration the reinforcement of information by social networks, the use of training of trainer health and livestock education programmes is essential. If equipped with the necessary information on means of transmission and early recognition of symptoms of zoonotic diseases, the groups could act as the surveillance system of the public sector. They could promote early reporting of diseases which in return could improve prompt delivery of intervention programmes which will be cost effective as well as reduce the damaging effects of the diseases. One Health centres on men as the custodians of livestock. However, the interplay of gender relations on livestock production, management, and disease prevention within the Kachia Grazing Reserve, reveals the importance of incorporating the gender factor into One Health.

7.3. Conflicts and Livelihoods

Chapter six focuses on an area affected by protracted conflict, where pastoral activities have often featured as a source of conflict. The chapter shows how conflict also affects gender relations, shapes women's and children's roles within the households and community. It also contains insights into the effects of conflict on the control of zoonotic diseases.

A factor that contributes to the conflict in Jos Plateau is the competition between the indigenes and the Fulani pastoralists in Bokkos LGA, Jos Plateau. Migration into areas rich in natural resources has caused population growth and led to a scarcity of natural resources. It is not surprising that conflicts, and at times, violence, occur in such areas as evidenced in the study area. The migration of the Fulani pastoralists into the Jos Plateau, apart from diminishing the natural resources which the indigenes claim as theirs, also negatively affects the livelihoods of the indigenes. The destruction of crop residues of the indigenes by the Fulani pastoralists during grazing has been a recurrent cause of conflict between the two groups from the past two decades. More recently, ethnoreligious as well as political issues have been indicated as some of the factors leading to the constant conflict and violence occurring in the Jos Plateau. The Common Property Resource Management (CPRM), a strategy recommended for the sustainability of natural resources, could address conflicts over the use of natural resources. However, in order to address the ethnoreligious and political factors to the conflict and violence in the Jos Plateau, special attention needs to be paid to preventing marginalization. Sadly, government intervention in tackling the conflict and violence in the Jos Plateau has not yielded much success.

The marginalization of the pastoralists over the use of natural resources has also affected the livelihoods of the pastoralists. Gender relations within households are affected. The women pastoralists are restricted from participating in diverse economic activities, a measure taken to prevent any association with the indigenous women of Bokkos LGA, Jos Plateau. This finding promotes gender inequality among pastoralists, and empowerment of the Fulani women in such an environment seems unlikely. Despite the call for gender equality, it appears that the situation within the environment plays a prominent role in making it an impossible feat among the pastoralist population. For example, in the Kachia Grazing Reserve, the pastoralist women, in contrast to their counterparts in Bokkos, Jos Plateau, were

encouraged to participate in many diverse economic activities. The Fulani women of Bokkos, Jos Plateau, on the other hand, are secluded. Their men are virtually responsible for every aspect of livelihood. Interestingly, the marginalization of the Fulani pastoralists in politics and the use of natural resources provided a vigorous push for educational attainment for their children; most especially, the girls were encouraged to attain, at least, a secondary school education before marriage. Many were encouraged to study animal health related courses. This finding indicates that the Fulani pastoralists see education as a way out of marginalization, and a means through which their dignity and self-worth could be enhanced. Possibly, those involved in prevention and reduction of infectious diseases in pastoralist communities of conflict-affected areas, could consider the situation to see the classroom as an avenue through which health education information on infectious diseases, especially those that are zoonotic, could be harnessed with school curriculum.

The knowledge, control and prevention of zoonotic diseases in Bokkos LGA communities' seem lopsided. Findings revealed that the Fulani pastoralists were knowledgeable about livestock diseases especially those that are zoonotic. In other to prevent the emergence of livestock diseases from the shortage of water and lack of grazing areas, transhumance is highly practiced by the Fulani pastoralists in Bokkos LGA. The Fulani women seem lost when it comes to livestock management. Though they keep small livestock, they feel helpless during periods of illness. It appears that women's confinement to household and familial activities and men being responsible for most of the needs of the household, because of conflict has a lot of implications on the livelihood of the Fulani pastoralists.

The much talked about failure of delivery of development programmes contributes a great deal to the conflict and violence in the Jos Plateau. Flawed assumptions about the livelihoods of specific groups can have particularly detrimental effects. Though the indigenes are

farmers, evidence has revealed that quite a number are cattle owners. The Fulani pastoralists are known as keepers of cattle and other livestock. They also cultivate crops. Programmes promoting crop production which targets farmers in the Jos Plateau should also involve the pastoralists. Likewise, livestock development programmes targeting the Fulani pastoralists should also include the indigenous farmers who own cattle in the villages of the Jos Plateau. The One Health approach, in its planning and implementation activities, could be of significant effect in reducing the tension between the pastoralists and the indigenes. This view, in a way, will promote cooperation between the Fulani pastoralists and the indigenes and allay any form of suspicion and competition between the two groups. It was observed that the CIDLID Project otherwise known as the Stamp out Samore (SOS) Project of which this research is a part, however, failed to consider this during its intervention programme in Bokkos LGA. The Fulani pastoralists were the only beneficiaries of its intervention. The consequence of the lapse affected my data collection with the indigenes who complained of being left out from the intervention treatment accorded to the Fulani cattle only. Without a conscious, sensitive approach to the delivery of One Health interventions in rural areas which might not necessarily be areas affected by conflict and violence, the application of it may fail to make any impact on the development of the agricultural and health sectors of developing countries.

7.4. The Contribution of this Thesis

This research has helped develop an understanding of some factors that can either inhibit or facilitate the successful implementation of One Health in resource poor areas of developing countries. Despite the importance of gender to agricultural development and neglected tropical diseases, little or no research has centred on the effects of gender on the implementation of One Health in developing countries. This thesis aims to offer a template of

how such research might be carried out. Despite much enthusiasm and positive progress in the last decade, One Health has failed to be 'people-centred'. This is unfortunate, as One Health offers a potentially valuable way of rethinking interventions that support sustainable livelihoods. The findings of this research have also contributed to the body of work on gender, pastoralism and One Health in developing countries.

Furthermore, the findings of my research on One Health and livelihoods corroborate Lawson and Sailor's (2000) argument that interprofessional collaboration is not the only kind of collaboration needed for programme implementation. As shown from the evidence in this thesis, the consideration of gender (on issues bordering on their activities, constraints, strengths, knowledge, attitudes and perceptions to animal and human health) in the planning and implementation of One Health programmes in poor-resource areas, could provide an enabling environment that promotes effective 'interprofessionalism' of One Health. Moreover, the environmental facets to One Health, as I believe, are crucial to the disease transmission of neglected tropical diseases. However, One Health rather focuses on the climatic situations of environment and forgets to encapsulate the social and political environment.

In summary, the findings from the case studies have yielded some considerable contributions to the literature on One Health and have equally helped to understand and appreciate the relevance of gender considerations in programmes coordinated along the One Health line in resource-poor areas of developing countries. Furthermore, this research is a point for use by advocates of One Health to press forward that implementation of One Health should go beyond the veterinary and clinical sciences and their intersectoral collaboration. It should also capture many other issues (cultural, social, and political) that border on the environment-animal- and human aspects of disease transmission.

7.5. Conclusion

In agreement with many empirical kinds of literature on livelihoods for poverty alleviation, the three empirical case studies pushed the notion that sustainability of livelihoods is subject to 'the people', 'the processes' and 'policies'. From the findings of the study, the processes of livelihoods were initiated by environmental and social conditions and the response of the people to these circumstances. The processes of livelihoods could determine and facilitate the formation of new strategies that could be employed to bring them out of poverty. The vulnerabilities of the people in the case studies could, however, be triggered by the very people; agents, institutions, international organisations, etc. who are expected to provide solutions, succour, and support, if they fail to act.

Furthermore, the consideration of the agricultural terrain of the case study areas, the poor knowledge of the people on significant diseases of man and animal are issues for concern, and they could account for the low response against disease transmission among the study population. The agricultural production of pastoralists, as a contribution to the economic growth of the country, seems to be the overarching concern of policy and development programmes, as interventions structured in the study areas are more towards the 'animals' than 'humans'. This situation calls for a shift in developmental thinking with regards to intervention programmes aimed at promoting agricultural production in rural areas.

Some insights from my three case studies viewed along One Health reveal that effective strategies for the control of neglected tropical diseases in developing countries could be formulated and adopted. In addition, concentration on the agricultural production of pastoralists in rural areas with a major focus on their livelihoods using a gender perspective could be a starting point towards a One Health movement in Nigeria. To summarize, in chapter four, I argued that environmental instability and a lack of consideration of gender

issues in programme planning and implementation are factors among others that could affect the control of neglected zoonotic diseases. In chapter five, I also argued that women self-group as a social network could promote the knowledge, as well as influence the attitudes and practices of pastoralists to the control of neglected zoonotic diseases if involved in programmes targeted at reducing the menace of these diseases. In chapter six, I discussed the effects of conflicts on gender relations and culture of pastoralists and how these shape women and children's roles in a conflict-affected area. The chapter also presented the argument that a cautious One Health approach to programme delivery could act as a conflict resolution tool in pastoralist areas affected by conflict. In brief, the empirical findings of this research reveal that understanding, in reality, the internal and external forces within and around people and the need to integrate such knowledge into programme planning and implementation is a prerequisite to effective utilization of One Health. This empirical finding is ground on which One Health could stand as an approach and a movement and its future assured.

BIBIOGRAPHY

Abenga, J. N., Enwezor, F. N. C., Lawani, F. A. G., Osue, H. O., & Ikemereh, E. C. D. (2004). Trypanosome prevalence in cattle in Lere area in Kaduna State, North Central Nigeria= Prévalence de trypanosomes chez des bovins dans la région de Lere dans l'Etat de Kaduna au centre nord du Nigeria= Prevalencia de la tripanosomosis en ganado en los distritos de Lere, estado de Kaduna, centro norte de Nigeria. *Revue d'élevage et de médecine vétérinaire des pays tropicaux*, *57*(1-2).

Abubakar AA, Brooks PH, Abdullahi SU, Kudi AC, Okaiyeto O (2005). Epidemiology of bovine and human tuberculosis in the Federal Capital Territory of Nigeria, Abuja. Proceedings of the British Society of Animal Science Annual Conference, 4th-6th April, York, UK.

Abubakar, U. B., Ameh, J. I., Abdulkadir, I. A., Salisu, I., Okaiyeto, S. O., & Kudi, A. C. (2011). Bovine tuberculosis in Nigeria: A review. *Veterinary Research*, *4*(1), 24-27.

Adebayo, A. G. (1991). Of man and cattle: a reconsideration of the traditions of origin of pastoral Fulani of Nigeria. *History in Africa*, *18*, 1-21.

Adebayo, A. G. (1995). Jangali: Fulani pastoralists and colonial taxation in Northern Nigeria. *The International journal of African historical studies*, *28*(1), 113-150.

Adefolalu, D., 1986. "Desertification Trends in the Sahel with Particular Reference to Nigeria." In *Paper presented at the Workshop in Land Resource, Kano, September 25-28, 1986*, by the Bayero University. Kano: Department of Geography, 1986.

Adegboye, M. A. (2012). "Effect of mining on farming in Jos South Local Government Area of Plateau State." Journal of Soil Science and Environmental Management **3**(4): 77-83.

Adekunle, A. A., Ellis-Jones, J., Ajibefun, I., Nyikal, R. A., Bangali, S., Fatunbi, O., & Ange, A. (2012). Agricultural innovation in Sub-Saharan Africa: experiences from multiple-stakeholder approaches. In *Forum for Agricultural Research in Africa (FARA), Accra, Ghana*.

Adeleke, B.O. Leong, G.C. (1981) *Certificate Physical and Human Geography*, University Press Ltd,Ibadan.

Adepetu, A. A. (1985). *Farmers and their farms on four fadamas on Jos Plateau*. Jos Plateau Environmental Resources Development Programme.

Aderinoye, R. A., K. O. Ojokheta, et al. (2007). "Integrating mobile learning into nomadic education programme in Nigeria: Issues and perspectives." The International Review of Research in Open and Distance Learning **8**(2).

Adewuyi, T. O., & Baduku, A. S. (2012). Recent consequences of land degradation on Farmland in the peri-Urban area of Kaduna Metropolis, Nigeria. *Journal of Sustainable Development in Africa*, *14*(3), 179-193.

Adeyemi, I. G., Adetunji, V. O., James, V. O., & Alonge, D. O. (2006). Ten-year (1993-2002) retrospective evaluation of vaccination of dogs against rabies at the University of Ibadan, Nigeria. *African Journal of Biomedical Research*, *8*(2), 71-77.

Adeyemi, I., & Zessin, K. (2000). Retrospective dog rabies vaccination evaluation at the University of Ibadan, Nigeria (1988-1992). *Veterinarski Arhiv*, *70*(5), 223-230.

Adeyemo, D. O. (2005). Local government and health care delivery in Nigeria: a case study. *J. Hum. Ecol*, *18*(2), 149-160.

Adhikari, B. (2005). Poverty, property rights and collective action: understanding the distributive aspects of common property resource management. *Environment and Development Economics*, *10*(01), 7-31.

Adisa, R. S. (2011). "Management of Farmer-herdsmen Conflicts in North-Central Nigeria: Implications for Collaboration between Agricultural Extension Service and other Stakeholders." Journal of International Agricultural Education and Extension **18**(1): 60-72.

Adriansen, H. K. (2005). Pastoral mobility: a review. *Nomadic Peoples*,*9*(1/2), 207-214.

Aganga, A. A., Umunna, N. N., Oyedipe, E. O., & Okoh, P. N. (1988). Seasonal variations in water requirement and influence of intermittent watering on grazing Yankasa sheep. *Small ruminant research*, *1*(4), 381-386.

Agrawal, A. (2010). Local institutions and adaptation to climate change.*Social dimensions of climate change: Equity and vulnerability in a warming world*, 173-198.

Ahern, M., Kovats, R. S., Wilkinson, P., Few, R., & Matthies, F. (2005). Global health impacts of floods: epidemiologic evidence. *Epidemiologic reviews*, *27*(1), 36-46.

Ahmad, H. S., Imam, M. Z., & Rostam, K. POVERTY AND HEALTH: A CASE OF WATER SUPPLY IN NIGERIA.

Ahmed, I. I., & Lipton, M. (1997). *Impact of structural adjustment on sustainable rural livelihoods*. Institute of Development Studies.

Ailou S. (2010) What health system for nomadic populations? World Health Forum. 2010;13(4):311-4. PubMed

Aina, T. A. (1995). *The migration experience in Africa*. Nordic Africa Institute.

Akin JS, Guilkey DK, Griffin CC and Popkin BM. (1985). The demand for primary health services in the third world. Totowa, New Jersey: Rowman and Allanheld

Akinsola, H. A. (1993). A to Z of community health and social medicine in medical and nursing practice (with special reference to Nigeria); 3 AM Communications. *Ibadan, Nigeria*.

Aklilu, Y., & Wekesa, M. (2002). *Drought, livestock and livelihoods: lessons from the 1999-2001 emergency response in the pastoral sector in Kenya*. ODI.

Akogun, O. B., Adesina, A. O., Njobdi, S., & Ogundahunsi, O. (2012). Nomadic Fulani communities manage malaria on the move. *International health*, *4*(1), 10-19.

Alausa, O. K. (1979). The investigation and control of a large-scale community outbreak of brucellosis in Nigeria. *Public health*, *93*(3), 185-193.

Alderman, H., Hoddinott, J., & Kinsey, B. (2006). Long term consequences of early childhood malnutrition. *Oxford economic papers*, *58*(3), 450-474.

Aldis, W. (2009). Health security as a public health concept: a critical analysis. *Revista Gerencia y Políticas de Salud*, *8*(17), 12-27.

Alexander, M. J., & Kidd, A. D. (2000). Farmers' capability and institutional incapacity in reclaiming disturbed land on the Jos Plateau, Nigeria. *Journal of environmental management*, *59*(2), 141-155.

Allotey, P., Reidpath, D. D., & Pokhrel, S. (2010). Social sciences research in neglected tropical diseases 1: the ongoing neglect in the neglected tropical diseases. *Health Research Policy and Systems*, *8*(32), 1-8.

Alpert, P. (1996). Integrated conservation and development projects. *BioScience*, 845-855.

Amanor, K. S. (1995). Dynamics of herd structures and herding strategies in West Africa: A study of market integration and ecological adaptation. *Africa*,*65*(03), 351-394.

Amézquita, E., Thomas, R. J., Rao, I. M., Molina, D. L., & Hoyos, P. (2004). Use of deep-rooted tropical pastures to build-up an arable layer through improved soil properties of an Oxisol in the Eastern Plains (Llanos Orientales) of Colombia. *Agriculture, ecosystems & environment*, *103*(2), 269-277.

Amundson, J.L., Mader, T.L., Rasby, R.J., Hu, Q.S.,(2005). Temperature and temperature–humidity index effects on pregnancy rate in beef cattle. In: Proceedings of 17th International Congress on Biometeorology. Deutscher Wetterdienst, Offenbach, Germany.

Aregheore, E. M. (2009). Nigeria: Country Pasture/Forage Resource Profiles.

Ari, M. D., A. Guracha, et al. (2011). "Challenges of establishing the correct diagnosis of outbreaks of acute febrile illnesses in Africa: the case of a likely Brucella outbreak among nomadic pastoralists, northeast Kenya, March–July 2005." The American journal of tropical medicine and hygiene **85**(5): 909-912.

Arizpe, L. (2004). Intangible cultural heritage, diversity and coherence. *Museum International*, *56*(1-2), 130-136.

Arnell, N. W., & Reynard, N. S. (1996). The effects of climate change due to global warming on river flows in Great Britain. *Journal of hydrology*, *183*(3), 397-424.

Arora-Jonsson, S. (2011). Virtue and vulnerability: Discourses on women, gender and climate change. *Global Environmental Change*, *21*(2), 744-751.

ARROW. (2005) Monitoring Ten Years of ICPD Implementation: The Way Forward to 2015: Asian Country Reports. ARROW, Kuala Lumpur.

ARROW. A Framework of Indicators for Action on Women's Health Needs & Rights after Beijing. Kuala Lumpur: ARROW; 2000.

Artz, N E, B E Norton and J T O'Rourke (1986) Management of common grazing lands: Timahdite, Morocco. BOSTID (ed.) Proceedings of Conference on Common Property Resource Management National Research Council, Washington DC. 259-280

Arua EO, Okorji EC. (1997). Multidimensional analysis of land tenure systems in eastern Nigeria. Land Reform Buletin 1997/2, Sustainable Development Department, Food and Agriculture Organisation of the United Nations, FAO, Rome.

Ashley, C., D. Carney, et al. (1999). Sustainable livelihoods: Lessons from early experience, Department for International Development London.

Assan, N. (2014). Gender disparities in livestock production and their implication for livestock productivity in Africa. *Scientific Journal of Animal Science*, *3*(5), 126-138.

Astbury, J. and Cabral, M. (2000) Women's mental health—an evidence-based review. World Health Organisation, Switzerland Review, Geneva: World Health Organisation.

Awogbade, M. O. (1987). Grazing Reserves in Nigeria. *Nomadic Peoples*, *23*, 19-30.

Awogbade, M., 1983. *Fulani Pastoralism: Jos Case Study*. Zaria: Ahmadu Bello University Press, 1983.

Axworthy, L. (2001). Human security and global governance: putting people first. *Global governance*, *7*, 19.

Ayele, W. Y., Neill, S. D., Zinsstag, J., Weiss, M. G., & Pavlik, I. (2004). Bovine tuberculosis: an old disease but a new threat to Africa. *The International Journal of Tuberculosis and Lung Disease*, *8*(8), 924-937.

Azeze, A., Babiker, M., & Tsegaye, D. (2002). *Post-Drought recovery strategies among the pastoral households in the horn of Africa: A review*. OSSREA.

Azuwike, O., & Enwerem, E. (2010). Nigeria's changing environment and pastoral nomadism: Redistribution of pains and gains. In *Proceedings of the Berlin Conferences on Human Dimensions of Global Environmental Change*.

Babalola, S., & Fatusi, A. (2009). Determinants of use of maternal health services in Nigeria-looking beyond individual and household factors. *BMC Pregnancy and Childbirth*, *9*(1), 43.

Barrett, C. B., & Luseno, W. K. (2004). Decomposing producer price risk: a policy analysis tool with an application to northern Kenyan livestock markets. *Food Policy*, *29*(4), 393-405.

Barrett, C. B., & Reardon, T. (2000). Asset, activity, and income diversification among African agriculturalists: Some practical issues. *Available at SSRN 257344*.

Bassett, T. J. (1986). Fulani herd movements. *Geographical review*, 233-248.

Bates, D. G., & Lees, S. H. (1977). The role of exchange in productive specialization. *American Anthropologist*, *79*(4), 824-841.

Bayer, W. (1986). Agropastoral herding practices and grazing behaviour of cattle in the subhumid zone of Nigeria. *ILCA Bulletin*, *24*, 8-13.

Beals, F. T. (2007). The Risk of Bovine Tuberculosis from Raw Milk Consumption with A Focus On Michigan in Wise Traditions in Food, Farming and the Healing Arts, the quarterly magazine of the Weston A. *Price Foundation*.

Bebbington, A. (1999). Capitals and capabilities: a framework for analyzing peasant viability, rural livelihoods and poverty. *World development*, *27*(12), 2021-2044.

Bechir, M., Schelling, E., Hamit, M. A., Tanner, M., & Zinsstag, J. (2012). Parasitic infections, anemia and malnutrition among rural settled and mobile pastoralist mothers and their children in Chad. *EcoHealth*, *9*(2), 122-131.

Bellot J.M (1982) Commerce, commercants de bétail et intégration régionale: L'example de l'ouest du Niger Institut d'Étude d'Afrique Noire, Bordeaux (1982)

Berger, R. (2003). Conflict over natural resources among pastoralists in northern Kenya: A look at recent initiatives in conflict resolution. *Journal of International Development*, *15*(2), 245-257.

Bhaskar, R. (1978) A realist theory of science. Hassocks, England: Harvester Press.

Blench, R. (1994). The Expansion and Adaptation of Fulbe Pastoralism to subhumid and Humid Conditions in Nigeria (L'expansion et l'adaptation du pastoralisme peul aux conditions climatiques humides et subhumides du Nigeria). *Cahiers d'Études africaines*, 197-212.

Blench, R. (1999). *Traditional livestock breeds: geographical distribution and dynamics in relation to the ecology of West Africa* (pp. 44-50). Overseas Development Institute.

Blench, R. (2004). Natural resource conflicts in north-central Nigeria. *Mandaras, London*.

Blench, R. (2004). Recent research on the Plateau languages of Central Nigeria

Blench, R., & Marriage, Z. (1999). Drought and livestock in semi-arid Africa and southwest Asia.

Blumberg, R. L. (2005, August). Women's Economic Empowerment as the Magic Potion of Development?. In *100th Annual Meeting of the American Sociological Association, August, Philadelphia*.

Bögel, K., & Meslin, F. X. (1990). Economics of human and canine rabies elimination: guidelines for programme orientation. *Bulletin of the World Health Organization*, *68*(3), 281.

Bohle, H. G., Downing, T. E., & Watts, M. J. (1994). Climate change and social vulnerability: toward a sociology and geography of food insecurity. *Global Environmental Change*, *4*(1), 37-48.

Bonneuil, C. (2000). Development as experiment: Science and state building in late colonial and postcolonial Africa, 1930-1970. *Osiris*, 258-281.

Borkman, T. (1997). A selective look at self-help groups in the United States. *Health & Social Care in the Community*, *5*(6), 357-364.

Bornemisza, O., Ranson, M. K., Poletti, T. M., & Sondorp, E. (2010). Promoting health equity in conflict-affected fragile states. *Social Science & Medicine*, *70*(1), 80-88.

Bourn, D., & Wint, W. (1994). *Livestock, land use and agricultural intensification in Sub-Saharan Africa* (pp. 1-24). Overseas Development Institute, Pastoral Development Network.

Bourn, D., Wint, W., Blench, R. and Woolley, E. (1994) Nigerian livestock resources survey. World Animal Review 78: 49-58.

Bowman, D. M. J. S. (1998). The impact of Aboriginal landscape burning on the Australian biota. *New Phytologist*, *140*(3), 385-410.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.

Breman, H., and de Witt, C. T., 1983, Rangeland productivity and exploitation in the Sahel.*Science. N. Y.,* 221,1341.

Brieger WR, Oke GA, Otusanya S, Adesope A, Tijanu J & Banjoko M (1997) Ethnic diversity and disease surveillance: Guinea worm among the Fulani in a predominantly Yoruba district of Nigeria. *Tropical Medicine and International Health* 2, 99–103.

Brieger, W. R., Otusanya, S. A., Oke, G. A., Oshiname, F. O., & Adeniyi, J. D. (2002). Factors associated with coverage in community-directed treatment with ivermectin for onchocerciasis control in Oyo State, Nigeria. *Tropical Medicine & International Health*, *7*(1), 11-18.

Brockerhoff, M., & Hewett, P. (2000). Inequality of child mortality among ethnic groups in Sub-Saharan Africa. *Bulletin of the World Health Organization*, *78*(1), 30-41.

Bronstein, J. M., & Morrisey, M. A. (1990). Determinants of rural travel distance for obstetrics care. *Medical Care*, 853-866.

Brown, L. D., & Ashman, D. (1996). Participation, social capital, and intersectoral problem solving: African and Asian cases. *World development*, *24*(9), 1467-1479.

Bryceson, D. F. (1999). African rural labour, income diversification & livelihood approaches: a long-term development perspective. *Review of African Political Economy*, *26*(80), 171-189.

Buckles, D. (1999). *Cultivating peace: Conflict and collaboration in natural resource management*. Idrc.

Bush, M. B., Miller, M. C., De Oliveira, P. E., & Colinvaux, P. A. (2000). Two histories of environmental change and human disturbance in eastern lowland Amazonia. *The Holocene*, *10*(5), 543-553.

Canon, T. (2000), "Vulnerability analysis and disasters", in Parker, D.J. (Ed.), Floods, Routledge, London, pp. 45-55.

Carney, D. (1999). *Approaches to sustainable livelihoods for the rural poor* (p. 32). ODI Poverty Briefing, Brighton, UK: Overseas Development Institute.

Carney, D. (2003). *Sustainable livelihoods approaches: progress and possibilities for change*. London: Department for International Development.

Carney, M. (1998). The competitiveness of networked production: the role of trust and asset specificity. *Journal of Management Studies*, *35*(4), 457-479.

Caroline Tynan, A., & Drayton, J. L. (1988). Conducting focus groups-A guide for first-time users. *Marketing Intelligence & Planning*, *6*(1), 5-9.

Carver, C. S., & Connor-Smith, J. (2010). Personality and coping. Annual Review of Psychology, 61, 679–704. doi:10.1146/annurev.psych.093008.10035

Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: a theoretically based approach. *Journal of personality and social psychology*, *56*(2), 267.

Cassanelli, L. V. (1982). The shaping of Somali society. *Reconstructing the History of a Pastoral People*, *1600*.

Casse, T., Milhøj, A., Ranaivoson, S., & Randriamanarivo, J. R. (2004). Causes of deforestation in southwestern Madagascar: what do we know? *Forest Policy and Economics*, *6*(1), 33-48.

Castle, S. E. (1995). Child fostering and children's nutritional outcomes in rural Mali: The role of female status in directing child transfers. *Social Science & Medicine*, *40*(5), 679-693.

Catley, A., Lind, J., & Scoones, I. (Eds.). (2013). *Pastoralism and development in Africa: dynamic change at the margins*. Routledge.

Cetto, A. M. (2000). Science for the Twenty-first Century. A new commitment. In *Proceedings of the World Conference on Science* (pp. 461-84). UK: Banson.

Chahota, R., Sharma, M., Katoch, R. C., Verma, S., Singh, M. M., Kapoor, V., & Asrani, R. K. (2003). Brucellosis outbreak in an organized dairy farm involving cows and in contact human beings, in Himachal Pradesh, India. *Veterinarski Arhiv*, *73*(2), 95-102.

Chale, E (1990) Summary of a Study of Problems/Constraints in Extension Strategies and Methods for Reaching rural Women pp. 4-34 in: Training Manual for the FAO/UNDP/FDA/NAERLS Specialised Course on Extension Delivery to Rural Women, 16-20, July, Zaria, Nigeria.

Chambers, 1997 and Oakley, 1991 cited in Mog, J. M. (2004). Struggling with sustainability—a comparative framework for evaluating sustainable development programmes. *World Development*, *32*(12), 2139-2160.

Chambers, R. (1995). Poverty and livelihoods: whose reality counts?. *Environment and urbanization*, *7*(1), 173-204.

Chambers, R. (2011). Sustainable livelihoods: An opportunity for the World Commission on Environment and Development.

Chambers, R. (2014). *Rural development: Putting the last first*. Routledge.

Chambers, R., & Conway, G. (1991). Sustainable livelihood-chambers and conway1991. pdf.

Chambers, R., & Conway, G. (1992). *Sustainable rural livelihoods: practical concepts for the 21st century*. Institute of Development Studies (UK).

Chancellor, T., & Kubiriba, J. (2006). The effects of climate change on infectious diseases of plants. *Foresight*.

Chen, L. (2004). Health as a human security priority for the 21st century. *Human Security Track III, Helsinki Process*, *7*.

Chen, L., & Narasimhan, V. (2003). Human security and global health. *Journal of Human Development*, *4*(2), 181-190.

Chien, Y. J. (2013). How did international agencies perceive the avian influenza problem? The adoption and manufacture of the 'One World, One Health'framework. *Sociology of health & illness*, *35*(2), 213-226.

Chima, G. N., Ijioma, M. A., Nwagbara, M. O., & Nwaugo, V. O. (2011). Sensitivity of vegetation to decadal variations in temperature and rainfall over Northern Nigeria. *Journal of Soil Science and Environmental Management*, *2*(8), 228-236.

CHne-Cole, R. (1998). Knowledge claims and landscape: alternative views of the fuelwood-degradation nexus in northern Nigeria.

Christofides, N. (2001). How to make policies more gender sensitive. *omen*, (2), 165.

Chua, P., Bhavnani, K. K., & Foran, J. (2000). Women, culture, development: a new paradigm for development studies?. *Ethnic and Racial Studies*, *23*(5), 820-841.

Cohen, D. (2005). "Providing nomadic people with health care." Bmj **331**(7519): 720.

Coker, A. O., Isokpehi, R. D., Thomas, B. N., Amisu, K. O., & Obi, C. L. (2002). Human campylobacteriosis in developing countries. *Emerging infectious diseases*, *8*(3), 237-244.

Coker, R., Rushton, J., Mounier-Jack, S., Karimuribo, E., Lutumba, P., Kambarage, D., & Rweyemamu, M. (2011). Towards a conceptual framework to support one-health research for policy on emerging zoonoses. *The Lancet infectious diseases*, *11*(4), 326-331.

Conrad, P. A., Mazet, J. A., Clifford, D., Scott, C., & Wilkes, M. (2009). Evolution of a transdisciplinary "One Medicine–One Health" approach to global health education at the University of California, Davis. *Preventive veterinary medicine*, *92*(4), 268-274.

Conti, L. A., & Rabinowitz, P. M. (2011). One Health Initiative. *Infektološki Glasnik*, *31*(4), 176-178.

Cooke, B., & Kothari, U. (Eds.). (2001). *Participation: The new tyranny?*. Zed Books.

Copestake, J., Bhalotra, S., & Johnson, S. (2001). Assessing the impact of microcredit: A Zambian case study. *Journal of Development Studies*, *37*(4), 81-100.

Coppock, D. L., Desta, S., Tezera, S., & Gebru, G. (2011). Capacity building helps pastoral women transform impoverished communities in Ethiopia. *Science*, *334*(6061), 1394-1398.

Cornwall, A., Harrison, E., & Whitehead, A. (2007). Gender myths and feminist fables: The struggle for interpretive power in gender and development. *Development and Change*, *38*(1), 1-20.

Cosivi, O., Grange, J. M., Daborn, C. J., Raviglione, M. C., Fujikura, T., Cousins, D., & Meslin, F. X. (1998). Zoonotic tuberculosis due to Mycobacterium bovis in developing countries. *Emerging infectious diseases*, *4*(1), 59.

Costa, M. H., Botta, A., & Cardille, J. A. (2003). Effects of large-scale changes in land cover on the discharge of the Tocantins River, Southeastern Amazonia. *Journal of Hydrology*, *283*(1), 206-217.

Coulston, A. M., Hollenbeck, C. B., Swislocki, A. L., Chen, Y. I., & Reaven, G. M. (1987). Deleterious metabolic effects of high-carbohydrate, sucrose-containing diets in patients with non-insulin-dependent diabetes mellitus. *The American journal of medicine*, *82*(2), 213-220.

Crabbé, P., & Robin, M. (2006). Institutional adaptation of water resource infrastructures to climate change in Eastern Ontario. *Climatic Change*, *78*(1), 103-133.

Creese, A. (1997). User fees. *BMJ: British Medical Journal*, *315*(7102), 202.

Creswell, J. W., Hanson, W. E., Plano, V. L. C., & Morales, A. (2007). Qualitative research designs selection and implementation. *The Counseling Psychologist*, *35*(2), 236-264.

Curry, J. (1996). Gender and livestock in African production systems: An introduction. *Human Ecology*, *24*(2), 149-160.

Dahl, G. (1979b). Suffering Grass: Subsistence and Society of Waso Borana. Stockholm Studies in Social Anthropology, University of Stockholm, Stockholm.

Dahl, G. (1987). Women in pastoral production: some theoretical notes on roles and resources. *Ethnos*, *52*(1-2), 246-279.

Dahlgren, G. (1996). Strategies for reducing social inequities in health— visions and reality. *Equity in Health Through Public Policy. STAKES, Helsinki*.

Danfulani, U. H., & Fwatshak, S. U. (2002). Briefing: The September 2001 Events in Jos, Nigeria. *African Affairs*, *101*(403), 243-255.

Dao M, Brieger W. Immunization for the migrant Fulani: identifying an under-served population in southwestern Nigeria. Int Quart Comm Hlth Educ. 1994 Jan 1;15(1):21-32.

Davids, T., Driel, F., & Parren, F. (2014). Feminist change revisited: gender mainstreaming as slow revolution. *Journal of International Development*, *26*(3), 396-408.

Davies, H. (1964). The eradication of tsetse in the Chad River system of northern Nigeria. *Journal of Applied Ecology*, 387-403.

Davis, P., & Howden-Chapman, P. (1996). Translating research findings into health policy. *Social science & medicine*, *43*(5), 865-872.

Davos, C.A. and Lajano, R.P.,(2001). 'Analytical perspectives of cooperative coastal management', Journal of Environmental Management, 62,123-130.

De Chavez, R., & Tauli-Corpuz, V. (2009). *Guide on climate change and indigenous peoples*. Tebtebba Foundation.

de Haan, C. (1994). *An overview of the World Bank's involvement in pastoral development*. Overseas Development Institute, Pastoral Development Network.

de Haan, C. (1996). Rangeland development in a developing world. In Proceedings of the Fifth International Rangeland Congress. Denver, Colo.: Society for Range Management

de St Croix, F. *The Fulani of Northern Nigeria: Some General Notes*. Lagos: Government Printer, 1945.

Denton, F. (2002). Climate change vulnerability, impacts, and adaptation: Why does gender matter?. *Gender & Development*, *10*(2), 10-20.

DFID, 1998. Guidance Manual on Water Supply and Sanitation programmes, London School of Hygiene and Tropical Medicine (LSHTM)/WEDC 1998. Cited in Dyer (2002). Assessing impacts of improved hygiene. Sustainable Environmental Sanitation and Water Services 28th WEDC Conference, Calcutta, India 2002.

Diao, X., Hazell, P. B., Resnick, D., & Thurlow, J. (2007). *The role of agriculture in development: Implications for Sub-Saharan Africa* (Vol. 153). Intl Food Policy Res Inst.

Dietrich, C. and Quain, C. (2014). Gender in Conflict. European Union Institute for Security Studies

Dorward, A., Anderson, S., Clark, S., Keane, B., & Moguel, J. (2001). CONTRIBUTED PAPER TO EAAE SEMINAR ON LIVELIHOODS AND RURAL POVERTY, SEPTEMBER 2001.

Ducrotoy, M. J., Bertu, W. J., Ocholi, R. A., Gusi, A. M., Bryssinckx, W., Welburn, S., & Moriyon, I. (2014). Brucellosis as an emerging threat in developing economies: lessons from Nigeria. *PLoS neglected tropical diseases*, *8*(7), e3008.

Dunbar, G. S. (1970). African Ranches Ltd., 1914–1931: An Ill-Fated Stockraising Enterprise in Northern Nigeria. *Annals of the Association of American Geographers*, *60*(1), 102-123.

Dyer, C., & Choksi, A. (1998). Education is like wearing glasses: Nomads' views of literacy and empowerment. *International Journal of Educational Development*, *18*(5), 405-413.

Dyson-Hudson, R., & Dyson-Hudson, N. (1980). Nomadic pastoralism. *Annual review of anthropology*, 15-61.

Ehiri, J. E., Oyo-Ita, A. E., Anyanwu, E. C., Meremikwu, M. M., & Ikpeme, M. B. (2005). Quality of child health services in primary health care facilities in south-east Nigeria. *Child: care, health and development*, *31*(2), 181-191.

Ehizibolo, D. O., Ehizibolo, P. O., Ehizibolo, E. E., Sugun, M. V., & Idachaba, S. E. (2013). The control of neglected zoonotic diseases in Nigeria through animal intervention. *African Journal of Biomedical Research*, *14*(2), 81-88.

Ekpo, U. F., Omotayo, A. M., & Dipeolu, M. A. (2008). Prevalence of malnutrition among settled pastoral Fulani children in southwest Nigeria. *BMC Research Notes*, *1*(1), 7.

El-Bushra, J. (2000). Rethinking gender and development practice for the twenty-first century. *Gender & Development*, *8*(1), 55-62.

El-Bushra, J. (2007). Feminism, gender, and women's peace activism. *Development and Change*, *38*(1), 131-147.

El-Bushra, J., & Piza Lopez, E. (1993, February). Development in conflict: The gender dimension. In *Report of an Oxfam AGRA East Workshop held in Pattaga, Thailand*.

El-Bushra, J., & Sahl, I. M. (2005). *Cycles of violence: gender relations and armed conflict*. Acord.

Ellis, F. (1999). *Rural livelihood diversity in developing countries: evidence and policy implications*. London: Overseas Development Institute.

Ellis, F. (2000). Rural livelihoods and diversity in developing countries, Oxford University Press.

Ellis, F., & Biggs, S. (2001). Evolving themes in rural development 1950s-2000s. *Development policy review*, *19*(4), 437-448.

Ellis, F., & Freeman, H. A. (2004). Rural livelihoods and poverty reduction strategies in four African countries. *Journal of development studies*, *40*(4), 1-30.

Ellis, F., & Mdoe, N. (2003). Livelihoods and rural poverty reduction in Tanzania. *World Development*, *31*(8), 1367-1384.

Ellis, J. E., & Swift, D. M. (1988). Stability of African pastoral ecosystems: alternate paradigms and implications for development. *Journal of Range Management Archives*, *41*(6), 450-459.

Elmi *et al.,* 2000 cited in Hodgson, D. L. (2000). *Rethinking pastoralism in Africa: gender, culture & the myth of the patriarchal pastoralist*. James Currey.

Enete, A. A., & Amusa, T. A. (2010). Challenges of Agricultural Adaptation to Climate Change in Nigeria: a synthesis from the literature. *Field Actions Science Reports. The Journal of Field Actions*, *4*.

Enwezor, F. N. C., Umoh, J. U., Esievo, K. A. N., Halid, I., Zaria, L. T., & Anere, J. I. (2009). Survey of bovine trypanosomosis in the Kachia Grazing Reserve, Kaduna state, Nigeria. *Veterinary parasitology*, *159*(2), 121-125.

Epstein, P. R. (2001). Climate change and emerging infectious diseases. *Microbes and infection*, *3*(9), 747-754.

Eriksen, C. (2007). Why do they burn the 'bush'? Fire, rural livelihoods, and conservation in Zambia. *The Geographical Journal*, *173*(3), 242-256.

Esque, T. C., Schwalbe, C. R., Defalco, L. A., Duncan, R. B., & Hughes, T. J. (2003). Effects of desert wildfires on desert tortoise (Gopherus agassizii) and other small vertebrates. *The Southwestern Naturalist*, *48*(1), 103-111.

Evans, R. G., & Stoddart, G. L. (1990). Producing health, consuming health care. *Social science & medicine*, *31*(12), 1347-1363.

Ezeomah, C. (1985). "odi."

Ezeomah, C. (2002). Social, economic and political activities of nomads and educational policy implementation. A tentative research report presented at the international conference. 16-19 January, Abuja, Nigeria.

Fabiyi, J. and G. Adeleye (1982). "Bovine fascioliasis on the Jos Plateau, Northern Nigeria with particular reference to economic importance." Bulletin of animal health and production in Africa. Bulletin des sante et production animales en Afrique **30**(1): 41-43.

Fabusoro, E. (2009). Use of collective action for land accessibility among settled Fulani agro-pastoralists in southwest Nigeria. *Sustainability Science*, *4*(2), 199-213.

Fabusoro, E., & OYEGBAMI, A. (2009). Key Issues In Livelihoods Security Of Migrant Fulani Pastoralists: Empirical Evidence From Southwest Nigeria. *ASSET: An International Journal (Series C)}*, *4*(2), 1-20.

Fagbami, A. H., Anosa, V. O., & Ezebuiro, E. O. (1981). Hospital records of human rabies and antirabies prophylaxis in Nigeria 1969–1978. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, *75*(6), 872-876.

Fan, S., & Rosegrant, M. W. (2008). *Investing in agriculture to overcome the world food crisis and reduce poverty and hunger*. International Food Policy Research Institute.

FAO (2009) Food security and agricultural mitigation in developing countries: options for capturing synergies. *FAO, Rome*

FAO (Food and Agriculture Organization). 2006. The State of Food Insecurity in the World 2006

FAO, (2006). Global Forest Assessment 200). FAO Forestry Paper 147. Food and Agriculture Organization, Rome, Italy.

FAO, (2009). The State of Food and Agriculture. Livestock in the Balance. Food and Agriculture Organization of the United Nations, Rome, Italy.

FAO. (2012). Livestock sector development for poverty reduction: an economic and policy perspective – Livestock's many virtues, by J. Otte, A. Costales, J. Dijkman, U. Pica-Ciamarra, T. Robinson, V. Ahuja, C. Ly and D. Roland-Holst. Rome, pp. 161.

FAO-WHO-OIE-Worldbank-UNICEF (2008) Available at http://www.oie.int/downld/

Farrington, J. (2001). *Sustainable livelihoods, rights and the new architecture of aid*. Overseas Development Institute.

Farrington, J., Turton, C. and James, A. J. (Eds), (1999a) *Participatory Watershed Development: Challenges for the 21st Century*. Delhi: OUP.

Farshad, A., Erian, W. F., Zarei Abarghuei, S. H., & Shrestha, D. P. (2002, August). Towards sustainable use of deserts. In *Proceedings of the 17th World Conference of Soil Science, August* (pp. 14-21).

Federal Ministry of Education and Youth Development (1987). Blueprint on Nomadic Education Victoria island, Lagos. *Government Printers*

Federal Ministry of Health (2001). National Health Survey.

Few, R., Brown, K., & Tompkins, E. L. (2007). Public participation and climate change adaptation: avoiding the illusion of inclusion. *Climate policy*, *7*(1), 46-59.

FGN/UNICEF 2003 Situation and Policy of Basic Education in Nigeria, National Report. Lagos: Federal Government Publication

Fisman, D. N., & Laupland, K. B. (2010). The 'One Health'paradigm: Time for infectious diseases clinicians to take note?. *The Canadian Journal of Infectious Diseases & Medical Microbiology*, *21*(3), 111.

Flintan, F. (2010). Sitting at the table: securing benefits for pastoral women from land tenure reform in Ethiopia. *Journal of Eastern African Studies*, *4*(1), 153-178.

Flintan, F., & Beth, C. (2011, March). Pastoral women's thoughts on change: Voices from Ethiopia. In *Paper presented on international conference on the future of pastoralism* (pp. 21-23).

Framework Convention for Climate Change United Nations, New York (1995)

Frantz, C. (1975). "Pastoral societies, stratification, and national integration in Africa."

Fratkin, E. (1997). Pastoralism: governance and development issues. *Annual review of anthropology*, 235-261.

Fratkin, E. M. (2013). Seeking alternative livelihoods in pastoral areas.*Pastoralism and Development in Africa: Dynamic Change at the Margins New York: Routledge*, 197-205.

Fratkin, E., Roth, E. A., & Nathan, M. A. (2004). Pastoral sedentarization and its effects on children's diet, health, and growth among Rendille of northern Kenya. *Human Ecology*, *32*(5), 531-559.

Frayling, B. E. (1943). Effect of mining on the economy of the Plateau Province'. *Farm and Forest*, *4*(3), 122-4.

Freund, B. (1981). *Capital and labour in the Nigerian tin mines*. Humanities Press.

Fricke, Werner., (1979). "Cattle Husbandry in Nigeria: A Study of its Ecological Conditions and Social-Geographical Differentiations." Translated by J. Hellen and Gordon Cockburn. Heidelberg: n.p., 1979.

Galab, S., & Rao, N. C. (2003). Women's self-help groups, poverty alleviation and empowerment. *Economic and Political weekly*, 1274-1283.

Garcia-Moreno, C. (2002) Violence against women: consolidating a public health agenda. In Sen, G., George, A. and O¨ stlin, P. (eds) Engendering International Health: The Challenge of Equity. MIT Press, Cambridge

Gefu, J. O. (1998). The pastoral problematic: Retracing the missing link. *Prospects of pastoralism in West Africa. Tropeninstitut, Giessen, Germany*, 163-184.

Ghebreyesus, T. A., Haile, M., Witten, K. H., Getachew, A., Yohannes, M., Lindsay, S. W., & Byass, P. (2000). Household risk factors for malaria among children in the Ethiopian highlands. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, *94*(1), 17-21.

Gibbon, S., & Novas, C. (Eds.). (2007). *Genetics, biosociality and the social sciences: Making biologies and identities*. Routledge.

Gibbs, E. P. J. (2005). Emerging zoonotic epidemics in the interconnected global community. *Veterinary Record*, *157*(22), 673.

Gibbs, E. P. J. (2014). The evolution of One Health: a decade of progress and challenges for the future. *Veterinary Record*, *174*(4), 85-91.

Giddens, (1979) cited in Klein, K. J., Tosi, H., & Cannella, A. A. (1999). Multilevel theory building: Benefits, barriers, and new developments. *Academy of Management review*, *24*(2), 248-253.

Gilson, L., Hanson, K., Sheikh, K., Agyepong, I. A., Ssengooba, F., & Bennett, S. (2011). Building the field of health policy and systems research: social science matters. *PLoS Medicine*, *8*(8), e1001079.

Giri, A. K., & van Ufford, P. Q. (Eds.). (2003). *A moral critique of development: in search of global responsibilities*. Routledge.

Gleick, P. H. (2003). Global freshwater resources: soft-path solutions for the 21st century. *Science*, *302*(5650), 1524-1528.

Glew, R. H., Conn, C. A., VanderJagt, T. A., Calvin, C. D., Obadofin, M. O., Crossey, M., & VanderJagt, D. J. (2004). Risk factors for cardiovascular disease and diet of urban and rural dwellers in northern Nigeria. *Journal of Health, Population and Nutrition*, 357-369.

Goeldner, C.R. & Ritchie, J.R. (2003). Tourism Principles, Practices, Philosophies. UK. Wiley & Sons Publishing.

Goh, A. H. (2012). A literature review of the gender-differentiated impacts of climate change on women's and men's assets and well-being in developing countries. *International Food Policy Research Institute, CAPRi Work*.

Goldschmidt, W. (1980) "The Failure of Pastoral Economic Development Program in Africa." In *The Future of Pastoral People: Proceedings of a Conference Held in Nairobi, August 4-8, 1980*, by the Institute of Development Studies. Nairobi: I.D.S., 1980, 101-117.

Goldsmith, A. H., Veum, J. R., & Darity, W. (1997). The impact of psychological and human capital on wages. *Economic Inquiry*, *35*, 815-829.

Gordon, A. J. (2000). Cultural identity and illness: Fulani views. *Culture, medicine and psychiatry*, *24*(3), 297-330.

Gouveia, N., Hajat, S., & Armstrong, B. (2003). Socioeconomic differentials in the temperature–mortality relationship in São Paulo, Brazil. *International journal of epidemiology*, *32*(3), 390-397.

Grahn, R. and T. Leyland (2005). "Complementarity between Community-Based Animal Health Delivery Systems and Community-Based Wildlife Management? An Analysis of Experiences Linking Animal Health to Conflict Management in Pastoralist Areas of the Horn of Africa." Proceedings Southern and East African Experts Panel on Designing Successful Conservation and Development Interventions at the Wildlife/Livestock Interface. Gland: IUCN.

Greeley, M. (1994). Measurement of poverty and poverty of measurement. *ids bulletin*, *25*(2), 50-58.

Guehlstorf, N. P., & Hallstrom, L. K. (2005). The role of culture in risk regulations: a comparative case study of genetically modified corn in the United States of America and European Union. *Environmental Science & Policy*, *8*(4), 327-342.

Guilkey, D. K., & Riphahn, R. T. (1998). The determinants of child mortality in the Philippines: estimation of a structural model. *Journal of Development Economics*, *56*(2), 281-305.

Gunderson, L.H., Holling, C.S. (Eds.), (2002). Panarchy: Understanding Transformations in Human and Natural Systems. Island Press, Washington DC.

Halderman, M., Jenner, H., Karuru, N., Ong'ayo, M., Smith, S., Smith, Z., & Carter, L. (2002). Assessment and programmatic recommendations: addressing pastoralist conflict in the Karamoja cluster of Kenya, Uganda and Sudan. *Greater Horn of Africa Peace Building Project. Report prepared for USAID. Berkeley and Washington DC*.

Hall, A. L., & Midgley, J. (2004). *Social policy for development*. Sage.

Hall, J. B. (1971). Environment and vegetation on Nigeria's highlands. *Vegetatio*, *23*(1-2), 339-359.

Hamilton-Peach, J., & Townsley, P. (2004). An IFAD Sustainable Livelihoods Framework.

Hampshire, K., & Randall, S. (2000). Pastoralists, agropastoralists and migrants: interactions between fertility and mobility in northern Burkina Faso. *Population Studies*, *54*(3), 247-261.

Hansen, J. W., Challinor, A., Ines, A. V. M., Wheeler, T., & Moron, V. (2006). Translating climate forecasts into agricultural terms: advances and challenges. *Climate Research*, *33*(1), 27-41.

Harpham, T., Grant, E., & Thomas, E. (2002). Measuring social capital within health surveys: key issues. *Health policy and planning*, *17*(1), 106-111.

Hatfield, R., & Davies, J. (2006). Global review of the economics of pastoralism. *World Initiative for Sustainable Pastoralism/IUCN, Nairobi, Kenya*.

Helland, J. (1982). Social organization and water control among the Borana. *Development and Change*, *13*(2), 239-258.

Herrero, M., Thornton, P. K., Gerber, P., & Reid, R. S. (2009). Livestock, livelihoods and the environment: understanding the trade-offs. *Current Opinion in Environmental Sustainability*, *1*(2), 111-120.

Heymann, D. L., & Rodier, G. R. (2001). Hot spots in a wired world: WHO surveillance of emerging and re-emerging infectious diseases. *The Lancet infectious diseases*, *1*(5), 345-353.

Hickey, J.V. (1978) "Shifting Marital Alliances Among the Bokkos Fulani. *"Ethnology: An International Journal of Culture and Social Anthropology* (Pittsburgh) 17, no. 1: pp. 25-37

Higazi, A. (2008). Social mobilization and collective violence: Vigilantes and militias in the lowlands of Plateau State, Central Nigeria. *Africa*, *78*(01), 107-135.

Higazi, A. (2011). *The Jos crisis: A recurrent Nigerian tragedy*. Friedrich-ebert-stiftung.

Higazi, A. (2013). Rural insecurity on the Jos Plateau, Nigeria: Livelihoods, land, and religious reform among the Berom, Fulani, and Hausa.

Hodgson, D. L. (1999). Pastoralism, patriarchy and history: Changing gender relations among Maasai in Tanganyika, 1890–1940. *The Journal of African History*, *40*(01), 41-65.

Hoffmann, I. (2004). Access to land and water in the Zamfara Reserve. A case study for the management of common property resources in pastoral areas of West Africa. *Human Ecology*, *32*(1), 77-105.

Homewood, K. (2008). *Ecology of African pastoralist societies*. James Currey; Ohio University Press; Unisa Press.

Homewood, K. M. (2004). Policy, environment and development in African rangelands. *Environmental Science & Policy*, *7*(3), 125-143.

Homewood, K. M., Trench, P. C., & Brockington, D. (2012). Pastoralist livelihoods and wildlife revenues in East Africa: a case for coexistence?.*Pastoralism*, *2*(1), 1-23.

Hoogeveen, J., Tesliuc, E., Vakis, R., & Dercon, S. (2004). A guide to the analysis of risk, vulnerability and vulnerable groups. *World Bank. Washington, DC. Available on line at http://siteresources. worldbank. org/INTSRM/Publications/20316319/RVA. pdf. Processed*.

Hopkins, A., & Del Prado, A. (2007). Implications of climate change for grassland in Europe: impacts, adaptations and mitigation options: a review. *Grass and Forage Science*, *62*(2), 118-126.

Hotez, P. J., & Kamath, A. (2009). Neglected tropical diseases in Sub-Saharan Africa: review of their prevalence, distribution, and disease burden. *PLoS neglected tropical diseases*, *3*(8), e412.

Hotez, P. J., Asojo, O. A., & Adesina, A. M. (2012). Nigeria:''Ground Zero''for the High Prevalence Neglected.

Hotez, P. J., Fenwick, A., Savioli, L., & Molyneux, D. H. (2009). Rescuing the bottom billion through control of neglected tropical diseases. *The Lancet*,*373*(9674), 1570-1575.

Hotez, P. J., Molyneux, D. H., Fenwick, A., Kumaresan, J., Sachs, S. E., Sachs, J. D., & Savioli, L. (2007). Control of neglected tropical diseases. *New England Journal of Medicine*, *357*(10), 1018-1027.http://www.wedc.Iboro.ac.uk/conferences/pdfs/28/Dyer.pdf (3/7/2009)

Hurault, J. (1998). Land crisis on the Mambila Plateau of Nigeria, West Africa. *Journal of biogeography*, *25*(2), 285-299.

Hussein, K., Sumberg, J., & Seddon, D. (1999). Increasing violent conflict between herders and farmers in Africa: claims and evidence. *Development Policy Review*, *17*(4), 397-418.

Ibrahim, A. (2012). Linking vision with reality in the implementation of policy framework for pastoralism in Nigeria. *Pastoralism*, *2*(1), 1-7.

IFRC (2004) World Disasters Report 2004. IFRC, Geneva.

Ikeh, E. I., Obadofin, M. O., Brindeiro, B., Baugher, G., Frost, F., Vanderjagt, D., & Glew, R. H. (2006). Intestinal parasitism in Rural and Urban areas of North Central Nigeria: an update. *The Internet Journal of Microbiology*, *2*(1), 1-12.

Imai, K. (2003). Is livestock important for risk behaviour and activity choice of rural households? Evidence from Kenya. *Journal of African Economies*, *12*(2), 271-295.

Imperato, P. J. (1974). Nomads of the West African Sahel and the delivery of health services to them. *Social Science & Medicine (1967)*, *8*(8), 443-457.

IPCC, Fourth Assessment Report (2007): Synthesis, published online 17 November 2007, www.ipcc.ch/ipccreports/ar4-syr.htm.

Iqbal, Z. (2006). Health and human security: The public health impact of violent conflict. *International Studies Quarterly*, *50*(3), 631-649.

Iro, I. (2006). Nomadic education and education for nomadic Fulani.*Retrieved May*, *18*, 2007.

Jacobs, A H (1980) Pastoral Maasai and Tropical Rural Development. Bates R H and M F Lofchie (eds) Agricultural Development in Africa: Issues in Public Policy New York: Praeger. 275-300

Jahnke, H. E., & Jahnke, H. E. (1982). *Livestock production systems and livestock development in tropical Africa* (Vol. 35). Kiel: Kieler Wissenschaftsverlag Vauk.

Jamala, G. Y., Boni, P. G., Abraham, P., & Teru, C. P. (2012). Evaluation of environmental and vulnerability impact of bush burning in Southern Guinea Savanna of Adamawa State, Nigeria.

Johannes, M. E. (2010). *The dynamics of female access to formal schooling among pastoralist communities in Kenya: a case of Turkana district in northwestern Kenya* (Doctoral dissertation, University of Illinois at Urbana-Champaign).

Johnson, I. R., & Thornley, J. H. M. (1985). Temperature dependence of plant and crop process. *Annals of Botany*, *55*(1), 1-24.

Johnston, R. (1993), *Geography and geographers. Anglo-American human geography since 1945*. 4th edition. London: Edward Arnold.

Jones, K. E., Patel, N. G., Levy, M. A., Storeygard, A., Balk, D., Gittleman, J. L., & Daszak, P. (2008). Global trends in emerging infectious diseases. *Nature*, *451*(7181), 990-993.

Juo, A. S., & Manu, A. (1996). Chemical dynamics in slash-and-burn agriculture. *Agriculture, Ecosystems & Environment*, *58*(1), 49-60.

Kabeer, N. (2005). Is microfinance a'magic bullet'for women's empowerment? Analysis of Findings from South Asia. *Economic and Political Weekly*, 4709-4718.

Kabeer, N. (2010). Women's empowerment, development interventions and the management of information flows. *ids Bulletin*, *41*(6), 105-113.

Kahn, L. H., Kaplan, B., & Steele, J. H. (2007). Confronting zoonoses through closer collaboration between medicine and veterinary medicine (as 'one medicine'). *Veterinaria Italiana*, *43*(1), 5-19.

Kahn, L. H., Kaplan, B., Monath, T. P., & Steele, J. H. (2008). Teaching "one medicine, one health". *The American journal of medicine*, *121*(3), 169-170.

Kakkar, M., & Abbas, S. S. (2011). One health: moving from concept to reality. *The Lancet infectious diseases*, *11*(11), 808.

Kalu, A. U. (1996). Acute trypanosomosis in a sedentary herd on the tsetse-free Jos plateau, Nigeria. *British Veterinary Journal*, *152*(4), 477-479.

Kandagor, D. (2005). Rethinking pastoralism and African development: a case study of the Horn of Africa. *Proceedings from lecture, Egerton University, Njoro*.

Kazianga, H., & Udry, C. (2006). Consumption smoothing? Livestock, insurance and drought in rural Burkina Faso. *Journal of Development Economics*, *79*(2), 413-446.

Keay, R. W. J. (1953). Outline of Nigerian vegetation.

Khan, L.H., B. Kaplan and J.H. Steele, 2007. Confronting zoonoses through closer collaboration between medicine and veterinary medicine (as 'one medicine'). Veterinaria Italiana, 43(1): 5-19

Khemani, S. (2006). Local government accountability for health service delivery in Nigeria. *Journal of African Economies*, *15*(2), 285-312.

Kherallah, M. and J. F. Kirsten (2002). "THE NEW INSTITUTIONAL ECONOMICS: APPLICATIONS FOR AGRICULTURAL POLICY RESEARCH IN DEVELOPING COUNTRIES: "New institutional economists are the blue-collar guys with a hearty appetite for reality." Oliver Williamson, 2000a." Agrekon 41(2): 110-133.

King, C. H. (2009). Toward the elimination of schistosomiasis. *New England Journal of Medicine*, *360*(2), 106-109.

King, L. J., Anderson, L. R., Blackmore, C. G., Blackwell, M. J., Lautner, E. A., Marcus, L. C., & Mahr, R. K. (2008). Executive summary of the AVMA one health initiative task force report. *Journal of the American Veterinary Medical Association*, *233*(2), 259-261.

Kirk, J. (2004). Promoting a gender-just peace: The roles of women teachers in peacebuilding and reconstruction. *Gender & Development*, *12*(3), 50-59.

Kirshenblatt-Gimblett, B. (2004). Intangible Heritage as Metacultural Production1. *Museum international*, *56*(1-2), 52-65.

Kloos H (1990) Health aspects of resettlement in Ethiopia. *Social Science and Medicine* 30, 643–656.

Klopp, J. M. (2000). Pilfering the public: the problem of land grabbing in contemporary Kenya. *Africa Today*, *47*(1), 7-26.

Kofi-Tsekpo, M. W., & Kioy, D. W. (1998). Newer directions for plant drug research: The need to examine and investigate traditional remedies for pharmacotherapy of animal and zoonotic diseases. *African journal of health sciences*, *5*(1), 12-14.

Kotto-Same, J., Woomer, P. L., Appolinaire, M., & Louis, Z. (1997). Carbon dynamics in slash-and-burn agriculture and land use alternatives of the humid forest zone in Cameroon. *Agriculture, Ecosystems & Environment*, *65*(3), 245-256.

Kovats, S., & Akhtar, R. (2008). Climate, climate change and human health in Asian cities. *Environment and Urbanization*, *20*(1), 165-175.

Krantz, L. (2001). The sustainable livelihood approach to poverty reduction. *SIDA. Division for Policy and Socio-Economic Analysis*.

Kratli, S. (2001). Education provision to nomadic pastoralists: A literature review. *Institute of Development Studies Working Paper*, *126*.

Krause, J. (2011). *A deadly cycle: ethno-religious conflict in Jos, Plateau State, Nigeria*. Geneva Declaration.

Kristjanson, P., Waters-Bayer, A., Johnson, N., Tipilda, A., Baltenweck, I., Grace, D., & MacMillan, S. (2010). *Livestock and women's livelihoods: A review of the recent evidence*. ILRI (aka ILCA and ILRAD).

Krug, E. G., Mercy, J. A., Dahlberg, L. L., & Zwi, A. B. (2002). The world report on violence and health. *The lancet*, *360*(9339), 1083-1088.

Kujul, N. B., Karshima, N. S., Chukwuedu, A. A., Olaleye, S., & Salisu, A. A. (2013). Retrospective study on puppy bites reported to veterinary clinic, Federal College of Animal Health and Production Technology, Vom, Plateau State from 2004 to 2010. *Nigerian Veterinary Journal*, *33*(3).

Kunda, J. S. (2006). The burden of zoonoses with emphasis on brucellosis in the northern regions of Tanzania. *University of Edinburgh, Faculty of Veterinary Medicine*.

Kwapena, N. (1984). Traditional conservation and utilization of wildlife in Papua New Guinea. *Environmentalist*, *4*(7), 22-26.

Lagarde, M., & Palmer, N. (2011). The impact of user fees on access to health services in low-and middle-income countries. *The Cochrane Library*.

Lahai, B. A., Goldey, P., & Jones, G. E. (1999). The gender of the extension agent and farmers' access to and participation in agricultural extension in Nigeria. *The Journal of Agricultural Education and Extension*, *6*(4), 223-233.

Lakoff, A. (2010). Two regimes of global health. *Humanity: An International Journal of Human Rights, Humanitarianism, and Development*, *1*(1), 59-79.

Lamorde, A. G. (1983, November). Collaborative Research Projects in Livestock Disease. In *Nigeria-Australia Seminar on Collaborative Agricultural Research* (p. 61).

Laven, J. (1991). Grazing Reserve Development and Settlement of Pastoralist Programme: Point for Inclusion. In *NLPD's Memorandum to the National Council on Agriculture meeting Holding in Calabar from October* (pp. 2-8).

Lawson, H. A., & Sailor, W. (2000). Integrating services, collaborating, and developing connections with schools.

Lele, S. M. (1991). Sustainable development: a critical review. *World development*, *19*(6), 607-621.

LeValley, R. B. (2003). *Alternative Feeds for Cattle During Drought*. Colorado State University Cooperative Extension.

Leyland, T., & Catley, A. (2002, September). Community-based animal health delivery systems: improving the quality of veterinary service delivery. In *Office International Epizootics Seminar. Tunis, Tunisia: Organisation of Veterinary Services and Food Safety. World Veterinary Congress*.

LID (Livestock in Development). 1999. Livestock in poverty-focused development. LID, Crewkerne, Somerset, UK.

Liebman, M., & Davis, A. S. (2000). Integration of soil, crop and weed management in low-external-input farming systems. *WEED RESEARCH-OXFORD-*, *40*(1), 27-48.

Little, P. D. (1985). Social differentiation and pastoralist sedentarization in northern Kenya. *Africa*, *55*(03), 243-261.

Little, P. D. (2003). *Somalia: Economy without state*. Indiana University Press.

Little, P. D., & Brokensha, D. W. (1987). Local institutions, tenure and resource management in East Africa. *Conservation in Africa: people, policies and practice*, 193-209.

Little, P. D., McPeak, J., Barrett, C. B., & Kristjanson, P. (2008). Challenging orthodoxies: understanding poverty in pastoral areas of East Africa. *Development and Change*, *39*(4), 587-611.

Livestock in Development (LiD) (1999) *Livestock in Poverty-Focused Development*. Crewkerne: Livestock in Development.

Lomas, J. (1998). Social capital and health: implications for public health and epidemiology. *Social Science & Medicine*, *47*(9), 1181-1188.

Lomas, J. (2000). UsingLinkage And Exchange'To Move Research Into Policy At A Canadian Foundation. *HEALTH AFFAIRS-MILLWOOD VA THEN BETHESDA MA-*, *19*(3), 236-240.

Lowe, P., Ray, C., Ward, N., Wood, D., & Woodward, R. (1999). Participation in rural development. *Dublin, European foundation for the improvement of living and working conditions*.

Luers, A. L., Lobell, D. B., Sklar, L. S., Addams, C. L., & Matson, P. A. (2003). A method for quantifying vulnerability, applied to the agricultural system of the Yaqui Valley, Mexico. *Global Environmental Change*, *13*(4), 255-267.

Macpherson CNL (1981) The existence of *Dracunculus medinensis* (Linnaeus, 1758) in Turkana, Kenya. *Transactions of the RoyalSociety of Tropical Medicine and Hygiene* 75, 680–681.

Mai, H. M., Ogunsola, O. D., & Obasi, O. L. (2004). Serological survey of the Newcastle disease and infectious bursal disease in local ducks and local Guinea fowls in jos, Plateau State, Nigeria= Encuesta serologica de la enfermedad de Newcastle y de la bursitis infecciosa en patos locales y gallinas de Guinea locales in Jos estados de Plateau, Nigeria= Enquête sérologique sur la maladie de Newcastle et la maladie de Gumboro chez les canards et les pintades indigènes de Jos dans l'Etat du Plateau au Nigeria. *Revue d'élevage et de médecine vétérinaire des pays tropicaux*, *57*(1-2).

Majekodunmi, A. O., Fajinmi, A., Dongkum, C., Picozzi, K., Thrusfield, M. V., & Welburn, S. C. (2013). A longitudinal survey of African animal trypanosomiasis in domestic cattle on the Jos Plateau, Nigeria: prevalence, distribution and risk factors. *Parasit Vectors*, *6*, 239.

Majok, A. A., & Schwabe, C. W. (1996). *Development among Africa's migratory pastoralists*. Greenwood Publishing Group.

Maliki, A. B., White, C., Loutan, L., & Swift, J.J. (1984) The Wodaabe. Swift, J J (ed) Pastoral Development in Central Niger: Report on the Niger Ranger and Livestock Project USAID/Ministry of Rural Development, Niamey. 255-530

Mamman, A. (2005). "Transport aspect of livestock marketing at Achida and Sokoto Kara Markets." Paper prepared on a network supported by UK Department of International Development (DFID) Sokoto.

Manderson, L., Aagaard-Hansen, J., Allotey, P., Gyapong, M., & Sommerfeld, J. (2009). Social research on neglected diseases of poverty: continuing and emerging themes. *PLoS Neglected Tropical Diseases*, *3*(2), e332.

Mangen, M. J., Otte, J., Pfeiffer, D., & Chilonda, P. (2002). Bovine brucellosis in Sub-Saharan Africa: estimation of sero-prevalence and impact on meat and milk offtake potential. *Food and Agriculture Organisation of the United nations, Rome*.

Marini, M. M. (1990, March). Sex and gender: What do we know?. In *Sociological Forum* (Vol. 5, No. 1, pp. 95-120). Kluwer Academic Publishers-Plenum Publishers.

Marmot, M., & Commission on Social Determinants of Health. (2007). Achieving health equity: from root causes to fair outcomes. *The Lancet*, *370*(9593), 1153-1163.

Matsepe-Casaburri, I. (1983). Women in Southern Africa: The Legacy of Exclusion. *Africa Report*, *28*(2), 7-10.

Maudlin, I., Eisler, M. C., & Welburn, S. C. (2009). Neglected and endemic zoonoses. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *364*(1530), 2777-2787.

Maxwell, J. A. (2012). *Qualitative research design: An interactive approach: An interactive approach* (Vol. 41). Sage.

May, J., Rogerson, C., & Vaughan, A. (2000). Livelihoods and assets.*Poverty and Inequality in South Africa, Cape Town, David Philip*.

Mayer, J. D. (2000). Geography, ecology and emerging infectious diseases. *Social science & medicine*, *50*(7), 937-952.

Mayoux, L. (1998). Research Round-Up women's empowerment and micro-finance programmes: strategies for increasing impact. *Development in practice*, *8*(2), 235-241.

McCabe, J. T., Leslie, P. W., & DeLuca, L. (2010). Adopting cultivation to remain pastoralists: the diversification of Maasai livelihoods in northern Tanzania. *Human ecology*, *38*(3), 321-334.

McMichael, A. J., Woodruff, R. E., & Hales, S. (2006). Climate change and human health: present and future risks. *The Lancet*, *367*(9513), 859-869.

McPeak, J. G., Little, P. D., & Doss, C. R. (2011). *Risk and social change in an African rural economy: Livelihoods in pastoralist communities* (Vol. 7). Routledge.

Meier, P., Bond, D., & Bond, J. (2007). Environmental influences on pastoral conflict in the Horn of Africa. *Political Geography*, *26*(6), 716-735.

Meinzen-Dick, R., Quisumbing, A., Behrman, J., Biermayr-Jenzano, P., Wilde, V., Noordeloos, M., ... & Beintema, N. (2011). *Engendering agricultural research, development and extension* (Vol. 176). Intl Food Policy Res Inst.

Mendelsohn, R., Dinar, A., & Dalfelt, A. (2000). Climate change impacts on African agriculture. *Preliminary analysis prepared for the World Bank, Washington, District of Columbia*, *25*.

Mersha, C., & Tewodros, F. (2012). One Health One Medicine One World: Co-joint of Animal and Human Medicine with Perspectives, A review. *Veterinary World*, *5*(4), 238-243.

Metiboba, S. (2011). The Role Of Health Education In Participatory Rural Health Development; The Case Of The Rural Fulani In Kogi West, Nigeria. *International Journal of Asian Social Science*, *1*(5), 181-187.

Michener, V. J. (1998). The participatory approach: contradiction and co-option in Burkina Faso. *World development*, *26*(12), 2105-2118.

Miller, M., & Olea-Popelka, F. (2013). One Health in the shrinking world: Experiences with tuberculosis at the human–livestock–wildlife interface. *Comparative immunology, microbiology and infectious diseases*, *36*(3), 263-268.

Milton, K. (1979). Male bias in anthropology. *Man*, 40-54.

Molyneux, M. (2002). Gender and the silences of social capital: Lessons from Latin America. *Development and change*, *33*(2), 167-188.

Moore, M. (2001). Empowerment at last?. *Journal of International Development*, *13*(3), 321-329.

Morgan, J. A., Milchunas, D. G., LeCain, D. R., West, M., & Mosier, A. R. (2007). Carbon dioxide enrichment alters plant community structure and accelerates shrub growth in the shortgrass steppe. *Proceedings of the National Academy of Sciences*, *104*(37), 14724-14729.

Moritz, M. (2010). Understanding herder-farmer conflicts in West Africa: Outline of a processual approach. *Human Organization*, *69*(2), 138-148.

Morrison, J. H. (1977). Early Tin Production and Nigerian Labour on the Jos Plateau 1906–1921. *Canadian Journal of African Studies/La Revue canadienne des études africaines*, *11*(2), 205-216.

Mortimore, M. (2000). Hard questions for pastoral development: A northern Nigerian perspective. *Elevage et gestion de parcours au Sahel, implications pour le développement*, 101-114.

Mortimore, M. J., & Wilson, J. (1965). Land and people in the Kano close-settled zone. *Occasional paper*, *1*.

Moser, C. O., & Holland, J. (1997). *Urban poverty and violence in Jamaica*. World Bank Publications.

Moser, C., & Moser, A. (2005). Gender mainstreaming since Beijing: a review of success and limitations in international institutions. *Gender & Development*, *13*(2), 11-22.

Muazu, A U (2005): 'Sheep Marketing in Some Major Livestock Markets in Zamfara State' M.Sc Pre-defence Seminar Dept of Agricultural Economics and Extension, U.D.U, Sokoto Nigeria

Mukheibir, P., & Ziervogel, G. (2007). Developing a Municipal Adaptation Plan (MAP) for climate change: the city of Cape Town. *Environment and Urbanization*, *19*(1), 143-158.

Mulumba, K. (2003). Socio economic and agricultural factors in the research and control of trypanosomiasis. PAAT technical and scientific series 4. *FAO. Rome*.

Muraskin, L. (1997). " Best Practices" in Student Support Services: A Study of Five Exemplary Sites. Followup Study of Student Support Services Programs.

Narayan, D., Patel, R., Schafft, K., Rademacher, A., & Koch-Schulte, S. (1999). Can anyone hear us? Voices from 47 countries.

National Population Commission. (2014). Nigeria Demographic and Health Survey (NDHS) 2013. *NPC and ICF International. Abuja, Nigeria*, 127-154.

National Population Commission. Federal Republic of Nigeria. Abuja, Nigeria . NDHS 2013

Nduma, I., Kristjanson, P., & McPeak, J. (2001). Diversity in income-generating activities for sedentarized pastoral women in northern Kenya. *Human Organization*, *60*(4), 319-325.

Nef, J. (1997). Human security and mutual vulnerability, Ottawa: IDRC.

Neumann, C., Harris, D. M., & Rogers, L. M. (2002). Contribution of animal source foods in improving diet quality and function in children in the developing world. *Nutrition Research*, *22*(1), 193-220.

Ngaido, Tidiane and Michael Kirk (2001) 'Collective action, property rights, and devolution of rangeland management: Selected examples from Africa and Asia', in Ruth S. Meinzen-Dïck, Anna Knox and Monica di Gregorio (eds) Collective Action, Property Rights, and Devolution of Natural Resource Management: Exchange of Knowledge and Implications for Policy, Feldafing, Germany: Zentralstelle für Ernährung und Landwirtschaft, pp.146-76.

Ngoitiko, M. (2008). *The Pastoral Women's Council: Empowerment for Tanzania's Maasai*. International Institute for Environment and Development.

Niamir-Fuller, M. (1999). Managing mobility in african rangelands, London: Food and Agricultural Organization and the Beijer International Institute of Ecological Economics.

Niamir-Fuller, M., & Turner, M. D. (1999). A review of recent literature on pastoralism and transhumance in Africa. *Managing mobility in African rangelands: the legitimization of transhumance.*, 18-46.

Nicol, A. (2000). *Adopting a sustainable livelihoods approach to water projects: implications for policy and practice*. London: Overseas Development Institute.

Nigeria Masterplan for Neglected Tropical Diseases (NTDs) 2013-2017

Nkinyangi, J. A. (1980). *Socio-economic determinants of repetition and early school withdrawal at the primary school level, and their implications for educational planning in Kenya*.

Nnabuife, H. E., Dakul, A. D., Dogo, G. I., Egwu, O. K., Weka, P. R., Ogo, I. N., ... & Obaloto, B. O. (2013). A study on helminthiasis of cattle herds in Kachia grazing reserve (KGR) of Kaduna state, Nigeria. *Veterinary World*, *6*(11), 936-940.

Nor, M.Switzer,J. and Crawford,A. (2005). 'Herding on the Brink: Towards a Global survey of pastoral Communities and Conflict'- An occasional paper from IUCN Commission on Environmental, Economic and Social Policy; Gland (ch)http://www.iisd.org/publications/pubasp?.pid=705

Nori, M., El Mourid, M., GIORGI, P., & NEFZAOUI, A. (2009). Herding in a Shifting Mediterranean Changing agro-pastoral livelihoods in the Mashreq & Maghreb region.

Nori, M., Taylor, M., & Sensi, A. (2008). *Browsing on fences: pastoral land rights, livelihoods and adaptation to climate change* (No. 148). IIED.

Nori, Michele, Jason Switzer and Alec Crawford (2005). Herding on the Brink: Towards a Global Survey of Pastoral Communities and Conflict. Working Paper, International Institute for Sustainable Development (IISD)http://www.iisd.org/pdf/2005/security_herding_on_brink.pdf

Noronha, R. (1997). Common-property resource-management in traditional societies. *The environment and emerging development issues*, 48-69.

Nouri M & Mahdavi Rad S (1993) Effect of nomadic shepherds and their sheep on the incidence of cryptosporidiosis in an adjacent town. *Journal of Infection* 26, 105–106.

Nwabara, S. N. (1963). The Fulani conquest and rule of the Hausa Kingdom of Northern Nigeria (1804-1900). *Journal de la Société des Africanistes*, *33*(2), 231-242.

Nwanta, J. A., Umoh, J. U., Abdu, P. A., Ajogi, I., & Alli-Balogun, J. K. (2006). Management of losses and Newcastle disease in rural poultry in Kaduna State, Nigeria. *Nigerian Journal of Animal Production*, *33*(2), 274-285.

Nyaruhucha, C. N. M., Mamiro, P. S., Kerengi, A. J., & Shayo, N. B. (2006). Nutritional status of underfive children in a pastoral community in Simanjiro District, Tanzania. *Tanzania Journal of Health Research*, *8*(1), 32-36.

Oba, G., Stenseth, N. C., & Lusigi, W. J. (2000). New perspectives on sustainable grazing management in arid zones of Sub-Saharan Africa.*BioScience*, *50*(1), 35-51.

Okeke, O. E. (2014). Conflicts between Fulani Herders and Farmers in Central and Southern Nigeria: Discourse on Proposed Establishment of Grazing Routes and Reserves. *AFRREV IJAH: An International Journal of Arts and Humanities*, *3*(1), 66-84.

Okello, A.L. (2012). Beyond Avian Influenza: Policy Considerations for the Implementation of 'One Health' in Developing Countries. PhD Thesis: School of Social and Political Science, University of Edinburgh.

Okello, A. L., Bardosh, K., Smith, J., & Welburn, S. C. (2014). One Health: Past successes and future challenges in three African contexts. *PLoS Negl Trop Dis*, *8*(5), e2884.

Okogun, J. A., Sanginga, N., Abaidoo, R., Dashiell, K. E., & Diels, J. (2005). On-farm evaluation of biological nitrogen fixation potential and grain yield of Lablab and two soybean varieties in the northern Guinea savanna of Nigeria. *Nutrient cycling in agroecosystems*, *73*(2-3), 267-275.

Olaniyi, O. A. (2013). Assessment of Utilization of Information and Communication Technologies (ICTs) Among Poultry Farmers in Nigeria: an Emerging Challenge. *Transnational Journal of science and technology*, 29.

O'Laughlin, B. (1995). Myth of the African Family in the World of Development.

Olowolafe, E. A., & Dung, J. E. (2000). Soils derived from biotite-granites on the Jos Plateau, Nigeria: their nutrient status and management for sustainable agriculture. *Resources, conservation and recycling*, *29*(3), 231-244.

Omiti, J., & Irungu, P. (2002). Institutional and policy issues relevant to pastoral development in Kenya.

Omore, A. O. (2004). *Employment Generation Through Small-scale Dairy Marketing and Processing: Experiences from Kenya, Bangladesh and Ghana: a Joint Study by the ILRI Market-oriented Smallholder Dairy Project and the FAO Animal Production and Health Division* (No. 158). Food & Agriculture Org..

Omotayo, A. M. (2003). Ecological implications of Fulbe pastoralism in southwestern Nigeria. *Land Degradation & Development*, *14*(5), 445-457.

Omotayo, A. M. (2010). The Nigerian Farmer and the Elusive Crown. *30th Inaugural Lecture, University of Agriculture*.

Onibokun AG (1998): Implementation strategies for the National Urban Development Policy for Nigeria. Paper presented at the National Workshop on the Modalities of Implementation of the National Urban Policy for Nigeria, Abuja; 1998. June 13–16, 1998

Onwuegbuzie, A. J., & Leech, N. L. (2007). A call for qualitative power analyses. *Quality & Quantity*, *41*(1), 105-121.

Onyeyili, R. A., & Egwu, G. O. (1995). Chemotherapy of African trypanosomiasis: A historical review. *Protozol Abstr*, *5*, 229-243.

O'Reilly, K. (2007). "Where the Knots of Narrative Are Tied and Untied": The Dialogic Production of Gendered Development Spaces in North India. *Annals of the Association of American Geographers*, *97*(3), 613-634.

Organization, W. H. (2010). World health statistics 2010, World Health Organization.

Osaghae, E. E., & Suberu, R. T. (2005). *A history of identities, violence and stability in Nigeria*. Centre for Research on Inequality, Human Security and Ethnicity, University of Oxford.

Osemeobo, G. J. (1988). Animal wildlife conservation under multiple land-use systems in Nigeria. *Environmental Conservation*, *15*(03), 239-249.

Ostberg, W. (1987). Ramblings on Soil Conservation: An Essay from Kenya SIDA Agricultural Division, Varnamo

Östlin, P., Eckermann, E., Mishra, U. S., Nkowane, M., & Wallstam, E. (2006). Gender and health promotion: A multisectoral policy approach. *Health Promotion International*, *21*(suppl 1), 25-35.

Oxby, C. (1984). Settlement schemes for herders in the subhumid tropics of West Africa: Issues of land rights and ethnicity. *Development Policy Review*, *2*(2), 217-233.

Panter-Brick, C. (2010). Conflict, violence, and health: setting a new interdisciplinary agenda. *Social science & medicine*, *70*(1), 1-6.

Parkes, M. W., Bienen, L., Breilh, J., Hsu, L. N., McDonald, M., Patz, J. A., & Yassi, A. (2005). All hands on deck: transdisciplinary approaches to emerging infectious disease. *EcoHealth*, *2*(4), 258-272.

Parpart, J. (2009). Fine words, failed policies: gender mainstreaming in an insecure and unequal world. *Development in an Insecure and Gendered World*, 51-68.

Parpart, J. L. (2014). Exploring the transformative potential of gender mainstreaming in international development institutions. *Journal of International Development*, *26*(3), 382-395.

Pasquini, M. (2002). *Soil fertility management strategies in irrigated peri-urban agriculture around Jos, Nigeria—an interdisciplinary approach* (Doctoral dissertation, Durham University).

Patz, J. A., Campbell-Lendrum, D., Holloway, T., & Foley, J. A. (2005). Impact of regional climate change on human health. *Nature*, *438*(7066), 310-317.

Peluso, N. L. (1993). Coercing conservation?: The politics of state resource control. *Global environmental change*, *3*(2), 199-217.

Perevolotsky, A. (1986). To sell or not to sell—A Pastoralist's Dilemma: A lesson from the slaughterhouse. *Human ecology*, *14*(3), 287-310.

Perry, B., & Grace, D. (2009). The impacts of livestock diseases and their control on growth and development processes that are pro-poor. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *364*(1530), 2643-2655.

Petras, J. (1997). Imperialism and NGOs in Latin America. *MONTHLY REVIEW-NEW YORK-*, *49*, 10-27.

Phillips-Howard, K. D., & Lyon, F. (1994). Agricultural intensification and the threat to soil fertility in Africa: evidence from the Jos Plateau, Nigeria. *Geographical Journal*, 252-265.

Phillipson, G. 1979. Report on social conditions among Fulani and non-Fulani groups in southern Kaduna State. ILCA Internal Communication No. 7, Kaduna, Nigeria.

Pica, G., Pica-Ciamarra, U., & Otte, J. (2008). *The livestock sector in the World Development Report 2008: Re-assessing the policy priorities* (No. 08-07). PPLPI Research Report.

Pitt, M. M., Rosenzweig, M. R., & Gibbons, D. M. (1993). The determinants and consequences of the placement of government programs in Indonesia.*The World Bank Economic Review*, *7*(3), 319-348.

Plotnicov, L. (1967). *Strangers to the city: Urban man in Jos, Nigeria*. University of Pittsburgh Pre.

Policy framework for pastoralism in Africa: Securing, Protecting and Improving the Lives, Livelihoods and Rights of Pastoralist Communities 2010. Department of Rural Economy and Agriculture.

Porter, G., Harris, F., Lyon, F., Dung, J., & Adepetu, A. A. (2003). Markets, ethnicity and environment in a vulnerable landscape: the case of small-scale vegetable production on the Jos Plateau, Nigeria, 1991–2001. *The Geographical Journal*, *169*(4), 370-381.

Posner, D. N. (2004). Measuring ethnic fractionalization in Africa. *American journal of political science*, *48*(4), 849-863.

Postel, S. L. (2000). Entering an era of water scarcity: the challenges ahead. *Ecological applications*, *10*(4), 941-948.

Powell, J. M., & Taylor-Powell, E. (1984). Cropping by Fulani agropastoralists in central Nigeria. *ILCA Bulletin*, *19*, 21-27.

Prothero, R. M. (1963). Population mobility and trypanosomiasis in Africa. *Bulletin of the World Health Organization*, *28*(5-6), 615.
Prothero, R. M. (1977). Disease and mobility: a neglected factor in epidemiology. *International Journal of Epidemiology*, *6*(3), 259-267.

Prus-ustun, A., & Corvalan, C. (2006) *Preventing disease through healthy environments:Towards an estimate of the environmental burden of disease*, (Geneva: World Health Organization).

Putman, D B (1984) Agro-pastoral production strategies and development in the Bay Region. Labahn, T (ed) Proceedings of 2nd International Congress of Somali Studies vol 3. University of Hamburg, Verlag, Hamburg. 159-186

Putnam, R. (2001). Social capital: Measurement and consequences. *Canadian Journal of Policy Research*, *2*(1), 41-51.

Putnam, R. D. (1993). The prosperous community. *The american prospect*, *4*(13), 35-42.

Rabozzi, G., Bonizzi, L., Crespi, E., Somaruga, C., Sokooti, M., Tabibi, R., & Colosio, C. (2012). Emerging zoonoses: the "one health approach". *Safety and health at work*, *3*(1), 77-83.

Raffensperger, C., & Tickner, J. A. (Eds.). (1999). *Protecting public health and the environment: implementing the precautionary principle*. Island Press.

Raleigh, C., & Urdal, H. (2007). Climate change, environmental degradation and armed conflict. *Political Geography*, *26*(6), 674-694.

Randolph, S. E. (2008). Tick-borne disease systems. *Review of science and technology off. Epiz*, *27*(2), 00-00.

Rankin, K. N. (2001). Governing development: neoliberalism, microcredit, and rational economic woman. *Economy and society*, *30*(1), 18-37.

Rass, N. (2006). Policies and strategies to address the vulnerability of pastoralists in Sub-Saharan Africa. *Rome: FAO, Pro-poor Livestock Policy Initiative (PPLPI) Working Paper Series*, *37*.

Rathgeber, E., and Carol Vlassof 1993 Gender and Tropical Diseases: A New Research Focus. *Social Science and Medicine 37:513-520.*

Ravindran, T. K. S., & Kelkar-Khambete, A. (2008). Gender mainstreaming in health: looking back, looking forward. *Global Public Health*, *3*(S1), 121-142.

Razavi, S., & Miller, C. (1995). *From WID to GAD: Conceptual shifts in the women and development discourse* (Vol. 1). Geneva: United Nations Research Institute for Social Development.

Reardon, T., & Vosti, S. A. (1995). Links between rural poverty and the environment in developing countries: asset categories and investment poverty. *World development*, *23*(9), 1495-1506.

Reddy, C. S., & Manak, S. (2005). Self-help groups: A keystone of microfinance in India-women empowerment and social security. *Andhra Pradesh Mahila Abhivruddhi Society (APMAS). India: Hyderabad*.

Reed, L., & Tehranian, M. (1999). Evolving security regimes. *Worlds apart: Human security and global governance*, 23-53.

Renner, M. (2001). Going to work for wind power. *World Watch*, *14*(1), 22-30.

Riesman, P., 1977. *Freedom in Fulani Social Life: An Introspective Ethnology*. Translated by Martha Fuller. Chicago: The University of Chicago Press, 1977.

RIM (1992). Nigerian Livestock Resoources. Four volume report to the Federal-III State Reports. Government of Nigeria by Resource Inventory and Management Limited.

Rock, M., Buntain, B. J., Hatfield, J. M., & Hallgrímsson, B. (2009). Animal–human connections,"one health," and the syndemic approach to prevention. *Social Science & Medicine*, *68*(6), 991-995.

Roeder, P. 1996. Livestock disease scenarios of mobile versus sedentary pastoral systems. Paper presented at the 3rd International Technical Consultations on Pastoral Development, May 20–22, Praïa, United Nations Sudano-Sahelian Office, Brussels.

Rohde, R. F., Moleele, N. M., Mphale, M., Allsopp, N., Chanda, R., Hoffman, M. T., & Young, E. (2006). Dynamics of grazing policy and practice: environmental and social impacts in three communal areas of southern Africa. *environmental science & policy*, *9*(3), 302-316.

Rosato, M., Laverack, G., Grabman, L. H., Tripathy, P., Nair, N., Mwansambo, C., ... & Costello, A. (2008). Community participation: lessons for maternal, newborn, and child health. *The Lancet*, *372*(9642), 962-971.

Rosegrant, M. W., & Cline, S. A. (2003). Global food security: challenges and policies. *Science*, *302*(5652), 1917-1919.

Rosenfield, S. (1987). *Instructional consultation.* Hillsdale, **NJ:** Lawrence Erlbaurn Associates, Inc.

Rosenzweig C, Ritchie JT, Jones JW, Tsuji GY, Hildebrand P (1995) Climate change and agriculture: analysis of potential international impacts. ASA Spec Publ No. 59, American Society of Agronomy, Madison, WI United Nations

Rossiter, C., H. Chong, et al. (1985). "3. Antenatal care, formal education and child-bearing." BJOG: An International Journal of Obstetrics & Gynaecology **92**(s5): 14-22.

Rowlinson, P. (2008). Adapting livestock production systems to climate change–temperate zones. *Livestock and global change*, 61-63.

Russell, S. (2005). Illuminating cases: understanding the economic burden of illness through case study household research. *Health policy and planning*, *20*(5), 277-289.

Rydin, Y., & Pennington, M. (2000). Public participation and local environmental planning: the collective action problem and the potential of social capital. *Local environment*, *5*(2), 153-169.

Sachs, J. (2008). *Common wealth: economics for a crowded planet*. Penguin.

Salamone, F. A. (1985). Colonialism and the Emergence of Fulani Identity in Ethnic Identities and Prejudices. *Journal of Asian and African studies*, *20*(3-4), 193-202.

Salih, M., Salih, A. M., & Baker, J. (1995). Pastoralist migration to small towns in Africa. *The Migration Experience in Africa, Scandinavian Institute of African Studies, Uppsala, Sweden, Stockholm*, 181-196.

Salvaing, Bernard, and Hunwick, John. (2003). Writers of Guinea. In *Arabic literature of Africa,* eds. John Hunswick and R.S. O'Fahey, 491-529. Leiden/Boston: Brill.

Salzman, C. P. (1980). *When Nomads Settle*. Praeger.

Saunders, L. Z. (2000). Virchow's contributions to veterinary medicine: celebrated then, forgotten now. *Veterinary Pathology Online*, *37*(3), 199-207.

Schelling, E., Bechir, M., Ahmed, M. A., Wyss, K., Randolph, T. F., & Zinsstag, J. (2007). Human and animal vaccination delivery to remote nomadic families, Chad. *Emerging infectious diseases*, *13*(3), 373.

Schelling, E., Wyss, K., Béchir, M., Moto, D. D., & Zinsstag, J. (2005). Synergy between public health and veterinary services to deliver human and animal health interventions in rural low income settings. *BMJ*, *331*(7527), 1264-1267.

Schelling, E., Wyss, K., Diguimbaye, C., Béchir, M., Taleb, M. O., Bonfoh, B., ... & Zinsstag, J. (2008). Towards integrated and adapted health services for nomadic pastoralists and their animals: a north–south partnership. In *Handbook of transdisciplinary research* (pp. 277-291). Springer Netherlands.

Scoones, I. (1992). The economic value of livestock in the communal areas of southern Zimbabwe. *Agricultural systems*, *39*(4), 339-359.

Scoones, I. (1998). Sustainable rural livelihoods: a framework for analysis.

Scoones, I. (2009). Livelihoods perspectives and rural development. *The Journal of Peasant Studies*, *36*(1), 171-196.

Scoones, I. (2010). *Dynamics and diversity: soil fertility and farming livelihoods in Africa: case studies from Ethiopia, Mali, and Zimbabwe*. Earthscan.

Scoones, I. (Ed.) (1995). Living with uncertainty: New directions in pastoral development in Africa. London: Intermediate Technology Publications.

Scoones, I., & Wolmer, W. (2006). Livestock, disease, trade and markets: policy choices for the livestock sector in Africa.

Seidl, A. F., de Silva, J. D. S. V., & Moraes, A. S. (2001). Cattle ranching and deforestation in the Brazilian Pantanal. *Ecological Economics*, *36*(3), 413-425.

Sen, G. (1997). Empowerment as an Approach to Poverty. *Background Paper to Human Development Report*.

Sen, G., & Östlin, P. (2008). Gender inequity in health: why it exists and how we can change it.

Seyoum, A., F. Balcha, et al. (2004). "Impact of cattle keeping on human biting rate of anopheline mosquitoes and malaria transmission around Ziway, Ethiopia." East African medical journal **79**(9): 485-490.

Shediac-Rizkallah, M. C., & Bone, L. R. (1998). Planning for the sustainability of community-based health programmes: conceptual frameworks and future directions for research, practice and policy. *Health education research*, *13*(1), 87-108.

Sheik-Mohamed, A., & Velema, J. P. (1999). Where health care has no access: the nomadic populations of Sub-Saharan Africa. *Tropical medicine & international health*, *4*(10), 695-707.

Shitaye, J. E., Tsegaye, W., & Pavlik, I. (2007). Bovine tuberculosis infection in animal and human populations in Ethiopia: a review. *VETERINARNI MEDICINA-PRAHA-*, *52*(8), 317.

Shiva, V. (1988). *Staying alive: Women, ecology and development*. Zed Books.

Sikana, P. M., Kerven, C. K., & Benkhe, R. H. (1993). From subsistence to specialised commodity production: commercialisation and pastoral dairying in Africa.

Simpson, M. C. (2008). Community benefit tourism initiatives—A conceptual oxymoron?. *Tourism Management*, *29*(1), 1-18.

Simpson, M. C. (2009). An integrated approach to assess the impacts of tourism on community development and sustainable livelihoods. *Community Development Journal*, *44*(2), 186-208.

Slifko, T. R., Smith, H. V., & Rose, J. B. (2000). Emerging parasite zoonoses associated with water and food. *International journal for parasitology*, *30*(12), 1379-1393.

Smit, B., I. Burton, I., Klein, R. J., & Street, R. (1999). "The science of adaptation: a framework for assessment." Mitigation and Adaptation Strategies for Global Change **4**(3-4): 199-213.

Smit, B., Pilifodova, O., Burton, I., Challenger, B., Huq, S., Klein, R.J.T., Yohe, G., Adger, N.W., Downing, T.E., Harvey, E., Kane, S., Parry, M., Skinner, M., Smith, J., Wandel, J., Patwardhan, A., Soussana, J.-F.,(2001), 'Adaptation to climate change in the context of sustainable development and equity', in: J. McCarthy, O.S. Canziani, N. Leary, D. Dokken, K. White (eds), Climate Change 2001: Impacts, Adaptation and Vulnerability, Cambridge University Press, Cambridge, UK.

Smith, C. A., & Kirby, L. D. (2009). Putting appraisal in context: Toward a relational model of appraisal and emotion. *Cognition and Emotion*, *23*(7), 1352-1372.

Smith, J. B., Klein, R. J., & Huq, S. (2003). *Climate change, adaptive capacity and development*. Imperial College Press.

Solomon S, Qin D, Manning M, Chen Z, Marquis M, et al. eds. 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK: Cambridge Univ. Press

Soludo, C. S. (2000). Comparative institutional development: Lessons from rural land markets in africa. *Background Paper for the World Development Report 2002*.

Sommerfeld J (2003) Plagues and peoples revisited. Basic and strategic research for infectious disease control at the interface of the life, health and social sciences. EMBO Rep 4: S32–S34.

Steinfeld, H., & Wassenaar, T. (2007). The role of livestock production in carbon and nitrogen cycles. *Annu. Rev. Environ. Resour.*, *32*, 271-294.

Steinfeld, H., De Haan, C., & Blackburn, H. (1997). Livestock-environment interactions. *Issues and Options. WRENmedia, Suffolk*.

Stenning, D. J. (1959). *Savannah nomads*. Oxford University Press in Komm..

Stenning, D. J. (1994). *Savannah nomads: a study of the Wodaabe pastoral Fulani of Western Bornu Province Northern region, Nigeria*. LIT Verlag Münster.

Stewart, F. (2005). Groups and capabilities. *Journal of human development*, *6*(2), 185-204

Sutton, P. (2004). A perspective on environmental sustainability. *Paper on the Victorian Commissioner for Environmental Sustainability*.

Swain, R. B., & Wallentin, F. Y. (2009). Does microfinance empower women? Evidence from self-help groups in India. *International review of applied economics*, *23*(5), 541-556.

Swallow, B. M. (1994). *The role of mobility within the risk management strategies of pastoralists and agro-pastoralists*. London: International Institute for Environment and Development.

Swift, J. (1986). The economics of production and exchange in West African pastoral societies. *Pastoralists of the west African Savanna*, 175-190.

Swift, J. (1989). Why are rural people vulnerable to famine?. *IDS bulletin*, *20*(2), 8-15.

Swift, J.J. 1988. *Major Issues in Pastoral Development with Special Emphasis on Selected African Countries*. Rome, FAO.

Sylla, D. (1994), 'Pastoral organisations for uncertain environments', in Scoones (ed.) 1994.

Sylla, D. (1995). Pastoral organizations for uncertain environments. In Scoones, I. (ed.), Living With Uncertainty, New Directions in Pastoral Development in Africa, Intermediate Technology Publications, London, pp. 134–152.

Szreter, S., & Woolcock, M. (2004). Health by association? Social capital, social theory, and the political economy of public health. *International Journal of Epidemiology*, *33*(4), 650-667.

Tahir G, Muhammad N.D. & Mohammed, A.M (2005). African Experiences Country Case Studies: Improving the Quality of Nomadic Education in Nigeria: Going Beyond Access and Equity. Paris France: Association for the Development of Education in Africa (ADEA). ISBN No: 92-9178-054-5

Talbert, J. E. (2009). Professional learning communities at the crossroads: How systems hinder or engender change. In *Second international handbook of educational change* (pp. 555-571). Springer Netherlands.

Talbot, L., & Verrinder, G. (2009). *Promoting health: the primary health care approach*. Elsevier Australia.

Tarawali, S., Herrero, M., Descheemaeker, K., Grings, E., & Blümmel, M. (2011). Pathways for sustainable development of mixed crop livestock systems: Taking a livestock and pro-poor approach. *Livestock science*, *139*(1), 11-21.

Taub, D. R., Miller, B., & Allen, H. (2008). Effects of elevated CO_2 on the protein concentration of food crops: a meta-analysis. *Global Change Biology*, *14*(3), 565-575.

Taylor, J. J. (2007). Assisting or compromising intervention? The concept of 'culture'in biomedical and social research on HIV/AIDS. *Social Science & Medicine*, *64*(4), 965-975.

Taylor, L. H., Latham, S. M., & Mark, E. J. (2001). Risk factors for human disease emergence. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, *356*(1411), 983-989.

Taylor, L. H., Latham, S. M., & Mark, E. J. (2001). Risk factors for human disease emergence. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, *356*(1411), 983-989.

Taylor, V. (1999). GENDER AND SOCIAL MOVEMENTS Gender Processes in Women's Self-Help Movements. *Gender & Society*, *13*(1), 8-33.

Tekki, I. S., Nwosu, C., & Okewole, P. A. (2013). Challenges and prospects of anti-rabies vaccines production in Nigeria. *Journal of Vaccines & Vaccination*, *2013*.

Tesoriero, F. (2006). Strengthening communities through women's self help groups in South India. *Community Development Journal*, *41*(3), 321-333.

Thoen, C., LoBue, P., & De Kantor, I. (2006). The importance of Mycobacterium bovis as a zoonosis. *Veterinary Microbiology*, *112*(2), 339-345.

Thomas, C. (2001). Global governance, development and human security: exploring the links. *Third World Quarterly*, *22*(2), 159-175.

Thornton, P. K., Herrero, M., Freeman, H. A., Mwai, A. O., Rege, E., Jones, P. G., & McDermott, J. (2007). Vulnerability, climate change and livestock–opportunities and challenges for the poor.

Thornton, P., W. Bowen, W.T., Ravelo, A.C., Wilkens, P.W., Farmer, G., Brock, J., & Brink, J.E. (1997). Estimating millet production for famine early warning: an application of crop simulation modeling in Burkina Faso." Agric. and Forest MeteoroL **83**: 95-ll92.

Tignor, R. L. (1993). Political corruption in Nigeria before independence. *The Journal of Modern African Studies*, *31*(02), 175-202.

Toenniessen, G., Adesina, A., & DeVries, J. (2008). Building an alliance for a green revolution in Africa. *Annals of the New York academy of sciences*,*1136*(1), 233-242.

Tonah, S. (2002). Fulani pastoralists, indigenous farmers and the contest for land in Northern Ghana. *Africa Spectrum*, 43-59.

Torrey, E.F., R.H. Yolken, cited in King, L. J., Anderson, L. R., Blackmore, C. G., Blackwell, M. J., Lautner, E. A., Marcus, L. C., ... & Mahr, R. K. (2008). Executive summary of the AVMA one health initiative task force report. *Journal of the American Veterinary Medical Association*, *233*(2), 259-261.

TOULMIN, C., C. Hesse, et al. (2004). "Pastoral commons sense: lessons from recent developments in policy, law and practice for the management of grazing lands." Forests, Trees and Livelihoods **14**(2-4): 243-262.

Towards sustainable Agricultural System in the 21st century 2010. National Research Council of the National Academies. The national academies press, Washington, D.C.

Trowell, H. C., K. W. Heaton, et al. (1985). Dietary fibre, fibre-depleted foods and disease, Academic Press London.

Tsigas, M., & Ehui, S. (2006). The Role of Agriculture in Nigeria's Economic Growth A General Equilibrium Analysis (Paper in progress).

Tugwell, P., O'Connor, A., Andersson, N., Mhatre, S., Kristjansson, E., Jacobsen, M. J.,& Losos, J. (2006). Reduction of inequalities in health: assessing evidence-based tools. *International journal for equity in health*, *5*(1), 11.

Turner, M. (1993). Overstocking the range: a critical analysis of the environmental science of Sahelian pastoralism. *Economic Geography*, 402-421.

Turner, M. D. (1999). Conflict, environmental change, and social institutions in dryland Africa: limitations of the community resource management approach. *Society & Natural Resources*, *12*(7), 643-657.

Turner, M. D. (2004). Political ecology and the moral dimensions of "resource conflicts": the case of farmer–herder conflicts in the Sahel. *Political geography*, *23*(7), 863-889.

Turner, M. D., & Williams, T. O. (2002). Livestock market dynamics and local vulnerabilities in the Sahel. *World Development*, *30*(4), 683-705.

U.S. Environmental Protection Agency (EPA). (2006) Global Anthropogenic Emissions of Non-CO2 Greenhouse Gases 1990-2020. http://www.epa.gov/climatechange/economics/international.html#global_anthropogenic

Udo, R. K. (1990). *Land Use Policy and Land Ownership in Nigeria* (pp. 103). Lagos: Ebieakwa Ventures.

Umali, D. L., Feder, G., & de Haan, C. (1994). Animal health services: finding the balance between public and private delivery. *The World Bank Research Observer*, *9*(1), 71-96.

Umar, A., & Tahir, G. (2009). 7 The Telesis of Nigerian Nomadic Education. *Traveller, nomadic and migrant education*, 102.

UNFCCC, (1992). United Nations Framework Convention on Climate Change [available at www.unfccc.de].

Union, A. (2010). *Policy framework for pastoralism in Africa: securing, protecting and improving the lives, livelihoods and rights of pastoralist communities*. Department of Rural Economy and Agriculture, African Union Commission.

Unruh, J. D. (1995). Pastoralist resource use and access In Somalia: a changing context of development, environmental stress, and conflict. *Disaster and Development on the Horn of Africa Macmillan, London*.

Uphoff, N. (1992). Monitoring and evaluating popular participation in World Bank-assisted projects. *World Bank Discussion Papers*, 135-135.

Uphoff, N. (2000). Understanding social capital: learning from the analysis and experience of participation. *Social capital: A multifaceted perspective*, 215-249.

Upton, M. (2004). The role of livestock in economic development and poverty reduction.

US-EPA. (2006) Global Anthropogenic non-CO2 greenhouse gas emissions: 1990–2020. Washington, DC, United States Environmental Protection Agency, EPA 430-R-06-003, June 2006.

Usman, L. (2006). Rural nomadic Fulbe boys' primary schooling: assessing repertoires of practice in Nigeria. *McGill Journal of Education/Revue des sciences de l'éducation de McGill*, *41*(2).

Uzochukwu, B. S., & Onwujekwe, O. E. (2004). International Journal for Equity in Health. *International Journal for Equity in Health*, *3*, 6.

Van Doorslaer, E., Wagstaff, A., Bleichrodt, H., Calonge, S., Gerdtham, U. G., Gerfin, M., & Winkelhake, O. (1997). Income-related inequalities in health: some international comparisons. *Journal of health economics*, *16*(1), 93-112.

van Hoeve, E., & van Koppen, B. (2005). Beyond fetching water for livestock: A gendered sustainable livelihood framework to assess livestock-water productivity. In *Nile Basin Water Productivity: developing a shared vision for livestock production, a workshop of the CGIAR Challenge Programme on Water & Food (CPWF), Kampala, Uganda*.

van Veen, T. S. (1997). Sense or nonsense? Traditional methods of animal parasitic disease control. *Veterinary Parasitology*, *71*(2), 177-194.

Vengroff, R., 1980. "Upper Volta: Environmental Uncertainty and Livestock Production." Texas: n.p., 1980.

Vlassof C, Bonilla E. (1994). Gender-related differences in the impact of tropical diseases on women. What do we know? *J Biosocial Sci 1994; 26(1): 149-157*

von Kaufmann, R., 1986. "An Introduction to the subhumid Zone of West Africa and I.L.C.A. subhumid Zone Program." In *Livestock Systems Research in Nigeria's subhumid Zone: Proceedings of a second I.L.C.A./N.A.P.R.I. symposium held in Kaduna, Nigeria, October 29-November 4, 1984*, edited by R. von Kaufmann, S. Chater, and R. Blench, 11-36. Addis Ababa: I.L.C.A., 1986.

Wall, G. (1996). Is ecotourism sustainable? *Environmental Management* 2(3-4):207-16.

Warner, M. (2000). *Conflict management in community-based natural resource projects: experiences from Fiji and Papua New Guinea*. London, UK: Overseas Development Institute.

Warner, M., & Jones, P. (1998). *Assessing the need to manage conflict in community-based natural resource projects*. London: Overseas Development Institute.

Waters-Bayer, A., & Bayer, W. (1992). The role of livestock in the rural economy. *Nomadic Peoples*, 3-18.

Waters-Bayer, A., & Taylor-Powell, E. Paper 3: Population and land use in the subhumid zone of Nigeria.

Watts, M. J. (1985). Social theory and environmental degradation. In *Desert Development* (pp. 14-32). Springer Netherlands.

White, R. P. and Nackoney, J. (2003) Drylands, people, and ecosystem goods and services: web based geospatial analysis. World Resources Institute.

WHO. Global tuberculosis control. WHO report 1998. Geneva, WHO, 1998: WHO/TB/98-237.

Williams, T. O., Hiernaux, P., & Fernandez-Rivera, S. (1999). Crop-livestock systems in Sub-Saharan Africa: Determinants and intensification pathways. *Property rights, risk and livestock development in Africa. International Livestock Research Institute, Nairobi, Kenya*, 132-151.

Winter, M (1984) The Twareg. Swift, J J (ed) Pastoral Development in Central Niger: report of the Niger Range and Livestock Project USAID/Ministry of Rural Development, Niamey. 531-620

Wong, L. P. (2008). Focus group discussion: a tool for health and medical research. *Singapore Med J*, *49*(3), 256-60.

Woolcock, M., & Narayan, D. (2000). Social capital: Implications for development theory, research, and policy. *The world bank research observer*, *15*(2), 225-249.

World Bank (1993). *World Development Report 1993: Investing in Health*. New York: Oxford University Press.

World Bank (2005). "Managing the Livestock Revolution: Policyand Technology to Address the Negative Impacts of a Fast-Growing Sector." June,World Bank,Washington,DC.

World Bank (2007a) .*World Development Report 2008 Agriculture for Development.*Washington, DC:World Bank.

World Bank, (2010). The Millennium Development Goals Report

World Bank, World Development Report (2008): Agriculture for Development (World Bank, Washington, DC, 2008).

World Bank. 2001. World Development Report 2000/2001: Attacking Poverty. World Development Report;. *New York: Oxford University Press. © World Bank. https://openknowledge.worldbank.org/handle/10986/11856 License: CC BY 3.0 IGO."*

World Development Report 2008: Agriculture for Development. Washington, D.C. © World Bank. https://openknowledge.worldbank.org/handle/10986/5990 License: CC BY 3.0 IGO."

World Health Organisation (1990). Report of the Consultation on AIDS and Traditional Medicine: Prospects for Involving Traditional Health Practitioners, paper presented at 1990 Traditional Medicine Programme and Global Programme on AIDS, Francistown, Botswana, 23-27 July.

World Health Organization (WHO). 1990. Report of the consultation on AIDS and traditional medicine: Prospects for involving traditional health practitioners. Paper presented at the Traditional Medicine Program and Global Program on AIDS, 23-27 July, Francistown, Botswana.

World Health Organization Strategies for the control and elimination of rabies in Asia. Report of a WHO interregional consultation. Geneva: The Organization; 2002

World Health Organization, WHD. (1996) Violence Against Women: WHO Consultation, February, 5–7; WHO, Geneva.

World Health Organization, WHD. Violence Against Women: WHO Consultation.Geneva: WHO; 1996. February, 5–7.

World Health Organization, WPRO. (1998) Domestic Violence: A priority public health issue in the Western Pacific Region. WHO, WPRO, Manila.

World Health Organization, WPRO. Domestic Violence: A priority public health issue in the Western Pacific Region. Manila: WHO, WPRO; 1998.

World Health Organization. (2002) World Report on Violence and Health. WHO, Geneva.

World Health Organization. (2004). World report on knowledge for better health: strengthening health systems.

World Health Organization. (2005) WHO Multi-country Study on Women's Health and Domestic Violence Against Women. WHO, Geneva.

World Health Organization. WHO Multi-country Study on Women's Health and Domestic Violence Against Women. Geneva: WHO; 2005.

WorldBank. 2005. Food safety and agricultural health standards: Challenges and opportunities for developing country exports. World Bank, Washington, DC.

Yin, R. (2003). *Case study research: Design and methods*. 3rd ed. Thousand Oaks, CA: Sage.

Young, H., A. M. Osman, A.M., & Abusin, A.M. (2009). Livelihoods, power and choice: the vulnerability of the Northern Rizaygat, Darfur, Sudan, Feinstein International Center.

Yuen, C. F. (1989). Justification, government policy, measures and strategy for the development of grazing reserves in Peninsular Malaysia. *HISTORY*, *581*, 38-267.

Yusuf, R. O., & Ukoje, J. A. (2010). Recent observations on rural geographic research in Nigeria. *Research Journal of Environmental and Earth Sciences*, *2*(2), 76-81.

Zinsstag, J. (2007). Animal health research. *Science (New York, NY)*, *315*(5816), 1193.

Zinsstag, J., & Weiss, M. G. (2001). Livestock diseases and human health. *Science*, *294*(5542), 477-477.

Zinsstag, J., Schelling, E., Wyss, K., & Mahamat, M. B. (2006). Potential of cooperation between human and animal health to strengthen health systems. *The Lancet*, *366*(9503), 2142-2145.