

A Study on The Effect of Livestock Farming on The Smallholder Farming System: A Case of Chongwe District (Conference ID: CFP/705/2018)

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ABSTRACT

Livestock farming is the rearing of animals for food and for other human uses. The word 'Livestock' applies predominantly to cattle or dairy cows, chickens, goats, pigs, horses and sheep. Nowadays, animals like donkeys, mules, rabbits and insects such as bees are being raised as part of livestock farming.

This study aimed at determining the influence of livestock farming on food security of the smallholder farmers in Chongwe District in Zambia

A descriptive study design was used specifically focusing on mixed methods approach so that the researcher could have a holistic picture of the issue under investigation and as well as to overcome the weaknesses of each one of them and take advantage of their strengths.

Hence the research adopted both qualitative and quantitative approaches that suit well a descriptive study design.

Key findings of this study were that livestock farming has a positive influence on the Smallholder farming System. The results from the study indicated that livestock farming has a positive influence on household food security hence meeting energy requirements and thereby being more food secure. The results of this study showed that respondents engaged in livestock farming have more access to income and are food secure.

It is therefore recommended to include dairy cattle keeping when planning for strategies of solving malnutrition problems in rural communities in Zambia.

The study also recommends that extension and veterinary services should be strengthened.

Key words

Livestock, farming system, food security, effects, Smallholder

1. INTRODUCTION

Overview

This section of the study focuses on the background of this study; statement of the problem purpose/rationale; objectives general specific hypothesis or research question framework (conceptual or theoretical framework).

1.1 BACKGROUND TO THE STUDY

Livestock can be described as all domesticated animals, especially sheep, goats, cattle and pigs, intentionally reared in an agricultural setting for food, fibre or breeding purposes (Ntshepe, 2011). Livestock systems occupy about 30 percent of the planet's dry land surface area (Steinfeld *et al.*, 2006a). According to Nouman *et al.* (2014), livestock has the biggest land-use activity globally, which is expected to double by 2020 with an annual increase of 2.7 percent in meat production and 3.2 percent in milk production. The livestock sector in Zambia falls under the Ministry of Fisheries and Livestock. Livestock plays an important role in the agriculture sector and contributes an estimated 35% to the agricultural GDP in the Zambian economy, but this contribution does not account for hides and skins, manure and animal draft power as input into crop production and leather manufacturing sectors. If these were accounted for, probably the contribution of livestock to agricultural GDP would rise to 45-50%. Smallholders use

livestock for the household's own consumption (meat, eggs and milk), animal draft power and to generate cash income through sale of livestock and livestock products and as a form of savings (World Bank, 2007). Livestock farming among the smallholder farmers have the opportunity to grow if improved production and management practices are developed among smallholder farmers. Livestock farming plays an important role in the agricultural sector for most countries. Livestock provide high-quality animal-source foods in conjunction with a myriad of associated economic and social benefits to communities worldwide (Capper, 2013). Imai (2003) believes that livestock farming plays an important role in helping households to cope with negative shocks, because livestock provide diversification of income sources as farmers can easily sell their livestock to get cash.

Livestock production is the key to food security for many farmers in most developing countries, and an increase in livestock production is invariably associated with an increase in livestock numbers (Salem and Smith, 2008). Livestock farming has great potential to alleviate household food insecurity and poverty in communal areas of the world, including Zambia (Musemwa *et al.*, 2008). Livestock may be used as a form of insurance against crop loss in poor weather (Seo *et al.*, 2008). Livestock production contributes to food security both directly and

indirectly, and plays a crucial role in the livelihoods of almost one billion of the world's poorest people (Smith *et al.*, 2013a). Important products and by-products derived from livestock farming include meat, milk, eggs, manure, feathers, hides and skins, fibre and wool. Keeping livestock is an important risk-reduction strategy for vulnerable communities, and livestock are important providers of nutrients and traction for growing crops in smallholder systems (Thornton, 2010).

Livestock also contribute to the food supply by providing manure in contributing to land preparation, providing ready cash to buy planting materials or fertilizer, or to hire labour for planting, weeding, or harvesting and converting low-value materials that are inedible or unpalatable for human consumption into milk, meat and eggs. However, livestock decreases food supply by competing with people for food, especially grains; currently livestock supply 13 percent of energy to the world's diet but consume half of the world's production of grain (Smith *et al.*, 2013b; Scholtz *et al.*, 2013). Livestock provide major support to the livelihoods of many rural dwellers in Africa where milk, meat and blood are important dietary components (Mariara, 2009). Livestock can also be used to deliver vital nutrients needed to supplement the nutritional status of

household members and secure their most fundamental livelihood asset and human capital as a means of alleviating poverty (Randolph *et al.*, 2007). According to Seré (2009), keeping livestock is not only a pathway out of poverty for the rural poor but also a means of spreading their risk and increasing their assets and resilience in order to cope with climate, market and diseases shocks.

As noted by (Ouma *et al.* (2004), the benefits of livestock in a livestock production system outweigh costs when non-market parameters are considered. The rate of return on livestock capital investment is higher than that obtainable from cash, in a form of savings that can be invested in formal or non-formal financial institutions. These benefits of livestock keeping are of special importance in developing countries, where financial markets function poorly and opportunities for risk management through formal insurance are generally absent (Moll *et al.*, 2001).

Apart from the financial benefits derived from livestock farming, Fafchamps *et al.* (1998) reveal that farmers may invest in livestock as part of a tribal custom or tradition, or use livestock as an investment device in the absence of access to banking. Reflecting on the social importance of livestock, they are considered a common means of demonstrating wealth, strengthening

relationships through bride price payments and for slaughter at funerals, child-naming ceremonies or other social/religious events to honour the person or god concerned.

Livestock are also used in settling local disputes, whereby fines are paid with certain numbers of livestock (Ouma, 2003). According to Morton (2007), livestock production, especially on a small scale, is critical for many of the poor in the developing world, often contributing to multiple livelihood objectives and offering a pathway out of poverty through its impact on their nutrition and health. Livestock kept or produced in smallholder farming systems are an important component of the agricultural economy in the developing countries of the world; large numbers of poor people currently depend and will continue to depend on this system for survival (McDermott et al., 1999).

The small-scale livestock farmers, sometimes referred to as smallholder farmers, are mainly categorized by the livestock numbers, land size and household inputs. Smallholder farmers in developing countries have multiple goals for their livestock enterprises. Apart from cash benefits, livestock are closely linked to the social and cultural lives of smallholder farmers, for whom animal ownership ensures varying degrees of household economic stability (Lubungu et al., 2012). Schultze et al. (2007) believe that cattle are the best instrument for finance for

smallholder farmers and that they are the best option for large and flexible cash reserves; they also maintain the food security of the smallholder farmers by providing emergency finance. In South Africa, cattle production is the most important livestock sub-sector as it contributes about 25–30 percent to the total agricultural output per annum. Cattle farming meet multiple objectives such as provision of draught power, manure and cash sales, among other socio-economic functions desired by poor farmers.

Livestock are also the main sources of meat, dairy products, fibre and manure (Musemwa et al., 2008). According to Umrani (2000), livestock contributes to the production of organic fertilizer and fuel; dung from livestock can be used to supply household energy. McManus *et al.* (2011) observed that ambient temperature is the factor that has the largest direct effect on livestock production. Most livestock perform at their best at temperatures between 40°C and 24°C, and the temperature usually rises above this comfort zone in the tropics and sub-tropics. According to the study, climate affects livestock production through its impact on pasture, forage crop quality and production, changes in distribution of livestock diseases, disease vectors and parasites. Changes in climate patterns have altered the patterns of disease in animals, as a result of change in the emergence of new parasites and syndromes and the prevalence of existing diseases,

putting greater pressure on livestock production and survival (McManus *et al.*, 2011).

Roger (2008) defines diseases in livestock as a state of disturbance of the health status of an animal. It can be caused by any factors that alter this status. Examples of diseases include foot-rot, gastrointestinal parasitism, and hypocalcaemia and pregnancy toxemia. According to the study, diseases in livestock can be specific, shared with other species, or zoonotic, i.e. transmissible between animals and humans. Diseases left uncontrolled can reduce livestock numbers drastically. On the other hand, Smith *et al.* (2013b) believe that livestock disease can impact on food security when transmitted to humans, as these diseases may limit productivity by hindering people's ability to produce food themselves or work to earn income to purchase food.

According to Salem and Smith (2008), breeding is an area of concern in improving livestock farming; however, cross-breeding of livestock to produce desirable traits for disease resistance requires better nutrition, which is provided by a higher intake and supply of good-quality forage. However, livestock development may imply an increase in the demand for forage crops, and this can be detrimental to grain production, thus raising grain security concerns (Smith *et al.*,

2013a). Thomas and Rangnekar (2004) further state that the available land for livestock grazing has been reduced due to pressure for more cropping areas and infrastructural development.

Blignaut *et al.* (2009) believe that in Zambia, as in many other African countries, the agricultural sector (of which livestock production is a part) plays a very important role in the national economy. Over 70 percent of the resource-poor farmers in Zambia live in harsh agro-ecological zones unsuitable for growing crops, and they are thereby forced to focus on livestock farming as a means of livelihood (Mapiye *et al.*, 2009).

The livestock sector is currently experiencing an expansion due to increasing demand for livestock products and population growth. This expansion of livestock sectors presents both challenges and opportunities for rural households in emerging economies. For example, Thomas and Rangnekar (2004) reveal that livestock farming encounters negative factors such as problems with housing and control of resources; access to credit and microfinance to purchase necessary inputs such as feed, supplements and drugs; and readily available and relevant knowledge. A study by the United Nations (2011) indicates that climate change is having a negative effect on livestock production and

has already led to a decline in the availability of surface-water resources, a requirement for livestock farming. Grassland pastures will also change to shrub land due to this decline, which will definitely have a negative impact on livestock farming.

Frequent droughts are also taking a toll on the condition and numbers of livestock, usually the breeding herd. A localized, limited supply of water leads to overgrazing and trampling by cattle, with a serious negative environmental impact (Marinara, 2009). This is similar to the case of livestock production in the tropics, where lack of available feed for livestock production is said to have resulted from overgrazing and poor-quality and reduced forage from natural veld during the dry season (Abdulrazak *et al.*, 1997). Munyai (2012), in a study in the Limpopo province of South Africa, indicates that the most important constraints on livestock production are overstocking rates, feed and herbage shortage during winter, loss of livestock due to extreme drought, poor grazing-land management, uncontrolled breeding, stock theft and snares.

Statement of Research Problem

The small-scale livestock farmers, sometimes referred to as smallholder farmers, are mainly categorized by the livestock numbers, land size and household inputs. Smallholder farmers in developing countries have multiple goals for their livestock enterprises. Apart

from cash benefits, livestock are closely linked to the social and cultural lives of smallholder farmers, for whom animal ownership ensures varying degrees of household economic stability (Lubungu *et al.*, 2012).

Livestock farming has great potential to alleviate household food insecurity and poverty in most of the world's communities. The role that smallholder livestock farmers play in livestock production is a very crucial one. According to Smith *et al.* (2013b), smallholder livestock keepers rely mostly on food that is not available to people (grass, fodder, residues and waste) to feed their livestock. In this way they reduce the threat posed by livestock to food security. This Sector is one of the key economic sectors with huge potential to contribute towards wealth creation and economic development of the country and living standards as crop production dwindles due to differences in weather patterns.

Today it is a known fact in Zambia that the crop farming sector has become a challenge as the rains during farming season are unpredictable posing problems for smallholder farmers hence the need to diversify and intensify efforts in livestock farming.

Conversely, Livestock farming is important in reducing income poverty, improving food

security and household assets. Livestock farming among the rural communities like the one in Chongwe is one thing, understanding the effect of such intervention on income poverty, food security and household assets is another thing completely different, and in the view of this study it's more fundamental to this study.

Consequently, this study is basically designed to assess the effect of livestock farming on household's socio-economic status in terms of household income, household food security and household assets owned. This will effectively contribute to the knowledge gap in the country regarding why poverty remains high even among households owning livestock.

General Objectives

To examine the effect of livestock farming on the Smallholder farming System in Chongwe District.

Specific Objectives

The specific objectives of this study were:

1. To determine the influence of livestock farming on the food security of the smallholder farmers in Chongwe District.
2. To investigate the influence of livestock farming on the production

output of the smallholder farmers in Chongwe District.

3. To ascertain the influence of livestock farming on the socioeconomic status of the smallholder farmers in Chongwe District.

Research Questions

The research raised the following key research questions;

1. What is the influence of livestock farming on the food security of the smallholder farmers in Chongwe District?
2. What is the influence of livestock farming on the production output of the smallholder farmers in Chongwe district?
3. What is the influence of livestock farming on the socioeconomic status of the smallholder farmers in Chongwe district?

Research Variables

1. Food security
2. Production output
3. Socioeconomic

Significance of the Study

The rationale of this study is that in a country like Zambia that is now struggling to rebuild its economy, there is need to concentrate efforts to diversify the

economic base with agricultural production, especially smallholder livestock farming. This could be achieved by ensuring that all major components to Livestock production such as access to land, improved production, disease control and marketing are looked into. Livestock farming among the smallholder farmers have the opportunity to grow if improved production and management practices are developed among smallholder farmers.

Many programs/schemes and projects for promotion of smallholder livestock production in the country have been done for years, with the aim of increasing income, improvement of nutritional status and living conditions of rural households. The socio-economic information resulting from this study will help different stakeholders in the smallholder livestock development such as planners and donors who want to establish new smallholder dairy projects. Information from this study can also help to streamline/up-scaling the already established smallholder livestock development programmes in the country.

Abbreviation and Acronyms

GDP - Gross Domestic Production

FAO - Food and Agriculture Organisation

UN – United Nations

LID – Livestock in Development

HPI – Heifer Project International

HIT – Heifer-In Trust

ILRC – International Livestock Research Centre

SDDP – Smallholder Dairy Development Programme

UNDP – United Nations Development Programme

UNICEF – United Nations Children Fund

SDP – Smallholder Dairy Project

WHO – World Health Organisation

URT – United Republic of Tanzania

Operational definitions

1. Livestock can be described as all domesticated animals, especially sheep, goats, cattle and pigs, intentionally reared in an agricultural setting for food, fibre or breeding purposes (Ntshepe, 2011).
2. Livestock farming is the rearing of animals for food and for other human uses (FAO,2007).
3. Small holder farming system are those farmers owning small-based plots of land on which they grow subsistence crops and one or two cash crops depending on almost exclusively on family labour (Muriuku,2011)
4. Effect is a change which result or consequence of an action or cause
5. World Bank (2003) defines food security as the access by all people at all times to enough food for an active and health life.

2. METHODOLOGY

This section focuses on the methodology of this study. It looks at the research design, selection of the study area, methods of data collection, sample size, sampling method and data presentation and analysis.

Study Design

A descriptive case study design was used in this study and it specifically utilised a mixed methods research approach so that the researcher could have a holistic picture of the issue under investigation in this study as well as to overcome the weaknesses of each one of them and take advantage of their strengths. According to (Creswell,2012) mixed methods research design is a procedure for collecting, analysing and “mixing” both quantitative and qualitative research methods in a single study to understand a research problem. Therefore the design has been chosen with a view of combining the collection and analysing of both quantitative and qualitative data to better understand the research problem in a single study. In this regard the research adopted both qualitative and quantitative approaches that suit well a descriptive case study (Creswell, 2009).

Qualitative approach was used by the researcher to design, collect and analyse the data. The goal of this method is defined as

describing and understanding rather than explanation and prediction of human behaviour (Babbie, 2001). Qualitative research involves exploration, elaboration and systematisation of the significance of an identified phenomenon. Babbie and Mouton (2001) define qualitative research as an approach in which research takes as its departure point the insider perspective on social action. It is a research approach that privileges the emic perspective- that is, the lived experience of the subject, and the meaning the subjects attaches to the phenomena being investigated while quantitative research involves counting and measuring of events and performing the statistical analysis of a body of numerical data (Smith, 1995).

Simply put, qualitative research investigates the why and how of decision- making, as compared to what, where, and when of quantitative research. Rees (1997) asserts that rather than presenting the results in the form of statistics, qualitative research produces words in the form of comments and statements. Qualitative research offers insights and understandings of participants, which is unobtainable by quantitative research, but is more than just non-numerical research. It aims to study the subject in their natural surroundings and to collect naturally occurring, non-biased data.

According to Creswell (2003) qualitative methods yield large volumes of exceedingly rich data obtained from a limited number of individuals. Qualitative data collection methods include the use of photography, interviews, group and/or individual, observation, field notes, projective techniques, life stories etc. While quantitative methods include a representation of an empirical system in a numerical mathematical system for the purpose of reasoning analytically within the mathematical system. Therefore, although this study is mainly qualitative, both quantitative and qualitative methods were used in order to overcome the weaknesses of each one of them and take advantage of their strengths.

Data Collection

Data collection refers to gathering specific information to prove or refute some facts. There are two major sources of data used by researchers. These are primary and secondary sources. Primary data is information gathered directly from respondents through interviews, questionnaires, focus group discussions, observation and experimental studies (Creswell, 2009). Secondary data collection involves gathering data that has already been collected by someone else and stored in form of books, magazines, newspapers, journals and electronic sources. Therefore, in this study both qualitative and quantitative primary data collection relied on interviews,

focus group discussions and questionnaires to determine the effect of livestock farming on the Smallholder farming System with focus on Chongwe District. Primary data was mainly obtained through semi-structured questionnaires and focus group discussions with some study participants particularly men and women above 18 years and interviews with some key stakeholders. Interviews were held with key informants from Headmen, Subjects and Extension Service Officers from Chongwe District.

Data collection Instruments

Data is often collected using questionnaires, observations, documents, interviews and past records (Creswell, 2003). However, in this study data was collected through the use of questionnaires, interviews and focus group discussions

Interviews

An interview is a face to face confrontation between the interviewer and the respondent (Leedy, 1980). The interview afforded the researcher personal contact with key people. The unstructured part of the interview guide was suitable for the study because it provided in-depth information on how the effect of livestock farming on the Smallholder farming System with focus on Chongwe District as per the objectives of the study.

Focus group discussions

Focus group discussion was also used to obtain information from the community. Especially information on the influence of livestock farming on the food security, on the production output of and on the socioeconomic status of the smallholder farmers in Chongwe District. The focus group discussion was used because of its group interaction characteristic which allows stimulation of ideas among respondents (Miller, 1999). The discussion was facilitated by the researcher who was assisted by 3 research assistants and notes were taken. In addition a tape recorder was used to ensure accuracy of data recording. The advantage of focus group discussion is that it allowed probing to obtain in-depth information. A total of 4 focus group discussions 1 focus in each of the communities namely Kanakantapa, Chikhuli, Nakatindi and Natindabale were conducted. The composition of the focus group discussion was 6-8 participants. The researcher organized some refreshments in form of snacks, soft drinks and mineral water considering the length of time.

Questionnaire

A questionnaire is a document containing questions designed to seek information that is appropriate for analysis (Tuckman, 1997).

The questionnaires were used to determine impact of micro financial institutions on client's livelihood with focus on Chongwe District of Zambia. The questionnaires allowed for anonymity and privacy, which encouraged more open responses on sensitive issues. The semi-structured questionnaire was administered to the adult members of households particularly those clients above 18 years of age by the researcher. This is because not all the respondents were able to read and write. The researcher read all the questions one by one to the respondents. With this approach, it was easy to clarify any misunderstanding with the respondent regarding the meaning of the questions immediately.

The questionnaire had both open ended and closed ended questions. The open ended questions helped in collecting data on information the influence of livestock farming on the food security, on the production output of and on the socioeconomic status of the smallholder farmers in Chongwe District. These questions gave the researcher an opportunity to explore and clarify issues and collect qualitative data as well. The closed questions helped the researcher to collect quantitative data on identified issues. Of the total sample, 200 participants were selected from households; in this case 40 participants were selected from each community of

Kanakantapa, Chikhuli, Nakatindi and Natindabale and the remainder 40 making up for informants, interview guide and focus group discussion.

Target Population

The target population of this research was smallholder farmers selected from some wards of Chongwe district specifically in Kanakantapa, Chikhuli, Nakatindi and Natindabale. This study specifically looked at Chongwe District local farmers in Lusaka Province.

However, during the collection of data a letter explaining the purpose of the study and aspects of confidentiality and anonymity of respondents will be attached to the questionnaires.

Study Sample

The total sample for this study was 200 respondents which is considered to be sufficiently representative of the population. Of the total sample, 160 participants were selected from households in this case from Kanakantapa, Chikhuli, Natindabale and Nakatindi while 40 participants were the key informants from the same area. Furthermore, four focus group discussions were conducted comprising of men and ranging from 6-8 per group.

Sampling Technique

The research used availability and purposive sampling methods which are non-probability

sampling methods (Ghosh, 1992) in the selection of houses, organisations and respondents from the District. Availability sampling was used in the selection of houses in the study area. From each house hold that was selected, an eligible respondent was interviewed as long as they agree. Availability sampling method was employed in the selection of houses due to non-availability of a sampling frame for most houses in Chongwe area. Purposive sampling was used in the selection of key informants. Similarly, purposive sampling was used in this case in order to select the key informants that would be located in places that may not be near and accessible. Also, it has been pointed out by (Babbie, 2001) that purposive sampling is used when you select your sample on the basis of your own knowledge of the population, its elements and the nature of the research aims, in short based on the judgement and the purpose of the study. The Advantages of purposive sampling are that people who do not fit the requirements are eliminated and it is less expensive as it involves lesser search costs. However, a limitation of purposive sampling is that, it is the responsibility of the researcher to choose participants, there is a possibility that the researcher could be wrong in choosing suitable participants for the study (Gillham, 2000).

Procedure used when approaching participants

The possible research participants were approached and the aims of the study were explained to them. After ensuring that they have understood the information, they were then requested to freely-consent to participate in the study.

Data Processing

Once the data was collected in the field, the filled in questionnaires was edited thoroughly. A well-developed coding scheme was used in order to ensure that data coding follows an unambiguous set of prescriptions of how all possible answers would be treated and what numerical codes would be assigned to particular responses. The function of the coding process would be to create codes and scales from responses which could be summarized in various ways.

Data Analysis

In this study, both qualitative and quantitative data was collected, therefore, qualitative and quantitative data analysis methods will be employed.

Analysis of Quantitative Data

Coding for closed questions was implored during the design of the questionnaires. Open ended questions were coded using themes

which emerged from the data. Similar themes and content categories were given the same codes. The data was then entered on a computer and analysed by means of SPSS computer program. Descriptive statistics was then used to summarize the data into frequencies and percentages where appropriate. SPSS tables was used to export into excel for the generation of more customized tables and graphs, which will then be taken to Microsoft word for the report writing.

Analysis of Qualitative Data

While quantitative data permits patterns of associations between variables, qualitative data offers greater insights into specific thoughts of respondents. Thematic and content analysis will be employed to analyse qualitative data. Using this qualitative analysis technique, the following steps were adhered to by the researcher in the analysis of qualitative data.

Firstly, the researcher had to peruse through the collected data through interviews and identify information that will be relevant to the research questions. Irrelevant information not related to the specific objectives and research questions will be separated from relevant information.

Secondly, the researcher identified themes from the respondents' description of their

experiences. Material relevant to a certain theme will be placed together. Thirdly, the direct quotations were used to present the findings. These direct quotations were used to reflect the deep thoughts and feelings of the respondents on what their perceptions are in relation to the problem under investigation. The relevant information was broken down into key quotations which would reflect specific thoughts of the respondent. The quotations were presented in narrative form.

Qualitative data obtained through key informant interviews and focus group discussions was analysed thematically. This involved extracting of significant statements from the respondents' answers and similar responses will be categorized into themes. It will also involve highlighting "voice" in the text, through significant quotations illustrating the theme that is being described.

Ethical Consideration

The researcher took steps to safeguard the rights, interests and sensitivities of informants. During the course of data collection, the researcher thoroughly explained the aims and the purposes of the study to the informants. Similarly, Strydom (1998: 24) defines ethics as a set of moral principle which is suggested by an individual or group is subsequently widely accepted, and which offers rules and behavioural expectations about the most correct conduct towards experimental subjects and

respondents. The study did not expose respondents to any harm be, it physical, emotional or psychological. The researcher explained to the respondent what the research is all about, and how it would benefit them and other people.

This study required that participants exposed issues that would be considered extremely private. Recognizing that such revelations is going to have far reaching implications for the participants, the principles of voluntary participation and informed consent was implemented during identification of interviewees and their recruitment to the study (Babbie and Mouton, 2001).

3. RESULTS

Introduction

This Chapter presents the findings of the study. The findings are based on the specific objectives of the study. The chapter is divided into two major sections. Section one presents the findings on the effect of livestock farming on the Smallholder farming System with focus on Chongwe District of Zambia. Section Two presents and discusses the findings on how the effect of livestock farming on the Smallholder farming System with focus on Chongwe District of Zambia. The findings of this study are intended to provide a better understanding of the effect of livestock farming on the Smallholder farming System with focus on Chongwe District of

Zambia. The results in this study must be interpreted in relation to its target group and setting, which consisted of the respondents of Chongwe sampled from four different communities, and should not be generalized to all residents in Zambia.

Background characteristics of respondents

Demographic and socio-economic characteristics of respondents have been perceived to have an effect on many aspects of social, economic and political life of individuals (Creswell, 2003). This section presents the demographic and socio-economic characteristics collected for this study which include: age, marital status, education level, household size and household occupation.

Age

The ages of the respondents ranged from 20 to 59 years with a mean age of 35.6 years and a median age of 32 years. The majority of the respondents were aged between 30 and 39 years (34.5%, 69), while 32.5% (65) of the respondents were in their twenties. Only 11% of the respondents were aged 50 years and over at the time of the study. The age groups 20-29 and 30-39, therefore, made up 65.3% (134) of the respondents (see table 4.1).

Marital status

At the time of the study, 66 % (132) of the respondents were reportedly married, 13.5 % (27) were divorced, 12 % (24) were single, 7 % (14) were on separation and 1.5 % (3) were widowed table 4.2.

Education level

In terms of education levels, table 4.3 shows that the levels of education among the respondents were very low. Almost half of the respondents had only attained primary education at 49.5% (99), 24% (48) had attained secondary education, 14.5% (29) of the respondents had attained tertiary education and with only 12% (24) that had never attended education.

Household Size

Table 4.4 shows the size of households from which respondents were selected. The majority of households (33%, 66) had 7 or more members, and only 7.5% (15) had less than three members. The average household size was 6.2 members.

Occupation

In terms of occupation, Table 4.5 shows that (85%, 170) of the respondents were engaged in farming while (10%, 20) were wage employees and (5%, 10) were involved in non-farming activities (pet businesses).

1. Influence of livestock farming on the food security

This section presents the findings of the study with regards the influence of livestock farming on the food security of the smallholder farmers in Chongwe District. Food insecurity occurs when people do not have continued access to a sufficient quantity and quality of food to meet their physiological needs. USAID (1992) defines food security as a situation in which "...all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life."

In this study household food security was assessed by focusing on households engaged in livestock farming in terms of energy/protein food consumed; number of meals eaten per day and part of household income spent on food. Furthermore, in the study area, staple foods included maize, rice, cassava and sweet potatoes. For purposes of this study, on food security was limited to energy and protein providing foods. Figure 1 below shows that the majority of respondents engaged in livestock farming shows that 91% (182) consumed more maize, potatoes, groundnuts and rice (energy providing foods) while the minority 9% (18) indicated consuming less.

It was revealed during focus group discussions that the respondents understood the importance of livestock farming and the

influence it has on food security. One woman stated:

"Everybody knows that livestock farming is the source of livelihood and also food security, in the sense that it is as a result of this farming that we have been able to have access to maize and other foods like potatoes, groundnuts and rice which are rich in energy and protein." (A woman, aged 36, FGD2).

This suggests that livestock farming has a positive influence on house household food security hence meeting energy requirements and thereby by being more food secure.

1.1 Weekly animal protein consumption among households

Further analysis was done to find out about protein consumption per week, Table 4.6 shows the results as cited by respondents regarding protein consumption per week, in this regard most respondents stated that households (40.5%, 81) consume of chicken. Other factors that were cited include; (23.5%, 47) of household consuming beef, household consumption of fish was at (21%, 43), household consumption of eggs being at (18%, 36) and consumption of milk (15.5%, 31) respectively.

"As a result of livestock farming it has basically become possible to have access to nutritious food during week, for example my family is able to eat chickens, eggs, drink milk and also buy nutritious foods like fish ." A Man, aged 44, FGD4)

In line with the above findings URT (2006) reports that most households in Tanzania consume animal protein at least once in a week and 49% of households eat animal protein at least 3 times a week. Therefore, these indicate that, most households consume animal protein, similar to what is generally reported for other households in Chongwe, Zambia. Moreover, the figure for animal protein consumption is higher than the average households' consumption in Chongwe, Zambia.

1.2 Number of meals eaten per day

The recommended feeding frequency regime for an adult is three meals per day and for under five year's children is four to six times per day (UNICEF, 2008). URT (2006) mentioned that among factors that determine food accessibility in the household is feeding frequency. Feeding frequencies of less than the recommended feeding regimes for both adults and under five year's children is considered inadequate (Kavishe, 1993). Most rural agricultural households in Zambia take two meals per day and this is closely followed by three meals per day. Very few households take more than three meals per day or one meal per day. Therefore, figure 3 shows that the majority of the respondents 85 % (170) indicated 5 meals whose children are under the age of 5, while 15 % (30) of the

respondents indicated 3 meals per day. This basically shows that livestock farming has a positive influence on food security of households in Chongwe district.

These results show that the majority of households involved in livestock farming whose children are under five years have access to food. This is an indication of food security in households. Therefore, according to the recommended feeding frequencies, and when under-fives children are considered, the results of this study suggest that households involved in livestock farming are more food secure.

1.2 Part of household income spent on food

Part of household income spent on food is one of the indicators used to assess household food security. Therefore, in this study, household heads were also asked to indicate part of the total household income that is used to purchase food for home consumption. The results are summarised in figure 4.6 below show that the majority of respondents 72% (144) indicated spending less, while the minority 28% (56) indicated high. The results show that the majority of households involved in livestock farming spend less income on food which is basically an indication that they are more food secure.

The study also found that respondents felt it was easy to access food in their area. When asked how easy they think it is for respondents in their area to access food, table 4.7 shows that 35.5% (71) of the respondents stated that it is very difficult while 52.5% (105) stated that it is was very easy, indicating that more than three-quarters of the respondents felt that it is easy for them to access food in their area.

2. Influence of livestock farming on the production/food output of the smallholder farmers

Livestock is globally the mainstay of the agricultural community. It provides 50 percent of the value of agricultural output globally and one-third of the value in developing countries (Nouman *et al.*, 2014). In many African countries as well as in Zambia, many rural households earn a living from livestock farming and consider keeping livestock as a store of wealth (Mandleni and Anim, 2012). Livestock makes a multifaceted contribution to the social and economic development of the rural masses. However, livestock farming is an important component of the agricultural economy, especially in most developing countries (McDermott *et al.*, 1999). Therefore, this study sought to find out the influence of Influence of livestock farming on the production output of the smallholder farmers by specifically focusing on increase in agriculture out and food output.

Agriculture

As an economic activity, agriculture helps the rural poor to achieve food security since majority of them derive their incomes from agricultural production. Specially, this contribution becomes vivid in the case of Sub-Saharan Africa where majority of the people experience highly variable domestic production, limited tradability of food staples and foreign exchange constraints. As a source of livelihood, agriculture provides shelter to 86% of the rural poor. In fact, nearly half of the world population lives in rural areas and most of these depend on agriculture; smallholder households are about 1.5 billion.

Interestingly, the decline in poverty rate of developing countries from 28% to 22% in 2002 is mainly attributed to falling poverty in rural areas; and 80% of the decline in rural areas is related exclusively to better conditions in rural areas. Also, Given the realities that about half of the world's population lives in rural areas and most of these rural dwellers depend on agriculture for livelihoods, "agriculture is likely to be central to rural development and rural poverty alleviation" (Hazell *et al.*, 2007:vii). Hazel *et al* (2007) further state that "farming has high potential to create jobs, to increase returns to the asset that the poor possess- labor and land, and to push down the price of food staples."

2.1 Agriculture Output

The study went on to focus on the influence of livestock farming on agriculture output and in order to do this, respondents were asked to respond to a statement 'I feel livestock farming has increased agricultural output at my farm' this would give an indication of the influence. Therefore, Table 4.8 shows that most of the 66% (132) of the respondents disagreed and 20.5% (41) strongly disagreed to the statement on agricultural output. This shows that almost two-thirds of the respondents did not feel livestock farming had contributed to increased productivity in terms of agricultural output.

When asked about the challenges that hindered increased agricultural output most of the respondents (41.5%, 83) stated poor veterinary interventions which they said is not effective, the animals are diseased there by not being very effective in influencing production output, 39.5% (79) cited poor market price, 31.5% (63) cites drought prevalence which impact negatively on livestock, 26% (52) cited market competition and 10% (20) cited other factors (table 4.9)

These factors also emerged during focus group discussions as the major challenges that hinder increased agricultural output

“Normally livestock farming is supposed contribute towards higher agricultural output, in terms of crops produced, as human labour is replaced by animals, now the problems of poor veterinary interventions and water which are very costly indeed proves to be extremely difficult to have more agricultural output through agricultural farming” (A woman, aged 39, FGD1).

2.2 Food output

Livestock production is key to food output for many farmers in most developing countries, and an increase in livestock production is invariably associated with an increase in livestock numbers (Salem and Smith, 2008). Livestock farming has great potential to alleviate household food insecurity and poverty in communal areas of the world, including South Africa (Musemwa et al., 2008). Livestock may be used as a form of insurance against crop loss in poor weather (Seo et al., 2008). Livestock production contributes to increased food output both directly and indirectly, and plays a crucial role in the livelihoods of almost one billion of the world's poorest people (Smith et al., 2013a). Important products and by-products derived from livestock farming include meat, milk, eggs, manure, feathers, hides and skins,

fibre and wool. Keeping livestock is an important risk-reduction strategy for vulnerable communities, and livestock are important providers of nutrients and traction for growing crops in smallholder systems (Thornton, 2010).

In this study, respondents were asked to respond to statements that would give an indication of increased food output in their communities. 'I feel livestock farming has an influence on increased food output at my farm' this would give an indication of the influence. Therefore, Table 4.10 shows that most of them show that most respondents agreed with this statement, as 63.5% (127) of them stated that they strongly agreed to the statement, 18% (36) agreed, while 10.5% (21) and 5.5% (11) stated that they strongly disagreed and disagreed with the statement. With only 2.5% (5) not sure if at all it influences food output.

“ I feel there is more food that is produced because of livestock farming, mostly food in form of meat, milk, eggs, chicken, goat meat as well as beef, and also not forgetting the vegetables which rely so much on the manure coming from cow dung and the chicken wastes,”(Man Aged 38, FGD 4).

Furthermore, the study attempted to get the extent to which respondents felt livestock farming had an influence on increased food output by asking them to: “To what extent do

you think livestock farming has an influence on increased food output?” The scale of responses ranged from one, which meant *little extent* to five, which meant *great extent*. We compare grouped responses from both male and female respondents in Figure 5.

3. The influence of livestock farming on the socioeconomic status of the smallholder farmers

Socioeconomic status is the social standing or class of an individual or group. It is often measured as a combination of education, income and occupation. Examinations of socioeconomic status often reveal inequities in access to resources, plus issues related to privilege, power and control, (Adler, and Ostrove. 1999). Furthermore, SES has been seen to affect almost all spheres of people's lives in one way or the other including health, education, and the general quality of life. Indeed, the American Psychological Association (2010). Therefore, in our study the unit of analysis regarding socioeconomic status was restricted to income, education, and occupation (employment)

3.1 Income

When respondents were asked to state the amount of income they earn from all sources in a month. Tables 4.11, shows the distribution of respondents by the level of income they earn in a month. The study found

that the respondents' monthly income ranged from K150 to K4800. On average, respondents earned K850 in a month. Fifty percent (100) of the respondents earned K1000 or less and only 9% (18) reported that they earn more than K3000.

Respondents were further asked about their required level of income which would allow them to meet their basic needs. The respondents' required level of income on average was found to be K2700. Table 4.12, shows that almost half of the respondents (48.5%, 97) had desired income of above K3000.

Further analysis revealed that only 18.5% (37) of the respondents felt that the level of income they earn was enough to enable them meet their basic needs. Table 4.13 shows the distribution of respondents who stated that they were satisfied with the level of income they earned and felt secured with regards to their income levels by selected background characteristics.

The study revealed that respondents in the age groups 30-39 and 40-49 felt more secured with their level of income compared to respondents in the younger age group (20-29) and respondents in the older age group (50-59). Further respondents with tertiary education felt more secured with their income (37.9%, 11) compared to respondents with

secondary (33.3%, 16) and Primary education (9.1%, 9). With regards to marital status, respondents who were not in marriage were found to be more secured (single, 29.2%, 7; divorced, 29.6%, 8) compared to married ones (14.4%, 19) (table 4.11).

Additionally, when asked about the extent to which respondents felt livestock farming had influence on income, the majority of the respondents 94% (188) indicated to a greater extent, while 6% (12) cited to a less extent as shown in figure 6 below.

3.2 Education

As shown in the first section of this chapter, education levels were very low among the respondents, indicating that access to education remains a challenge among rural community from Chongwe. The study also reviews that most respondents would have loved to attain higher education but they were unable to do so due to a number of social and economic factors that hindered their access to education. Figure 7 shows that 91% (182) of the respondents reported that they were not satisfied with their level of education and wished to have continued to attain higher education.

It was revealed during focus group discussions that small scale farmers understood the importance of attaining higher education and had a strong passion for

education but the challenges they face hinders them from realizing their dreams. One woman stated:

“Everybody knows that education is key to success, we live here and in these conditions because we did not go to school, not that we didn’t want to go to school but because we were not privileged enough; the long distances to school and we had to spend most of the time doing household chores.”(A woman, aged 36, FGD2)

The study also found that respondents felt it was difficult to access education in their area. When asked how easy they think it is for them in their area to access education, table 4.14 shows that 35.5% (71) of the respondents stated that it is very difficult while 52.5% (105) stated that it is difficult, indicating that more than three-quarters of the respondents felt that it is not easy for respondents to access education in their area.

When asked about the challenges that hinder accessing education in their area, most respondents (41.5%, 83) cited long distances to school, 39.5% (79) cited early marriages, 31.5% (63) cites too much household chores 26% (52) cited failure to see the benefit of completing school and 10% (20) cited lack of finance (table 4.15)

These factors also emerged during focus group discussions as the major challenges that hinder rural women from accessing education.

“Unlike boys, as girls we were not given an opportunity to concentrate on school, boys could be having leisure or attending to school work while we have to perform a lot of work at home; cooking, fetching water and firewood, looking after and caring for the young ones and sometimes are married off early, thus we could have very little time to attend to school, I would definitely say our culture has disadvantaged women when it comes to accessing education.” (A woman, aged 28, FGD1)

In line with the above, when asked about the extent to which respondents felt livestock farming had influence on educating their children and dependants, the majority of the respondents 77% (154) indicated to a larger extent, while 23% (46) cited to a lesser extent as shown in figure 8 below.

“Livestock farming is the main source of livelihoods for many farmers here in Chongwe district, therefore it is through livestock farming that am able to send my children to school, my two boys one being in grade 12 and the younger brother in grade 10 and of course their elder sister is at college in second year pursuing a diploma in nursing and I sponsor them from livestock farming;”(Key Informant; Kanakantapa).

3.3 Employment

In this analysis about 70% (140) respondents were found to be self-employed, 20 % (40) were in some form of paid employment, 6% (12) were reportedly retired while 4% (8) were unemployed (table 4.16).

When it came to the aspect of focusing on the influence of livestock farming on employment, respondents were asked to respond to the statement 'I feel livestock farming influences employment'. Table 4.17 shows that 12 % (24) of the respondents strongly disagreed, 60% (120) disagreed, 18% (36) agreed and 10% (20) strongly agreed. According to the respondents the livestock they keep can easily be looked after by family members hence the aspect of employing others isn't much. They practice small scale livestock farming and its manageable as services are offered by family members.

“Indeed livestock farming influences employment positively in the sense that agriculture is the main stay of the majority of the people in our community, as some farmers have expanded and created employment opportunities for others who are working at the farms and thus contributing towards the enhancements of their livelihoods,

however the situation in our case is different because of the large families we have and are able to offer the service” (A Man, aged 48, FGD2).

4. DISCUSSION OF RESEARCH FINDINGS

This study confirms with most studies which were reviewed, there is a positive effect of livestock farming on the Smallholder farming System with focus on Chongwe District. Specifically in relation to the influence of livestock farming on the food security as those with livestock were more food secure and their socioeconomic status entailed better standard of living of the smallholder farmers but this study further proved otherwise on the production output given the challenges that hinder production output.

4.1 Influence of livestock farming on the food security

Food insecurity occurs when people do not have continued access to a sufficient quantity and quality of food to meet their physiological needs. USAID (1992) defines food security as a situation in which “...all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life.” In this study household food security was assessed by

focusing on households engaged in livestock farming in terms of energy/protein food consumed; number of meals eaten per day and part of household income spent on food. This suggests that livestock farming has a positive influence on household food security hence meeting energy requirements and thereby by being more food secure. Hence results from this study confirms with the findings studies conducted by (Salem and Smith, 2008) who found that Livestock production is the key to food security for many farmers in most developing countries, and an increase in livestock production is invariably associated with an increase in livestock numbers. Livestock farming has great potential to alleviate household food insecurity and poverty in communal areas of the world, including South Africa (Musemwa *et al.*, 2008).

4.2 Influence of livestock farming on the production output of the smallholder farmers

This study sought to find out the influence of Influence of livestock farming on the production output of the smallholder farmers by specifically focusing on increase in agriculture and food output. Therefore, the results show that most of the 66% (132) of the respondents disagreed and 20.5% (41) strongly disagreed to the statement on agricultural output owing to the challenges of poor veterinary services and drought

experienced in the area. This shows that almost two-thirds of the respondents did not feel livestock farming had contributed to increased productivity in terms of agricultural output. Therefore, these results are in line with (Capper, 2013) who found that Livestock farming plays an important role in the agricultural sector for most countries by providing high-quality animal-source foods in conjunction with a myriad of associated economic and social benefits to communities worldwide.

Also, regarding the influence of livestock farming on food output the results shows that most of them show that most respondents agreed with this statement, as 63.5% (127) of them stated that they strongly agreed to the statement that it influenced food output and 10.5% (21) stated that they strongly disagreed with the statement.

Hence confirming what (Smith *et al.*, 2013b; Scholtz *et al.*, 2013) found that livestock also contribute to the food supply by providing manure in contributing to land preparation, providing ready cash to buy planting materials or fertilizer, or to hire labour for planting, weeding, or harvesting and converting low-value materials that are inedible or unpalatable for human consumption into milk, meat and eggs. Furthermore, (Seo *et al.*, 2008) found that Livestock production contributes to food security both directly and indirectly, and plays

a crucial role in the livelihoods of almost one billion of the world's poorest people (Smith *et al.*, 2013a). Important products and by-products derived from livestock farming include meat, milk, eggs, manure, feathers, hides and skins, fibre and wool. Keeping livestock is an important risk-reduction strategy for vulnerable communities, and livestock are important providers of nutrients and traction for growing crops in smallholder systems (Thornton, 2010).

4.3 The influence of livestock farming on the socioeconomic status of the smallholder farmers

Socioeconomic status has been seen to affect almost all spheres of people's lives in one way or the other including health, education, and the general quality of life indeed, the American Psychological Association (2010). Therefore, in our study the unit of analysis regarding socioeconomic status was restricted to income, education, and occupation (employment)

Therefore, regarding income when asked about the extent to which respondents felt livestock farming had influence on income, the majority of the respondents 94% (188) indicated to a greater extent, while 6% (12) cited to a less extent. These results are in line with the findings of Imai (2003) who believes that livestock farming plays an important role

in helping households to cope with negative shocks, because livestock provide diversification of income sources as farmers can easily sell their livestock to get cash.

Additionally, when asked about the extent to which respondents felt livestock farming had influence on education the majority of the respondents 77% (154) indicated to a larger extent, while 23% (46) cited to a lesser extent. However, society can with a great deal of unanimity, agree on to the fact that the path to an economically vibrant, comfortable, successful life must include a higher education. However, by perpetuating systems and structures that cause higher educations to be an unattainable dream, many countries have failed low income communities from accessing decent education levels (Francesco, 2006). The study has shown that access to education was a big challenge among the respondents. Despite most respondents having the desire to attain higher education very few of them would achieve this dream as they faced a number of challenges that hindered their attainment of higher education. The main challenges that were cited as hindering their access to education include; long distances to school, early marriages, too much household chores and failure to see the benefit of completing education and very few cited lack of finance. These factors have also been identified by many studies as hindering access

to education. Chongwe rural is a typical example of rural settings in Zambia, where household chores are an impediment to girl child's education. In such set up, for example girls perform large share of household chores including cooking, fetching water, firewood, caring for the young, the old and the sick as compared to boys more time and less chores thus attaining education. This puts them at a disadvantage when it comes to attaining education.

When it came to the aspect of focusing on the influence of livestock farming on employment, the results shows that 12 % (24) of the respondents strongly disagreed, 60% (120) disagreed, 18% (36) agreed and 10% (20) strongly agreed. Many expressed their satisfaction on the services offered by family and extended family in raising livestock since it's done at small scale level. Further, limited access to decent work has been identified as a major impediment for the advancement of respondents especially women who are rarely hired as farm workers and this proves the notion that in many parts of the world and hinders the possibility for women to live as dignified human beings enjoying equal rights with men. Despite the growth of labour force, participation of women and the intensifying opportunities for women to enter into remunerated work and to become economically independent, it is more and more evident that access to 'decent work' is

becoming a serious issue world over, especially in the developing world (Herath, 2011).

Additionally, the findings in this study are in line with Mutangadura (2011) who ascertains that in developing countries farmers in general continue to face major barriers to successfully attain economic security including difficulties in accessing credit, market information, technology, and infrastructure. He argues that the benefits of farmers in the rural areas accessing decent employment and or successfully running businesses are both economic and social and go beyond allowing families to have access to a decent standard of living to contributing to poverty eradication and economic development.

Income affects every aspect of our lives, from where we live to what we eat, from what we wear to how we get where we are going. Lack of income means doing everything the hard way (Mookherjee and Ray, 2001). In most parts of the developing world, rural people's access to income has been hindered by many social, economic, cultural and political factors. Income levels among these categories of people were found to be very low. The study found that on average, respondents earned K850 from all sources in a month. Only 9% of the respondents earned more than K3000. The study has also shown that on average, respondents stated that they would require K2700 to enable them meet their basic

needs. About 48.5% of respondents had desired income level of above K3000. Only 18.5% (37) of the respondents felt that the level of income they earn was enough to enable them meet their basic needs. The study revealed that older respondents were more likely to feel secured with their level of income compared to women in the younger age group. Further respondents with tertiary education felt more secured with their income compared to respondents with secondary and primary education. With regards to marital status, respondents who were not in marriage were found to be more secured compared to married women.

5. CONCLUSION AND RECOMMENDATIONS

Overview

This chapter comprises of the conclusion and recommendations of the study, the purpose of this study was to investigate the effect of livestock farming on the Smallholder farming System with focus on Chongwe District. Specifically it aimed at determining the influence of livestock farming on the food security of the smallholder farmers in Chongwe District; to investigate the influence of livestock farming on the production output of the smallholder farmers in Chongwe District and last to ascertain the influence of livestock farming on the socioeconomic status

of the smallholder farmers in Chongwe District.

5.1 Conclusion

The study has shown that livestock farming has a positive influence on the Smallholder farming System. This study assessed the influence of livestock farming on the food security of the smallholder farmers; the influence of livestock farming on the production output of the smallholder farmers and lastly the influence of livestock farming on the socioeconomic status of the smallholder farmers in Chongwe District.

The results from the study indicate that livestock farming has a positive influence on household food security hence meeting energy and protein requirements and thereby by being more food secure. Therefore, it's in line with what others have said that livestock farming has great potential to alleviate household food insecurity and poverty in communal areas of the world, including South Africa (Musemwa *et al.*, 2008).

This study sought to find out the influence of livestock farming on food output and most of respondents agreed with this statement, as 63.5% (127) of them stated that they strongly agreed to the statement, 18% (36) agreed, while 10.5% (21) and 5.5% (11) stated that they strongly disagreed and disagreed with the statement. While on production output of

the smallholder farmers by specifically focusing on increase in agriculture output, the results show that most of the 66% (132) of the respondents disagreed and 20.5% (41) strongly disagreed to the statement on agricultural output. This shows that almost two-thirds of the respondents did not feel livestock farming had contributed increased productivity in terms of agricultural output.

The results from the study indicate that socioeconomic status has been seen to affect almost all spheres of people's lives in one way or the other including health, education, and the general quality of life. Indeed, the American Psychological Association (2010). Therefore, in our study the unit of analysis regarding socioeconomic status was restricted to income, education, and occupation (employment)

Therefore, regarding income when asked about the extent to which respondents felt livestock farming had influence on income, the majority of the respondents 94% (188) indicated to a greater extent, while 6% (12) cited to a less extent. Additionally, when asked about the extent to which respondents felt livestock farming had influence on education the results from the study indicate that majority of the respondents 77% (154) indicated to a larger extent, while 23% (46) cited to a lesser extent.

5.2 Recommendations

In this study, the following recommendations are made from the major findings:

5.2.1. The results of this study showed that respondents engaged in livestock farming have more access to income and are food secure. It is therefore recommended encouraging livestock farming as one of the means to improve rural households in Zambia, in terms of income, food security and employment creation

5.2.2. The results of the study have also shown that consumption of energy and protein source foods differ between households engaged in livestock farming. It is therefore recommended to include dairy cattle keeping when planning for strategies of solving malnutrition problems in rural communities in Zambia.

5.2.3. The study also recommends that extension and veterinary services should be strengthened. Extension officers should be well distributed and well equipped with necessary resources, which will enable them to increase their coverage in terms of the numbers of farmers they reach. Extension officers should give timely and professional advice on overall management practices which will assist farmers to improve their livestock activities as well as their standard of living.

5.2.4. The study also recommends that government should provide subsidies for purchase of breeding stock and dosing

products. Distribution policies that will ensure that all smallholder livestock farmers at grassroots level benefit should also be put in place. This should enable smallholder livestock farmers to cope with the high transactional costs associated with purchasing equipment and facilities (e.g. windmills, crawl pens, head clamps, dipping tanks, veterinary drugs and feed supplements).

5.2.5. Education indeed seemed to be a great source of concern for the rural respondents of Chongwe district. Therefore, there is need to ensure the area receive adequate education opportunities; government should sensitise on the importance of education and upgrade learning institutions in the area by building more government schools.

5.2.6. Regarding employment it should be recommended that government should initiate projects that would create employment as it can be seen from projects such as link Zambia 800 and also it should embark on establishing industries in the rural areas based on the type of agricultural activity more dominant in the area as this will result in increased employment opportunities.

5.2.7. Further, it must be recommended that both the institutional and legal frameworks must be reviewed in such a way that issues of gender equality and equity permeate every aspect of the land reform policy, education,

employment as well as income generating and credit facility programmes.

Study Limitations

Lack of monetary incentives for answering the questionnaire discouraged some respondents not to answer the questions. The researcher and the research assistants endeavoured to recruit more possible participants.

Limited financial capacity of the researcher; the limited resources posed a challenge to the smooth operation of the research programme including typing, printing, and transport among other logistics. However, the researcher made sure to work within the budget.

The study was conducted in the rural setting of Chongwe district where the literacy levels among men and women are low, this had the potential to affect the quality of data to be collected. However the researcher employed an adequate number of well-trained research assistants that ensured that the data collected met the set quality standards.

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REFERENCES

- [1] Abdulrazak, S.A., Muinga, R.W., Thorpe, W. and Orskov, E.R. (1997). Supplementation with *Gliricidia Sepium* and *Leucaena Leucocephala* on voluntary food intake, digestibility, rumen fermentation and live weight of crossbred steers offered zea mays stover. *Livestock Production Science*, 49(10):53-62.
- [2] Adhiguru, P., Birthal, P.S. and Kumar, B.G. (2009). Strengthening pluralistic agricultural information delivery systems in India. *Agriculture Economics Research Review*, 22:71-79.
- [3] Adkinson, A. and Adkinson, R. (2013). The *FecB* (Booroola) gene and implications for the Turkish sheep industry. *Turkish Journal of Veterinary and Animal Science*, 37:621-624.
- [4] Ahmad, M., Akram, M., Rauf, R., Khan, I.A. and Pervez, U. (2007). Interaction of extension workers with farmers and radio and television are sources of information in technology transfer: a case study of four villages of districts Peshawar and Charsadda. *Sarhad Journal of Agriculture*, 23(2):515-518.
- [5] Alemayehu, M. (1998). The Borana and the 1991-1992 droughts. A rangeland and livestock resource study. Institute of Sustainable Development, Addis Ababa, Ethiopia.
- [6] Alemayehu, M., Amede, T., Bohme, M. and Peters, K.J. (2012). Increasing livestock water productivity under rain-fed mixed crop / livestock farming scenarios of Sub-Saharan Africa: a review. *Journal of Sustainable Development*, 5(7):1-10.
- [7] Ali, J. (2006). Structural changes in consumption and nutrition of livestock products in India: implication for food security. *Indian Journal of Agricultural Economics*, 61(3):419.

- [8] Amede, T., Tawaradi, S. and Peden, D. (2011). Improving water production in crop-livestock system of drought-prone regions. *Experimental Agriculture*, 47(1):1-5.
- [9] Anaeto, F.C., Asiabaka, C.C., Nnadi, F.N., Ajaero, J.O., Aja O.O., Ugwoke, F.O., Ukpongson, M.U. and Onweagba, A.E. (2012). The role of extension officers and extension services in the development of agriculture in Nigeria. *Woodpecker Journal of Agricultural Research*, 1(6):180-185.
- [10] area of Southern Ethiopia. *Journal of Agriculture and Environment for International Development*, 102:7-33
- [11] ASSOSA zone (Western Ethiopia). *Tropical and Subtropical Agro Ecosystems*, 12:583-592.
- [12] Banda, L.J., Kamwanja, L.A., Chagunda, M.G.G., Ashworth, C.J. and Roberts, D.J. (2012). Status of dairy cow management and fertility in smallholder farms in Malawi. *Tropical Animal Health Production*, 44:715-727.
- [13] Barnes, J., Cannon, J. and MacGregor, J. (2008). Livestock production economics on communal land in Botswana: effects of tenure, scale and subsidies. *Development Southern Africa*, 25(3):327-345.
- [14] Benton, T., Gallani, B., Jones, C., Lewis, K., Tiffin, R. and Donohoe, T. (2012). Severe weather and UK food chain resilience. *Food Research Partnership: resilience of the UK food system subgroup*.
- [15] Blignaut, J., Ueckermann, L. and Aronson, J. (2009). Agricultural production's sensitivity to changes and climate in South Africa. *South African Journal of Science*, 105(1-2):61-68.
- [16] Capper, J.L. (2013). Should we reject animal source foods to save the planet? A review of the sustainability of global livestock production. *South African Journal of Animal Science*, 43(3):233-246.
- [17] Cardoso, L.A. (2012). Environmental and economic impacts of livestock productivity increase in Sub-Saharan Africa. *Tropical Animal Health and Production*, 44:1879-1884.
- [18] Cassini, R., Guerreta, I., Dated, D., Morbin, D. and Pallottino, M. (2008). Traditional systems and development interventions in LVIA experience in Moyale, a pastoral
- [19] Chhabra, A., Manjunath, K.R., Panigraph, S and Parihar, J.S. (2013). Greenhouse gas emissions from Indian livestock. *Climatic Change*, 117:329-344.
- [20] Conference on Innovations in Extension and Advisory Services. Nairobi, 15-18 November 2011.
- [21] Creswell, J.W. (2009) *Research Design: Qualitative, Quantitative and Mixed Approaches*, Thousand Oaks: Sage Publications.
- [22] Creswell, J.W. (2012) *Educational Research: Planning, conducting , and evaluating quantitative and qualitative research(4thed.)*, Upper Saddle River, NJ: Pearson Education.
- [23] Creswell, S. (ed) (2003) *Research design: qualitative, quantitative, and mixed approaches*, Thousand Oaks, CA: Sage Publications, Inc.
- [24] De Han, O., Steinfield, H. and Blackburn, H. (1997). *Livestock and the environment: finding a balance*. Report of a study coordinated by FAO, USAID and the World Bank. FAO publishers, Rome.

- [25] Delgado, C., Rosegrant, M., Steinfeld, H., Ehui, S. and Courbois, C. (1999). Livestock to 2020: the next food revolution. Food, Agriculture and the Environment Discussion Paper 28. International Food Policy Research Institute (IFPRI), Washington DC.
- [26] Department for Environment Food and Rural Affairs (DEFRA). (2013). Farming statistics –livestock at 1 December 2012, in UK and England. A Joint Announcement by the Agricultural Departments of the United Kingdom, March, 13, 2013, United Kingdom. Available from:
- [27] Dobell, D.B., Burke, M.B., Tebaldi, R.L., Mastrandrea, M.D., Falcon, W.P. and Naylor, R.L. (2008). Prioritizing climate change adaptation needs for food security in 2030. Policy Brief 5863 for Program on Food Security and the Environment. February, 01, 2008, Washington.
- [28] Fafchamps, M., Udry, C. and Czulcas, K. (1998). Drought and saving in West Africa: are livestock a buffer stock? *Journal of Development Economics*, 55:273 -305.
- [29] Fan, S., Brzeska, J., Keyzer, M. and Halsema, A. (2013). From subsistence to profit. Transforming smallholder farms. IFPRI Food Policy Report, July 2012, Washington, DC.
- [30] FAO (2008). Climate change adaptation and mitigation in the food and agriculture. Sector. Technical background document from the expert consultation, 5-7 March, 2008 FAO, Rome.
- [31] FAO. (2009). Livestock keepers – guardians of biodiversity. Paper prepared by the Food and Agriculture Organization of the United Nations Animal Production and Health Division, FAO, Rome.
- [32] Food Organization Agency, corporate document repository (2009) *The rights of self-employed rural women*, Available from:
<http://www.fao.org/docrep/005/y4311e/y4311e06.htm> [Accessed: 07 April 2014].
- [33] Food Organization Agency, (2009) *Corporate document repository: The rights of self employed rural women*. Available from <http://www.fao.org/docrep/005/y4311e/y4311e06.htm>
- [34] Food Organization Agency/ United Nations Educational, Scientific and Cultural Organization. (2002) *Education for rural development in Asia: Experiences and policy lessons*. Available from: <http://www.unesco.org/iiep>. [Accessed: 07 April 2014].
- [35] Gill, M. (1999). Meat production in development countries. *Proceeding of the Nutrition Society*, 58:371-376.
- [36] Gill, M., Smith, P. and Wilkinson, J.M. (2010). Mitigating climate change: the role of domestic livestock. *Animal*, 4(3):323-333.
- [37] Glendenning, C.J., Babu, S. and Asenso-Okyere, K. (2010). Review of agricultural extension in India. Are farmers' information needs being met? IFPRI discussion paper 01048. December, 2010.
- [38] Godber, O.F. and Wall, R. (2014). Livestock and food security: vulnerability to population growth and planet change. *Global Change Biology*. doi:10.1111/gcb.12589.
- [39] Gujarati, D.N. (2003). *Basic Econometrics*. New York: McGraw Hill Book Co. New york.
- [40] Hailemariam, F., Melesse, A. and Banerjee, S. (2013). Traditional sheep production and breeding practice in Gamo Gofa zone, southern Ethiopia. *International Journal of Livestock Production Research*, 1(3):26-43.
- [41] Herrero, M., Grace, D., Nsuki, J., Johnson, N., Enahoro, D., Silvestri, S. and Rufino, M.C. (2013). The role of

- livestock in developing countries. *International Journal of Animal Bioscience*, 7:3-18.
- [42] Hinrichs, C.C. and Welsh, R. (2003). The effects of the industrialization of US livestock agriculture on promoting sustainable production practices. *Agriculture and Human Values*, 20(2):125-141.
- [43] <http://www.cop17-cmp7durban.com/en/south-africa-on-climate-change/effects-of-climate-change-on-south-africa.html> [Accessed 23/04/12].
- [44] <http://www.fao.org/ag/AGP/AGPC/doc/counprof/PDF%20files/SouthAfricaEnglish.pdf>. (Accessed 27/04/2014).
- [45] http://www.theidlgroup.com/documents/IDLRedbook_000.pdf (Accessed on
- [46] Hutcheson, G.D. and Sofroniou, N. (1999). *The multivariate social scientist*. London: Sage publications, London.
- [47] Ilea, R. (2009). Intensive livestock farming: global trends, increased environmental concerns and ethical solutions. *Journal of Agricultural and Environmental Ethics*, 22(2):153-167.
- [48] Imai, K. (2003). Is livestock important for risk behavior and activity choice of rural households? Evidence from Kenya. *Journal of African Economics*, 12(2):271-295.
- [49] Intergovernmental Panel on Climate Change (IPCC). (2001). *Climate Change 2001: The Scientific Basis. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge.
- [50] Intergovernmental Panel on Climate Change (IPCC). (2007). *Impacts, adaptations and vulnerability. Fourth assessment report*. Cambridge: Cambridge University Press.
- [51] International Fund for Agricultural Development (2009b). *Livestock and climate change. Livestock thematic papers: Tools for project design*. IFAD publishers, Rome, Italy.
- [52] International Fund for Agricultural Development (IFAD). (2009a). *Livestock and land Livestock thematic papers: Tools for project design*. IFAD publishers, Rome, Italy.
- [53] International Fund for Agricultural Development (IFAD). (2013). *Smallholders, food security, and the environment*, IFAD publishers, Rome.
- [54] Kaimba, G.K., Njehia, B.K and Guliye, A.Y. (2011). Effect of cattle rustling and household characteristics on migration decision and herd size amongst pastoralists in Barlingo district, Kenya. *Pastoralism: Research Policy and Practice*, 1(18):1-16.
- [55] Kumar, A., Staal, S., Elumalai, K. and Singh, D. (2007). Livestock sector in North-Eastern Region of India. An appraisal of performance. *Agricultural Economics Research Review*, 20 (2):255-272.
- [56] Kuriuku, J., Njuki, J., Mbubju, S. and Waithanji, E. (2013). *Livestock ownership and food security. International Livestock Research Institution brief*.
- [57] Lange, G., Barnes, J. and Motinga, D. (1998). Cattle numbers, biomass, production and land degradation in the commercial farming sector of Namibia. *Development Solutions Africa*, 15(4):555.

- [58] Livestock in Development (LID), (1999). Livestock in poverty-focused development. Crewkerne, UK. Available from:
- [59] Lubungu, M., Chapoto, A. and Tembo, G. (2012). Smallholder farmers' participation in livestock markets: the case of Zambian farmers. IAPRI working paper 66. August 2012, Lusaka, Zambia.
- [60] Macharia, P.N. and Ekaya, W.N. (2005). The impact of rangeland condition and trend to the grazing resource of a semi-arid environment in Kenya. *Journal of Human Ecology*, 17(2):143-147.
- [61] Macharia, P.N., Kinyamario, J.I., Ekaya, W.N., Gachene, C.K.K., Mureithi, J.G. and Thurairara, E.G. (2010). Evaluation of forage legumes for introduction into natural pastures of semi-arid rangelands of Kenya. *Journal of the British Grasslands Society*, 65:456-462.
- [62] Macleod, N.D., Ash, A.J. and McIvor, J.G. (2004). An economic assessment of the impact of grazing land condition on livestock performance in tropical woodlands. *Rangel Journal*, 26(1):49-71.
- [63] Majekodunmi, A. (2011). Pastoral livelihoods and the epidemiology of emergent trypanosomiasis on the Jos plateau, Nigeria. PhD thesis. University of Edinburgh.
- [64] Mandleni, B. (2011). Impact of climate change and adaptation on cattle and sheep farming in the Eastern Cape province of South Africa. PhD thesis. University of South Africa, Pretoria.
- [65] Mandleni, B. and Anim, F.D.K. (2012). Climate change and adaptation of small-scale cattle and sheep farmers. *African Journal of Agricultural Research*, 7 (17): 2639-2646.
- [66] Mapiye, C., Chimoyo, M., Dzama, K., Raats, J.G. and Mapekula, M. (2009). Opportunities for improving Nguni cattle production in smallholder farmers' systems in South Africa. *Livestock Science*, 124:196-204.
- [67] Maree, J.G. (ed.) (2007). First steps in research. Van Schaik Publishers, Pretoria.
- [68] Mariara, J.K. (2009). Global warming and livestock husbandry in Kenya: impacts and adaptations. *Journal of Ecological Economics*, 68(7):1915-1924.
- [69] McCosker, T. (2000). Cell-grazing – the first 10 years in Australia. *Tropical Grasslands*, 34:207-218.
- [70] McDermott, J.J., Rondolph, T.F. and Staal, S.J. (1999). The economics of optimal health and productivity in smallholder livestock systems in developing countries. *Scientific and Technical Review of the Office International des Epizooties*, 18(2):399-424.
- [71] McManus, C., Louvandini, H., Paim, T.P., Martins, R.S., Julio, O.J.O., Caio, C., Guimaraes, R.F. and Santana, O.A. (2011). The challenge of sheep farming in the tropics: aspects related to heat tolerance. *Brazilian Journal of Animal Science*, 40:107-120.
- [72] Meena, H.R. and Singh, Y.P. (2013). Importance of information and communication technology tools among livestock farmers: a review. *Scientific Journal of Pure and Applied Sciences*, 2(2):57-65.
- [73] Meissner, H., Scholtz, M. and Palmer, A. (2013). Sustainability of the South African livestock sector towards 2050. Part 1: worth and impact of the sector. *South African Journal of Animal Science*, 43(3):282-297.
- [74] Mogue, T., Cohen, M.J., Birner, R., Lemma, M., Randriamamonjy, J., Tadesse, F., and Paulos, Z. (2009). Agricultural extension in Ethiopia through gender and governance lens. *Ethiopia Strategy Support Programs*

- (ESSP2) Discussion paper No ESSP2007. October, 2009.
- [75] Moll, H.A.J., Staal, S.J. and Ibrahim, M.N.M. (2001). From meat to milk: smallholders' livelihoods and markets. Paper presented at the 12th Symposium of Tropical Animal Health and Production, Dairy Developments in the Tropics. University of Utrecht.
- [76] Molua, E.L. (2002). Climate variability, vulnerability and effectiveness of farm-level adaptation options: the challenges and implications for food security in South Western Cameroon. *Environmental Development Economics*, 7(3):529-545.
- [77] Morgan, E.R. and Wall, R. (2009). Climate change parasitic disease: farmer mitigation? *Trends in Parasitology*, 25(7):308–313.
- [78] Morton, J.F. (2007). The impact of climate change on smallholder and subsistence agriculture. *Proceedings of the National Academy of Sciences (PNAS)*, 104(50):19680-19685.
- [79] Moyo, B.H.Z. (2010). The use and role of indigenous knowledge in small-scale agricultural systems in Africa: the case of farmers in northern Malawi. PhD thesis. University of Glasgow.
- [80] Munyai, F.R. (2012). An evaluation of socio-economic and biophysical aspects of small-scale livestock systems based on a case study from Limpopo province: Muduluni village. PhD thesis. University of the Free State, Bloemfontein.
- [81] Mupawenda, A.C., Chawatama, S. and Muvavarirwa, P. (2009). Gender issues livestock production: a case study of Zimbabwe. *Tropical Animal Health and Production*, 41(7):1017-1021.
- [82] Murad, W.M., Rafiqul, I.M., Mazlin, B. and Murad, A.R. (2010). Climate change and agricultural growth: an examination of the link in Malaysia. *International Journal of Climate Change Strategies and Management*, 2(4):403-417.
- [83] Musemwa, L., Mushunje, A., Chimonyo, M., Fraser, G., Mapiye, C. and Mchenje, V. (2008). Nguni cattle marketing constraints and opportunities in the communal area of South Africa. *African Journal of Agricultural Research*, 3(4):239-245.
- [84] Mwangi, J.G (2013). Developing a vibrant livestock industry in East Africa through market driven research. *Journal of US-China Public Administration*, 10(6):608-617.
- [85] National Department of Agriculture (NDA). (2009). National livestock statistics – August 2008 and May 2009. Newsletter on national Livestock Statistics. National Department of Agriculture, Pretoria, South Africa.
- [86] National Department of Agriculture (NDA). (2013). National livestock statistics – August 2012 and May 2013. Newsletter on national Livestock Statistics. National Department of Agriculture, Pretoria, South Africa.
- [87] Ngigi, M. (2005). The case of smallholder dairying in Eastern Africa. International Food Policy Research Institute (IFPRI). Environment and Production Technology Division Discussion Paper 131. February, 2005.
- [88] Nouman, W., Basra, S., Siddiqui, M., Yasmeen, A., Gull, T. and Alcayde, M.A.C. (2014). Potential of Moringa Oleifera L. as livestock fodder crop: a review. *Turkish Journal of Agriculture and Forestry*, 38(1):1-14.
- [89] Ntshepe, L. (2011). Marketing information needs of smallholder

- livestock farmers in the Moretele area in the Bojanala Platinum district municipality of the North-West province. MSc Thesis. University of South Africa, Pretoria.
- [90] Nyariki, D.M., Mwang'ombe, A.W. and Thompson, D.M. (2009). Land-use change and livestock production challenges in an integrated system: the Masai-Mara ecosystem, Kenya. *Journal of Human Ecology*, 26(3):163-173.
- [91] Ouma, E.A. (2003). An analysis of the economic value of cattle in smallholder livestock production systems in western Kenya. MSc Thesis. Egerton University, Kenya.
- [92] Ouma, E.A., Obare, G.A. and Staal, S.J. (2004). The socio-economic dimensions of smallholder livestock management in Kenya and its effects on competitiveness of crop-livestock systems. Paper prepared for presentation at the Naro Conference on Integrated Agricultural Research for Development: Achievements, Lessons Learnt And Best Practice. September 2004, Kampala, Uganda.
- [93] Palmer, T. and Ainslie, A. (2006). Country pasture/forage resource profiles South Africa. FAO, Rome Available from:
- [94] Papachristoforou, C. and Markou, M. (2006). Overview of the economic and social importance of the livestock sector in Cyprus with particular reference to sheep and goats. *Small Ruminant Research*, 62(3):193-199.
- [95] Patra, A.K. (2012). Enteric Methane Mitigation technologies for ruminant livestock: a synthesis of current research and future direction. *Environmental Monitoring and Assessment*, 184:1929-1952.
- [96] Peden, D., Tadesse, G. and Haileselassie, A. (2009). Livestock water productivity: Implications for sub-Saharan Africa. *The Range Land Journal*, 31, 187-193.
- [97] Pittock, B. (ed.) (2003). *Climate change: an Australian guide to the science and potential impacts*. Australian Greenhouse Office.
- [98] Premaratne, S., Premalal, G.G.C. and Jayawardena, V.P. (2003). Sustainable management of grassland resources in ruminant livestock resources in Sri Lanka. *Tropical Agricultural Research Extension*, 6:60-65.
- [99] Projected change in climate thresholds in the Northern US: implications for crops, pest, livestock and farmers. *Mitigation and Adaptation Strategies for Global Change*, 13(5-6):555-575.
- [100] Rae, A. (2008). China's agriculture, smallholders and trade: driven by the livestock revolution? *Australian Journal of Agricultural and Resource Economics*, 52(3):283-302.
- [101] Randolph, T.F., Schelling, E., Grace, D., Nicholson, C.F., Leroy, J.L., Cole, D.C., Demment, M.W., Omere, A., Zinsstag, J. and Ruel, M. (2007). Invited review: role of livestock in human nutrition and health for poverty reduction in developing countries. *Journal of Animal Sciences*, 85:2788-2800.
- [102] Rees, C. (1997) *Doing qualitative research: A practical handbook*. Thousand Oaks, CA: Sage Publications.
- [103] Reid, H., Sahlen, L., Stage, J. and MacGregor, J. (2008). Climate change impacts on Namibia's natural resources and economy. *Climate Policy*, 8(5):452-466.
- [104] Revero, H.H. (2013). *Developing the Theoretical and Conceptual Framework*. London: SPSS Press.
- [105] Roger, P.A. (2008). The impacts of diseases and disease prevention on sheep welfare. *Journal of Small Ruminant Research*, 76(1):104-111.

- [106] Rutherford, A. (2001). *Introducing ANOVA and ANCOVA: a GLM approach*. London: Sage Publications.
- [107] Ryschawy, J., Choisis, N., Choisis, J.P., Joannon, A. and Gibon, A. (2012). Mixed crop livestock systems: an economic and environment friendly way of farming? *Animal*, 6(10):1722-1730.
- [108] Salem, B.H. and Smith, T. (2008). Feeding strategies to increase small ruminant production in dry environments. *Journal of Ruminant Research*, 77:174-194.
- [109] Scholtz, M.M., Van Ryssen, J.B.J., Meissner, H.H. and Laker, M.C. (2013). A South African perspective on livestock production in relation to greenhouse gases and water usage. *South African Journal of Animal Science*, 43(3):1-9.
- [110] Schultze, M.S., Rischkowsky, B., Da Veiga, J.B. and King, J.M. (2007). Cattle are cash-generating assets for mixed smallholder farms in the East Amazon. *Journal of the Agricultural System*, 94:738-749.
- [111] Scollan, N., Moran, D., Joong Kim, E. and Thomas, C. (2010). The environmental impact of the meat production system. Report to the International Meat Secretariat. July, 2nd, 2010.
- [112] Seo, S.N., Mandelsohn, R., Dinar, A. and KuruKulasuriya, P. (2008) Differential adaptation strategies by agro-ecological zones in African livestock management. Policy Research Working Paper 4601. April, 2008, Washington.
- [113] Seré, C. (2009). Livestock, food and climate change. *Issues*, 89:40-43.
- [114] Seré, C., Steinfeld, H. and Groenewold, J. (1995). World livestock systems. Current status, issues and trends. *FAO Animal Production and Health*, Paper No 127. Rome, Italy.
- [115] Silvestri, S., Bryan, E., Ringler, C., Herrero, M. and Okoba, B. (2012). Climate change perception and adaptation of agro-pastoral communities in Kenya. *Regional Environment Change*, 12:791-802.
- [116] Slingo, J.M., Challinor, A.J., Hiskins, B.J. and Wheeler, T.R. (2005). Introduction: food crops in a changing climate. *Philosophical Transactions of the Royal Society Series B*, 360:1983-1989.
- [117] Smith, J. Tarawali, S., Grace, D. and Sones, K. (2013a). Feeding the world in 2050: trade-offs, synergies and tough choices for the livestock sector. *Tropical Grasslands – Forages Tropicales*, 1:125-136.
- [118] Smith, J., Sones, K., Grace, D., Macmillan, S., Tarawali, S. and Herrero, M. (2013b). Beyond meat, milk and eggs: role of livestock in food and nutrition security. *Animal Frontiers*, 3(1):18.
- [119] South African Government information. (2012). About SA. South Africa's provinces. Available from: www.info.gov.za/aboutsa/province.html [accessed 23/05/12].
- [120] Statistics South Africa (2013). Mid-year population estimates 2013. Statistics South Africa, Pretoria.
- [121] Steinfeld, H., Gerber, P., Wassenaar, T., Castel, V., Rosales, M. and De Haan, C. (2006a). *Livestock's long shadow: environmental issues and options*, FAO.
- [122] Steinfeld, H., Wassenaar, T. and Jutzi, S. (2006b). Livestock production systems in developing countries: status, drivers, trends. *Revue Scientifique et Technique (International Office of Epizootics)*, 25(2):505-516.

- [123] Steinfeld, H. (2004). The livestock revolution: a global mission. *Veterinary Parasitology*, 125(1-2):19-41.
- [124] Steinfeld, H. and Maki-Hokkonen, J. (1995). A classification of livestock production system. *World Animal Review*, 83-94, FAO, Rome.
- [125] Teklu, B., Negesse, T. and Angassa, A. (2010). Effects of farming systems on floristic composition yield and nutrient content of forages at the natural pasture of
- [126] Thomas, D. and Rangnekar, D. (2004). Responding to increasing global demand for animal products: implications for livelihood of livestock producers in developing countries. *British Society of Animal Science*, 33:1-36.
- [127] Thornton, P.K. (2010). Livestock production: recent trends, future prospects. *Philosophical Transaction: Biological Sciences*, 365(1554):2853-2867.
- [128] Tibbo, M. (2002). The opportunities and challenge of enhancing goat production in East Africa. *Proceedings of a conference held at Debub University, Awassa, Ethiopia*:92-106.
- [129] Todd, S., Milton, S.S., Dean, R., Carrick, P and Meyer, A. (2009). Ecological best-practice livestock production guidelines for the Namakwa district. *Karoo Consortium June 2009, Draft 1*.
- [130] Tolera, A. and Abebe, A. (2007). Livestock production in pastoral and agro-pastoral production systems of Southern Ethiopia. *Livestock research for rural development*, 19(12). Available from: <http://www.lrrd.org/lrrd19/12/tole19177.htm> [Accessed 4/4/2014].
- [131] Trollope, W.S.W., Trollope, L. and Bosch, O.J.H. (1990). Veld and pasture terminology in Southern Africa. *Journal of the Grassland Society of South Africa*, 7(1):52-61.
- [132] Turpie, J., Wrinkler, H., Spalding-Fecher, R. and Midgley, G. (2002). Economic impacts of climate change in South Africa: a preliminary analysis of unmitigated damage costs. *Research paper. Southern Waters Ecological Research and Consulting and Energy and Development Research Centre. University of Cape Town, Cape Town, South Africa, February 2002*.
- [133] Umrani, A.P. (2000). Role of livestock production in economy. *Pakistan Economic Review (05318955)*, 31(2):27.
- [134] UNECA. (2011). Agricultural water management in the context of climate change in Africa. *African Climate Policy Centre Working Paper 9. November, 2011*.
- [135] United Nations. (2009). *Millennium Development Report 2009*. New York. Available from: http://www.un.org/millenniumgoals/pdf/MDG_Report_2009_ENG.pdf
- [136] United Nations. (2011). Effects of climate change on South Africa. *United Nations Framework Convention on Climate Change*. Available from:
- [137] Uzma Ambreen, N.A., Mian Mudasalqbal, S. and Ikramkhan, S.U. (2013). Impact of livestock on growth of agriculture sector and GDP. *International Journal of Information, Business and Management*, 5(4):195-208.
- [138] Van de Pol, R. and Jordaan, J.J. (2008). The fodder bank system: its current place in veld management. *Grassroots*, 8(1):36-44.
- [139] Vithanage, U.Y.W., Gunaratne, L.H.P., Kumara, M.M.B.P and Cyril, H.W. (2014). Comparison of technical efficiency and socio-economic status in animal-crop mixed farming systems in any lowland in Sri Lanka. *Asian Journal*

- of Agriculture and Rural Development, 4(1):128-141.
- [140] Vonnahme, K.A. (2012). How the maternal environment impacts fetal and placental development: implications for livestock production. *Journal of Animal Reproduction*, 9(4):789-797.
- [141] Warburton, H., Blake, R., Coupe, S., Pasteur, K. and Phillips, E. (2011). Bridging the gap between resource-poor performers and extension services: the roles of community-based extension systems. Paper presented at the International
- [142] Wilson, R.T. (2007). Status and prospects of livestock in production in the Laos People's Democratic Republic. *Tropical Animal Health and Production*, 39(6):443-452.
- [143] Wolfe, D.W., Ziska, L., Petzoldt, C., Seaman, A., Chase, L. and Hayhoe, K. (2008).
- [144] Wreford, A. and Adger, W.N. (2010). Adaptation in agriculture: historic effects of heatwaves and droughts on UK agriculture. *International Journal of Agricultural Sustainability*, 8(4):278-289.
- [145] Wuebbles, D.J. and Hayhoe, K. (2004). Climate change projections for the United States Midwest. *Mitigation and Adaptation Strategies for Global Change*, 9(4):335-363.
- [146] www.gov.uk/government/uploads/system/uploads/attachment_data/file/183227/defra-stats-foodfarm-landuselivestock-farmstats-dec2012-130314.pdf.

Tables and figures

The table below indicates a justifiable reason for the need to enhance livestock farming in Chongwe District which is part of Lusaka Province.

ESTIMATES OF LIVESTOCK POPULATION IN MAJOR LIVESTOCK PROVINCES IN ZAMBIA

Province	Cattle	Sheep	Goats	Pigs	Poultry
Southern	825,540	63,905.00	368,001	85,458	838,557
Lusaka	58,134	1,794.00	41,557	9,208	1,608,594
Central	434,489	215,293.00	12,992	169,709	4,094,870
Eastern	291,645	168,449.00	17,445	242,270	812,565
Subtotal	1,609,808	449,441	439,995	506,645	7,354,586

Table1.Source: **Source FAOSTAT, 2010**

Fig 2. Conceptual Framework



Source: Adapted by Author 2017

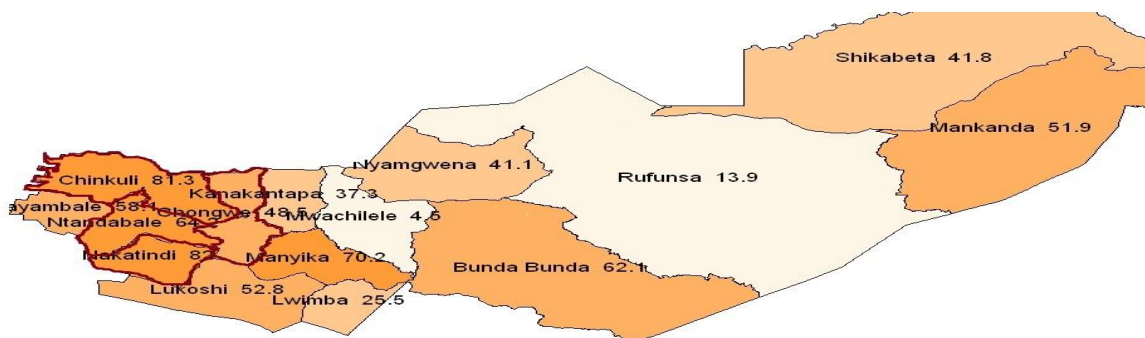


Fig 1: Chongwe District Map, with all its wards indicated. Source; Chongwe Council

Age	Count (n=200)	%
20-29	65	32.5
30-39	69	34.5
40-49	43	21.5
50-59	23	11.5
Total	200	100

Table 4.1: 1 Distribution of respondents by age

Marital Status	Count (n=200)	%
Single	24	12
Married	132	66
Divorced	27	13.5
Separated	14	7
Widowed	3	1.5
Total	200	100

Table
Distribution of respondents by marital status

4.2:

Education	Count (n=200)	%
None	24	12
Primary	99	49.5
Secondary	48	24
Tertiary	29	14.5
Total	200	100

Table
Distribution of respondents by education level

4.3:

Household size	Count (n=200)	%
1-2	15	7.5
3-4	56	28
5-6	63	31.5
7 and over	66	33
Total	200	100

Table 4.4: Distribution of households by size

Occupation	Count (n=200)	%
Farming	170	85
Wage employee	20	10
Non-farm activities	10	5
Total	200	100

Table 4.5: Distribution of respondents by occupation

Protein consumption	Count (n=200)	%
Eat Chicken	81	40.5
Eat Fish	43	21.5
Eat eggs	36	18
Eat Beef	47	23.5
Drink Milk	31	15.5

Table 4.6: Distribution by protein consumption per week

Response	Count (n=200)	%
Very easy	105	52.5
Easy	15	7.5
Don't know	3	1.5
Difficult	6	3
Very difficult	71	35.5

Table 4.7: Respondents' to access food

<i>Response</i>	<i>Count (n=200)</i>	<i>%</i>
Strongly agree	3	1.5
Agree	17	8.5
Not sure	7	3.5
Disagree	132	66.0
Strongly disagree	41	20.5

Table 4.8 distribution by influence of livestock farming on agriculture output

<i>Hindrance</i>	<i>Count (n=200)</i>	<i>%</i>
Poor veterinary interventions	83	41.5
Drought prevalence	63	31.5
Poor market price	79	39.5
Market competition	52	26
Other	20	10

Table 4.9: Factors hindering agricultural output

<i>Response</i>	<i>Count (n=200)</i>	<i>%</i>
Strongly agree	127	63.5
Agree	36	18.0
Not sure	5	2.5
Disagree	11	5.5
Strongly disagree	21	10.5

Table 4.10: Distribution by influence of livestock farming on food output

<i>Income earned</i>	<i>Count (n=200)</i>	<i>%</i>
Less than 500	49	24.5
501 – 1000	51	25.5
1001 – 1500	26	13
1501 – 2000	23	11.5
2001 – 2500	15	7.5
2501 – 3000	18	9
Over 3000	18	9
Total	200	100

Table 4.11: Levels of income among the respondents

<i>Desired Income</i>	<i>Count (n=200)</i>	<i>%</i>
1000 -1500	18	9
1501 – 2000	24	12
2001 – 2500	26	13
2501 – 3000	35	17.5
3001 – 3500	45	22.5
3501 – 4000	31	15.5
Over 4000	21	10.5
Total	200	100

Table 4.12: Desired level of income among the respondents

<i>Age</i>	<i>Count (n=200)</i>	<i>%</i>
20-29	5	7.7
30-39	17	24.6
40-49	10	23.3
50-59	5	21.7
Education		
None	0	0.0
Primary	9	9.1
Secondary	16	33.3
Tertiary	11	37.9
Marital status		
Single	7	29.2
Married	19	14.4
Divorced	8	29.6
Separated	3	21.4
Widowed	0	0.0
Total	37	18.5

Table 4.13: Respondents who felt secured with their level of income

<i>Response</i>	<i>Count (n=200)</i>	<i>%</i>
Very easy	6	3
Easy	15	7.5
Don't know	3	1.5
Difficult	105	52.5
Very difficult	71	35.5

Table

4.14:

Distribution by access education

<i>Hindrance</i>	<i>Count (n=200)</i>	<i>%</i>
Long distances to school	83	41.5
Early marriages	63	31.5
Too much household chores	79	39.5
Failure to see the benefit school	52	26
Lack of finances	20	10

Table 4.15: Factors hindering access to education

<i>Employment status</i>	<i>Count (n=200)</i>	<i>%</i>
Paid employment	40	20
Unemployed	8	4
Self employed	140	70
Retired	12	6

Table 4.16: Employment status of the respondents

<i>Response</i>	<i>Count (n=200)</i>	<i>%</i>
Strongly agree	20	10
Agree	36	18
Not sure	0	0.0
Disagree	120	60
Strongly disagree	24	12

Table 4.17: Influence of livestock farming on employment

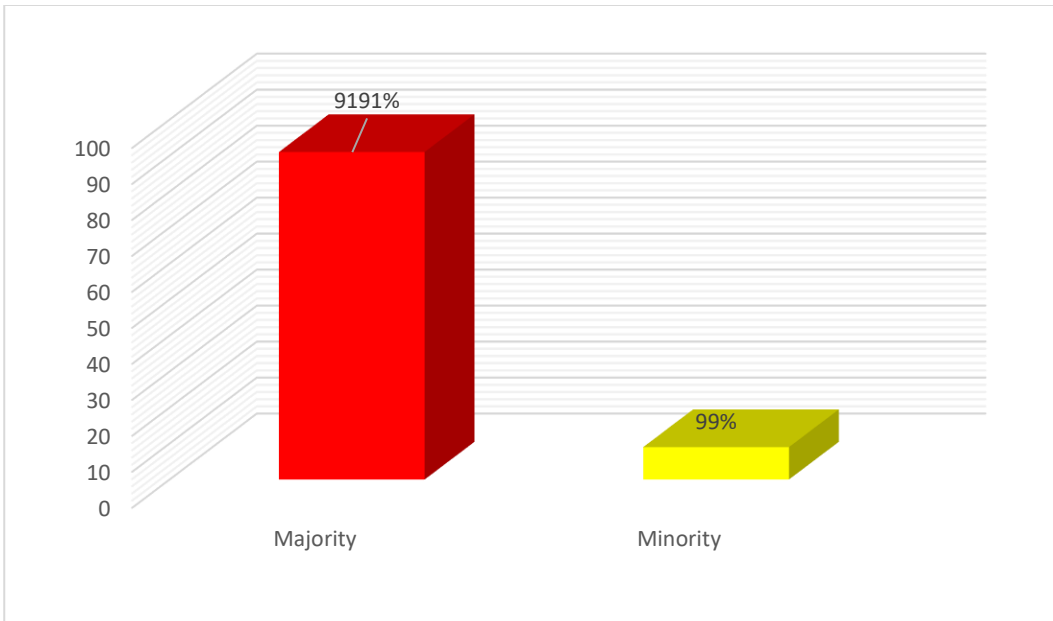


Figure .2 : Distribution by energy/protein food consumed

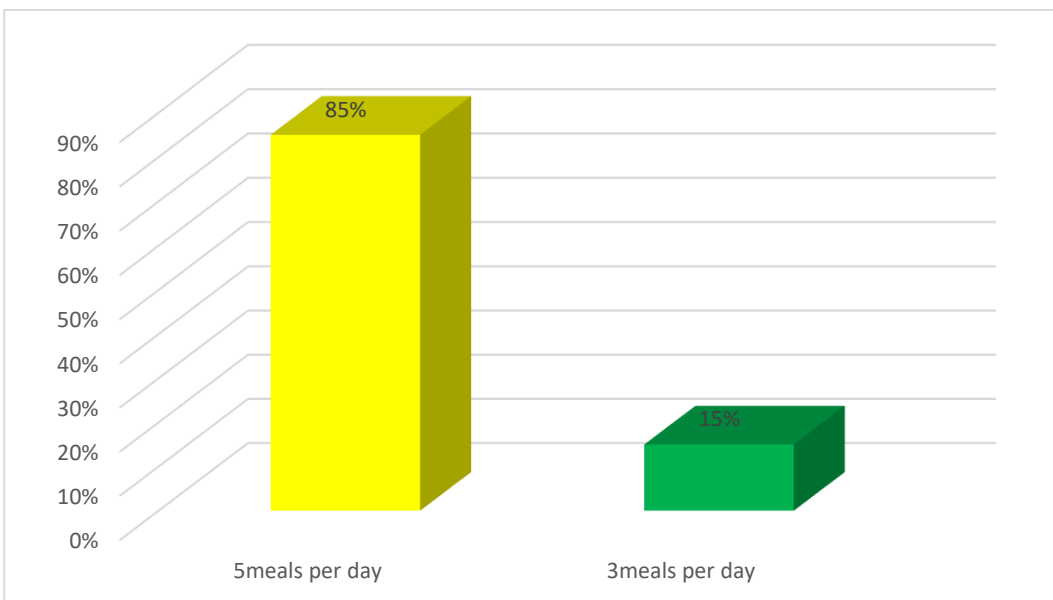


Figure 3: Distribution by number of meals per day

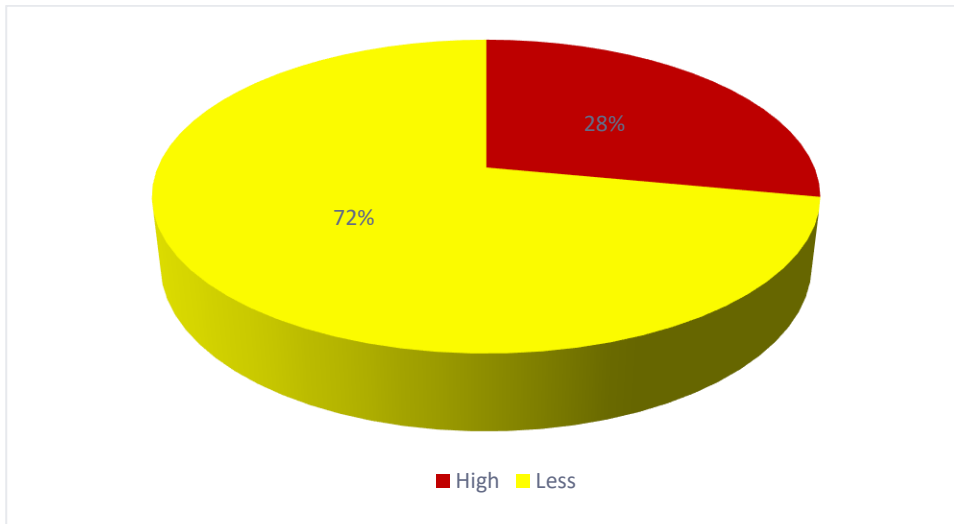


Figure 4: Distribution by household income spent on food

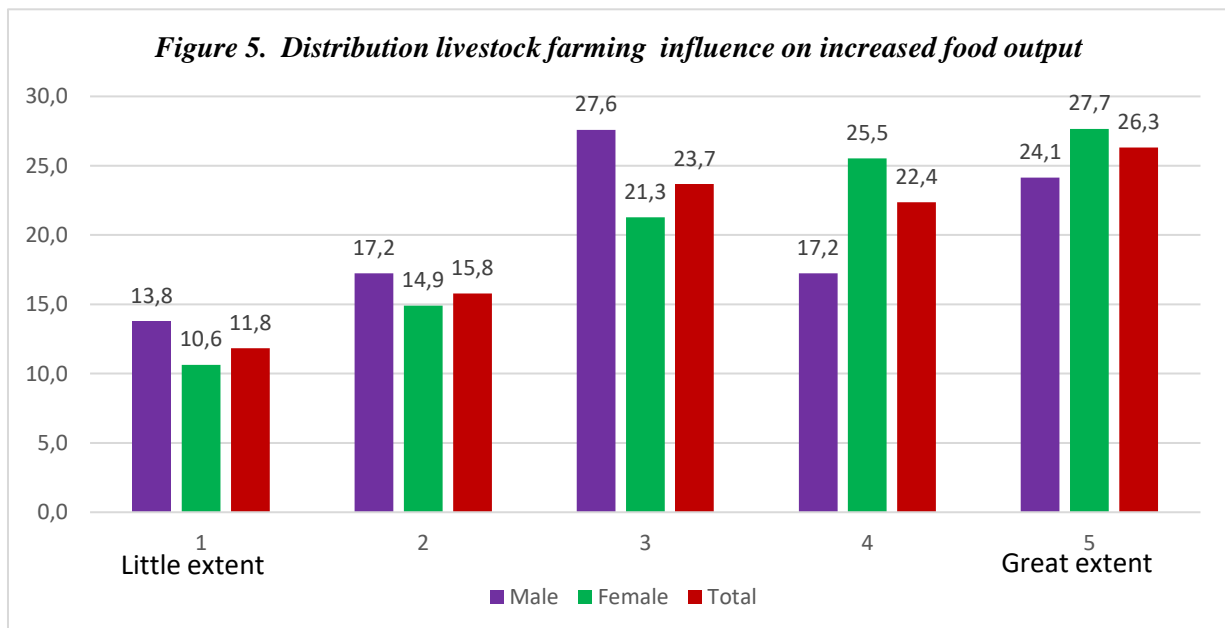


Figure 5. Shows that the responses are skewed towards 'great extent' as the means were 3.2 for females, 3.4 for males and 3.3 for the total.

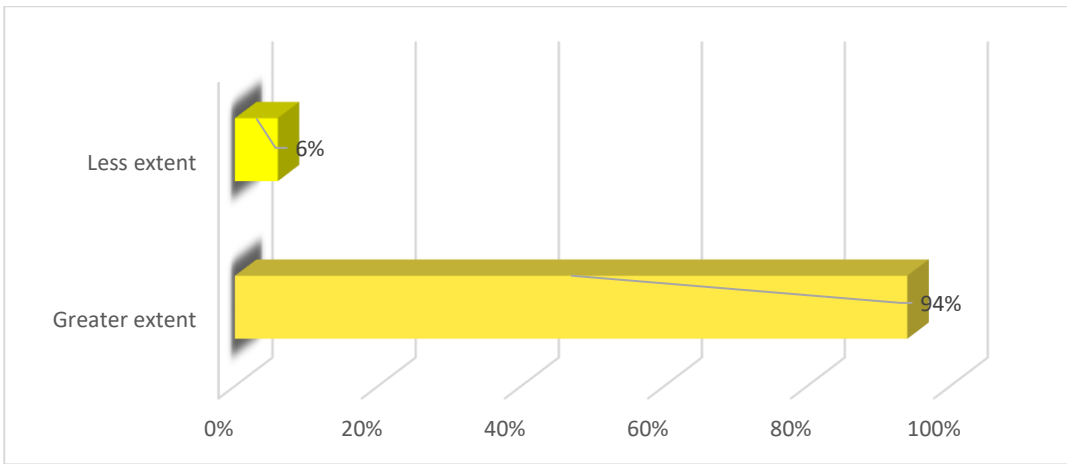


Figure 6: Influence of livestock farming on income

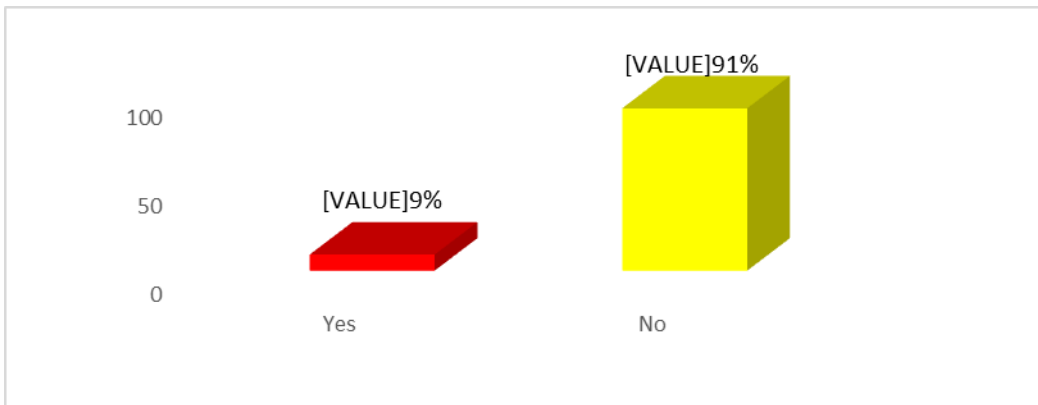


Figure 7: Satisfaction with the level of education attained

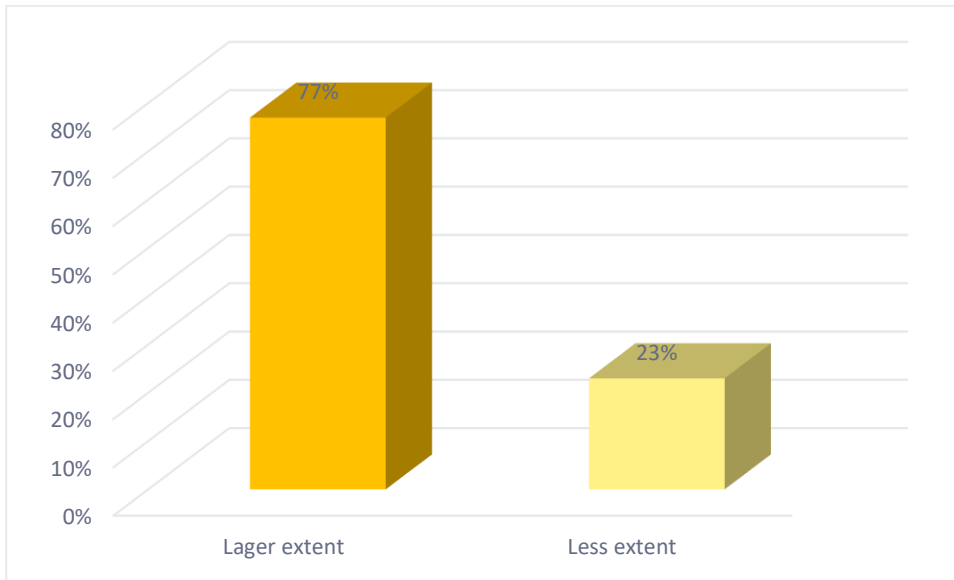


Figure:8. Distribution by influence of livestock farming on education