BINDURA UNIVERSITY OF SCIENCE EDUCATION

DEPARTMENT OF AGRICULTURAL ECONOMICS, EDUCATION AND EXTENSION

CATTLE OFFTAKE AS A LIVELIHOOD BASED INTERVENTION TO BUILDING RESILIENCE IN PERIODS OF DROUGHT: THE CASE OF WARD 15 MBIRE DISTRICT.

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REQUIREMENTS OF THE MASTER OF SCIENCE DEGREE IN FOOD SECURITY

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DECLARATION

I hereby declare that the research project entitled 'Cattle offtake as a livelihood based intervention to building resilience in periods of drought: the case of Ward 15 Mbire District' submitted to Bindura University of Science Education, Department of Agricultural Economics, Education and Extension is a record of an original work done by me under the guidance and supervision of Prof. C. Gadzirayi, and this work is submitted in partial fulfilment of the requirements for the award of a Master of Science Degree in Food Security and Sustainable Agriculture. The results embodied in this thesis have not been submitted to any University or Institute for the award of any degree or diploma.

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DEDICATION

This study is dedicated to my son, Tichaona Jnr, who was a source of inspiration throughout my research.

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ABSTRACT

The study concentrated on the analysis of socio-economic factors affecting cattle offtake in Mbire District. The study sought to discover the variables which matter most on cattle offtake during periods of drought. This was done through a survey. The technique used to gather data included observation, interviews through a semi-structured questionnaire and use of official data. Price and herd size were found to have a positive effect on the number of cattle sold, so were age, other livestock kept and household size, though to a lesser extent. Recommendations were an auctioning system in marketing of cattle that result in attractive prices, the building of cattle herds and strengthen production of goats. Effectiveness of private and public institutions in the area was found to be an area needing further studies.

Key words

cattle offtake, household, resilience

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LIST OF ACRONOMIES/ABRVIATIONS

FAO : Food and Agriculture Organisation

SPSS : Statistical Package for the Social Sciences

ILO : International Labour Organisation

ZRBF : Zimbabwe Resilience Building Fund

TANGO : Technical Assistance to Non-Governmental Organisation

ZIMSTATS : Zimbabwe National Statistics Agency

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CHAPTER ONE: INTROCUCTION

1 CHAPTER INTRODUCTION

Chapter one outlines the background to the study and highlights the problem giving rise to the research. Aims and significance of the study are given in this chapter.

1.1 BACKGROUND TO THE STUDY

Poverty cycles, if not broken, contribute significantly to the continued suffering of rural populace. In Sub Saharan Africa, 60% of the population is found in rural areas. (The World Bank, 2018). Most of the rural people have very limited, and in some cases no access, to financial income. Their dependence is on farming. (FAO. 2018). Their sources of livelihoods are not strong enough such that any disturbance to the originating source of these livelihoods erodes their survival base. Once the sources of livelihoods are disturbed, going back to the levels that had been attained before calamities occurred is difficult. Communities are taken back to poverty that they are trying to emancipate themselves from. Governments, international development lenders and policy advisers have undervalued rural areas such that 60 per cent of rural people live in extreme poverty. (ILO, 2014).

As a result of geographical location of rural communities, such areas have been marginalized in terms of education, technology, information, and development at large. Literacy levels are low such that comprehension of the current trends of livelihoods are not well understood. According to FAO, (1998), an educated and informed populace is fundamental to any policies and strategies to reduce poverty, excessive population growth, environmental degradation and other factors that are most often the direct causes of hunger.

The vicious cycle of poverty is magnified by the lack of shock absorbers. If households or communities do not have other sources of survival once the only means are grounded or fail to take appropriate measures when faced by a disaster, it then follows that all that had been build or set up, and that forms livelihoods foundation, is also affected. This means building afresh the means of survival, hence taken back to dire poverty.

Rural communities in Zimbabwe are characterized by dry areas such as Chiredzi, Mbire, Rushinga and Mangwe. Such areas receive very low rainfall in the region of 400mm – 600mm per annum. Thus, shocks such as drought leave them with minimal rains to sustain crop production in the absence of water reserves. Livelihoods in such areas are predominantly farming that is comprised of animal husbandry and crop production. Of the crop production, it is noted that mostly one or two types of crops are grown commercially. For instance, in Mbire, cotton is the main cash crop grown. Other small grains are grown but production is hampered by seasonal dry spells. Same is apparent with animal husbandry where one enterprise such as goat production or cattle production is practiced. When that one enterprise is affected adversely by shocks or stresses, then the households are thrown into poverty and recovery becomes a major challenge, depending on their sensitivity and differential vulnerability to shocks and stresses.

As of 2014, Mashonaland Central Province had 302 725 cattle and 219 155 goats in communal areas. (ZIMSTAT 2015). Seasonal deficiency in feed quality and quantity particularly during the second half of the dry season is the major constraint to communal livestock production. (Masikati 2010), cited by Tavirimirwa *et al* (2013).

In Mbire, peoples' livelihoods are mainly the growing of cotton as a cash crop in most wards and cattle ranching in some wards mainly those that border Muzarabani and Mavuradonha Range, while goat rearing spreads across the wards. According to TANGO International, (2016), as the primary source of household savings, livestock represent a key asset, and one that contributes to household resilience to and recovery from drought in Mbire. Other activities that are carried out by households include growing of small grains, honey production (part of Kanyemba), and picking of wild fruits mainly *masau* and *mauyu*. In events of disaster strikes, people in Mbire are adversely affected, unlike people in similar areas. Households in Mbire have fairly low levels of existing resilience capacity for dealing with drought, and with shocks/stresses generally. (TANGO International, 2016)

Observation by the researcher, and confirmations by the local veterinary service provider is that households along the border with Mozambique, when faced with insufficient pasture and limited water supplies illegally drive their cattle into Mozambique and return when pastures and water situations improve, usually on onset of the next rainy season, as a

coping strategy. However, this does not benefit the majority of farmers who are far from the border and who do not have relatives across the border, whom they can give custodianship of the livestock as do others. It was also observed that the other option that they adopt is to do nothing and observe their livestock dying with minimum offtake, possibly due to lack of appreciation of opportunity cost.

One of the ways of solving such problems in livestock production is offtake. Selling stock helps in many ways that include reducing competition for the little pastures and water that is available. The exercise also helps in that it generates income for the households, which can then be used to procure food and other necessities for the household members. The income so generated can form an adaptive capacity: use the income to venture into some unrelated enterprises. The income generated from the sale of animals can be used to procure conventional feed to serve the remaining livestock especially the breeding stock.

Unexpectedly, smallholder farmers in Mbire are reluctant to sell livestock in face of limited pastures and safe drinking water. As highlighted earlier, due to the climatic conditions and geographical location of Mbire, ventures that give income stability and food security are limited in the area. As such, an alternative is to build absorptive capacities and try to maintain the existing livelihoods. In order for market linkages and other infrastructure necessary for the smooth marketing of livestock under situations of shocks to be arranged, there is need to understand the dynamics surrounding the reluctance of farmers to practice livestock offtake when pastures and water sources dwindle.

1.2 STATEMENT OF THE PROBLEM

Farmers in Mbire experience severe calamities mainly droughts. Drought affects their farming activities in a number of ways that include low to nil yields, limited water for livestock, limited pastures, potential for disease outbreak for livestock, and poor nutritional foods for households. In respect of livestock, lack of adequate feeds and drinking water affect their health and this may lead to disease outbreak and low reproduction capabilities. Thus, following period of shocks, in light of limited breeding stock, recovery in building cattle herds take a very long time. To make matters worse, another disaster may strike during this long period of asset rebuilding hence reducing further the chances of full recovery. However, no concrete understanding of the factors that hinder smallholder

farmers in Mbire from cattle offtake during periods of limited water and pastures induced by droughts, hence the need for this research. Understanding the determinants of cattle offtake and use of the proceeds as shield for disaster effects will go a long way in shaping the necessary assistance that can be rendered to the affected farmers. Mbire District, that was identified as a priority district for ZRBF initiatives by TANGO International (2016) has high rates of poverty, stunting, and food insecurity, hence the need to identify the motive behind avoidance of cattle offtake. Lack of proper cattle management practices contributes to weak resilience for Mbire communities.

1.3 OBJECTIVES OF THE STUDY

Main objective

The main objective of the study was to analyse the determinants of cattle offtake by smallholder farmers in Mbire Ward 15 community in building resilience.

Specific Objectives

i) to characterize households that are into livestock production,
ii) to describe alternative cattle management systems that help build resilience in periods of disasters, and
iii) to analyse the factors influencing cattle offtake, and the reasons for holding on to livestock, at household level during periods of drought.

1.4 RESEARCH QUESTIONS

In order to achieve the objectives of the study, the research sought to answer the following questions:

i) What are the attributes of households that are into livestock production in Ward 15 Mbire District?
ii) What are the cattle management practices employed by farmers during periods of drought?
iii) What factors significantly influence cattle offtake in Mbire District?

1.5 HYPOTHESIS

The decision to destock cattle is influenced by age of the household head. As age catches up with him/her so is the reluctance to practice cattle offtake. Young people are quick to make decisions and comprehend that destocking helps in building resilience

1.6 SIGNIFICANCE OF THE STUDY

Literature states that stressed livestock cannot effectively go on heat, hence affecting production. Therefore, maintaining a huge herd that is stressed does not add value. Furthermore, the livestock lose weight and cannot fetch good prices. Such livestock are susceptible to disease attack and may die, which is a total loss to the farmer, hence eroding the asset base of the farmer that is necessary for resilience. It can be a double tragedy in that those animals that die are the ones for reproduction, thereby complicating efforts to regain footing in livelihoods.

Limited numbers of animals help in reducing competition for the little pastures and water that remain. If offtake is done through sale of livestock, income generated can be used to secure other nutritional food for the household, hence prevaricating the sale of household assets that include family land, building materials on hand meant for further development, stocks of inputs such as fertilizers that were purchased or donated, and small livestock such as traditional chickens meant for family sources of protein. (However, it was noted that following the 2015/2016 season, access to formal safety nets tended to prevent households from engaging in asset reduction strategies in Mbire. (TANGO International, 2016)). Managing the livestock herds is important for resilience in periods of disasters. Thus , given the changing climatic conditions being experienced nowadays and the economic hardships faced, there is need for farmers to have solid fall back initiatives should a disaster strikes. Offtake through selling serve as a store of value for replacement of livestock in future, during normal seasons, and this helps farmers with footing in getting back to their livelihoods. As such, the research will contribute significantly to the building of a think tank in terms of resilience related to livestock in Mbire community when disasters strike. Cattle offtake is a key livestock management issue that is not given the attention that it deserves across the animal husbandry culture.

The research explored the factors that affect the decision to practice offtake; findings expected to help policy makers in shaping strategies that aim to change the mindsets of community members or for identification of institutional assistance and/or reforms needed, to increase resilience. A community is a system with interdependent parts: people, institutions, infrastructure and many more. There is need for coordination of the parts for the system to create an environment for conducive attainment resilience approach to development. The government has realized the need to destock by encouraging farmers through extension officers, to destock slightly in order to be able to generate funds to purchase feed to ensure that the remaining livestock stay healthy and productive. The Standard (2019). Thus, this research will augment such efforts.

TANGO International (2018), states that predominant use of cash transfers in Mberengwa versus in-kind food assistance in Mbire suggests that resilience-building initiatives need to consider the specific contexts in which they will operate and identify the best modality for that context. Conversely, there is need for understanding the motive(s) for holding on to livestock; hence, this research will contribute significantly to resilience through proper livestock management practices like cattle off take at the right time. Furthermore, the identification and understanding of the systemic constraint will enable productive use of resources at all stakeholder levels as far as cattle management practices are concerned.

The research findings will also help farmers realize the importance of cattle offtake when the detriments have been dealt with at various levels (institutional/community/household) depending on the nature of the determinants as the research will establish. When appropriate measures have been taken after targeting efforts to dealing with or handling the determinants of cattle offtake as will be noted, farmers' resilience will be improved.

Non-governmental organisations and other independent players are known for their generosity in giving food handouts. This is a welcome move as it provides nutritious food in times of need. However, when these organisations pull out at the end of their projects, households are left exposed to poverty. Going back to livelihoods levels that had been reached before the disaster is difficult. Therefore, assistance to households that takes into cognizance the household resource endowments is crucial. This research will help such

organisations in channeling their aid towards livestock management that encompasses cattle offtake, as this is one of the cornerstone of peoples' livelihoods in Mbire Ward 15.

1.7 SCOPE AND LIMITATION OF THE STUDY

Livestock management encompasses many activities. The scope was limited to demographic and socio-economic practices as variables that influence the size of herds of cattle that are manageable with the little resources available in periods of drought, and the timing of implementing the decision to maintain such herd sizes. Furthermore, the study focused on factors that are controllable by farmers and not considering those which are external. This would help farmers build resilience, as they would able to rebuild their herds from the healthy small herds that remain, with no or limited external help. Therefore, not all management practices were considered and not all livestock types were looked at. The research was limited to Mbire District Ward 15: results may be inferred to farmers in other areas with similar socio-economic conditions.

Due to the limited resources in light of the geographical area concerned and number of farmers, it was not be possible to interview all the farmers. Therefore, sampling as explained in Chapter 3 was done.

1.8 ORGANIZATION OF THE REPORT

This study report is structured into five chapters. Chapter one gives the background to the study and outlines the aims of the research. Chapter two sets literature review and focuses on cattle production under small-scale farm setup. Methodology and means used to analyze data are given in chapter three. Chapter four outlines research findings and includes a discussion on the findings while conclusions to the report and recommendations are stated in chapter five.

1.9 CHAPTER SUMMARY

This chapter outlined the background to the study, statement of the problem and research questions. The chapter ended with significance, scope and limitations of the study.

CHAPTER TWO: LITERATURE REVIEW

2 INTRODUCTION

In the analysis of cattle offtake as means of building resilience in communal areas, it is prudent to review literature on households and their cattle production systems, and sound cattle production in general. Chapter two gives the theoretical framework of cattle production for resilience capacity building and resilience building in general. Five broad categories make up this chapter with the first part focusing on definitions of terms and the second on the theoretical framework on animal production. The third part is on characterization of small holder farmers while the forth part deals with empirical studies to cattle production practices that help build resilience in smallholder farming communities. The fifth part is on insights from literature.

2.1 DEFINITIONS

Agriculture, Forestry and Fisheries Department RSA, (2012) defines smallholder farmer as a farmer who grows or rears animals for subsistence. The smallholder farmer is characterized by small pieces of land and limited resources. There is reliance on mainly family labour.

FAO (2017) defines resilience as the ability of people, communities or systems that are confronted by disaster or crisis to withstand damages and to recover rapidly. Therefore, following a shock or stress, households and communities should be in a position of quickly going back to levels that they had attained (or even better) before the disaster.

Livelihoods are means of making a living and includes the various activities and resources that enable households to live. Chambers and Conway, cited by FAO (2007) states that a livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, in an environment that does not deplete natural resources.

Chitea and Dona (2017), defines a rural household as a unit consisting of one or several physical persons that have some similarities in general, and living together. These persons share the resources that they have and the other features is that they obtain agricultural products principally for consumption. Thus from their explanation of a household, it is

noted that there are some linkages amongst family members. It is also deduced that there is dependence on one another and as a unit is kept intact by some values and norms.

2.2 THEORETICAL FRAMEWORK ON CATTLE MANAGEMENT

2.2.1 IMPORTANCE OF CATTLE PRODUCTION

Monda (2018), identifies several functions of cattle and these include provision of milk, meat and hides for domestic use or sell, tillage, manure, and transport, serve as investments and savings, ritual purposes, ceremonial functions, and social status. This was echoed by Musemwa *et al* (2010) that rural households depend on cattle for their milk, meat, horns and income. Monda (2018) concurs with FAO (2020) that in years of drought or some other domestic crisis, the cattle are turned into cash in order to cope up with the effects of a disaster. Musemwa *et al* (2010) further state that cattle are not adversely affected by inflation hence form a good investment.

Moyo, a communal farmer in Lupane, cited by FAO (2020) reiterates the notion that livestock is a family asset that requires a joint decision in selling. This is in line with the findings of Chitea and Dona (2017) that a household is a unit made up of persons with some ties. Tavirimirwa *et al* (2013), point that cattle is a source of income to rural households; income is obtained through sale of livestock and animal products. Cattle production and the processing of products from cattle create employment. Maburutse *et al* (2012) cited by Tavirimirwa *et al* (2013), say that cattle play a crucial role in socio-cultural function through use as payment for *lobola* and appeasement of ancestors.

2.2.2 LIVESTOCK PRODUCTION SYSTEMS

Sere and Steinfield, cited by FAO (2010) have classified world's livestock sector based on the degree of integration with crops into three distinct categories: grazing systems, mixed farming systems, industrial systems and global overlays.

Drought is imparting negatively on livestock production. Hit most are rural farmers who cannot afford the expensive supplementary conventional feeds. There is a call for farmers to make use of the natural grazing land. While farmers are being urged to double the size of their herds, the availability of water and pastures is a constraint. The revived Cold Storage Commission quoted by Mwayera (2019), encourages farmers to adopt innovative

measures such as feeding cattle with crop residues during the period September to November when natural postures are most affected. The crop residues would have been cut or gathered in winter.

Bell (2018) identifies a three-part process of destocking, with the first part looking at the price of supplementary feed against the time of feeding, the second part being the environmental component comprising of the effect on pastures and water while the third part deals with the stressful process of selling the breeding stock. Resilience is vital and has to be based on sound economic and business related considerations.

Mwayera (2019) identifies four challenges in cattle production that are inbreeding, unethical behaviour of dealers, diseases and climate change. A suggestion was made of the crop stock cut during the rainy season and kept for feeding purposes during the dry season.

2.2.3 NON-CONVENTIONAL FEEDS

Sontakke *et al* (2014) describes non-conventional feed resources as those feeds that have not been traditionally used in animal feeding and or are not normally used in commercially produced rations for livestock and include single cell proteins, and feed material derived from agro industrial by-products of plant and animal origin, by-products such as from slaughter-house and processing of sugar, cereal grains, citrus fruits and vegetables from the processing of food for human consumption. Various factors affect their use despite being readily available, less costly, and less competition with human beings.

There is no proper or organised production in some cases and therefore cannot be processed into feed. Furthermore, processing then into feed is very difficult because of the material makeup of the raw materials. For instance, sweet potato vines and cassava peels are characterized by very low dry matter content and drying is not easy·

Small farmers who form the backbone of traditional agriculture in communal farming areas have neither the resources and knowledge nor the quantity of residues to make any individual impact. Even if they were to grow crops that give residues that can be used as non-conventional feed, the yields would be very low compared to quantities that may be

needed to feed the animals. Sontakke *et al* (2014). However, communal farmers who face challenges in procuring conventional feeds and who keep small herds of animals, those low yields can go a long way in solving that livestock protein feeds.

The availability of the sources in terms of time, location, seasonality and storage also affects the use of non-conventional feeds. The material for use is not enough especially in communal areas. Shortage of the material is accelerated by climate change events such as droughts and floods.

Non-conventional feeds have high concentration of anti-nutritional factors that hinders their use. Ariaya, (2018), describes anti nutritional factors as chemical constituent of feedstuffs that interferers with the normal digestion, absorption and metabolism of feeds, some of which may have dexterous effects on the animal's digestive systems. It is not yet known how these anti-nutritional variables can be removed.

Some of the non-conventional feeds are obtained from moist material. Mold growth such as aflatoxins in groundnuts residues may cause toxicity. (Sontakke *et al*. 2014). This may affect the health of animals hence there is fear amongst some farmers on the use of such material.

Digestibility is another factor that affects the use of non-conventional feeds. Some material is characterized by high fiber content making their digestibility by animals difficult. However, the majority of feeds of crop origin are bulky poor-quality cellulosic roughages with high crude fiber and low nitrogenous content, which are suitable for feeding mostly ruminants.

At times costs of collection of the material to be used as animal feed can be very high. For instance, collecting and transporting potato vines for onward processing as feed. They may need to be dried first. There is also the cost of storage. All these and other factors related to costs limit use of non-conventional feeds in livestock production. (Sontakke *et al*. 2014)

Despite being readily available in some communities, there appears to be competition with other uses. The advent of conservative farming is calling for the retention of these

crop residues in the fields, plus the addition of other inorganic material into the soil. Thus, crop residues is being left in the filed for use as soil cover and mulch, which limit their use as animal feed.

2.2.4 CULLING AS MEANS OF REDUCING CATTLE HEAD

Culling is the elimination or removal of undesirable animals from the herd for various reasons. In communal beef herd, culling is done for reasons that are over and above those for commercial farmers. Culling in communal farming areas is done as a result of animal health. If the animal's health deteriorates to a point at which recovery is doubtful, culling is done.

In communal areas, farmers expect to build and sustain a beef herd from the existing animals. A sterile animal is subject of culling. Due to biological makeup of the animal, it may be sterile. (Ansari-Lary, 2012) Such animals are subjects of culling, because one of the reasons for keeping the animals in communal areas is breeding with surplus being sold as source of income. Additionally, a cow may be able produce calves but failing to raise them. Culling is also done for such animals. Normally culling is through selling and replacement or exchange usually for young cows

Culling is also done as a result of some irregularities in the animal. (Jaśkowski, 2011).The irregularities may be on legs, body or head. For instance, a beast may have deformed or loose horns that make grazing difficult. In communal areas, grazing land is normally shared and some physical characteristics may make it difficult for the animal to mix well with the rest, hence culling of such animals is done.

Farmers need animals that grow bigger to the size of the breed in stock for them to realise good returns from the livestock production. An animal that has stunted growth is culled. For beef production, weights are very important. Stunted growth may be due to poor nutrition at young age. There is therefore need to for farmers to ensure that their animals especially at young age get nutritious feeds.

An animal is culled if suffering from an incurable disease. (Ansari, 2012). There are some diseases that are not curable like the foot and mount disease and in such cases, farmers do not have options except to do culling.

Injury is one of the factors that lead to culling. An animal that becomes disabled through say a fractured led or rib is subject of culling. Accidents happen from various activities like dipping, driving livestock to pastures, when drinking water and so on. Injuries are also a result of weapons that are used by cattle herders in controlling the animals. It is necessary that the cattle herders avoid taking actions that result in injuries to animals like use of stones, logs, bricks and so on; practices that are common in communal areas. (Ansari. 2012)

Animals are also culled if they produce undesirable characteristics in the offspring. (Carpenter. Hart. 2014). This is common to bulls due to in breeding. Furthermore, breeding stock is culled if it has outlived its useful life.

2.2.5 INTERLINKAGES BETWEEN LIVESTOCK PRODUCTION AND CLIMATE CHANGE

Climate change is a change in the pattern of weather, and related changes in oceans, land surfaces and ice sheets, occurring over time scales of decades or longer. Climate change related events are rising sea levels, extreme heat, changes in rainfall patterns, and more frequent intense weather conditions such as droughts, hurricanes and floods.

Animal production is based on natural pastures in Zimbabwe especially in communal areas. Climate events such as droughts are destroying these natural pastures. Floods also have a negative impact on pastures as happened in Chimanimani where vast of top soil was washed away. Giampiero *et al*. (2018) highlights that shorter rainfall seasons result in loss of pastures for animal production: pastures degrade, as livestock is moved from some places to other areas deemed less affected. This results in overstocking in these new areas causing land degradation. Pastures in such areas quickly run out.

Livestock production in face of climate change leads to land degradation. (Giampiero *et al*. 2018). Climate change events result in the destruction or disturbance of ground cover

such as vegetation. Livestock, in search of feed loosen the already exposed soils and in the process, subjecting land to soil erosion through running water and wind. Furthermore, the frail vegetation is destroyed by animals easily thereby accelerating of natural resources and ecosystems.

Climate change related events such as hurricanes destroy vegetation such as leafs of shrubs and small trees. These leaves are necessary in feeding small livestock such as goats. Areas of Matebeleland South such as Maitengwe and Plumtree have good numbers of goats that feed on leaves of shrubs and trees.

Livestock require water for drinking. Some require water for cooling themselves. On the other hand water is becoming scarce due to climate driven factors such as drought. (FAO. 2011). In some parts of the country it becomes scarce such that it is no longer available nearby. This affects animal production that require fresh, clean water. In communal areas where the majority cannot drill boreholes, farmers have to drive their animals over long distances and some animals fail to make it. This also has an effect on the health of animals that are not being well fed due to lack of feed as a result of climate change.

Animals can drink dirty water. However, it is ideal to give then clean water. Animals when drinking water can take up dirty water aide in the spreading of diseases and parasites as these. Climate change events may deplete the sources of clean water for animals and the available sources may contain dirty water, especially in communal areas. (Masana, 2012).

When a commodity becomes scarce, there is usually competition for it and not all parties can equally benefit. (Sarkwa *et al*. 2016). Same is true for water resource that result in animals and humans competing for it. In some areas of Muzarabani and Mbire Districts, it has been observed that people open shallow wells along the riverbeds and guard or secure the source by thorny tree branches so that animals dot not get access to the water. All such activities have negative impacts on animals.

2.2.6 CHANGES IN BEEF PRODUCTION IN ZIMBABWE

There was focus on intensive commercial farming during colonial and after colonial period. This was associated with exploitation of lucrative marketing opportunities. There followed a change in land tenure and use that saw land reforms being implemented in which large scale farmers were being appropriated to indigenous farmers practicing commercial farming. As this was being implanted, there was a fall in the national diseases control measures and resulting in stoppage of exports. (Bennett B *et al*. 2019)

According to the same Bennett B *et al* (2019) the majority of beef cattle herd is in the hands of small-scale farmers that rely on communal farming land for production. Offtake rates are low and continue to decline as farmers hold on to their cattle for several reasons that include economic uncertainty, use of herd as risk aversion strategy, cultural purposes for draught power. The size of the animal weight has also gone down from 200kgs to 167kgs.

2.3 ATTRIBUTES OF FARMERS THAT ARE INTO LIVESTOCK PRODUCTION

2.3.1 CHARACTERISTICS OF RURAL HOUSEHOLDS THAT ARE INTO FARMING

As highlighted later in this discussion, there are many forms of livestock production. In communal areas, there is reliance on family labour in livestock management. This extends to the decisions that are made on grazing, feeding, and offtake. The household is therefore key in livestock production in rural areas. It is therefore important to describe a household.

World Bank (2008) states that the key issue is to enhance collective action and mobilize policy that improves the chances of success of rural households from poverty. World Bank (2008) - further argues that the resource endowments of rural households are low and have been so for many years, and shocks usually reduce these resources that are already limited leading to households adopting low risk and low return economic activities as result of failure to cope up with shocks.

Rural households do not have other means of recovery from natural disasters that affect their livelihoods apart from selling productive assets that include livestock (FAO, 2020).

There is therefore need for multisector approach to widen the ability of farmers to cope with effects of disasters, such as climate smart agriculture. Example of such interventions is the climate smart agriculture in which FAO has trained 141000 households, that has resulted in households securing their livelihoods in the face of natural disasters. (FAO, 2020).

As alluded to earlier, the management of livestock in communal areas is influenced by the makeup of a household. In addition, the household's decision is influenced by the roles of cattle as preserved by the households and community at large.

Gender refers to the social attributes and opportunities associated with being male and female and the relationships between women and men, and girls and boys, as well as the relations between women and those between men. There is a misconception in explaining gender: gender is taken as referring to women yet it refers to both women and men. Women are mentioned often in gender issues because they are or have been the most vulnerable in societies.

In Africa, 80% of the agricultural production comes from small farmers, who are mostly rural women. Women comprise the largest percentage of the workforce in the agricultural sector, but do not have access and control over all land and productive resources (Ajadi *e*t *al* 2015).

Small farm production is increasingly unattractive to males who too frequently abandon agriculture in favour of better remunerated work in other sectors, leaving women to make a living on often degraded land (FAO, 2012). Men generally utilise their spare time drinking beer, gambling or other activities which do not add value to the agricultural production chain.

2.3.2 CATTLE MANAGEMENT SYSTEM PRACTICES EMPLOYED BY FARMERS DURING PERIODS OF DROUGHT.

Scoones (2019) in a study of cattle production in Masvingo noted that some parts of the country soon after the resettlement exercise, communal farmers would move their cattle to resettled relatives in the resettlement areas. Links between rural and communal farmers were lost due to time lapse as such the loaning out of animals ended. This resulted in

cattle in the communal areas competing for the little pastures available. The study also revealed that cattle offtake is very low, with sales being triggered by economic hardships. This is attributable to the small herds that farmers have.

In a study carried out in Gwanda and Nkayi, Dube *et al* (2014) notes that for communal farmers in dry regions to improve livestock offtake, there is need to increase cattle and goat production. The study further notes that in so doing, there is need to improve livestock quality to generate more income and this can be achieved through supplementary feeding through use of crop residue and fodder production. The study suggests that mechanization can reduce use of cattle as draft power for cropping, hence use them for income generation. On the marketing side, same study suggests an improvement in the market infrastructure and the building of trust in markets.

In respect of the Gwanda communal area, Dube *et al* (2014) argue that farmers prefer sale pen management, direct sales to meat processors and auctioning systems as means of earning higher incomes from their livestock. Emphasis is livestock fattening for improved marketing opportunities.

Chawatama *et al* (2005) highlights several characteristics of communal livestock farmers. Males generally head the households. The average age is fifty years while the average household size is ten in Chikomba and seven in Matobo. Farm experience ranges from an average of 2 years to 18 years in Matobo, Kadoma and Chikomba. This is not materially different from the findings of Dube *et al* (2014) in a study of Nkayi and Gwanda in which the average age of the farmer is fifty years and household size is six.

Findings of Chawatama *et al* (2005) and Dube (2014), in separate studies, show that cattle are for men while small livestock such as goats are for women, and cattle are considered the basis of recovery should a disaster strike. In other words, cattle are a store of wealth. Supplementary feeding is mainly use of crop residues.

Bennet *et al* (2018) classifies Zimbabwe cattle farming into three: fully communal, characterized with subsistence mixed farmer relying on shared grazing land; partially communal/commercial practices by relocated farmers on shared grazing and limited

intensive production techniques; and fully commercial characterized by semi intensive with commercial gain as the motive.

2.3.3 CATTLE OFFTAKE BY SMALL HOLDER FARMERS

Enkono *et al* (2013) argues that to understand cattle offtake by small scale farmers, there is need to appreciate first the reasons why the farmers dispose of their cattle. They also observed that older farmers are likely not to sell cattle. The older farmers prefer keeping the cattle for prestige purposes also for gain.

Musemwa *et al* (2010) noted that in households that have males as households the cattle off-take was low compared to households that have females as heads. It was further noted that the availability of markets and resultant high prices were a stimulus for cattle offtake.

Motiang (2017), in a study of factors influencing offtake rates of small holder farmers identified age as the major component contributing to decision to sell.

Money realized from sell of livestock can be used to buy feeds and/or invested in some activities that sustains the livelihoods of the households. FAO (2020) noted that in Somali Region of Southeastern Ethiopia, many farmers used the money received from sell of livestock during drought to purchase productive assets such as animal feed or donkeys that are critical in transporting water across long distances and reduce the burden on women to carry out the activity.

Dube *et al* (2014) in a study of Nkayi and Gwanda crop and cattle production noted that one of the reasons for low cattle offtake was that during drought farmers prefer to hold on to stock for breeding purposes. Thus, the fear of losing out on herd rebuild makes them hold on to their livestock.

In a study of Chawatama et al (2005), farmers highlight livestock markets as a challenge and the low prices on the market. Dube *et al* (2014) indicate that in Gwanda, the famers preferred taking their livestock direct to abattoirs as noted by Dube (2014). However, there are challenges in this avenue. The farmers in Mbire once tried to bypass the traders but found the going tough as noted by Murendo and Sinkula (2010) in their analysis of livestock trading in Mbire District. They highlight that farmers in Mbire encountered challenges related to transport, late payment, grading, hidden costs and risks, and on

other end abattoirs had problems in dealing with large number of clients, payment mode, business interactions, quality and consistency.

Musemwa *et al* (2008) highlights transaction costs a hindrance to cattle farmers from active participation in markets.

Ruhangawebane (2010), in a study of factors affecting the level of commercialization among cattle keepers in the pastoral arears of Uganda, notes that farmers keep cattle as a store of value and are motivated to see the herds grow, with sales being pushed by economic hardships to cover immediate needs. Market information is also cited as an obstacle to cattle offtake; lack of it forming mistrust amongst the players. The same study reveals that distance to market, information on markets, sex of the household head, and price have positive and insignificant effect while education, pastures other sources of income, road condition are significant and have a negative effect on cattle.

Tavirimirwa *et al* (2013) state that cattle farming in communal areas is characterized by herding during the day with penning during the night, no or less limited control mating as cattle from different pens graze as one herd, use of crop residue as supplementary feeds with limited commercial feeds, poor body condition and limited productivity. Also cited in the same study, as constraints, are diseases and parasites, poor livestock management, quality of animal feed and management of livestock market.

2.3.4 EMPIRICAL STUDIES ON FACTORS AFFECTING CATTLE OFFTAKE IN SMALLHOLDER CATTLE FARMERS.

Enkono *et al* (2013) argue that to understand cattle offtake by small scale farmers, there is need to appreciate first the reasons why the farmers dispose of their cattle.

Dube *et al* (2014) in a study of Nkayi and Gwanda crop and cattle production highlights breeding purposes emanating from fear of failure to rebuild the head. The same study also showed that the price was discouraging farmers from selling cattle.

Ruhangawebane (2010), in a study on factors affecting the level of commercialization among cattle keepers in the pastoral arears of Uganda notes that farmers keep cattle as a store of value. Thus, farmers hold on to cattle as this more wealth on hand.

Tavirimirwa *et al* (2013) deduced from a study poor livestock management as leading to low cattle offtake.

Scoones (2019), from a study of cattle production in Masvingo, attributes small herd sizes as a constraint to cattle production.

Murendo and Sinkula (2010) in their analysis of livestock trading in Mbire District, identified transport, late payment, grading, hidden costs and risks as factors affecting farmers in selling livestock direct to abattoirs.

2.4 CONCEPTUAL FRAMEWORK.

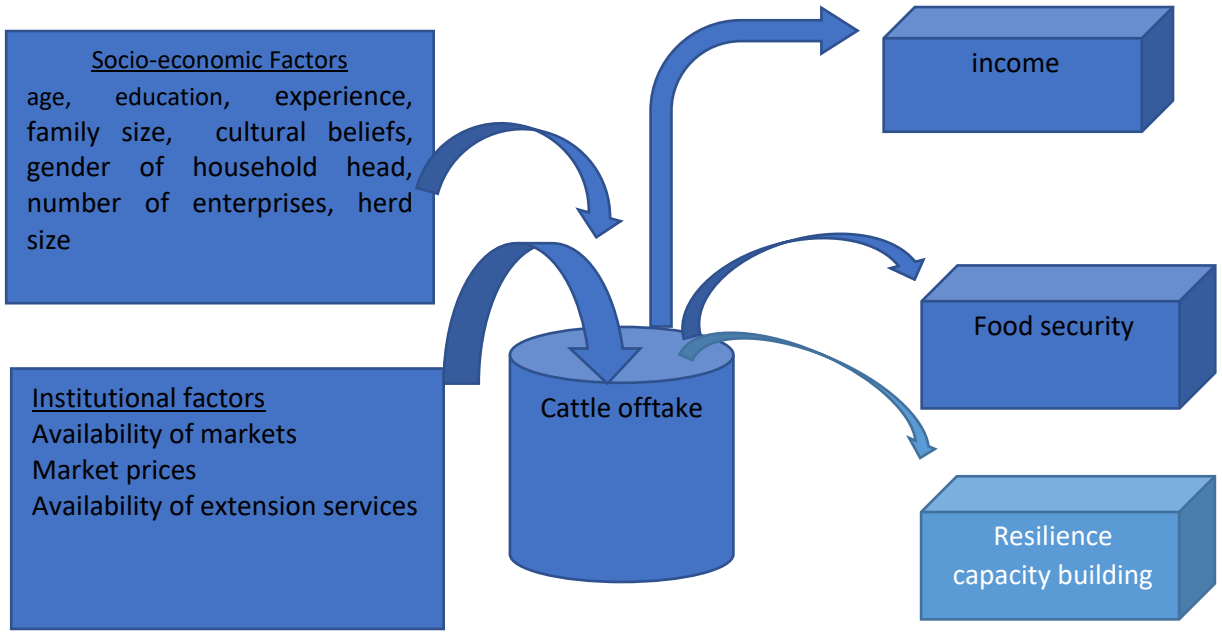

Figure 2.1. Conceptual Framework

Source: Survey data, 2020

In a study of cooperatives in Manicaland, Charinda (2015) noted farming experience and weak management skills as part of the factors affecting smallholder farmers. Mohammed, (2011) states literacy, labour, and family size, as having a significant influence on the

production levels of smallholder farmers. Figure 2.1. shows the framework used in this study.

2.5 INSIGHTS FROM LITERATURE

Mohammed (2011), carried out a study on the production of rice in Nigeria by smallholder farmers and noted that literacy level, marketing factors, age and family size as having effect on the production levels.

Experience in farming and farm management skills were identified as some of the factors affecting small holder farmers by Charinda (2015), in the study of cooperatives in Manicaland.

Enkono *et al* (2013) observed that older farmers are likely not to sell cattle. The older farmers prefer keeping the cattle for prestige purposes and also for gain.

Musemwa *et al* (2010) noted that in households that have males as households, cattle off-take was low compared to households that have females as heads.

As alluded to by Asfaw and Jabbar (2008), herd size influences the decision of the farmers to sell livestock. It was noted in a study of cattle offtake and their determinants in Ethiopia that as the farmer has a bigger size of herd, his/her participation in markets as buyer decreases while participation as seller increases.

In this study, the researcher used regression analysis to analyse the most influential variables matter on cattle offtake by small holder farmers.

2.6 SUMMARY

Chapter two covered literature review on theoretical framework of cattle production for resilience capacity building and resilience building in general. Conceptual framework of this study was given in this chapter.

CHPATER THREE: METHODOLOGY

3 INTRODUCTION

Chapter three gives details of the site where the study was carried out. The method used to select a sample and the technique used to gather data are given in this chapter.

3.1.1 LOCATION OF THE STUDY SITE

The research was carried out in Mbire District Ward 15. Mbire District is in Mashonaland Central Province. It borders Mozambique and Zambia. There are relationships between people along the border and their counterparts in Mozambique and Zambia. The Border is porous such that people and animals move at will serve for a few controls on the Mozambique side.

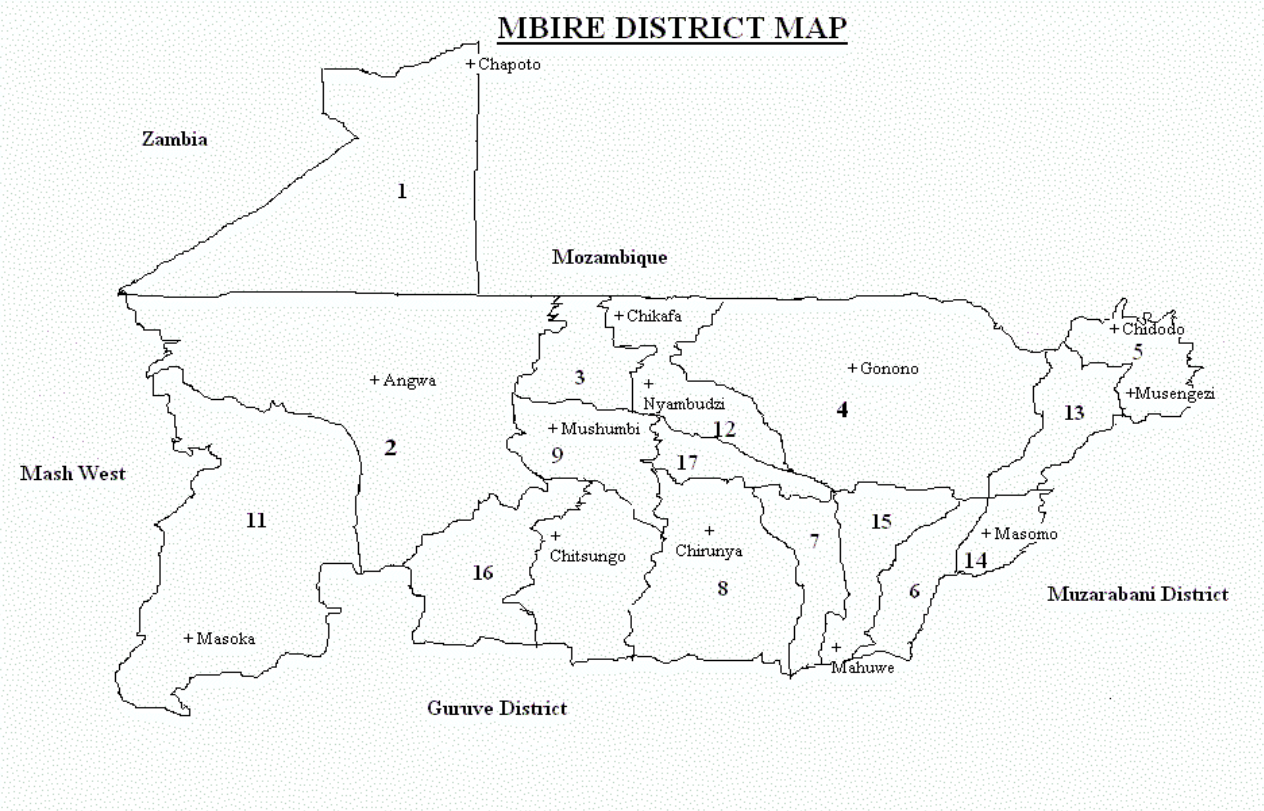

Figure 3.1 Mbire District Map

Source: ZIMSTATS

Mbire District has 17 wards. The population as per 2012 National Census is 82 380 with 18 111 households. ZIMSTATS (2012). There is no industry and no town serve for one growth point.

3.1.2 CLIMATIC CONDITIONS

Mbire is in Region IV and receives rainfall of around 400mm to 650mm per annum. The area is very hot and experiences period droughts. In some seasons floods do occur.

3.1.3 FARMING ACTIVITIES

Livestock farming in the area is the rearing of mainly cattle and goats. These enterprises give most of the households' some income. Market for cattle is mainly Harare through intermediaries who go down the valley to purchase the animals for resale.

3.1.4 LEADERSHIP STRUCTURE

The leadership structure is principally based on tradition in this communal area. A household reports to a village head who in turn reports to a headman. The headman reports to a Chief. The Chief solves most of the issues and in the case of issues that cannot be handled by the Chief, these are referred to the relevant Ministry organ. Any subject that is not satisfied with the ruling of the Chief may ask for the matter to be heard by another Chief of may appeal to the Magistrates courts. The councilor is also part of the leadership and is normally on the administrative side, representing the council, which has overall jurisdiction of the area. On the political side, there is the member of parliament and senator who are concerned mainly with development of the area. The District Development Coordinator works hand in hand with mainly the council and the traditional leadership, representing the Ministry of Local Government. Thus, in one way or the other the leadership has some influence on the agricultural activities in the areas. For some issues, villagers report directly to government organs within their areas, for instance, the veterinary office, agricultural extension service and the environmental management agency.

3.2 SAMPLING PROCEDURE AND SAMPLE SIZE DETERMINATION

3.2.1 SAMPLING PROCEDURE

Due to the economic activity in the communities and geographical location of the wards, the research, employed multistage sampling, starting with purposive sampling. This ensured that communities that practise cattle farming significantly would be covered. Furthermore, purposive sampling catered for arears with specific characteristics such as alternative pastures, like Chikafa, Gonono and Chidodo farmers that drive their cattle to Mozambique in search of pastures through the porous border, and Kanyemba and part of Angwa where cattle farming is not significantly practised due to tsetse infestation. Therefore, cluster sampling was employed alongside purposive sampling. The District was divided into three clusters:

Table 3.1. Clustering of wards

Cluster	**Wards**	**Characteristics**
1	1(Chapoto), 3(Madzomba, 12(Chikafa), 4(Masomo), 13(Sapa), 5(Chidodo)	along the border with Mozambique, border porous, low lying area in Mbire, manly plain velds.
2	15(Mahuwwe), 6(Kasuwo), 14(Masomo), 7(Hambe), 8(Karai), 17(Majongwe), 9(Mushumbi)	In the middle of the district, bordered by other wards that have easy access to another district. Affected mostly by droughts.
3	16(Bwazimonozi), 10(Makuvatsine), 11 (Masoka), 2 (Angwa)	Upper part of the district, mainly forested.

Source: Survey data 2020

Purposive sampling was extended to the clusters in coming up with the ward that formed the basis of the study. Ward 15 was selected as this is one of the wards where cattle are affected severely during the drought spell. Mahuwe is the hub of economic activity and is the main entrance to the District when coming from the upper part, Guruve. It is generally expected that there is information exchange hence farmers are a bit informed. However, this is one of the wards that are hit most by the adverse effects of drought.

A simple random sample of villages in Ward 15 was selected, followed by another random selection of respondents from these villages.

3.2.2 SAMPLE SIZE DETERMINATION

The population of Ward 15 is 1113 households (ZIMSTATS, 2013). Therefore, interviewing all the cattle farmers in the ward would have been ideal. However, due to limited resources, namely, finance, Covid 19 pandemic and time, it was found prudent to use a representative sample.

The sample size was determined using Slovin's Formula. The formula fits well to small populations as in this case. Furthermore, is simple to use and understand. Ward 15 has 1113 households (ZIMSTATS, 2013). Using information from local extension service providers, it was estimated that about 1000 households were into cattle farming. Use of this formula gave a sample size of 100 as depicted in the formula below:

$$n = N/(1+N*Ne^2)$$

where: n = sample size

N = population size

e = margin on error

N = 1000; e = 10% (a confidence level of 90% was used).

Therefore: $1000/(1+1000*0.1^1) = 100$

Thus, a sample of 100 farmers was adopted, though on administering the research instrument, 116 respondents participated, as more household showed interest in participating.

3.2.3 SIMPLE RANDOM SAMPLING

A sample of 116 respondents were randomly drawn from the villages as described in 3.2.2. In order to accord every element in the sample an opportunity to be selected, simple random sampling was adopted. With then use of simple random sampling method, bias is reduced.

3.3 METHOD OF DATA COLLECTION

3.3.1 COLLECTION OF DATA

Four assistants were engaged to assist in collection of the data. These were given proper training, with the assistance of the local counsellor. During the interviews, some questions were being asked in Shona, the vernacular language, then converted into English upon summarising responses. The researcher was also supervising assistants during the data collection process. It was fortunate that during the period of field work, the farmers were found relaxed at their homes during this winter season.

3.3.2 RESEARCH INSTRUMENT

Researcher-administered Questionnaire

A questionnaire was used in the in survey to gather data. The researcher in a personal interview administered the questionnaire. The researcher-administered questionnaire was preferred for various reasons. The researcher, through the assistants, would explain grey areas in the questions. Bias on the part of the interviewee would be reduced as the respondent would answer at the time of being asked, unlike in cases where he/she takes the form home in which case another person like a child may complete it. There would be better response rate as other respondents would be selected in the event that the ones selected first are not around. Dialogue would be encouraged and some facial expressions would assist in handling the conversation. This way of gathering information was found in line with the requirements of Covid 19 prevention measures of maintaining distance and avoidance of direct contact. The researcher was merely asking questions and the respondent was answering without the exchange of objects like papers that were potential avenues of transmitting the virus in the event that one party had it.

The questionnaire used is in given in Appendix 1. It was designed to establish from the cattle smallholder farmers the demographic information on farmers, cattle management practices for resilience measures, and factors affecting cattle offtake.

3.3.3 SECONDARY DATA

Secondary data was obtained from internet searches and records from local extension service providers' offices. The focus was to get a distribution of the cattle farmers in the ward.

3.4 ANALYTICAL FRAMEWORK

3.4.1 CHARACTERIZATION OF FARMERS THAT ARE INTO CATTLE PRODUCTION.

The objective to characterize households that are into livestock production was analysed using descriptive statistics. Quantitative and qualitative variables were used to comprehend the socio-economic characteristics of cattle farmers. Variables were analysed into averages and frequencies by use of SPSS, and these were used to understand the characteristics of farmers.

3.4.2 DESCRIPTION OF ALTERNATIVE CATTLE MANAGEMENT SYSTEMS THAT HELP BUILD RESILIENCE IN PERIODS OF DISASTERS.

The objective was analysed using descriptive statistics. In order to describe a phenomenon, qualitative and quantitative variables are normally used, and these were relied upon by the researcher to achieve this objective. Averages and frequencies were used to explain the various practices used by farmers in cattle production.

3.4.3 ANALYSIS OF THE FACTORS INFLUENCING CATTLE OFFTAKE, AND THE REASONS FOR HOLDING ON TO LIVESTOCK, AT HOUSEHOLD LEVEL DURING PERIODS OF DROUGHT.

There are many models used to analyse data. One of these is regression analysis. Regression analysis, as highlighted by Gallo (2015) plays important role in data analysis and these include determining factors that matter most, which of the given factors to ignore, how the variables interact, and how sure the researcher is on the interpretation of the variables.

The researcher therefore found it prudent to use the regression analysis as the overall aim of the study was to determine factors affecting cattle offtake. As highlighted earlier, not

all variables were considered. The computations were done by use of SPSS. The formula is given in formula below.

$Y = \beta_o + \beta_1 x + \beta_2 x + \ldots + e$

Where: Y = dependent variable

β_o = population slope coefficient

$\beta_1 x$ = independent variable

e = random error term

Outcome Equation

$$Y(NUM.SOLD) = \beta_0 + \beta_1 HSEHOLDSIZ + \beta_2 NUM.CATTLE + \beta_3 NUMGOATS + \beta_4 FARMEXP + \beta_5 AGE + \beta_6 NUMPIGS + \beta_7 \text{NUMSHEEP} + \beta_8 HERDSIZERED + \beta_9 COMCONSULT + \beta_{10} HZECONSULT + e.$$

Table 3.2. Description of variables used in Regression Analysis Procedure

Variable	Description of the variable		Measurement
Dependent variable			
NUM.SOLD	No of cattle sold		Number of cattle sold in a year
Independent variable			
HSEHOLDSIZ	Household size of farmer		Number of members in a household
NUM.CATTLE	Size of herd		Number of cattle owned
NUMGOATS	The number of goats owned		Number of goats owned
FARMEXP	Cattle farming experience of the farmer		Number of years into cattle farming
AGE	Age in years		Number of years of age
NUMPIGS	The number of pigs owned		Number of pigs owned
NUMSHEEP	The number of sheep owned		Number of sheep owned

HERDSIZERED	Prices of cattle		Prices of cattle that influence reduction
COMCONSULT	Consultations with community		Dummy 0=yes, 1=no
HZECONSULT	Consent of household members		Dummy 0=yes, 1=no

Source: Survey data, 2020.

In this study, the dependent variable is number of cattle sold and the independent variables are age, sex, household size, farm experience, number of other animals kept and any availability of supplementary feeds. These are expected to influence number of cattle sold as explained below:

Age (AGE) is a continuous variable in the model denoting the number of years of the respondent. Age is expected to have a negative influence on the cattle take off.. It is measured by the number of years hence is continuous variable.

Household size (*HSEHOLDSIZ*) is expected to have a positive significance on the number of cattle sold. A big household size exerts pressure on monetary needs hence frequent decisions to sell. A small household may prefer to maintain the herd size irrespective of the effects of drought as the forces for cash may not be much. It is measured by number of family members and is a continuous variable.

Farming experience (FARMEXP) is also coded as a continuous variable that denotes the number of years the farmer has been into cattle farming. The higher the years of practice is believed also to contribute to more experience hence this variable is expected to have a positive influence on the cattle sold. Usually farmers with more farming years have more experience and can easily adjust to the changes in climatic patterns. In addition, they also have efficient management capabilities which contribute to increase in production.

Size of herd (NUM.CATTLE) is a continuous variable and as the farmer has many cattle, the decision to dispose of some is not as painful as for a farmer that has a small herd. A farmer with a small herd may count the reduction in the herd as a depletion in wealth, oblivious of the fact that the same herd can be wiped as a result of the effects of drought without a realization of even a dollar.

Number of goats owned (NUMGOATS). As the number of goats increases, farmers are prepared to sell cattle as they have a fallback in the event of a disaster, and in face of reduced cattle herd.

Number of pigs owned (NUMPIGS). As the number of pigs increases, farmers are prepared to sell cattle as they have a fallback in the event of a disaster, and in face of reduced cattle herd.

Number of sheep owned (NUMSHEEP). As the number of sheep increases, farmers are prepared to sell cattle as they have a fallback in the event of a disaster, and in face of reduced cattle herd.

Prices of cattle (HERDSIZERED). Market prices have a bearing cattle offtake. As better prices are offered, more cattle are expected to be offered for sale on the market.

Consultations with community members on decision to sale (COMCONSULT*).* As the farmer consults the community members, his/her decision to sell is negatively influenced to implement. This is so since the community is founded of traditional belief that see owning many cattle as symbol of status and store of value

Consultations with household members (HZECONSULT). This variable is expected to behave the same as consultations with community members. The more consultations are made the delayed the decision to sell which may then never take place.

3.5 SUMMARY

Chapter three outlined the study area, selection of sample, and data gathering instruments that were used. This chapter concluded with explanations on the analysis of data as per the aims of the study.

CHAPTER FOUR: RESULTS AND DISCUSSION

4 INTRODUCTION

Results of the study are presented in this chapter. The results are presented in sections according to the objectives of the study. Findings are given first followed by a discussion in another section.

4.1 FINDINGS

4.1.1 CHARACTERIZATION OF THE SMALL HOLDER CATTLE FAMERS.

Table 4.1. Analysis of the social variables

	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic
Age of the farmer	18	84	48.14	16.329
Number of cattle owned	1	40	9.28	7.824
Number of goats kept	0	44	10.17	10.32
Experience in cattle farming	1	40	12.59	8.879

Source: Survey data, 2020

Table 4.1 shows the characteristics of the farmers. The study indicated that households as old as eighty-four years were still into farming. The youngest farmer had eighteen years. The farmer who had the largest herd of cattle had 40 animals while the farmer with the least number had one animal. The average number of cattle per farmer was nine. It was also noted that the farmers were also into goat farming with an average of ten goats per farmer. Framers had various years of experience in cattle farming ranging from one to 40 years with an average of twelve years.

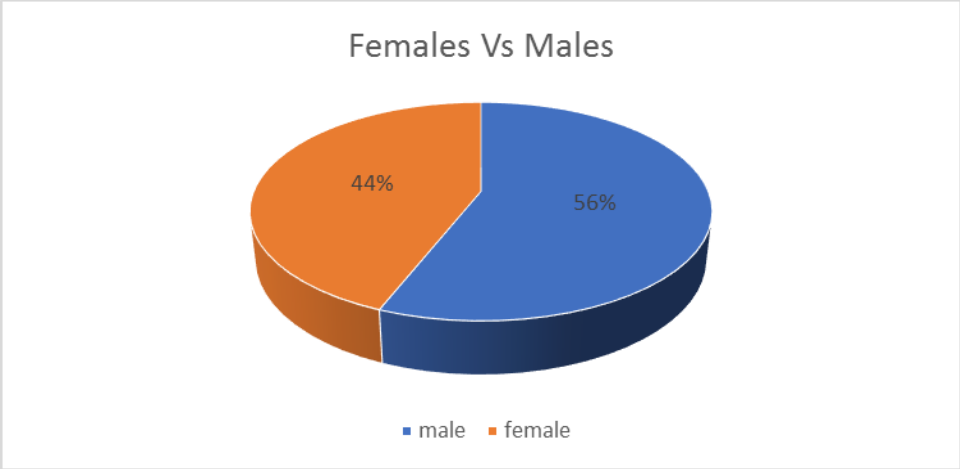

Figure 4.1. Distribution of cattle farmers by gender

Source: Survey data, 2020

The survey sought to interview specifically the member of the household that had the responsibility of rearing the animals. This was meant to explore the methods that were being employed in keeping animals during the drought. It was noted that there were more men that were into cattle farming, constituting 56% of the respondents. When looking at the final decisions on major issue in the household, it was noted that fathers had the upper hand. As depicted in Table 4.3, of the household surveyed, it was noted that the father in the household was the key decision maker, constituting about 77% of the households. Households in which the mother was the decision maker on key issues were 12% while the eldest son also had influence in 4% of the households. There were households that key decisions are made by the family as a whole and this constituted to 10% of the households.

Table 4.2. Household size

	Household size	**Age of the farmer**
Mean	5.82	48.14
Std. Deviation	2.157	16.329

Source: Survey data, 2020

Table 4.2 shows that the average number of household members were 6 per household. Age on average was 48 years. However, given a standard deviation of 16 years, there was great variation of the age from the average.

Table 4.3. Household member making key decisions in a household.

Category	No. of respondents	Percentage
Father	89	76.7
Mother	14	12.1
Eldest son	5	4.3
Whole household	8	6.9

Source: Survey data, 2020

Table 4.4 Literacy Levels

Level of education	No. of respondents	Percentage
No primary education	23	19.8
Primary school	51	44
Secondary School	41	35.3
Tertiary educated	1	0.9

Source: Survey data, 2020

Table 4.4 above suggests that most of the farmers were able to read and write as only about 20% did not attend school. However, the majority of the farmers did not go beyond primary school with only 35% having attended secondary school and one famer up to college level.

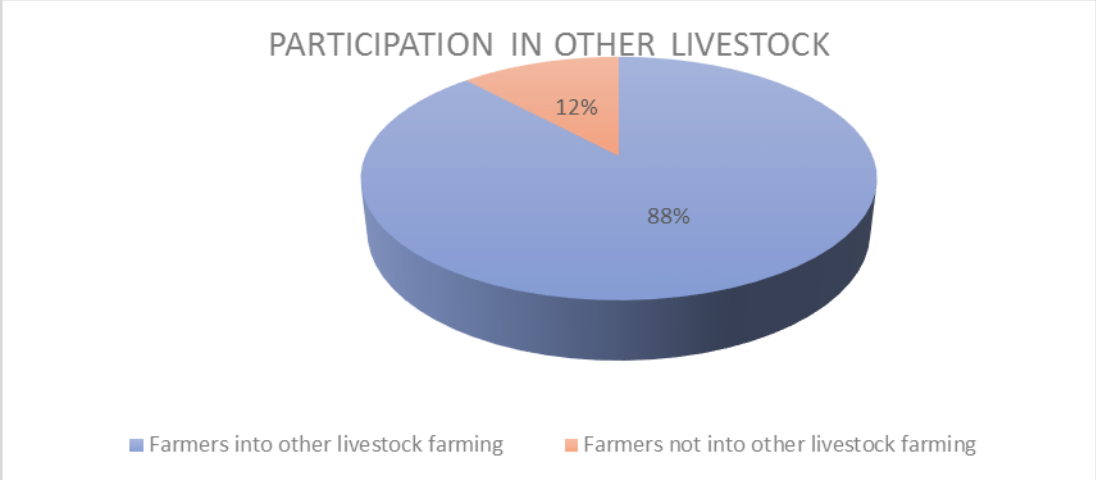

Figure 4.2. Participation in other livestock farming

Source: Survey data, 2020

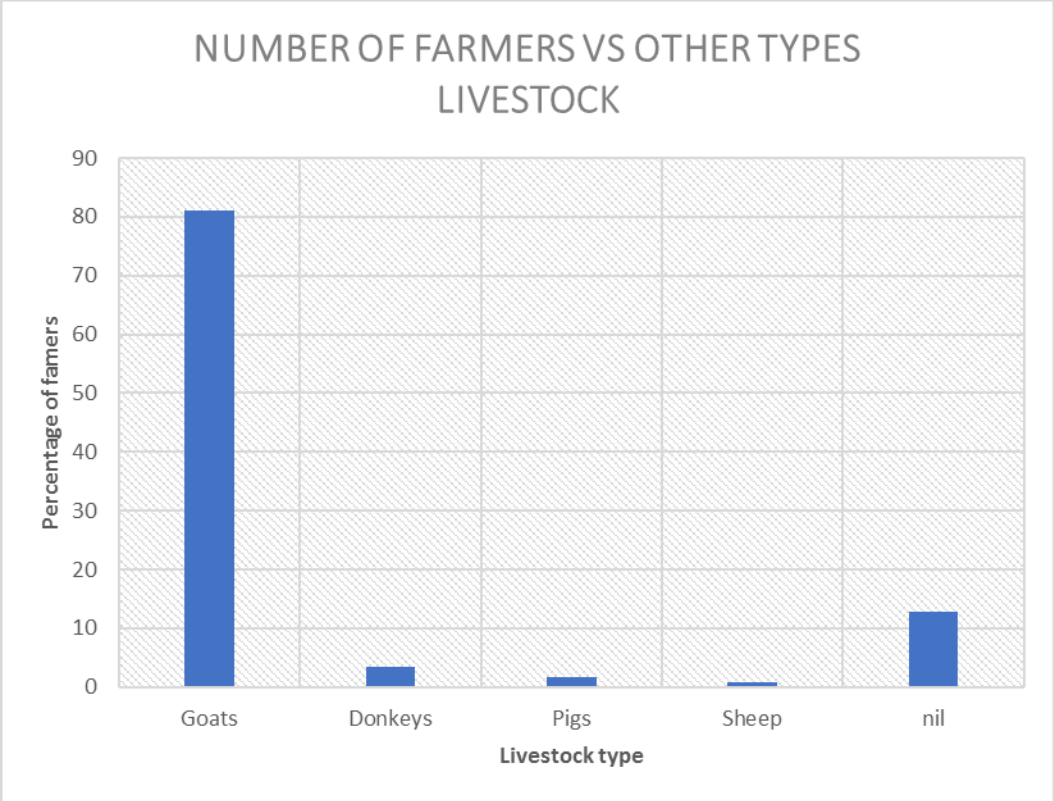

Figure 4.3. Distribution of farmers keeping other types of livestock

Source: Survey data, 2020

Figures 4.2 and 4.3 show the participation levels of farmers into other livestock, excluding chickens. Figure 4.2 shows that 88% of the cattle farmers also owned other livestock. 12% did not have other livestock apart from cattle. Goats were the main type of livestock reared by farmers (81%) in addition to cattle while a sizeable number had donkeys, 3.4%. A few farmers 1.75% and 0.9% percent had pigs and sheep respectively.

With regards to land tenure, the research showed that all the land used for cattle grazing is communal area. Control of the land use is community based.

4.1.2 DESCRIPTION OF ALTERNATIVE CATTLE MANAGEMENT SYSTEMS THAT HELP BUILD RESILIENCE IN PERIODS OF DISASTERS.

Table 4.5. Use of supplementary feeds generally

Use of supplementary feeds	No of respondents	Percentage
Use supplementary feeds	38	32.8
Do not use supplementary feeds	78	67.2

Source: Survey data, 2020

Table 4.6. Type of feed ordinarily used in normal years

Type of supplementary feed in normal years	No of respondents	Percentage
Crop residue	38	32.8
No supplementary feed used	78	67.2

Source: Survey data, 2020

Table 4.7. Measures taken during drought periods

Measure taken in drought periods	Number of respondents	Percentage
buy animal feed	25	21.6
drive cattle to mountain for pastures	2	1.7
leaf cuttings from trees	5	4.3
no action taken	13	11.2
no other action taken apart from use of crop residue	47	40.5
reduce herd	8	6.9
salt added to crop residue	8	6.9
use of grass cuttings from mountain	8	6.9

Source: Survey data, 2020

Tables 4.5 and 4.6 show the extent of use of supplementary feeding in the ordinary course of farming activities by the farmers. 33% of the respondents indicated that they use supplementary feeds generally while 67% do not use any additional feeds in normal years. Those that use additional feed rely on crop residue from sorghum, and millet,

groundnuts and maize stalk. When drought strikes, most farmers take some measure to supplement animal feed. Only 11% take no cation as shown in table 4.7. The same table shows the various strategies that farmers take and 41% continue relying on crop residue as they do in normal years. 7% of the farmers add salt to the crop residue while 7% go to the mountains to cut grass for the cattle. Another measure is the procurement of animal feed with a significant number, 22%, of respondents taking this action.

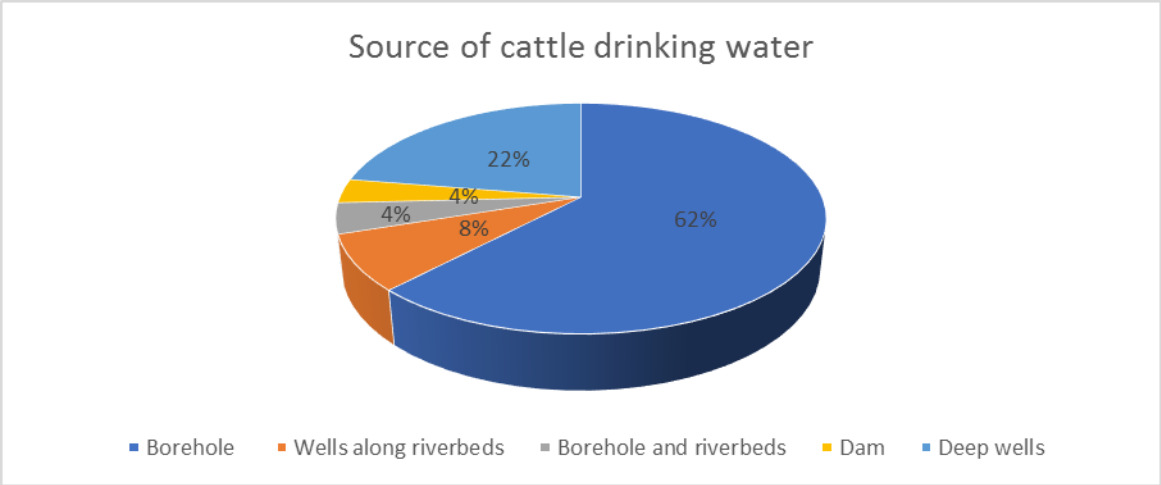

Figure 4.4. Source of drinking water for cattle
Source: Survey data, 2020

The sources of drinking water for cattle and consequently other animals are basically boreholes, wells, dam. The main source is borehole water that is used by 62% of the respondents, followed by deep wells that are used by 22% of the respondents. Some farmers open some shallow wells along the riverbeds for cattle to get water. About 4% of the respondents drive their cattle to the dam, which is not accessible to many due to distance. Some, about 4%, use a combination of both boreholes and wells for source of water of animals. Figure 4.4 summarises the sources of water and the extent to which they are used.

Table 4.8 Decision to reduce herd in drought periods

Decision to reduce herd size	Number of respondents	Percentage
Farmers that consider reducing herd size	67	57.8
Farmers that do not consider reducing herd size	49	42.2

Source: Survey data, 2020

When faced with drought, 58% of the farmers were found considering reducing the herd size while 42% would hold on to their stock as in Table 4.8.

4.1.3 FACTORS INFLUENCING CATTLE OFFTAKE, AND THE REASONS FOR HOLDING ON TO LIVESTOCK, AT HOUSEHOLD LEVEL DURING PERIODS OF DROUGHT.

Table 4.9. Cattle sales in a year.

Number of cattle sold in a year.	Number of respondents	Percentage
0	86	74.1
1	15	12.9
2	9	7.8
3	2	1.7
4	3	2.6
5	1	0.9

Source: Survey data, 2020

Table 4.10. Cattle slaughtered for consumption in a year

Number of cattle consumed in a year	Number of respondents	Percentage
0	103	88.8
1	10	8.6
2	2	1.7
3	1	0.9

Source: Survey data, 2020

Tables 4.9 and 4.10 show the cattle offtake. As per table 4.9, the greatest number of cattle sold by one farmer was five animals and this was sold by one respondent out of the 116

respondents. 86 of the 116 respondents, or 74%, did not sell any cattle in the previous twelve months of the study. 13% of the farmers sold one animal each while 8% sold 2 animals each. Some of the cattle were slaughtered for consumption in which 8 of the 116 respondents, or 8%, consumed one beast each. Thus apart from selling, some cattle were slaughtered for consumption. The study revealed that the basis of slaughter were ill health or age of the animals.

Table 4.11. Household comments on herd size cutback during drought

Household comments on herd size cutback	Number of respondents	Percentage
No market	1	0.9
Low market prices	17	14.7
See no benefit	15	12.9
Herd too small	15	12.9
Opted to sell	68	58.6

Source: Survey data, 2020

The study sought to find out from those who had not sold any cattle in the previous twelve months of the survey and it was noted that the reasons were various as shown in Table 4.11. Seventeen farmers, or 15%, of the respondents showed that the prices on the market were too low hence discouraging them from selling. 13% of the farmers felt that there was no benefit in selling the cattle during drought and the same percentage was of the view that the herd was too small for them to reduce the herd size.

Table 4.12. Consent of household members to sell cattle

Consent of household members to sell cattle	Number of respondents	Percentage
Seek consent	30	25.9
Do not seek consent	86	74.1

Source: Survey data, 2020

Table 4.13. Household member consulted

Household member consulted	Number of respondents	Percentage
Spouse	10	8.6

Son	19	16.4
Ordinary household member	1	0.9
Whole household members	9	7.8
Did not dispose of in previous 12 months	77	66.4

Source: Survey data, 2020

The study sought to establish the extent to which a household consults household and community members on the decision to reduce herd size when faced with drought disaster. Table 4.11 shows the extent to which farmers sought consent of household members when disposing of the cattle. It was noted that 26% of the respondents sought consent of the household members as a whole or specific members in cattle offtake. Table 4.13 shows the category of household members consulted and who was being consulted most. From Table 4.12 the son amongst household members was the main person being consulted by most farmers with 16% of the respondents consulting this family member category. Spouse and the whole house hold as distinct categories were almost equally being consulted with 9% and 8% of the respondents consulting them before selling or slaughtering a beast.

Table 4.14. Community comments on cattle offtake

	Number of respondents	**Percentage**
Good idea	14	12.1
Wrong decision	1	0.9
Nothing said	1	0.9
Farmers that did not consult	14	12.1
Framers that did not dispose of in past 12 months	86	74.1

Source: Survey data, 2020

The study also showed that some farmers consulted members of their community as a check on their decision to sell cattle. 12% of the farmers were recommended as having taken a good decision while another 12% decided not to consult as shown in table 4.13.

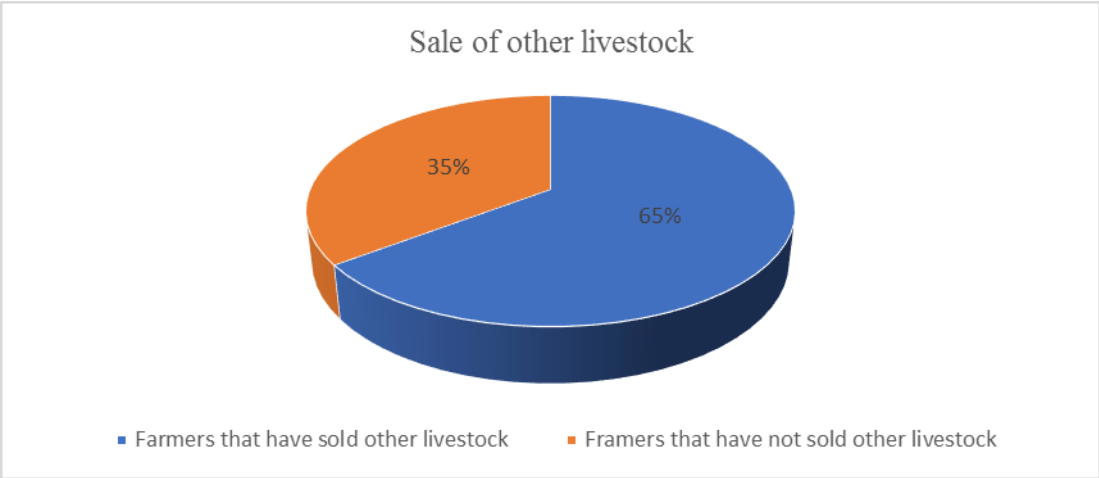

Figure 4.5. Sale of other livestock
Source: Survey data, 2020

Figure 4.5 shows participation of cattle farmers in other livestock sales. More than half of the farmers, 65%, sell other livestock. The study showed that farmers sell mostly goats apart from cattle: goats were kept by 81% of the farmers that participated in the study as per figure 4.3.

4.1.4 FACTORS AFFECTING CATTLE OFFTAKE

The aim of the study was analysed using descriptive statistics and linear regression analysis statistical tool. The statistical tool was also used to test the hypothesis that age affects cattle offtake. SPSS was used for the regression analysis and the results are given in Tables 4.15 and 4.16.

Data preparation

Testing of the data for multicollinearity and for heterogeneity was done. This was done on the background that multicollinearity and heterogeneity causes the inconsistence of the co-efficient in the model. SPSS was used to test these as shown in tables 4.15 and 4.16 below.

Table 4.15. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.795[a]	0.632	0.597	0.634

a. Predictors: HSEHOLDSIZ,NUM.CATTLE ,NUMGOATS, FARMEXP ,AGE ,NUMPIGS, NUMSHEEP,HERDSIZERED,COMCONSULT ,HZECONSULT
b. Dependent variable : NUM.CATTLE - Number of cattle sold

Source: Survey Data 2020

Table 4.15 shows the results of R value. Which is 0.795. Therefore, our core-efficiency is efficient in estimating the outcome of the dependent variable. The table shows that 80% of the variation in the dependent variable, cattle sold, are explained by the independent variables in the model.

Table 4.16. Determination of significant variables

	Standardized Coefficients	t	Sig.	Collinearity Statistics	
	Beta			Tolerance	VIF
(Constant)		2.249	0.027		
Household size	0.011	0.161	0.873	0.722	1.384
Number of cattle owned	0.087	1.272	0.206	0.744	1.344
Number of goats kept	0.02	0.329	0.743	0.916	1.092
Experience in cattle farming	-0.004	-0.054	0.957	0.573	1.746
Age of the farmer	0.056	0.749	0.455	0.631	1.585
Number of pigs kept	0.031	0.484	0.63	0.863	1.158
Number of sheep kept	-0.03	-0.473	0.637	0.851	1.175
Price factor of beast	0.065	1.02	0.31	0.868	1.152
Consultations with community on offtake	-0.044	-0.25	0.803	0.116	8.65
Consent of household members	-0.707	-4.158	0	0.121	8.26

Dependent variable: Number of cattle sold

Source: Survey data 2020

The VIF values in Table 4.16 are less than a value of 10, which is an indication that there is no correlation. If there was a VIF on table4.16, we could say the some variables in the model have a relationship: there is an influence of an independent variable on another independent variable. Thus, the values used in the model had no multicollinearity problems.

The regression model results are shown in Table 4.16. Four out of the ten variables included in the model had a negative co-efficiency. These variables are cattle farming

experience, number of sheep kept and consent of household members and the community.

4.2 DISCUSSION

4.2.1 CHARACTERIZATION OF THE SMALL HOLDER CATTLE FAMERS.

4.2.1.1 Household size

Table 4.2 shows the size of the family as made up of six members on average. 33% of the farmers indicated that they use supplementary feeds as in Table 4.5. The study showed that the supplementary feed used is crop residue mainly, which is collected from the fields and stored on stakes and that there is reliance on family labour in carrying out this task. Obiero (2016), in a study of socio-economic factors affecting farm yield in Kenya noted that family labour was the dominating source of labour force. This is congruent with the results of this study where collection of crop residue and transportation in based on family labour.

4.2.1.2 Farm experience of farmers in cattle farming

Experience contributes to better production capacity. Experienced farmers are likely to produce more per hectare. King *et al* (2007) pointed out that in South Africa, failure by small scale farmers was partly due to lack of management experience and know how as well as ignorance on part of members. The respondents' average experience of twelve years could be a contributing factor to the use of supplementary feeds such as grass cuttings, crop residue and use of salt that is added to the crop residue in periods of drought. However, the same experience could be detrimental in the cattle offtake as farmers fell that they have managed drought challenges over years, oblivious of the changing climatic patterns: that the effects of dry spells are now more damaging than in previous years.

4.2.1.3 Literacy of farmers

Education helps in the understanding of some aspects of animal husbandry practices where an appreciation of opportunity cost is required. With literacy levels of up to primary education for most of the farmers as in Table 4.4, it is difficult for the farmers to understand that their resilience capacity can be improved through selling some cattle and

venture into other enterprises, or buy feeds, than holding on to the cattle with the hope and interest in attaining large herds. In this study, it was noted that farmers that did not prefer selling their cattle in times of drought proffered the small size of herd as one of the reasons.

4.2.1.4 Age of farmers

Biologically, as one advances in age, the energy to work and make decisions decreases. However, according to Gorman, knowledge comes with age. Old farmers have a wealth of knowledge of traditional farming and land use. So, age could be a contributing factor in the management of supplementary feeds that include grass cuttings from the Mavuradonha Mountain and tree leaves from the river bank trees. However, age could be contributing to reluctance in cattle offtake in periods of disasters. Siamwala (2004), cited by Poungchompu *et al* (2012) agrees that age comes with vast knowledge: however, old farmers are slow to adapt to variations in agriculture.

4.2.1.5 Sex and gender

The dominance of male cattle farmers in the community is commensurate with trends in this remote rural settlement. The age distribution also shows that the community is dominated by middle aged to old aged farmers who still follow culture that certain animals are for the men while women are left to farm animals such as chickens and goats. Thus, this is not surprising that men still dominate the farming of cattle in this community. It can also be deduced that unlike other communities that have women dominating agricultural activities, men in this community are not migrating to some other places to look for jobs or income generating activities like gold panning. One can argue that since many of the farmers are the middle aged to old age, these farmers have exhausted energy such that they are not going away from the communities. However, on the issue of consultations, it is noted that sons are a major category of household members that are consulted on major issues. Therefore, the male youths are present in the community, offering support to household heads.

4.2.1.6 Income levels

The sale of cattle is very low as established in the study. Rainfall is erratic in this area such that agronomy contributes very little in terms of incomes. The participation of cattle

farmers in goat production shows that the farmers earn some income from goat sales. This is buttressed by findings that most of the cattle farmers at some point have sold other animals, principally goats at some time. This is also common to areas that are in the same climate regions: Dube T (2014) in an ICRISAT study of integrated crop and livestock production noted that goat selling was common in Nkayi and Gwanda as source of income for food supplies. Thus, livestock farming, especially the sale of small livestock, stabilizes incomes of communal farmers.

4.2.2 DESCRIPTION OF ALTERNATIVE CATTLE MANAGEMENT SYSTEMS THAT HELP BUILD RESILIENCE IN PERIODS OF DISASTERS.

4.2.2.1 Use of conventional feeds

The use of supplementary feeding in the form of commercial feeds is low. This could be due to low cattle offtake that result in farmers not being able to buy the feeds. The other type of supplementary feeding is given to animals is crop residue. However, use of the crop residue low. One would expect most if not all the farmers in this dry area which experiences drought to be using some supplements to some extent. The conventional feeds require some finance that the farmers find difficult to raise from the small livestock sales that they make. Sound livestock management involves properly feeding animals so that at cattle offtake stage, better prices are negotiated, and the decision to sell is not compromised by the grade of animal. Tavirimirwa *et al* (2013) state identify poor livestock management as leading to low cattle offtake.

4.2.2.2 Use of crop residue as supplementary feeds

The other type of supplementary feed that one would expect to dominate is crop residue. However, this is hampered by low agronomic activities as a result of low rainfall. The amount of crop residue is little and not easy to gather and store. Discussions with key stakeholders also revealed that fields are a distance from homes and cattle pens hence there is need for transport to take the residue to safe places for storage. Given the size of some farmers' herds, they cannot afford to ferry the crop residue even if this was available: mode of transport for such products is scotch carts. Crop residue is one of the main supplementary feeds that has been used during dry periods in many rural areas. A study of Chawatama *et al* (2005) showed that in Kadoma, Matobo and Chikomba crop

stover was the main supplementary feeds during drought periods with some farmers (about 10%) using conventional feeds. The same reliance on crop residue as supplementary feed for livestock was noted in a study of Dube *et al* (2014) of Nkayi and Gwanda.

4.2.2.3 Source of drinking water

The rivers and streams in the communities dry up very quickly. They no longer have ponds due to siltation. This leaves the farmers with boreholes as the main source of cattle drinking water. Observation showed that the boreholes are not evenly distributed as some areas have many boreholes, one close to the other, like villages that surround the business center. This has led to some villages digging deep wells to get water for their animals. Observation also showed that the boreholes and wells are manually operated, and key informants confirmed this. There is a possibility that the cattle may not be getting enough water as the availability to pump depends on the energy of the household members. This compromises the health of animals. Each household, or farmer has the duty to ensure that their cattle get water for drinking. The burden to pump water is made great given that other livestock like goats and sheep should also get a share of the manually pumped water. The same household members have to pump or draw water from the wells for their domestic use. Use of modern water pumping technologies like solar systems make the pumping easy and ensures the availability of drinking water for livestock all the time.

4.2.2.4 Measurers taken during drought period

During drought periods, farmers take extra steps to have their cattle fed. A sizeable number buy additional feed from the livestock sales and other sources of income while a few drive their cattle to Mavuradonha Mountain or cut grass from the same mountain for feeding animals. However, this benefit those that live alongside the mountain. The desperation of farmers is also seen in the extent of cutting tree leaves for the cattle to feed, which is not sustainable agriculture as it leads to environmental degradations as branches and trees are destroyed in the process.

In order to appetize the animals, salt is added to the crop residue and this is one of the means to ensure that the animals are not selective in what is available for them to survive.

The measures being taken by the farmers are in line with calls by the revived Cold Storage Commission quoted by Mwayera (2019), where farmers are encouraged to adopt innovative measures such as feeding cattle with crop residues during the period September to November when natural postures are most affected. The crop residues would have been cut or gathered in winter. Mwayera (2019) suggests cutting crop stock during the rainy season and keep for feeding purposes during the dry season.

As resilience building capacity, farmers indicated that they would prefer to reduce the herd size so that they avoid losing out much. However, it was noted that the size of herds that farmers have were small in the views of the farmers for that decision to be taken without pain.

4.2.2.5 Rearing of other animals

As a measure to safeguard total loss in periods of disasters, the cattle farmers keep other animals in addition to cattle, and these include goats. Noted in the study is that most of the cattle farmers sell other animals as source of income for house upkeep and to buy feed for cattle. Tavirimirwa *et al* (2013), point that rural households obtain income through sale of livestock and animal products.

4.2.3 CATTLE OFFTAKE AND THE REASONS FOR HOLDING ON TO LIVESTOCK, AT HOUSEHOLD LEVEL DURING PERIODS OF DROUGHT.

4.2.3.1 Cattle offtake

Cattle offtake is very low amongst the farmers with more than half of the farmers not selling at least a beast in one year. Several reasons explain this phenomenon, chief amongst them being the market price and size of the herd.

4.2.3.2 Market for cattle

From the study, it could be deduced that small livestock was being sold by many farmers compared to cattle. One could suggest that probably the market for cattle was nonexistent. However, in the study, the farmers did not highlight availability of markets as constraint.

4.2.3.3 Cattle prices

Farmers are not happy with the prices that they feel are too low. This could be true since there is no well-established market such as an auction system. Buyers of cattle are

generally intermediaries from Harare that possibly take advantage of the desperation of farmers in the Zambezi Valley. The study showed that when a buyer gets into the villages, they are reluctant to offer prices that are above USD150 for a beast and the farmer is left with a compromised bargaining power and take what has been offered, although they hear that upland similar beast sells for as much as USD350. The depressed prices result in farmers seeing no benefit in selling the cattle. To them, it is painful to let a beast go for a few dollars deemed to be below the expected price.

4.2.3.4 Herd size

Farmers need cattle that they can turn into cash in times of need. Thus, their thrust is to have a bigger cattle size of the cattle herd. This is correct for resilience capacity building in that should an agricultural year prove to be dry such that yields are too low, households will be spurred from selling income producing assets such as scotch carts, ploughs and wheelbarrows to survive and go for the cattle. The study showed that the many farmers that did not sell any cattle in the previous twelve months of the study cited the small herd as detrimental factor. Farmers wanted to wait for the number of animals to grow big first. Thus, to them, reducing the size of herd was not a good option as the herd would never grow. This is in line with findings of Scoones (2019), from a study of cattle production in Masvingo, in which small herd sizes are attributable as constraint to cattle offtake. Dube *et al* (2014) in a study of Nkayi and Gwanda crop and cattle production noted that one of the reasons for low cattle offtake was that during drought farmers prefer to hold on to stock for breeding purposes.

4.2.3.5 Slaughter of cattle for domestic use

Some cattle were slaughtered for consumption. However, these were slaughtered as a result of ill health or they were too old to continue keeping them. Therefore, age of animal and animal health contributed in the selection of animal to remove from the herd. The behaviour of these farmers is compatible with findings of Carpenter and Hart (2014) who noted that breeding stock is culled if it has outlived its useful life.

4.2.3.6 Participation of cattle farmers in goat production

It can be suggested that the trends are that sales of livestock by these farmers start with small livestock, goats, as coping strategies before moving to cattle. This is sustainable

provided hat the small livestock generate enough for the purchase of supplementary feeds for the cattle that farmers wish to see grow in numbers, and that the goat numbers do not get too depleted. According to TANGO International, (2016), as the primary source of household savings, livestock represent a key asset, and one that contributes to household resilience to and recovery from drought in Mbire. Therefore, proper management of the whole livestock unit in a household is vital.

4.2.3.7 Influence of community members on cattle offtake

In an examination of the influence of household and community members on the decision to reduce herd size when faced with drought disaster, it was noted that the community does not influence negatively cattle offtake. Normally members of a community pass comments that are solicited or unsolicited, and such comments may shape the decision of farmers towards some action. What came out of the study is that the community generally supports the decision to sell cattle. Thus, the decision of the farmers to avoid cattle offtake is not influenced by members of the community.

4.2.3.8 Influence of household members on cattle offtake

The decision of the household head is also influenced by household members. In the study, it was noted that most farmers do not consult household members when it comes to crucial decisions. It was further noted that the head of the house is the father in most households. This is congruent with the findings in the study that most of the farmers were men. Furthermore, it is not outside this world that men have the final decision in such a community that is founded on traditional values. However, Moyo, a communal farmer in Lupane, cited by FAO (2020), states the notion that livestock is a family asset that requires a joint decision in selling.

There is a shift in paradigm that the head of the family is the father and should make decisions on crucial issues, to a modern thinking that sustainable agriculture, the involvement of the whole household is important. In the study, it was noted that there are farmers that do consult their family members in cattle offtake. Amongst those consulted most were sons and spouses.

4.2.4 FACTORS AFFECTING CATTLE OFFTAKE

Cattle farming experience and consultations with members of the family and community had a negative effect on cattle offtake. One would expect cattle offtake to increase with experience. However, this was not the case in the study. An explanation could be that since the herd sizes are small and an increase in the herd size as noted in Table 17 results in an increase in cattle sales, it may follow that as farmers attain more experience in rearing cattle, they develop or improve techniques of feeding and taking care of animals during drought periods. Therefore, a farmer would feel that he/she is able to overcome the effects of drought rather than selling, judging from the manner in which he has handled catastrophes previously.

Consultations with the community and household members on the decision to sell were found to have no positive effect on cattle offtake. This could be emanating from the protocols involved which my change the decision of the household to sell some cattle. The greater the frequency of consultations, the less cattle are disposed off by the farmers.

Age of the farmer, although positively influencing cattle offtake, had no major impact compared to the other variables. It had been hypothesized that age influences the decision to sell more than the other variables. Looking closely at experience, we note that experience actually reduces the desire to sell cattle. In the same vein, as one's experience grows, so is the age. Thus, the two, despite that the VIF values has shown no interdependence, seem to speak to one thing. Noted to have much influence in cattle offtake as per table 4.16 is the herd size. As the herd size increase so is the number of cattle sold. This is congruent with findings from the descriptive analysis that many farmers lamented the small herd size of the cattle as a discouraging factor from selling cattle.

Prices offered on the markets were also found to have a positive influence on the decision for cattle offtake. Farmers were of the view that the prices on the market were too low, hence, it would be noble for them to hold on to their livestock.

The hypothesis that cattle offtake is influenced by age of the farmers, though correct to some extent, was found not to be the main factor from the variables considered. Market

prices and herd size, though not significant in the model, were found exerting more positive influence than other variables considered in cattle off take by Ward 15 Mbire farmers.

4.2.5 CATTLE OFFTAKE AS A RESILIENCE MEASURE

The results show that cattle offtake, as a resilience measure is low in Ward 15 Mbire. The farmers are anxious to see their herds grow. Thus, the analysis is that herd sizes are affected by the cattle management practices being employed. There is reliance on natural pastures and crop residue for animal feed, which may not have enough protein for quicker growth.

For resilience purposes, the notion is that in the event of a disaster such as drought, famers can sell their cattle and get income to meet other financial needs and to buy animal feed for the sustenance of the remaining animals for ease of herd rebuild. Proceeds from sale of cattle can be also be used to venture into other income generating enterprises.

Chambers and Conway, cited by FAO (2007) state that a livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, in an environment that does not deplete natural resources.

In Mbire Ward 15, findings have shown that herd sizes and market price are frustrating the process of building resilience through cattle farming.

4.3 SUMMARY

Chapter four outlined results of the study. This was followed by a discussion on the findings. Descriptive analysis was used to describe factors affecting cattle offtake. Regression analysis was used to determine the most influencing variable. The study found that market price of cattle, and herd size, were discouraging cattle offtake in the area.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5 INTRODUCTION

Objectives of the study, data gathering methods used and findings are summarised in this chapter. The chapter also sets out some recommendations from the findings of the study.

5.1 CONCLUSION

The main objective of the study was to analyse the determinants of cattle offtake by smallholder farmers in Mbire Ward 15 community in building resilience. Mbire is in Region four and receives erratic rainfalls. Farmers, main sources of income are livestock production and a bit of commercial farming, mainly cotton. However, cotton prices are depressed for some years now. Farmers in the district are yearning for the government to assist them in their livestock farming on the background of climatic change and persistent dry spells. Sound livestock management practises that include well-timed cattle offtake is vital in the region for resilience capacity building. Thus, the study sought to find the factors, at household level, that affect farmers in the area in cattle offtake during periods of drought that are associated with insufficient pastures and safe drinking water.

Findings were that farmers are discouraged from selling cattle by the prices on the market. Households deem prices low and they are therefore not incentivised to sell. The farmers prefer to hold on to their cattle, hoping that they survive and go through the dry periods. Additionally, the sizes of the herds is also a discouraging factor since they are small. Farmers are eager to let the herd sizes grow before they start selling.

i) **Characterization of households that are into livestock production**

Men were found to comprise of a major proportion of the cattle farmers. The farmers have wide range of experience in keeping animals. This experience could be helping them manage cattle in the periods of drought. However, the majority went as far as primary education in terms of literacy, which makes it difficult for them to appreciate opportunity cost when making decisions to sell cattle, hence compromising resilience building capacity.

ii) **Description of alternative cattle management systems that help build resilience in periods of disasters.**

Farmers rely mainly on crop residue, use of salt and grass cutting as supplementary feeding, with little use of conventional feeds. The use of these non-conversional feeds is sustainable to some extent as these are available within the communities with very little cost where costs are incurred. In periods of drought, unless very extreme, farmers use the residue from crops that have failed. Fortunate to the community, boreholes have been sunk and the deep wells recharge enough water for the livestock. However, the nutritional composition of the supplementary feed that is used is not enough to stimulate rapid growth of the cattle herds that farmers are eager to have and which will result in improved cattle offtake for resilience building capacity.

iii) **Analysis of factors influencing cattle offtake, and the reasons for holding on to livestock during periods of drought.**

Findings showed that prices of cattle on the market and the herd size, though not significant at 95% confidence level, have some bearing on cattle offtake. Farmers are discouraged from selling cattle by the prices on the market. Households deem prices low and they are therefore not incentivised to sell. The farmers prefer to hold on to their cattle, hoping that they survive and go through the dry periods. Additionally, the sizes of the herds are also a discouraging factor since they are small. Farmers are eager to let the herd sizes grow before they start selling.

5.2 RECOMMENDATIONS

An issue of interest in the analysis of cattle offtake in Ward 15 Mbire was for resilience building capacity. The anticipation is that improved cattle offtake enable households to buy supplementary feeding, venture into some other income producing projects, cushion themselves from extreme poverty using cattle proceeds and avoid selling of assets that have been accumulated.

i) **Characterization of households that are into livestock production**

The farmers have wide experience in rearing cattle. However, there is need to educate then on new technologies that will assist them build their herds. It was noted that there is heavy consultations with sons in making decisions. Thus, programs to enhance farmers' knowledge should include the youth as well and where possible to make such household initiatives.

ii) **Description of alternative cattle management systems that help build resilience in periods of disasters.**

Another key element in the herd building is the access to commercial feeds during drought periods. It is further recommended that subsidized stock feeds or sponsored feeding pens be made available, especially for breeding stock, and this will go a long way in herd building.

Findings are that the cattle farmers diversify into other livestock production. Many farmers do keep goats in addition to cattle. Although goats are regarded as small livestock, cattle farmers have at some point sold goats, signifying a source of additional income. This is vital for resilience purposes. Goats and cattle, although they both share the same pastures, the former tend to feed mostly on leaves. Furthermore, largely, different diseases affect cattle and goats. Thus, a disaster that affects one category may spur the other, which households can turn to for continuity of their livelihoods. In light of this, there is need to strengthen the production of other livestock like goats.

iii)**Analysis of factors influencing cattle offtake, and the reasons for holding on to livestock during periods of drought.**

It is recommended that efforts be directed towards building cattle herds through use of conventional feeds for the breeding stock. This is on the background that farmers are hesitant to sell because the herds are small.

Concerning market prices, it is recommended that systems be put in place to facilitate fair negotiation of prices. Framers can be assisted to work as a community and agree on minimum prices for given sizes of cattle. Educating farmers on marketing systems can help in coming up with markets such as an auction system. This will lead into fair market prices.

5.3 DIRECTION FOR FUTURE STUDIES

The study was limited to demographic and socioeconomic variables. Many factors affect cattle offtake for resilience building as conceptualized in Chapter Two. Therefore, study of institutional factors can go a long way in mapping how well the small farmers in Ward 15 and similar wards in Mbire, so that they improve their resilience capacity. This involves

assessing the relevance of both state and private extension service provision and the milestones that have been covered by various institutions of a public or private nature that have undertaken developmental projects in the area.

5.4 SUMMARY

Chapter five looked at the summary of the study, starting with summary of the objectives, data collection methods and subsequent analysis, recommendations and ending with indications for future studies.

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Appendix 1

BINDURA UNIVERSTITY OF SCIENCE EDUCATION

Dear valued respondent

RE: REQUEST TO ANSWER QUESTIONS IN THIS QUESTIONNAIRE

I am a final year Master of Science degree student at Bindura University of Science Education (BUSE) and I am doing a research project in line with the programme's requirements. The title of my research is;

Cattle offtake as a livelihood based intervention to building resilience in periods of drought: the case of Mbire District ……...

I am therefore requesting your assistance by answering the questions objectively.

Your participation in this survey is voluntary and is greatly appreciated as it will ensure accuracy of the data collected. All the information that you provide is strictly confidential and shall be used for my studies only.

Kindly respond to all questions and be as objective as possible. I will go through the questionnaire and record your responses. Where there is need for clarification, please free to indicate so. Your co-operation is greatly appreciated.

SECTION A: GENERAL DETAILS

A1) Sex Male Female

A2) How old are you? ……years

A3) Who makes decisions on crucial issues in the household? Father ☐ Mother ☐

Eldest son ☐ Whole household ☐

A4) What is your position in the family? Father ☐ Mother ☐

Eldest son ☐ Ordinary family member ☐ Other …….

A5) How many people ordinarily reside at your home …….

A6) What is your highest level of education?

Not educated ☐ Primary education ☐

Secondary education ☐ Tertiary education ☐

SECTION B. DESCRIPTION OF FARMING ACTIVITIES

B1) How many cattle do you have? …….

B2) Do you keep any other animals (not being chickens)? Yes ☐ No ☐

B3) If your answer to question B2 is 'yes', which animals do you keep?

Goats ☐ Donkeys ☐ Pigs ☐ Other ☐

B4) If your answer to question B2 is yes, how many animals do you keep?

Goats ……. Donkeys ……. Pigs ……

Other (specify) ……..

B5) How long have you been keeping cattle? ……..years

SECTION C. PRODUCTION PRACTICES AND COPING STRATEGIES

C1) Where do you take your cattle for grazing?

Family controlled land ☐ Community land ☐

Other ☐ (specify) …….

C2) Do you give cattle supplementary feeds generally? Yes ☐ No ☐

C3) If your answer to C2 is yes, what type of supplementary feed do you give to your animals?

……..

C4) In times of drought, what type of supplementary feeds do you give to your animals?.....……

C5) In times of drought, where do you get drinking water for your cattle?

……..

C6) When drought strikes, what measures do you take so that you do not lose completely?

……

……

……

SECTION D. CATTLE OFFTAKE AS A RESILIENCE MEASURE

D1) In times of limited pastures and drinking water as result of drought, do you consider reducing the number of cattle? Yes ☐ No ☐

D2) If your answer to question D1 is 'no', why do you maintain the same herd size in face of drought where there are limited pastures and water?

No market ☐ low market prices ☐ See no benefit in disposing of ☐

Other reasons……..

……

D3) If your answer to D1 is 'yes', how do you reduce the number of cattle?

☐ ☐

Slaughter Selling as live animals

Other ☐ Specify……..

D4) In the previous 12 months, how many cattle did you dispose of?

Through selling …….. Through slaughter for home consumption ……..

Through other means (specify) …….. …….

D5) What factors do you consider before reducing the herd?

……..

……..

……..

……..

D6) In the previous twelve months, did you sell any other livestock (not cattle) for income generation? Yes ☐ No ☐

D7) Do you seek consent of household members when deciding to slaughter or sell cattle?

Yes ☐ No ☐

D8) If your answer to question D6 is 'yes', whom do you consult?

Spouse ☐ Eldest son ☐ Other (specify) ……

D9) When deciding to slaughter or sell, or dispose of cattle through other means, do you consult community members? Yes ☐ No ☐

D10) What does the community members say when you reduce the number of cattle?

Good idea ☐ Wrong decision ☐

Other ☐ …….

D11) Do you find reducing numbers through sell helpful during periods of drought?

Yes ☐ No ☐

D12) If your answer to question D10 is 'yes', how did you find this helpful?

……
……
……

Any other comments

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Thank you