BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF AGRICULTURE AND ENVIRONMENTAL SCIENCE

DEPARTMENT OF ANIMAL SCIENCE

A Survey Of Cattle Diseases In Shamva District, Mashonaland Central

BY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE BACHELOR OF SCIENCE HONOURS DEGREE IN ANIMAL HEALTH AND PRODUCTION EXTENSION AT BINDURA UNIVERSITY OF SCIENCE EDUCATION

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DECLARATION

I Shadreck Magorimbo, declare that this project hereby submitted for the Bachelor of Science Honours Degree in Animal Health and Production Extension at the Bindura University of Science Education, is entirely my original work and affirm that it has not been submitted anywhere for the award of a degree or otherwise.

Shadreck Magorimbo ……. Date ……..…

Supervisor(s)' declaration:

…… Date…….

Dr P Chatikobo (Major Supervisor)

…… Date……

Mr Mangwiro (Co- supervisor)

I certify that I have checked this Research Project and I am satisfied that it conforms to The Department of Animal Science Guidelines for Project Preparation and Presentation. I therefore, authorize the student to submit this dissertation for marking.

…….. Date……

DEDICATION

To my beloved wife and children with love.

ACKNOWLEDGEMENTS

I am indebted to Dr. Chatikobo and Mr Mangwiro, my supervisors, for their untiring supervision, valued guidance and recommendations as well as for his reassurance that I treasure so much in undertaking this project. My sincere gratitude goes to Mrs. Moyo from the Department of Veterinary Services (DVS), Shamva district, for their immense cooperation which greatly facilitated completion of my work. I would also want to express my sincere appreciation to the entire team from the Department of Animal Science at Bindura University of Science Education for their assistance and colossal contribution during all the time to improve this work.

Abstract

The study was conducted to assess cattle diseases affecting farmers in Shamva district in Zimbabwe. A semi-structured questionnaire was administered to 250 farmers that were randomly selected from cattle owners in 5 wards.The data was analysed using SPSS. The results indicated that a lot of diseases are prevalent in Shamva district. The include tick borne diseases are the most prevalent diseases in Shamva district with the infamous Theileriosis toping the list. FMD, Lumpy skin and Blackleg are also prevalent in Shamva district. Some diseases of cattle

which are also prevalent in Shamva district are Mastitis, Bovine babesiosis, Contagious opthalmia, Hardware disease and Warts though to a lesser extent. Tick borne diseases were the major causes of death with Theileriosis being the major cause of death of cattle in Shamva district followed by Lumpy skin. Dermatophilosis and FMD are also causing cattle deaths in Shamva district. Government should therefore channel funds towards the control of tickborne diseases. This entails investment in extension and dipping as preventative measures and antibiotics as a curative measure. NGOs may also intervene by supporting goverment efforts of ensuring effective dipping of cattle to avoid losses due to tick borne diseases. . There must be awareness campaigns and effective law enforcement to discourage animal movement to minimize cases of FMD. However, there is need for learning and research institutions to prioritise research in prevention and control of cattle diseases. Such research should encompas vaccinations and farmer indigenous knowledge systems such as the use of ethnoveterinary remedies.Future studies should also investigate the role of extension and actors in the livestock value chain in controlling cattle diseases.

Farmers, livestock mortality, Shamva district,

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LIST OF ACRONYMS

DVS…….Department of Veterinary Services

FAO …….Food and Agricultural Organisation of the United Nations

GDP……...Gross Domestic Product

VEW……...Veterinary Extension Worker

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CHAPTER 1

INTRODUCTION

1.1. INTRODUCTION

Zimbabwe, is endowed with the second largest livestock population in Southern Africa (Solomon *et al*., 2016; CSA, 2015) and the sector contributes 17% to the gross domestic product (GDP) and 36% to the agricultural GDP (Metaferia *et al.* 2018), and provides a livelihood for 75% of the population. The cattle population of Zimbabwe is estimated at 5.83 million head, of which 55.48% are females, (CSA 2021).

Cattle farming is an important source of employment, income and food. Mention directly, and straight to the point on all the products and benefits that famers get from cattle. There are plenty of them including meat, milk, draught power, transport, a form of savings, income generation, manure, hides, rituals and cultural ceremonies, payment of lobola, etc. Food produced from these animals provides an important source of family nutrition for the majority of rural as well as urban and peri-urban population (Mapekula *et al*., 2017).

Despite the multiple benefits, the productivity of smallholder cattle is low. Low productivity is attributed to a number of challenges including diseases, inadequate nutrition, poor quality animals, climate change effects, poor animal husbandry practices (Belay *et al.,* 2014). Among these constraints, disease is the most important, and responsible for reducing both numbers and productivity of animals (Solomon *et al.*, 2016; Negassa *et al.*, 2015).

Diseases have many negative impacts on production and productivity of cattle, imposing significant economic losses resulting from mortality, morbidity, loss of weight, poor growth rate, and poor fertility and reduced animal draft power (Dereje *et al.,* 2018). Worldwide, cattle diseases cause considerable economic losses in livestock farming because it increases animal morbidity and mortality. The most common diseases affecting cattle production and productivity in Zimbabwe include anthrax, blackleg, brucellosis, contagious bovine pleuropneumonia, cowdriosis, foot-and-mouth disease, internal and external parasites, mastitis, pasteurellosis and

trypanosomiasis (Welay *et al.,* 2018; Tedla and Gebreselassie 2018; Dereje *et al.,* 2018). A mortality of 8–10% has been reported for the indigenous cattle in Zimbabwe (MLAFWR, 2021). It is also reported that considerable financial losses in the livestock sector are associated with diseases and inefficient management (Simianer *et al.,* 2017). However, the spatial and temporal distribution of a disease varies with the disease, management system, and disease control measures put in place. The aim of this study will, therefore, be to assess cattle diseases affecting farmers in Shamva district in Zimbabwe.

1.2. Problem Statement

Cattle diseases are reported annually to the Department of Veterinary Services (DVS), but there is no published information on the prevalence of cattle diseases in Shamva district. Unofficial reports indicates high cattle morbidity and mortality from unknown causes which has been a cause for concern for both farmers and the DVS. Without updated, proper information on the diseases that are occur in an area, their causative agents and epidemiology, it is not possible to put in place effective disease control and prevention measures. This study will highlight the key cattle diseases in Shamva district as the first step towards effective cattle diseases control in the area. The findings will help address the current information gap.

1.3. Study Objectives

The broad objective of this study is to improve the health, and subsequent production and productivity of cattle in Shamva district.

Specific objectives are to:

1. Identify cattle diseases that are prevalent in Shamva district;
2. Determine main disease leading to cattle mortality in Shamva district

1.4. Research Questions

1. Which cattle diseases are prevalent in the Shamva district?
2. What is the main disease causing cattle deaths in Shamva district?

Hypothesis?

1.5. Justification

Cattle are an important source of food, income and employment for many citizens of Zimbabwe. However, cattle diseases poses a threat to benefits that is brought by rearing this type of livestock. Such a threat may be controlled by providing information through research. Information on the epidemiology of a disease is critical for the design of effective and sustainable disease control priorities and strategies.

CHAPTER 2

LITERATURE REVIEW

2.0 INTRODUCTION

Animal diseases have important impacts on animal productivity and welfare and on human health and wellbeing. From a 'One Health' or ecohealth perspective, disease impacts on human health, animal health and ecosystem health are considered holistically (Solomon, et al., 2016). Animal diseases impose direct costs on the livestock sector, as a result of animal deaths, reduced productivity and the cost of disease control. The impacts of zoonotic and foodborne diseases are felt in terms of human illness and associated costs. Many diseases also have impacts in terms of indirect costs, both upstream (feed) and downstream (e.g. retailing links). Emerging diseases tend to have high impacts on other sectors, such as travel and tourism. It is often difficult to quantify the costs of wildlife diseases, but the impacts are potentially high.

Livestock is a main agricultural activity in Zimbabwe and plays an important role in the livelihoods of smallholder farmers, especially in rural areas. The livestock sector has enormous potential for growth and could contribute to overall rural development, sustained growth and poverty reduction, but it is hindered by low productivity, high disease morbidity and mortality (FAO, 2016). Food security through the effective control of animal disease is essential, especially the control of ecto-parasites in smallholder rural farming areas of Zimbabwe. Although semi-arid regions in Zimbabwe are suited for extensive livestock husbandry, that is, cattle and other small ruminants, performance in these areas remains subdued owing to numerouanimals interactive factors — key among them being diseases and poor health management. Livestock, especially cattle, play a crucial role in the livelihood of the population of Zimbabwe where the majority live in rural areas. Here, crop production is restricted by low

and poorly-distributed rains coupled with recurrent droughts; their importance, especially to food security, is even greater.

Cattle among other livestock are sources of income, food security and livelihood to over 70% of the households in Zimbabwe (FAO, 2018). With a rising demand for livestock products in both domestic and regional markets, there is a growing need to support farmers to produce and get more income from the cattle value chains. However, cattle disease outbreaks continue to affect the productivity of both the beef and dairy sector in Zimbabwe.

2.1 Cattle disease diagnosis

Many farmers fail to identify some cattle diseases hence can not find remedies to such diseases resulting in high cattle mortalities. A disease is defined as any condition that causes the systems of animals not to function properly, and also include bacterial and viral diseases. lmproved diagnosis is a prerequisite for effective management of endemic cattle diseases in sub-Saharan Africa (Radostits et al., 2007). However this is currently constrained by the limited availability of suitably trained professional staff, field-level diagnostic tests and a general lack of knowledge about disease among livestock owners. Moreover, under field conditions clinical diagnosis of these diseases is complicated by the occurrence of a combination of intestinal and haemoparasites, which mutually exacerbate each other's pathogenic effects. Where multiple similar diseases occur decision support tools might facilitate differential diagnosis. Current thinking in terms of veterinary service provision favours pen-side diagnostic tests and decision support technology suitable for use by farmers, extension workers and agro-veterinary traders; i.e. those who most often make the diagnosis and treatment decisions in rural African settings. Recently a low cost decision support tool has been developed to aid the diagnosis of anaplasmosis, babesiosis, cowdriosis, fasciolosis, parasitic gastro enteritis, schistosomosis, theileriosis, and trypanosomosis in sub Saharan Africa. Studies have been conducted to evaluate the effectiveness of the decision support tool as a diagnostic aid under field conditions by observing whether its introduction to veterinary and animal health officers undertaking primary

animal health care in rural communities would lead to changes in clinical practice (Rweyemamu et al., 2008). Paragraph too long, should be a max of 10 lines

2.2 Cattle diseases prevalent in Zimbabwe

One of the major health concerns affecting cattle in Zimbabwe are ecto-parasites, particularly ticks and tick-borne diseases (TBDs). Bacterial diseases include abortion, anthrax, (calf) scours, mastitis and tuberculosis. Abortion, the expulsion of a premature foetus in fifth-to-seventh month of pregnancy, is a zoonotic disease spread through contact (FAO, 2018).

Anthrax, another zoonotic disease, has a high mortality rate, which is caused by bacterium called bacillus anthracis that produce relatively large spores on contact with oxygen. A highly infectious and fatal disease of cattle, anthrax causes acute mortality in ruminants and occurs on all the five continents. The bacteria bacillus anthracis produce extremely potent toxins which are responsible for the ill effects, causing a high mortality rate. Signs of the illness usually appear within three-to-seven days after the spores are swallowed or inhaled. Anthrax typically causes an unusual rise in body temperature followed by depression, cardiac distress, staggering and death. Affected animals sometimes die of suffocation, usually within two days, once signs manifest in the animals. Hoofed animals, such as cattle, deer, goats and sheep, are the main animals affected by this disease. They usually acquire the disease by swallowing anthrax spores while grazing on pasture contaminated with bacillus anthracis spores. Inhaling the spores, which are odourless, colourless and tasteless, may also cause infection in animals and people. There are three types of anthrax which affect skin, lungs and the digestive system. Generally, outbreaks of this disease occur in areas where animals have previously died of anthrax due to the presence of spores which remain viable for decades. Large numbers of anthrax spores were released by the Selous Scouts during Zimbabwe's war of liberation (circa1965-1979) despite the world-wide ban of chemical warfare causing great fatalities among the indigenous population and their cattle (Mapekula., et al, 2017).

Blackquarter or blackleg, is a soil-borne infection which generally occurs during the rain season. It is an acute, infectious and highly fatal bacterial disease of cattle, buffalo, sheep and goats. In cattle the disease is mostly confined to young stock between 6 months to 2 years but occasionally it may occur in younger animals and cattle up to 3 years (Radostits et al., 2007). Studies have shown that some cows and bulls are also affected with black leg.Cattle in good body condition, are mostly affected.

Calf scours usually appear in calves under five days of age. It is a common contaminant in manure and may build up to epidemic levels. Calf scours is the primary cause of death in calves from two-to-30 days of age. It is usually caused by bad hygiene, feeding management or both and is known to cause high financial loss to calf producers. Rotavirus and coronavirus are the causative organisms that contribute to calf scours. On their own, they usually produce only mild disease signs, but become more severe when combined with stress or other agents.

Mastitis, or inflammation of the mammary gland is a bacterial disease of the cow's udder. Here, infection caused by almost 20 different bacteria occurs through the teat canal, mainly due to bad hygiene. There are two types of mastitis; clinical and sub-clinical mastitis. Mastitis, is the most common and the costliest disease of dairy cattle in the world. Although stress and physical injuries may cause inflammation of the gland, infection by invading bacteria or other micro-organisms like fungi, yeasts and possibly viruses is the primary cause of mastitis. Infections begin when micro-organisms penetrate the teat canal and multiply in the mammary glands (Mapekula, et al., 2017).

Pink-eye is an eye infection of cattle due to a specific bacterium that is commonly carried by many normal animals. A herd outbreak of pink-eye is often precipitated by eye irritation (dust, sunlight, etc). The infection is readily spread to other animals by flies during summer, the period of greatest exposure (Tedla and Gebreselassie, 2018).

Tuberculosis, a zoonotic disease caused by mycobacterium bovus — affects all types of cattle. Clinical signs for tuberculosis include weakness, loss of appetite, weight loss and diarrhoea. Tuberculosis can also be transmitted through raw milk. Other respiratory disease in cattle include

bovine parainfluenza virus, bovine respiratory syncytial virus, bovine coronavirus, bacterial pneumonia and lungworm.

Viruses are infectious agents that replicate within cells of living host. Among them are, bovine viral diarrhoea (BVD), blue tongue, rinderpest as well as foot and mouth disease (FMD) that keep recurring needlessly in Zimbabwe. The occurrence of FMD has been reported in all age groups of animals and all the seasons of the years but higher susceptibility to young's and associated with increased movement of animals at the start of dry winter grazing season. FMD is a transboundary animal disease (Rweyemamu et al., 2008). Even after appropriate vaccination it is very difficult to control unless and until cattle trafficking is stopped and quarantine is followed appropriately during import from international market.

Bovine viral diarrhoea is a common cause of respiratory and reproductive cattle problems. Signs of acute infection of BVD include fever, lethargy, loss of appetite, ocular discharge, diarrhoea and decreasing milk production. Infected animals must be culled. The viral disease blue tongue, spread by insect vectors, is characterised by fever, widespread hemorrhages of oral and nasal tissue, excessive salivation and nasal discharge. Blue tongue cannot be spread without the presence of insect vectors

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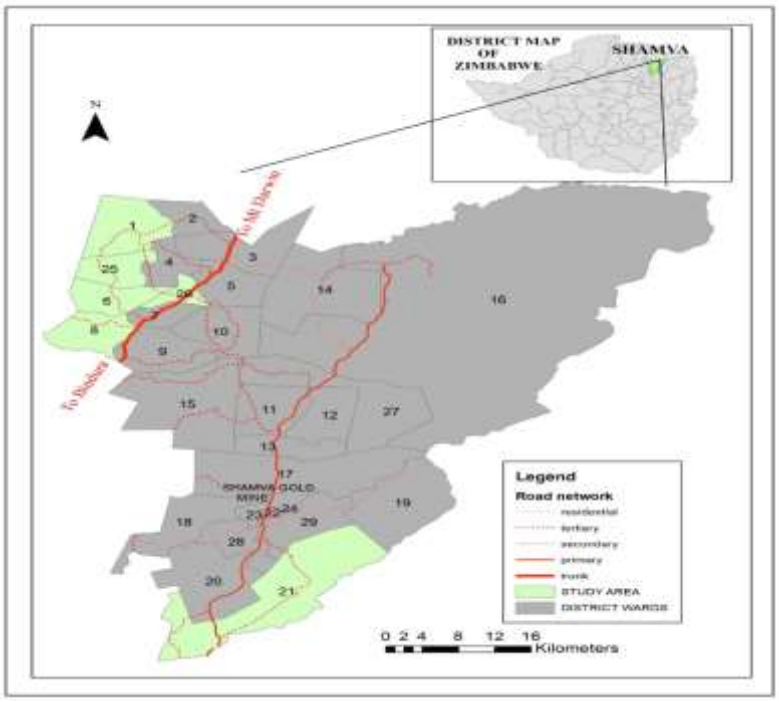
CHAPTER 3
MATERIALS AND METHODS

3.0 Description of the study area

The survey will be done in Shamva district. The district is one of the administrative districts in Mashonaland Central Province (MLAFWR, 2021). It is located about 24km east of the provincial capital Bindura. It falls under ecological region 2A, receiving between 750mm and 900mm annual rainfall (MLAFWR, 2021). Shamva district is divided into 29 wards. A total 13 wards are located in communal areas, three wards in resettlement areas and the remainder is

large scale commercial farms MLAFWR, 2021. The area is characterized by perennial short and long savanna grass and pastures.



3.1 Research design

A semi-structured questionnaire was administered to 250 farmers that were randomly selected from cattle owners in 5 wards. A cross-sectional survey design was employed for the study. The five study wards were randomly selected on the basis of their high potential for cattle production. The wards selected included; 3,5, 7, 8 and 11. The study population was all households in the five wards who keep cattle. A list of all households keeping cattle was obtained from the Ministry of Lands, Agriculture, Fisheries, Water and Rural resettlement (MLAFWR) for the respective wards. The study units for this study were cattle farmers only. Finally, number of households (respondents), in total, was randomly selected, proportionally for the sampling frame of each ward, using a simple random-sampling method.

3.2 Data Collection

Data wascollected through face-to-face interviews by using semi-structured questionnaires. The questionnaire was designed to collect information on:

- Household der sizes;
- Breeds of cattle kept;
- Classes of cattle raised;
- Cattle diseases or disease syndromes observed/recorded by the farmer;
- Dipping frequency;
- De-worming frequency; and
- Any preventive vaccines used.

The questionnaire gathered information on demographic data of respondents (age, sex, marital status, educational level, main occupation, farming experience and family size), cattle breed and herd sizes, the most common cattle diseases, management practices (feeding, breeding, housing, water sources), calf-rearing practices, animals died in the past 12 months before the interview date, causes of cattle deaths, reasons for culling, milking procedures and pre-milking hygienic practices, access to animal health services, disease treatment options, sources of labour, distance to river point, record keeping, and farmers' knowledge of disease identification. Cattle housing

condition on all farms werevisually inspected with the aid of a checklist to assess the drainage (present or not), hygiene (accumulation of slurry, animals soiled with dung), ventilation (present or not), and space (adequate or small for easily lying down, rising or movement) were categorised as good, satisfactory and poor.

3.3 Data Analysis

Questionnaire data was coded and analysed using SPSS software (Statistical Package for Social Sciences for Windows, version 22; BI Survey Tips, Chicago, IL, USA) to generate descriptive statistics for the variables. Descriptive statistics, such as means, percentages and standard errors of the mean were used to present the results.

CHAPTER 4

RESULTS

4.1 Prevalent cattle diseases in Shamva district

Diseases	Count
Lumpy skin	(15)6%
Dermatophilosis	(10)4%
Theileriosis	(120)48%
Anaplasmosis	(20)8%
Heartwater	(30)12%
Bovine babesiosis	(5)2%
Anthrax	(5)2%
Blackleg	(10)4%
Contagious opthalmia	(5)2%

Hardware disease	(3)1%
Warts/ Papilomavirus	(3)1%
Mastitis	(7)3%
FMD	(17)7%

A graph or pie chart would express this better

The study revelead that a lot of diseases are prevalent in Shamva district. Many (68%) respondents sighted tick borne diseases as the most prevalent diseases in Shamva district with the infamous Theileriosis toping the list as 120 responents that is 48% indi ating that Theileriosis is the major tick borne disease followed by Anaplasmosis and Heartwater with 8% and 12% repectively. FMD was another disease which was sighted by 7% of the respondents as a prevalent disease in Shamva district. Some respondents (6%) indicated that Lumpy skin skin was another prevalent disease followed by Blackleg (4%), Mastitis (3%), Bovine babesiosis (2%), Contagious opthalmia (2%), Hardware disease (1%) and Warts (1%).

4.2 Main diseases leading to cattle mortality in Shamva district

Diseases	Count
Lumpy skin	(25)10%
Dermatophilosis	(10)4%
Theileriosis	(150)60%
Anaplasmosis	(25)10%
Heartwater	(30)12%
FMD	(10)4%

The study indicated that tick borne diseases were the major causes of death with 60% of the respondents sighting that Theileriosis is the major cause of death in Shamva district. Thirty respondents constituting 12% said that Heartwater was the main cause of death whereas 10% of the respondents indicated that Anaplasmosis was the major cause of death. Some (10%) respondents indicated that Lumpy skin was the main cause of death of cattle whereas some respondents indicated that Dermatophilosis and FMD were the major causes of death of cattle in

Shamva district that is 4% and 4 % of the respondents respectively. The same trend was also reported by the Shamva Veterinary Services Department which noted that tick borne diseases where the major cause of deaths in Shamva communal area claiming 361 cattle as shown in Figure 4.1 below.

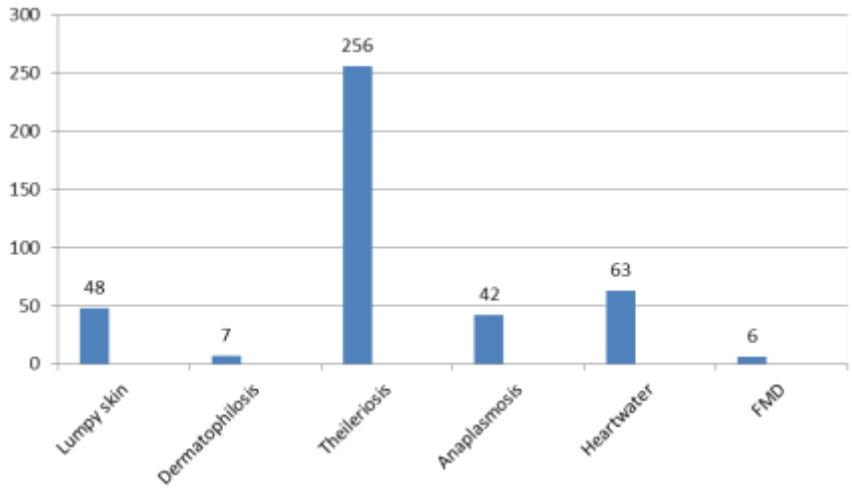


Figure 4.1. Cattle deaths in Shamva communal as reported by the Veterinary Services Department

CHAPTER 5

DISCUSSION

5.1 Prevalent cattle diseases in Shamva district

The study revealed that a lot of diseases are prevalent in Shamva district. This was also observed by Ruzvidzo (2021) who observed the same under studies in Mashonaland West. Many respondents sighted tick borne diseases as the most prevalent diseases in Shamva district with the infamous Theileriosis toping the list. The same was observed by Tomy (2021) who also noticed that tick borne diseases were prevalent in Mt Darwin district, Mashonaland central. FMD was another disease which was sighted by the respondents as a prevalent disease in Shamva district. FMD has become a cause of concern for both farmers and the government not only because of its hinderance to trade but also due to the fact that its now spreading to the once said green zones (MLAFWR, 2021). Some respondents indicated that Lumpy skin skin was another prevalent disease followed by Blackleg, Mastitis, Bovine babesiosis, Contagious opthalmia, Hardware disease and Warts. Mapekula et al., 2017 posited that mastistis has affected the dairy sector to a larger extent resulting in low milk yields.

5.2 Main diseases leading to cattle mortality in Shamva district

The study indicated that tick borne diseases were the major causes of death with many respondents sighting that Theileriosis is the major cause of death in Shamva district. The devastating impact of the Theileriosis has been experienced in most rural parts of Zimbabwe, with Matabeleland provinces and parts of Dande Valley in Mount Darwin being least affected (Ruzvidzo, 2021). The Veterinary services Department also reported a 361 cattle deaths due to tick borne diseases. Theileriosis was the major cause of deaths claiming 256 cattle in Shamva communal. The VET department attributed the death due to tick borne diseases to poor acaricide supply coupled with poor dipping infrastructure and water shortages at dip tanks. However, farmers mainly blamed the Veterinary Services department on lack of acaricide supply at dip tanks despite them paying the required yearly amount of money per animal. One farmer was

quoted during the focused group discussion saying, “We cannot blame the government since pay the money meant for dipping but we would rather blame the Veterinary Department for spending money meant for dipping on something else and also the dip attendant we doesn’t know hoew nto mix chemicals”. However, Ruzvidzo (2021) also posited that dip attendants need to be monitored when mixing dipping chemical to avoid under mixing since some will later sell the acaricide meant for communal dippings. Negasa et al., 2015 that if one fails to properly mix correct proportions of acaricide in relation to water or if dirty water is used this may lead to no acaricide deaths and acaricide resistance. Theileriosis was followed by Heart water and Anaplasmosis as the second and third causes of death in cattle in Shamva district. Lumpy skin, Dermatophilosis and FMD where also sighted as the causes of death in Shamva district. Vaccinations are now expensive and scarce leading to cattle dying due to novel diseases such as FMD (MLAFWR, 2017).

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

CONCLUSION

It can be concluded that a lot of diseases are prevalent in Shamva district. The include tick borne diseases as the most prevalent diseases in Shamva district with the infamous Theileriosis toping the list. FMD, Lumpy skin and Blackleg are also prevalent in Shamva district. Some diseases of cattle which are also prevalent in Shamva district are Mastitis, Bovine babesiosis, Contagious opthalmia, Hardware disease and Warts though to a lesser extent.

From the study it cqn also be concluded that tick borne diseases were the major causes of death with Theileriosis being the major cause of death of cattle in Shamva district followed by Lumpy skin. Dermatophilosis and FMD are also causing cattle deaths in Shamva district.

RECOMMENDATION

Government should channel funds towards the control of tickborne diseases. This entails investment in extension and dipping as preventative measures and antibiotics as a curative measure. NGOs may also intervene by supporting goverment efforts of ensuring effective dipping of cattle to avoid losses due to tick borne diseases. . There must be awareness campaigns and effective law enforcement to discourage animal movement to minimize cases of FMD. However, there is need for learning and research institutions to prioritise research in prevention and control of cattle diseases. Such research should encompas vaccinations and farmer indigenous knowledge systems such as the use of ethnoveterinary remedies.Future studies should also investigate the role of extension and actors in the livestock value chain in controlling cattle diseases.

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