

The role of ethnoveterinary practices in the rural livestock keeping households: The case of UMP district in Zimbabwe.

A research project submitted to:

Van Hall Larenstein University of Applied Sciences

In partial fulfilment of the requirements for the degree of

**Master in Management of Development
specialising in Food and Nutrition Security**



By Willard Chandavengerwa
September 2021



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university of applied sciences

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Dedication

This work is dedicated to my big family (my beautiful wife Jane Chandavengerwa, daughters (Cheryl and Chantelle), my caring parents Alexander and Ruth Chandavengerwa, my brothers (Togara, Willmore and Esman) and sisters (Nyasha and Emildah), my supervisor Jan Hoekstra, the faculty and staff of Van Hall Larenstein University of Applied Sciences and the staff of the Department of Veterinary Services Zimbabwe. The above mention personalities supported me during my studies and my thesis research at VHL. A special thank you message to my beautiful and caring wife Jane. She inspired and supported me every day of my journey through the master program. She was determined to see me achieve my goals. To my daughters who always see me as a super dad and hero, who can achieve anything in life. My parents for your unwavering faith and belief in me.

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List of abbreviations

Agricultural Extension Worker	AEW
Department of Veterinary Services Zimbabwe	DVS
Ethnoveterinary Practitioner	Ethnovet
Food and Agriculture Organisation	FAO
Government Veterinary Officer	GVO
Gross Domestic Product	GDP
Sustainable Livelihood Framework	SLF
Uzumba-Maramba-Pfungwe	UMP
Veterinary Extension Worker	VEW

Abstract

The study was carried out to investigate the capacity of farmers, knowledge, and skills on ethnoveterinary practices. The main research question being addressed is, what is the capacity of the rural livestock farmers in maintaining the health and welfare of their livestock using ethnoveterinary medicine in UMP District? The sub research questions were created to address the main research question. These included why the livestock keeping households use ethnoveterinary remedies, the knowledge, skills, and resources on use of ethnoveterinary remedies by poorly resourced households, the role of man and women in the use of ethnoveterinary remedies in cattle and poultry and the perception of farmers on the support they get from the Department of Veterinary Services (DVS) on the use of ethnoveterinary remedies.

A qualitative approach was used. Forty (40) livestock keeping households, ethnoveterinary practitioner, government veterinary officer, veterinary extension worker, and an agricultural extension worker were interviewed. Two (2) focus group discussions with one comprising of ten (10) men and the other ten (10) women were conducted to confirm the data from the questionnaire interviews.

The study revealed that livestock keeping households use ethnoveterinary remedies because they are cheap, readily available, accessible and it is part of their tradition which is passed on from one generation to the other. The livestock keeping families have ethnoveterinary remedies to these diseases. 106 and 105 treatment options were described in cattle and poultry respectively during the questionnaire interviews. At least 80% of the treatment options are plant-based in both cattle and poultry. Household ingredients which include cooking oil, sugar and salt were also used as ethnoveterinary remedies.

The study also showed that men are in the cattle business while women were mainly into poultry rearing. Older people who are over 40 years of age were more knowledgeable about ethnoveterinary practices compared to respondents less than 40 years. Most respondents only seek for assistance from the government when the traditional remedies have failed. The study revealed that farmers receive advisory services, training, and consultation services from the DVS. Only advisory services are important in their ethnoveterinary practices because they give early warning signs on disease outbreaks. Livestock keeping farmers become more prepared and minimise on livestock losses using ethnoveterinary remedies.

Chapter 1: Background

Rural households rely on livestock and poultry in the supply of food. The importance of livestock and poultry in food security and rural livelihoods lies in the provision of meat, eggs, milk, draught power, hides & skins, and manure. Zimbabwe is a landlocked sub-Saharan African country with a total land area of approximately 39 million hectares. About 33.3 of this land is used for agricultural purposes while the remaining 6 million hectares were reserved for urban settlements, national parks, and wildlife. Agriculture is the backbone of the economy in Zimbabwe as it provides employment and income for 60-70% of the total population, supplies 60% of the raw materials used in the industrial sector and contributes 17% of the country's Gross Domestic Product (GDP). Cattle account for 35-38% of the GDP contributed by the agriculture sector (FAO, 2021b; Eiki, et al., 2021).

Approximately up to 60% of the rural households in Zimbabwe own cattle (FAO, 2021b). Poultry is the most prevalent type of animal ownership in Zimbabwe (FAO, 2021a) with over 80% of the households owning chickens (FAO, 2021b). In countries like Zimbabwe, farmers keep livestock to meet household needs, but its production is constrained by rampant animal diseases (Eiki, et al., 2021). Animal diseases tend to cause loss in production of meat, milk, and eggs leading to lack of food availability and accessibility. The impact is mainly in rural areas of developing countries where there is diverse use of livestock, incomes are low and producing food is difficult (Kumar, et al., 2021). Livestock kept by the rural community provide a regular supply of protein, diversity to plant-based diets and critical supplement especially for milk and eggs. The meat, milk and eggs help to mitigate the negative effects of seasonal variations in grain availability.

Livestock keepers have become dependent on the Department of Veterinary Services (DVS) in Zimbabwe. This is because there were massive inputs at some point in 2009 after Department of Veterinary Services (DVS) received usd843880 revolving fund from FAO (FAO, 2011). The purpose of the funding was to buy dipping chemical and improve community dipping services in rural areas. However, DVS is failing to be effective in providing its regular, conventional services for different reasons. These reasons include foreign currency shortages (FAO,2021a) and the changing environment from new policies made in the country due to hyper-inflation making it difficult to import drugs and dipping chemicals (Gadaga , et al., 2016).

Moreover, the DVS currently does not take ethnoveterinary knowledge and skills into account for its own service delivery. This is despite the evidence that, traditional knowledge systems provide self-reliance to farmers. Thailand, Mexico, China, and Nigeria successfully integrated traditional medicine into primary health care systems (Phondani, et al., 2012; Byaruhanga, et al., 2015). Most communities have at least one ethnoveterinary practitioner whom people turn to for help (Mathias & McCorkle, 2004). There is realisation by the Commissioner (DVS), that farmers also have knowledge and skills which can be utilised to reduce dependency on government support and empowers them to maintain the health and welfare of livestock.

Farmers, particularly both men and women have ethnoveterinary knowledge and skills they use in their daily husbandry practices. The better use of this ethnoveterinary knowledge and skills will lead to sustainable livelihoods and subsequently increased food and nutrition security of the local communities / farming (livestock keeping) households. Also, an appropriate approach (e.g. participatory approach), to services delivery by the Department of Veterinary Services supports the capacity of local livestock keeping households and empowers them to deal with animal diseases; and, thereby, improving their food and nutrition security.

Research problem

The mandate of Department of Veterinary Services (DVS) in Zimbabwe is to safeguard the health of livestock and the safety of animal-based food products through strategic implementation of disease control programmes and provision of extension services. The Department of Veterinary Services is interested in supporting farmers to address diseases and animal health care through farmers' local knowledge systems. Diseases of livestock have pronounced effects on livelihoods, food security and poverty.

There is realisation by DVS at national level that, farmers also have knowledge and skills which should be integrated in to into the current primary animal health care delivery services. This ethnoveterinary practice is important because it reduces dependency of farmers and empowers them to maintain the health and welfare of livestock.

The Department of Veterinary Services as the Commissioner represented by Dr Ndlovu, who is the Director of the Epidemiology Unit wants to know how to integrate its services with what the farmers already know and practice. However, the Department of Veterinary Services is lacking knowledge on, the farmers' local knowledge systems and use of ethnoveterinary medicine, ethnoknowledge, and practices by man and women in the rural communities.

Research Objective

To investigate the capacity of livestock keeping families in UMP District in maintaining the health and welfare of livestock using ethnoveterinary practices, in order to recommend DVS on appropriate interventions that integrate traditional livestock health care practices into current primary animal health care delivery services thereby improving livelihoods, and food and nutrition security of livestock keepers.

Research Questions

What is the capacity of the rural livestock farmers in maintaining the health and welfare of their livestock using ethnoveterinary medicine in UMP District?

Sub research questions

1. Why do the farmers use ethnoveterinary medicine?
2. What are the farmers' knowledge and skills on ethnoveterinary practices that are used to maintain the health and welfare of livestock?
3. What are the differences in perception between man and women when practicing ethnoveterinary medicine?
4. What is the perception of farmers on support provided by the government on the use ethnoveterinary practice in their livestock?

Chapter 2: Literature Review

Chapter 2 starts with the definition of the important terms used in the study followed by an in-depth study of issues to do with local knowledge systems in ethnoveterinary medicine. The Sustainable Livelihood Framework is used to explain in detail in relation to the topic of study to food and nutrition security and sustainable rural livelihoods. The conceptual framework for this study is presented followed by exploring in detail ethnoveterinary practice in the rural context.

Definition of terms

Ethnoveterinary medicine is human's knowledge, abilities, practices, methods, and beliefs concerning animal health and welfare (Balieva & Kostadinova, 2013).

Ethnoveterinary practitioner is traditional a 'animal doctor' or livestock healer.

Sustainable livelihood is when it can "cope with and recover from stresses or shocks, maintain, and enhance capabilities and assets, and provide opportunities for succeeding generations (Chambers & Conway, 1992).

Appreciative inquiry is referred to as a highly inclusive process which maximises the positive in which the community assumes responsibility for gathering and generating information and then make strategies based on the positive experiences from the past (Serrat, 2017).

Food security exists "when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996).

Food availability relates to the supply side of food security and is concerned with the availability of adequate quantities of food supplied through domestic agricultural production (FAO, 1996).

Food accessibility addresses the demand side of food security and is concerned with the individual or household's ability and capacity to acquire appropriate quantities of food (FAO, 1996).

2.1 Sustainable livelihoods in context of ethnoveterinary medicine practice

A sustainable livelihood framework (SLF) is an analytic tool which focuses on the interests of societies and recognises the complexity of people's lives (Su, et al., 2019) and can be used for thinking through diversified rural livelihoods (Ellis, 2000). It improves understanding the livelihoods of the poor societies through organising the factors that enhance or constrain livelihood opportunities as well as indicating how they can relate (Serrat, 2017). SLF has proven to be a tool that can be restructured to fit the application of ethnoveterinary practices in cattle and poultry by rural livestock keepers. It achieves this by helping to plan developmental activities and assessment of contribution which the existing activities have made in sustaining livelihoods (Serrat, 2017).

Sustainable livelihood concept was introduced in the field of rural development and has been applied and extended in various areas in both developing and developed countries (Ellis, 2000; Tao & Wall, 2009). It is comprised of assets, capabilities, and activities essential to make a living (Chambers & Conway, 1992; Ellis, 2000). According to Chambers & Conway, (1992), a livelihood is sustainable when it can "cope with and recover from stresses or shocks, maintain, and enhance capabilities and assets, and provide opportunities for succeeding generations, while not undermining the natural resource base. Livelihood diversity is used as an indicator to evaluate livelihood sustainability. It involves both the diversity of available options and income allocation derived from a combination of various activities (Kumar, et al., 2021).

The Sustainable livelihood approach provides a way of thinking about scope, objectives, and priorities for developmental activities. It provides a way of organising complex issues surrounding poverty. This is because it is based on evolving thinking on the way the vulnerable and the poor live their lives and the importance of structures, policies, and institutions (Serrat, 2017). It enables formulate development activities that are people-centred, multi-level, responsive and participatory, dynamic, sustainable, and conducted with multi-stakeholder partnerships involving government and the private sector.

Usually, households are studied at household level and then combined to provide insights at societal level. Research indicates that the scale of investigation influences results as enhancement of sustainability at societal level does not usually translate to the same positive change at household or individual level (Su, et al., 2016). Furthermore, the assessment of sustainability of livelihoods can be complex, when considering benefits in short and long term and at both local and global levels. Hence, it must be made appropriate to local priorities and local circumstances (Serrat, 2017).

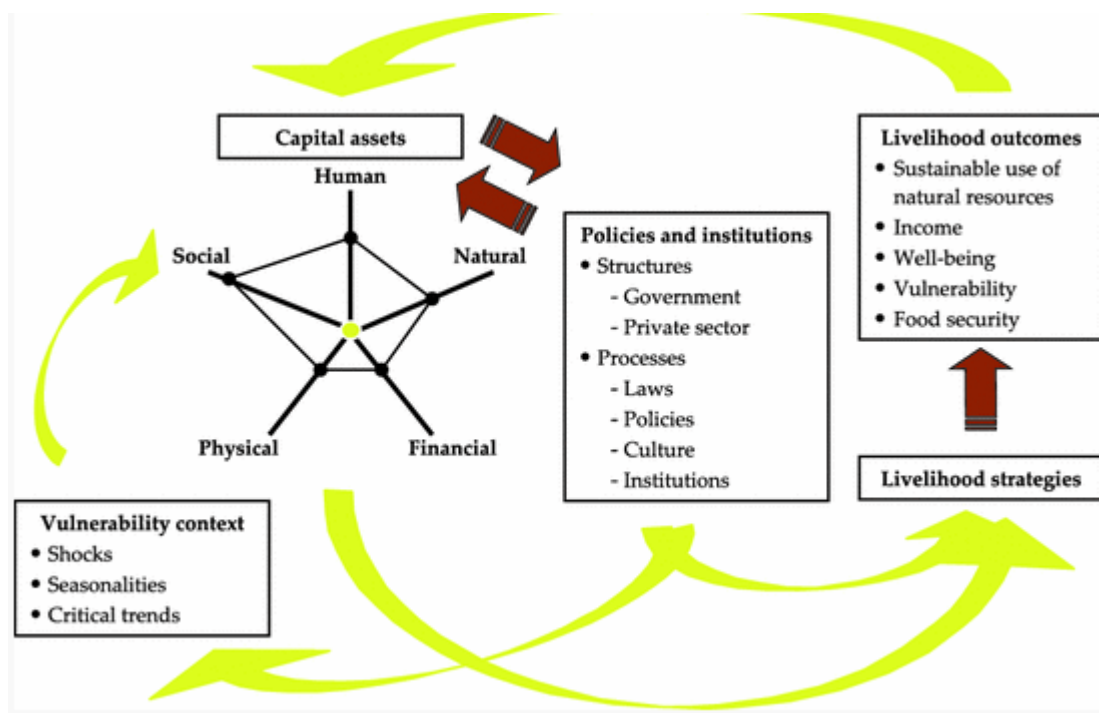
The Sustainable Livelihood Framework (SLF) was initiated by UK's Department for International Development (DFID). It is widely utilised to analyse community livelihoods. The SLF consist of five key components namely context, conditions, and trends; livelihood resources; transforming processes and structures, livelihood strategies and livelihood outcome. It facilitates the identification and recognition of practical priorities for action which are based on interests and views of the concerned community. It conducts the connection between people and the enabling environment which influences the outcomes of sustainable livelihood strategies. The SLF approach captures the potential of people in terms of knowledge and skills, access to natural, physical, and financial resources, social networks, and the ability to influence organisations and institutions (Serrat, 2017).

In this study, human capital may play an important role in the transfer of into livelihood strategies, especially those involving ethnoveterinary practices. A variety of strategies is then constructed based on the livelihood resources and mediated by transforming processes and structures to minimise the negative impact of trends and seasonality of diseases. Various outcomes may be achieved with different consideration on physical, natural, and social capital. The livelihood outcomes in turn influence macro conditions and context and shape livelihood resources as well as moderating access to them.

2.2 Implications of the sustainable livelihood approach

The sustainable livelihood approach fosters thinking outside the box. It enables development practitioners to be free from conventional approaches which are often limited to problem identification and finding solutions (Serrat, 2017). It invites a more process-oriented approach that considers contexts and relationships in the development of activities. This compels development practitioners to identify multi-level entry points thereby moving beyond homogeneous community perspectives and narrow sectorial views. This is important in ethnoveterinary medicine because it enables a shift from universal prescriptions to more practical context-specific approaches which allow the adoption of alternative and local perspectives aided by appreciative inquiry.

Figure 1 Sustainable livelihoods in context of ethnoveterinary medicine practice

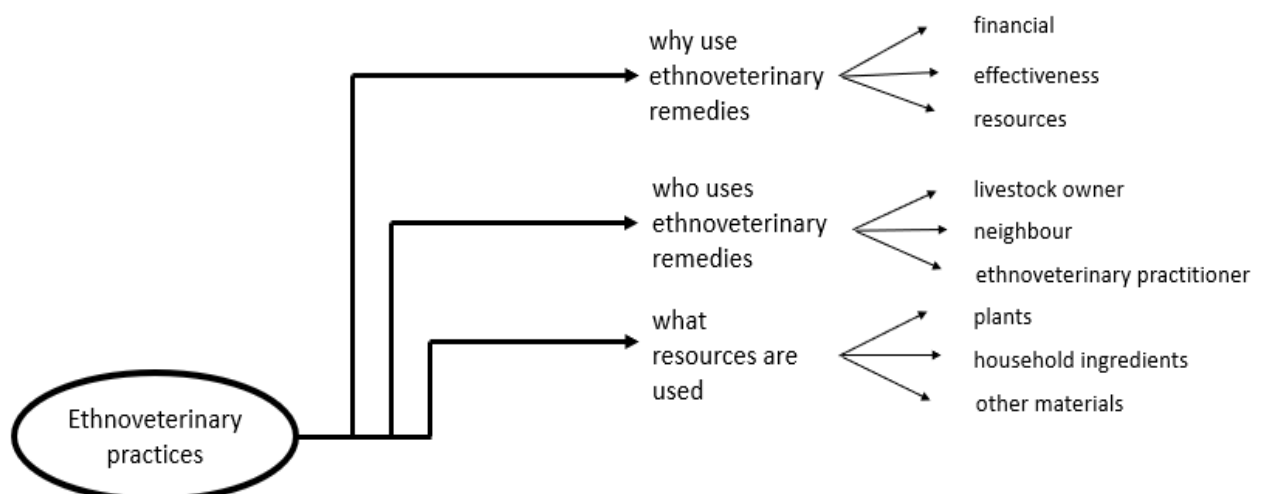


Source: (Serrat, 2017).

2.3 Conceptual design and Operationalisation

The figure below illustrates the main concepts and dimensions on the capacity of the rural livestock farmers in maintaining the health and welfare of their livestock using ethnoveterinary medicine. This includes the reason why ethnoveterinary practices are used, who uses them and what resources are utilised.

Figure 2: Conceptual design and operationalisation



Source: Chandavengerwa, (2021)

2.4 Local knowledge systems in ethnoveterinary medicine

Indigenous animal health systems involve the knowledge ethnoveterinary practitioners and livestock keeping families have on maintaining animal health and welfare. It includes knowledge, skills and practices on diseases and their management; clinical practices and medicinal plant remedies for disease treatment and prevention; management, breeding and feeding strategies; spiritual elements; and human resources bearing information and experience (Mathias, 2004). A study done by Maroyi, (2012), recognised the existence of ethnoveterinary practitioners in Zimbabwe, the use of 23 plant species as ethnoveterinary medicine. The livestock keepers in the study identified fourteen animal conditions affecting livestock in the surveyed area.

Local knowledge is generated and disseminated by communities, from generation to generation for centuries, to cope with their own socio-economic and agro-ecological environments. It is generated systematically through observing local conditions, and real-life experiences (Senanayake, 2006; Rafique Khan, et al., 2021). The local knowledge systems are dynamic, and over the time adapted to new situations and challenges, resulting in the mixing of local and modern approaches to animal health care (Mathias, 2004). In addition it was also observed that the indigenous knowledge systems have great practical value for establishing sustainable, cost-effective, socio-culturally workable and environmentally benign initiatives to improve food security and livelihoods (McCorkle & Methias-Mundy, 1992). It is considered an asset essential for survival, food security and sustainable livelihoods (Senanayake, 2006).

2.5 Livestock and livestock keeping families

Ownership of a variety of livestock species is regarded as typical of most communal farmers in Zimbabwe whereby livestock keeping families rear more than one type of livestock (Mwale, et al., 2005). This is done to spread the risk and capitalise on natural interrelationships among different livestock species (Maroyi, 2012). The different livestock species commonly reared are draught power species (cattle and donkeys), four different types of poultry (chicken, turkey, pigeon, and guinea fowl), two ruminants (sheep and goats) and rabbits reared as sources of meat. In general men own more cattle than women while poultry and small ruminants are mainly owned by women (Maroyi, 2012). This influences the issue of access and control as well as division of labour in the management of animal health and welfare.

2.6 Ethnoveterinary Practitioners

Ethnoveterinary practitioners are an essential component of traditional animal health care systems in developing countries. This is because they represent valuable resource to smallholder and poor livestock keeping families in remote or difficult environments. (Mathias & McCorkle, 2004). Many farmers and herders treat their animals before seeking help from outsiders especially with common diseases that can be diagnosed easily (Martin, et al., 2001). If the self-treatment fails or the disease is known to require external help, they consult ethnoveterinary practitioners. According to Toyang, et al., (2007, p12), the ethnoveterinary practitioners take a holistic view on sick animals in search of the cause of disease saying that they consider the relationship between the sick animals and their natural, social, and spiritual environment. The author goes on to say that the traditional healers use the senses of sight, touch, smell, and taste in addition to the supernatural methods such as divination, consulting spirit mediums and oracles.

Most communities have at least one livestock healer whom people turn to for help. In some countries like Cameroon there is a board of Ethnovet Council with about 300 members practicing as ethnoveterinary practitioners and are also trained as paravets who can also use conventional medicine (Toyang, et al., 2007). Furthermore, in Cameroon there are well established ethnoveterinary gardens

which are important in improving access to medicinal plant as well as conserving rare plant species. These specialists often attended both animals and people offering services such as surgery, bone setting, firing (cauterisation), vaccination, breeding assistance, obstetrics, castration, medicinal treatments, and nutritional advice (Mathias & McCorkle, 2004; Toyang, et al., 2007). Usually, a small proportion of healers concentrate on spiritual practices. However, in some countries the modern sector does not recognise the healers as essential health care providers even though they are often consulted in the community. They also face legal changes when their treatments involve components of modern medicine as dispensing is restricted to registered professionals (Mathias, 2004).

2.7 Ethnoveterinary practices and the rural community

Locals employ different strategies based on the traditional animal health information and experiences such as grazing and feeding practices, housing types and herd movements. According to a study by Schillhorn van Veen, (1997), African pastoralists make use of seasonal herd movements to evade tsetse flies and the disease they spread. The seasonal herd movements require thorough planning, skills, experience, and detailed knowledge of vegetation.

Survival in the marginal areas requires breeds of animals that can adapt with harsh conditions. Smallholder farmers and pastoralists have developed an array of practises to obtain suitable breeds of animals. The strategies include pedigree keeping, selection of best males for breeding, offspring testing and prevention of less valuable males from mating through herd sub-divisions, aprons, and castration (Kohler-Rollefson, 2000). For example, many indigenous breeds of livestock are more resistant to ticks and diseases compared to exotic breeds.

Medicinal plants are used across the globe (by 65-85% of the world's population) due to their availability, efficacy, lack of modern medicine as well as cultural beliefs (Kumar, et al., 2021; Rafique Khan, et al., 2021). Plant based ethnoveterinary medicine is widely practiced in rural communities because animal husbandry is an integral part of rural livelihoods. In these rural communities ethnoveterinary medicine remains essential to people's livelihoods for practical (higher accessibility) and financial (lower cost) reasons (Vogl, et al., 2016). Livestock keepers in are faced with few veterinarians, and shortage of other modern veterinary facilities that include expensive, scarcity, and uncertain supply of drugs (Eiki, et al., 2021).

The impact of animal disease is severe particularly for poor communities. Although these communities heavily depend on livestock, they have restricted access to conventional veterinary services, and therefore depend on traditional medicine for treatment of livestock diseases (Eiki, et al., 2021). The use for plants medicinal purposes is an option for livestock farmers who cannot afford to use chemical drugs for health problems of animals or are not allowed to use chemical drugs under certified organic programs (Lans, et al., 2007).

2.8 Livestock keepers ethnoveterinary knowledge and skills

Livestock producers everywhere have traditional ways of diagnosing, classifying, treating, and preventing common animal diseases (Sri Balaji & Vikrama Chakravarthi, 2010). Studies revealed treatment of wounds, tickborne diseases, anthrax, blackleg, abdominal distension, retained after-birth, eye problems and wounds are some of the ailments rural farmers treat using ethnomedicinal plants (Maroyi, 2012; Temeche & Asnakew, 2020; Lans, et al., 2007). Also, ethnoveterinary medicine was used to treat external parasites such as ticks, fleas, lice, worm burden, skin diseases and respiratory disorders such as coughing (Maroyi, 2012; Kumar, et al., 2021).

Livestock owners and herders who live closely with their animals tend to have detailed information on disease causes, treatment, and control. Disease concepts and treatments vary widely across

societies and even within local communities according to individual's education, gender, age, and caste. The other factors which affect disease knowledge and treatments are herd size, family's experience in animal breeding and labour division. For instance, a person who milk cows daily is more likely to know about problems related to milk quality, lactation, and milk let-down (Mathias, 2004). According to the research by Teklay, (2015) the males over 40 years were found to be more knowledgeable on use of medicinal plants compared to women and youngsters. Rafique Khan, et al., (2021) agreed with the same findings and further observed that the old and the illiterate age group respondents have more ethnoveterinary knowledge than the young and educated informants. Temeche & Asnakew, (2020) indicated that in Ethiopia, traditional knowledge on medicinal plants is passed orally from the father to a favourable child who is usually a son.

Farmers have knowledge about plants used for cattle health and diets. In addition to herbal plants, livestock keepers use products of animal and mineral origin in treatments (Monteiro, et al., 2011). Ethnoveterinary medicine are multipurpose and dynamic as they can treat many different types of livestock diseases (Rafique Khan, et al., 2021).

2.9 Preparation of ethnoveterinary medicine

The most common ethnoveterinary preparations are powders, ointment, poultice, decoctions, tincture, fumigation, and cold ware extract (Sri Balaji & Vikrama Chakravarthi, 2010). Plants are the most used ingredients in making ethnoveterinary medicine. All parts of trees, shrubs, herbs, and climbers are used in preparation of herbal medicine namely roots, bark, leaves, flowers, fruits, and seeds (Sri Balaji & Vikrama Chakravarthi, 2010; Temeche & Asnakew, 2020; Eiki, et al., 2021). The research done by Maroyi, (2012), in Zimbabwe revealed that 78% of the ethnoveterinary medicine were gathered from the wild, with 48%, 26%, 17%, and 9% of the respondents using herbs, trees, shrubs and climbers respectively.

The same study also revealed leaves as the most frequently used part of the plant, followed by bark, roots, and then fruits although this may vary from place to place. The common methods of drug extraction are crushing or grinding in a stone or wooden mortar and pestle, soaking, or boiling various parts of the plant (Teklay, 2015). In some areas barks and roots are prepared by boiling while preparation of leaves involves pounding and soaking in warm or cold water (Eiki, et al., 2021). The whole part or useful part of the plant can be burnt to ash which is used for treatment. Ingredients such as water, coffee and butter can be used for processing some ethnomedicine. However, adding additives like sugar, whey, and sometimes water to ethnomedicine may sometimes dilute or reduce the strength of the remedy (Yirga, et al., 2012).

2.10 Ethnoveterinary medicine administration skills

The ethnomedicine are applied through various routes of administration such as oral (by mouth), dermal (application on the skin), nasal (through the nostrils), ocular (through the eyes), and anal. The most common route of administration is oral (Yirga, et al., 2012). This may be intake of decoctions (where the remedy is extracted by heating) or steeping (which involves extraction by soaking). Some are administered as smoke or vapours through the nose, as suppositories, as massages, or applied directly on the skin or as a bath in skin ailments (Temeche & Asnakew, 2020). Ash from burned medicine is applied through licking or by placing it directly on wounds or on small cuts.

Some medicine can be taken orally and applied on the skin at the same time to increase the curative power of the medicine. Ethnoveterinary practitioners use bottles, teacups, finger length, teaspoons and number of drops when administering and determining dosages of ethnomedicine. In addition, farmers also consider the type of animal species, body condition, sex, age physiological status such as

pregnant or lactating when preparing dosages. For example, older animals with a good body condition receive more quantity of concoctions compared to the emaciated and young animals.

Ethnoveterinary medicine is characterised by interdisciplinary orientation, holistic and systems analysis. It recognises the interconnectedness of social, physical, economic, political, historic, and cultural matrices in which livestock keepers and their animals are embedded. It seeks to integrate the findings of biological and social science disciplines (McCorkle, 1986).

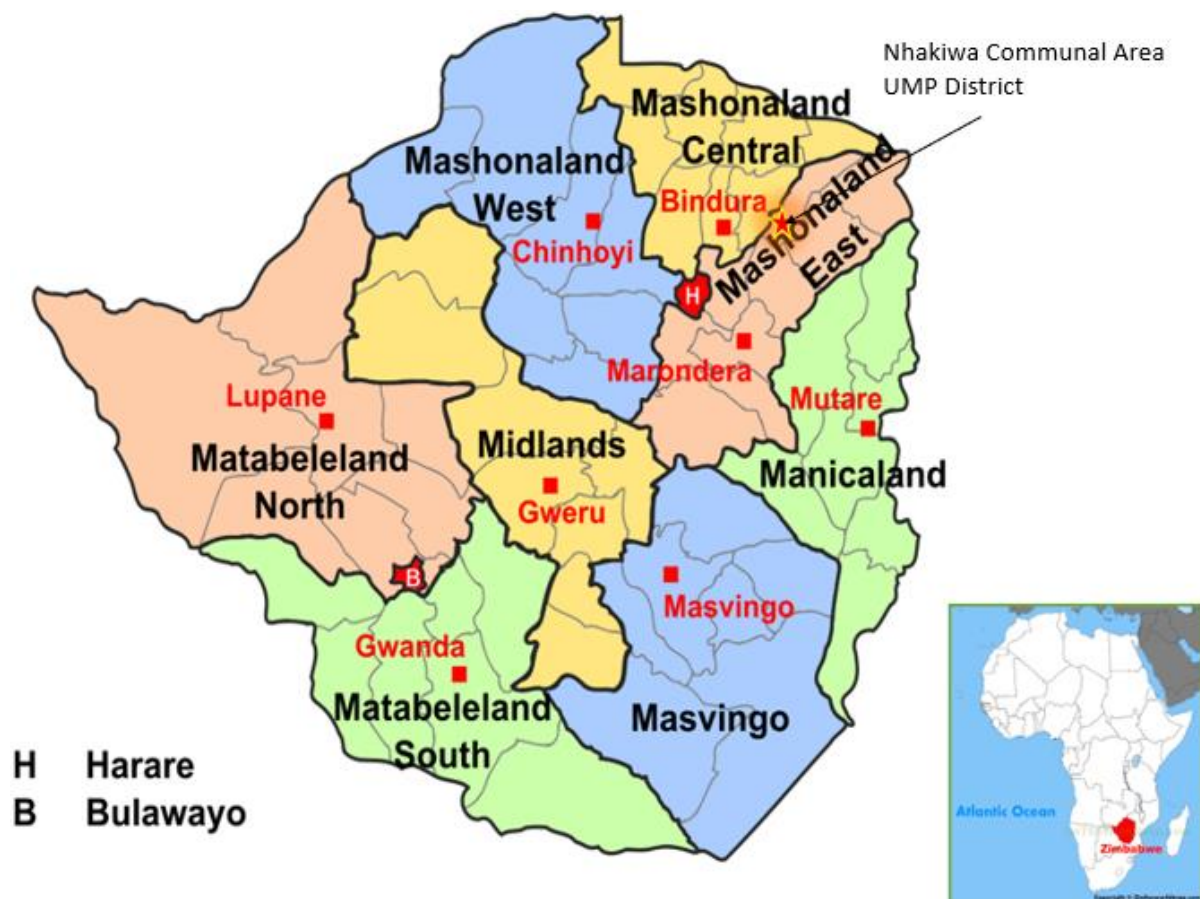
Chapter 3: Methodology

This chapter outlines and discusses the research context, research strategy, data collection methods, and sampling criteria. The reasons for choosing methods are also explained in this chapter.

3.1 Study area profiles

The study was carried out in UMP district in Mashonaland East Province of Zimbabwe. UMP district in Zimbabwe is situated 147km northeast from the capital of Harare. The district is wholly communal covering a total land surface area of 2660 square kilometres. Mazowe river marks the boundary separating UMP district and Mashonaland Central province (Shamva and Rushinga districts on the north-western side. On the eastern side there is Nyadire river which marks the border with Mutoko (south east) and Mudzu (north-east). To the south of UMP district there is Muhume river which forms the boundary with Murewa District. UMP district has a population of 112611 people (UMP RDC, 2018).

Figure 3: Map of UMP District, Zimbabwe.



According to the Veterinary Services Department UMP district as an estimated total of 48000 heads of cattle and 80000 poultry. The district has 8 Animal Health Management Centres which are being run by 1 Doctor of Veterinary Medicine and 8 Veterinary Extension Workers. Agriculture is the main economic activity in this area with maize occupying the greatest part of cultivated land of all households. Maize and vegetables are the main sources of on-farm income. The area is very underdeveloped and the rural peasant with high levels of poverty depending on subsistence farming (Wikipedia, 2021).

The present study was conducted in Nhakiwa area of UMP district. Nhakiwa communal area is adjacent to Mazowe river and is located about 60km south-west of UMP Business Centre. The justification for selection of the study area is was that Nhakiwa area of UMP district is remote and not easily accessible to conventional veterinary support services. The livestock keeping families in Nhakiwa are known to use ethnoveterinary medicine, hence the researcher is likely to gather rich data for in-depth analysis on the phenomena.

There are little livelihood opportunities available in Nhakiwa communal area. Livestock plays a crucial role as it provides meat, milk, draught power, and farmyard manure. Ethnoveterinary practices provides accessible, cheap, and readily available source for the maintenance of animal health and welfare in the remote rural communities. The conventional animal health delivery system is inadequate in Nhakiwa communal area and conventional medicine is unaffordable. Hence, the locals use ethnoveterinary practices to treat their livestock and this necessitate the empowerment of the locals to make use of their own resources to maintain their livestock health.

3.2 Research strategy

The purpose of the research is to gather knowledge on what farmers know, practice and what skills they have in terms of ethnoveterinary practices and how that relates to what the department of veterinary services can build upon in supporting remote communities. The research approach was guided by a qualitative research design. This paper uses insights from the phenomenological method in study of ethnoveterinary medicine and practice in a way that minimises bias. This involves suspending presuppositions or prejudices and studying the phenomena since the author is a veterinarian. The approach emphasises the livestock keepers and the ethnoveterinary practitioners as the primary sources of data. This enables livestock keepers and ethnoveterinary practitioners to be respected, understood, and credited to refrain imposing the researchers on judgements. The approach ensures that the data collected will be from the inside view of the respondents. This aims to understand the livestock keeper knowledge, skills, and practices on ethnoveterinary medicine.

3.3 Sampling

The research population comprises of the livestock keeping families in Nhakiwa communal area of UMP District in Zimbabwe.

Sampling Procedure

The study used two non-probability methods namely purposive and snowball sampling methods. The use of purposive snowball sampling technique helps in collecting the desired quantity and quality of information on traditional animal health care systems (Feyera, et al., 2017). The selection of first respondents of livestock keeping families utilised the purposive sampling method because they wanted to identify certain respondents who were able to provide useful data on answering the research question. So, this meant selecting respondents who directly practice ethnoveterinary medicine. Also, selecting ethnoveterinary practitioner used the purposive sampling method as well, because the

researcher wanted to identify people with great experience and special insights in ethnoveterinary medicine.

This is because it allowed the researcher to purposefully select livestock-keepers who use medicinal plants in managing animal health. The other respondents were selected using snowball sampling. This involved asking the respondent to nominate two respondents suitable for interviewing. The nominated respondents were asked to nominate like the previous one until the process is completed. The participants were selected based on their understanding of the concept of ethnoveterinary medicine, informed consent, and willing participation. Sampling stratified was used to ensure that women and the below 40 years age group were represented in the study.

Table 1: Operationalisation of research methods

Sub question	Source of information	Data collection methods	Data analysis	Sampling	When	Where	Expected outcome
1. Why do the farmers use ethnoveterinary medicine?	Key informants	Semi-structured interviews	Thematic content analysis	Purposive	During research	Online	The extent to which farmers value ethnoveterinary medicine, cost, accessibility, tradition
	Livestock keepers	Semi-structured interviews	Thematic content analysis	Stratified random sampling	During research	Fieldwork	
	40 farmers respondents	Focus group discussions	Generate trends	Stratified random sampling	During research	Community hall	
		Observation	Photo elucidation	Purposive	During research	Fieldwork	
2. What are the farmers' knowledge and skills on ethnoveterinary practices that are used to maintain the health and welfare of livestock?	Key informants	Semi-structured interviews	Thematic content analysis	Purposive	During research	Online	Knowledge on disease identification, treatment, control, and prevention
	Livestock keepers	Semi-structured interviews	Thematic content analysis	Stratified random sampling	During research	Fieldwork	
	40 farmers respondents	Focus group discussions	Generate trends	Stratified random sampling	During research	Community hall	

		Observation	Photo elucidation	Purposive	During research	Field work	
3.What are the differences in perception between man and women when practicing ethnoveterinary medicine?	Livestock keepers	Semi-structured interviews	Harvard analytical tool	Stratified random sampling	During research	Fieldwork	Perception differences Who does what? Who has access and control?
	40 farmers respondents	Focus group discussions	Harvard analytical tool	Stratified random sampling	During research	Community hall	
		Observation	Photo elucidation	Purposive	During research	Field work	
4.What is the perception of farmers on support provided by the government on the use ethnoveterinary practice in their livestock?	Key informants	Semi-structured interviews	Thematic content analysis	Purposive	During research	Online	Training Advisory services Consultation Financial and material support
	Livestock keepers	Semi-structured interviews	Thematic content analysis	Stratified random sampling	During research	Fieldwork	
	40 farmers respondents	Focus group discussions	Generate trends	Stratified random sampling	During research	Community hall	
	Key informants	Semi-structured interviews	Thematic content analysis	Purposive	During research	Online	

Source: Chandavengerwa, (2021)

3.4 Data Collection

Data collection conditions

The researcher was not able to travel from Netherlands to Zimbabwe for data collection because of travel restrictions due to the Covid pandemic. Moreover, the COVID-19 cases were increasing as the country was in a winter season. The researcher went on to appoint a research assistant who is a resident of the area of study in Zimbabwe and had clearance to travel in the study area to assist with data collection.

Gaining access

Gaining access to the research field was not a major challenge as great support was given by the DVS. One research assistant was employed in the study. The research assistant work for DVS in Nhakiwa community and is knowledgeable about the study phenomena. The Veterinary Extension Worker has been working in the area for over 20 in the study area. Permission was granted with ease both from the government and local authorities. Before data collection the assistant researcher approached the potential respondents to give complete briefings about the purpose of the research and his role in data collection was clearly explained to him. This included taking verbal consents from the localities where data was collected. The research assistant was also provided with a checklist to guide activities after each interview. The data collection followed the code of ethics of the International Society of Ethnobiology (International Society of Ethnobiology, 2008).

Pilot studies

The data collection strategy was tested on a small sample of people. These small regroup of respondents were not part of the main study. This was done to see if the process functions well, checking carefully for any positive and negative characteristics which might come to light during the main study. The issues of consideration include whether the interview sparked interest, the ability to clarify own ideas about the subject, quality of the responses tape recorded, length of the interview process and if there are any other questions that could have been asked. The schedule of questions was revised according to the input from the feedback obtained.

3.5 Data collection methods

Interviews

The questionnaire interviews were conducted in Zimbabwe. The interviews for the livestock-keeping farmers and ethnoveterinary practitioner were conducted by the assistant researcher at the location where the respondents were based through face-to-face interaction. The interviews with the key informants who are the officials from the government of Zimbabwe were conducted by the researcher remotely over the phone. The interviews were conduct for a period not exceeding 30 minutes for every individual respondent. The interviews were recorded concurrently using an audio recording device. Open ended questions relating to the research and sub research questions were asked and were accompanied with a guiding checklist.

The research assistant was asked to fill in the guiding checklist according to the answers given by each respondent to ensure that all the critical areas were covered. The audio recorded material and notes were sent to the researcher and were transcribed on the same day. Feedback information was given to improve on the subsequent interviews. In total the assistant researcher conducted 40 interviews comprising of 23 man and 17 women. The initial plan was to interview 20 man and 20 women, but 3 women were not available for the interviews and were replaced by men. The researcher conducted 3 interviews with the key informants who were the government veterinary officer (GVO), veterinary extension worker (VEW), and agricultural extension worker (AEW).

Focus Group Discussions

Two (2) focus group discussions were held. One focus group was for women while the other focus group comprised of man. Each focus group discussion was attended by 10 participants. The researcher joined the focus group discussion via video calling. Data was gathered on different perceptions of men, and women, the educated and the uneducated. An audio device was used with permission to record he proceedings. The recordings were transcribed by the researcher at the end of the day. The focus group discussion was used in triangulation to support and verify the data gathered through the questionnaire interviews and observations.

Observations

Some observations were made by the assistant researcher during the visits to the livestock-keeping households. The assistant researcher used a guiding checklist to record the notes on visual observations he made. This was accompanied by taking relevant photographs (with permission) of various ethnoveterinary practices performed by the livestock-keeping households. The observations were also used for triangulation to verify the ethnoveterinary practices described in the questionnaire interviews and the focus group discussions.

3.6 Demography and data collection

Well informed people of the appropriate area were approached for group discussion and interviews for documentation and collection of demographic information. Data was gathered through investigations and repeated field trips with individual interviews, focus group discussions, and field observations. Questionnaires for conducting participant interviews were prepared in English and administered in Shona (local language) with the help of competent translators.

The data collected comprises of the household demography, indications (poultry and cattle disease conditions), and use of ethnoveterinary medicine in livestock (indigenous name, parts used in traditional remedies, ways of preparation, dosage, and route of administration of the remedies against livestock diseases) (Mwale, et al., 2005; Feyera, et al., 2017). The methods utilised in the present study were designed for the purpose of gathering precious ethnoveterinary knowledge practices from the perspective of the livestock keepers. The experienced and elderly respondents above 40 years of age, women and younger respondents below 40 years were deliberately interviewed.

3.7 Data analysis

The qualitative approach of data analysis was done in this study. This involved collection of fragments of data from the interviews, focus group discussions and reports of respondents' observation. This method was used to examine questionnaire interview transcripts, focus group discussions and observations supported by the relevant literature. Coding and categorising were done in developing conceptions and was guided by research and sub research questions.

Open coding was utilised to address the why, who and what questions from the information gathered. Axial coding was used to arrange the information into major themes and generating trends about the study phenomena. This included the reason why farmers use ethnoveterinary medicine, what resources they use in ethnoveterinary medicine, who uses ethnoveterinary medicine and the perceptions of livestock-keeping families in the ethnoveterinary practice. Furthermore, clusters were formed between men and women, the young and the old and the level of education attained by the respondents. Microsoft excel was used to prepare the tables and bar graphs in presenting the information.

3.8 Limitations of the study

The limitations of this study emanated from restricted movements which have been enforced to reduce the spreading of the COVID-19 virus. Consequently, the research was unable to travel to Zimbabwe for data collection. The research sought the help of a research assistant for data collection who had clearance to travel to the area of study. The assistant researcher works for the government as an extension area. So, his position might have an influence on the respondents' answers to questions on their perception of the support they get from the government.

Chapter 4 Results

This chapter presents the findings of the research on the use of ethnoveterinary practices by livestock-keeping families in the Nhakiwa area of UMP district in Zimbabwe.

4.1 Socio-Demographic characteristics of the respondents

A total of 40 respondents (livestock-keeping households) were interviewed using a questionnaire in Nhakiwa area of UMP district. This was done to gather data on the capacity of rural livestock farmers in maintaining the health and welfare of their livestock using ethnoveterinary medicine. The response rate by the livestock-keeping households was 92.5%. Three women who could not be interviewed were replaced by three men. Hence, twenty-three (23) men and seventeen (17) women were interviewed. The socio-demographic data comprises of sex composition of the participants, their age and level of education attained.

4.1.1 Sex composition and age of respondents

Table 2: Sex composition and age of respondents

Age group	Male		Female		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
40 years and below	9	22.5%	7	17.5%	16	40%
Above 40 years	14	35%	10	25%	24	60%
Total	23	57.5%	17	42.5%	40	100%

Source: Chandavengerwa, (2021).

Both male and females were represented in the 40 questionnaires conducted. Twenty-three (23) males and seventeen (17) females were interviewed. Fourteen (14) males and ten (10) females were above the age of 40 years. 60% of the respondents were the elderly who were over 40 years of age. The median age for the group above 40 years of age was 56. This can be attributed to having a large population of the elderly having retired. After the retirement families usually move to their rural homes. The retirement age in Zimbabwe is 60 years of age. Their source of livelihood is agriculture which includes livestock keeping.

An observation from the interviews showed that generally men are in the cattle business while women were mainly into poultry rearing. When the question on the most worrisome disease was asked to women, they would mostly start by naming poultry diseases. Furthermore, the women were more passionate and elaborate than men when describing the treatment of poultry diseases. A similar trend was observed with men who looked more concerned with the welfare cattle compared to poultry.

Figure 4: Cattle regarded as a man's business: A man treating a sick heifer with traditional remedies



Source: Field data, (2021)

The focus group discussions revealed that there is a predominant culture of issues to do with labour division and who has access and control of livestock resources. Men are involved in herding cattle and tilling the land using ox-drawn ploughs from a tender age while women are involved in the household reproductive roles like taking care of the home and cooking. However, the narrative change with elderly women who are 50 years of age as they become keen on cattle rearing. This is because some will be from single headed households or have received cattle as dowry in the marriage of their daughters. Hence, they have direct access and control on the cattle assets.

To a lesser extent the younger women under the age of 40 years who participated in the FGD agreed that they benefit directly from the sales of milk from cattle. So, women are not totally excluded from the cattle business. Men who attended the focus group discussion said that the poultry keeping save a lot of money as women can slaughter, collect eggs, or sell poultry products without much of man's involvement. A young man aged 28 said:

I can go away from home for 2 weeks without worrying on buying my family meat. I am not even worried when my wife tells me that she has slaughtered three chickens in my absence. However, that can't happen with cattle. She can milk the cow, but I must decide when cattle are sold.

4.1.2 Level of education attainment, age, and gender

Table 3: Level of education attainment, age, and gender

Age group	Years spent in school									
	Less than 8 years		8 to 9 years		10 to 11 years		12 to 13 years		Over 13 years	
	Freq	%ge	Freq	%ge	Freq	%ge	Freq	%ge	Freq	%ge
Men 40 years and below	1	2.5%	1	2.5%	5	12.5%	1	2.5%	1	2.5%

Women 40 years and below	0	0	1	2.5%	5	12.5%	0	0	1	2.5%
Sub total	1	2.5%	2	5%	10	25%	1	2.5%	2	5%
Men above 40 years	4	10%	5	12.5%	5	12.5%	0	0	0	0
Women above 40 years	4	10%	2	5%	4	10%	0	0	0	0
Sub total	8	20%	7	17.5%	9	22.5%	0	0	0	0
Grand total	9	22.5%	9	22.5%	19	47.5%	1	2.5%	2	5%

Source: Chandavengerwa, (2021).

22.5% of the respondents attended school for a period of less than 8 years. Most of these respondents were over 55 years of age. All the five men attained 7 years of schooling. Only one woman, respondent ETH1 attained 7 years of schooling. The system at the time encouraged the male child to go to school while at the same time suppressing the girl child. Respondent ETH1 was one of the respondents who attended our FGDs and said:

“When we were growing up, fathers would say that if you educate a girl child, she will grow up to be a prostitute and become a disgrace to the family.”

22.5% of the respondents attended school up to form 2 or Sub B. Most of these respondents were over 55 years of age. FGDs revealed that this age group was affected by shortage of schools before independence in 1980. Respondent EHT32 who is a retired teacher confirmed this in the FGDs by saying that:

When we were growing up there were not many secondary schools. It was before the Zimbabwean Independence in 1980. I only managed to go to school up to form 2. During this time only those who were exceptionally good in their grades were given scholarships to go and study in mission schools. We learnt most of the life survival skills from our parents, grandparents, and the community elders. I was privileged to acquire my certificate which landed me a teaching job.

47.5% of the respondents attended school up to ordinary level. One respondent attained an Advanced level certificate. Respondent ETH16 had a diploma in agriculture while respondent EHT39 had a bachelor's degree in education (see annexure 1).

4.1.3 Age of respondents and ethnoveterinary knowledge

The semi-structured interviews revealed that generally the elderly above 40 years of age were more knowledgeable about ethnoveterinary practices compared to respondents less than 40 years. Respondent ETH1 who is a 59 year old woman confidently said that her family learn from her on the use of ethnoveterinary remedies. Male respondents ETH2 and ETH26 aged 26 and 21 respectively said they consult the elderly or friends when they are not sure of the treatment of certain problems and that is how they learn. Whereas most of the respondents above the age of 40 indicated that they manage disease conditions on their own without seeking for help from outsiders.

The elderly people were more elaborate and generally gave more treatment options than the youth. The focus group discussions ascertained that older man and women were more knowledgeable as the

group always requested older people to confirm if the treatment protocol of certain disease conditions were right. The older men were observed to be more confident and experienced.

Figure 5: A picture showing three generations (grandfather, father, son) participating in the preparation of ethnoveterinary remedies



Source: Field data, (2021)

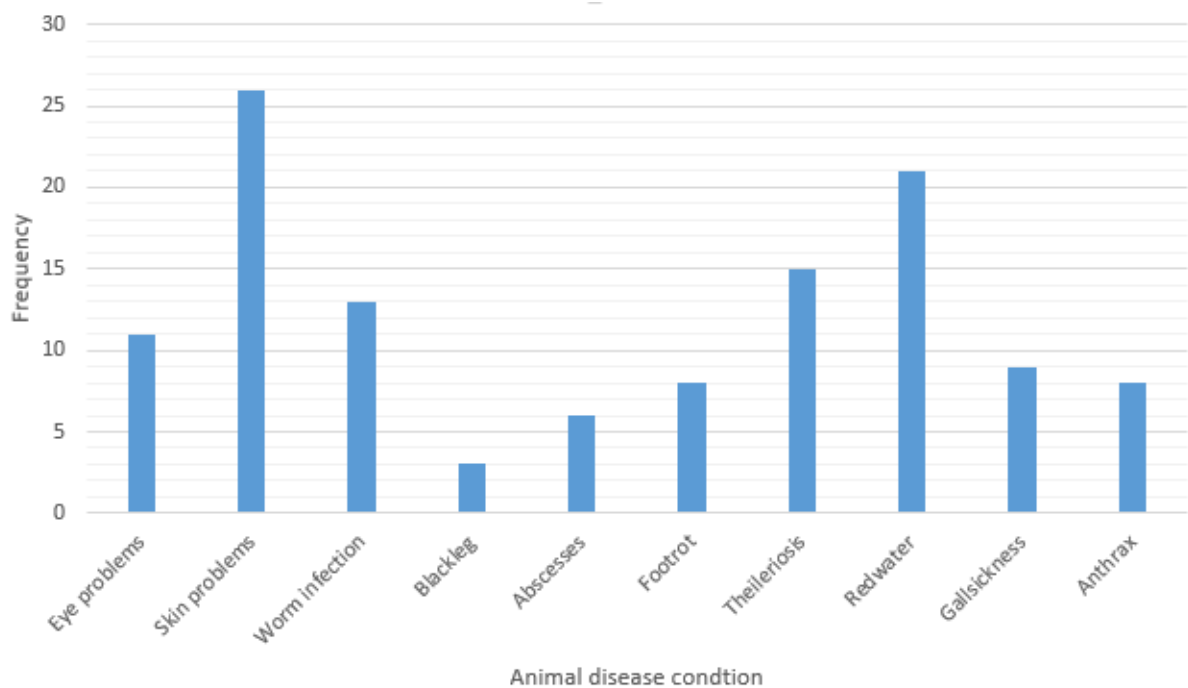
4.1.4 Level of education attainment and ethnoveterinary knowledge

All the respondents in the above 40 years age group sounded equally knowledgeable on ethnoveterinary practices regardless of the level of education. It was difficult to determine the influence of the level of education in the 40 years and below age group as majority of respondents attended school up to the ordinary level.

4.2 Cattle and poultry disease conditions identified by the livestock keepers

4.2.1 The number of times cattle disease conditions were mentioned in the interviews

Figure 6: The number of times cattle disease conditions were mentioned by the respondents in the interviews



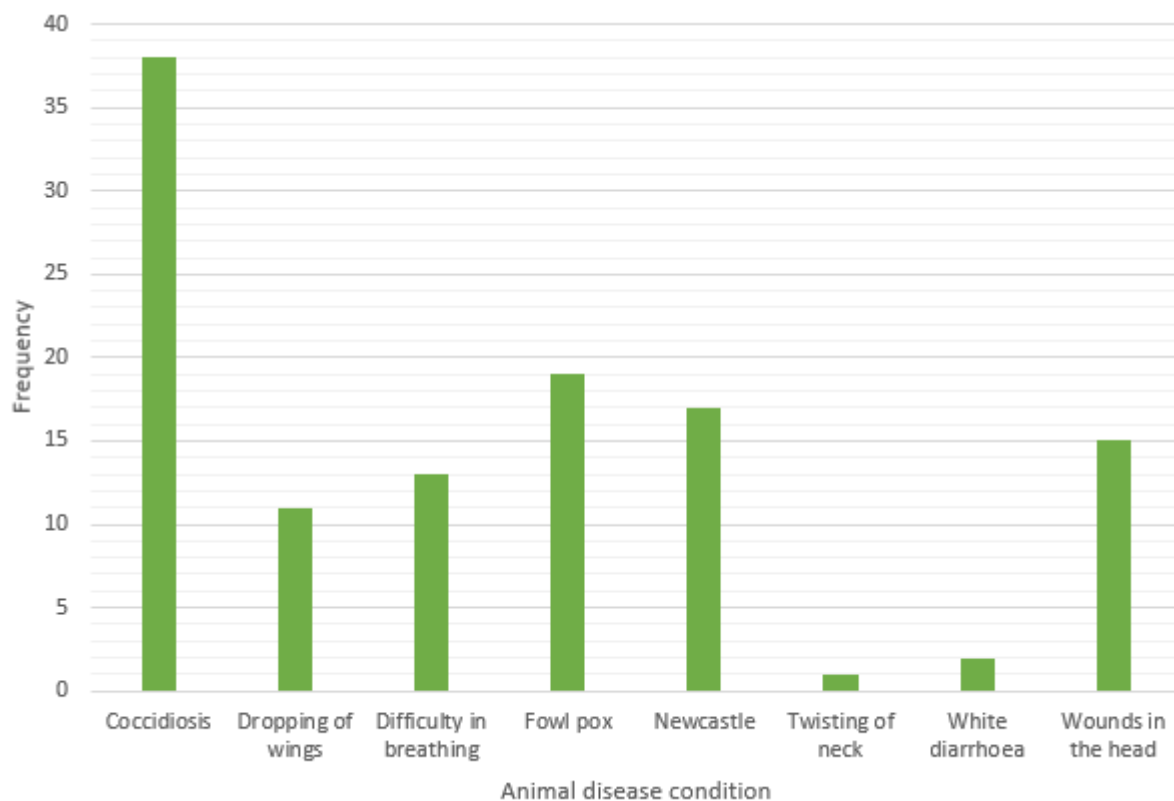
Source: Chandavengerwa, (2021).

Ten (10) disease conditions were identified by the respondents to be causing problems in cattle in Nhakiwa communal area. Skin infection, eye diseases and redwater were identified to be the most problematic in that order. A follow up question was asked on whether these disease conditions can be managed by ethnoveterinary practices. The livestock keeping farmers stressed that they have ethnoveterinary practices to treat or manage these animal disease conditions. However, ETH4 highlighted that anthrax cannot be treated with ethnoveterinary remedies. ETH7 stressed that he failed to treat called senkobo (a skin disease) and footrot with traditional medicine. ETH10 also said he cannot treat senkobo with traditional remedies. EHT16 said there are no ethnoveterinary remedies for both skin diseases which are senkobo and lumpy skin disease. ETH18 mentioned that he was not able to treat anthrax with ethnoveterinary remedies.

According to responded EHT26, he can manage all the disease with ethnoveterinary remedies except for lumpy skin disease. EHT29 mentioned that some diseases do not respond to ethnoveterinary medicinal treatment and mentioned anthrax as an example. Respondent ETH30 said that she is failing to treat problems associated with development of lumps on the skin of cattle. ETH32 mentioned that he was not able to treat anthrax with traditional medicine. ETH35 cited that all the diseases can be treated with traditional medicine although the treatment can be difficult with some diseases. ETH40 shared similar views with respondent ETH35 by saying that some disease conditions respond fast to traditional treatments while some take long to respond.

4.2.2 The number of times poultry disease conditions were mentioned by the respondents in the interviews

Figure 7: The number of times poultry disease conditions were mentioned by the respondents in the interviews



Source: Chandavengerwa, (2021).

Eight (8) conditions were identified to be causing problems in chickens. 98% of the respondents in the interviews mentioned that they are having problems with coccidiosis in their chicken. All the respondents said that they can treat all these conditions with ethnoveterinary remedies. Only respondent EHT2 said that he fails to treat birds that have twisted neck with ethnoveterinary remedies. Focus group discussions further confirmed this finding when all the farmers from the two focus group discussions agreed that coccidiosis is a problem to their flock.

4.3 Raw materials used by farmers in ethnoveterinary practices

Livestock keeping families have knowledge on plants, household ingredients and parts of living organisms that can be used as ethnoveterinary remedies in the maintenance of health in cattle and poultry. There are plants that are commonly used in the treatment of both cattle and poultry. These include *alovera*, *mutiti* and *nhundurwa*.

Figure 8: The ethnoveterinary practitioner holding a bunch of alovera or *gavakava* which is the most common plant used in both cattle and poultry according to the findings of his research.



4.3.1 Raw materials or ingredients used in cattle treatment preparations

Table 4: Raw materials or ingredients used in cattle treatment preparations

Raw material/Ingredient	Frequency	Percentage
Plants	85	80%
Household ingredient	13	12%
Other materials	8	8%
Total	106	100%

Source: Chandavengerwa, (2021).

Each respondent was asked a question on how they manage the diseases which they identified to be worrisome in cattle. Ethnoveterinary remedies were mentioned 106 times by the forty respondents during the interview questions. Plants are the most common raw material used with a frequency of 80%. Other raw materials that were mentioned by respondents in the semi-structured interview include traditional beer, crushed chameleon, hot iron, and black sooth from thatched kitchens (see annexure 2). Respondent EHT35 said when treating blackleg, he takes presses the affected leg with a hot iron which is covered by a wet cloth.

Figure 9: A 63 years old man harvesting *matamba* for treatment of eye disease conditions in cattle



Source: Field data, (2021)

4.3.2 Raw materials or ingredients used in poultry treatment preparations.

Table 5: Raw materials or ingredients used in poultry treatment preparations.

Raw material/Ingredient	Frequency	Percentage
Plants	98	93%
Household ingredient	3	3%
Other materials	4	4%
Total	105	100%

Source: Chandavengerwa, (2021).

Similarly, the same respondents were asked to identify three problematic diseases in poultry. Treatment options with ethnoveterinary remedies were mentioned 105 times by the 40 respondents. 93% of the raw materials were plant based. Sugar was the only household ingredient used in the management of poultry disease and it was mentioned by three respondents. The other materials mentioned include used oil, grease, and donkey faecal material. Respondent EHT35 said he uses grease or used oil when treating fowl pox lesions.

Figure 10: Poultry drinking water that is treated with *nhudurwa*



Source: Field data, (2021)

4.4 The reasons why farmers use ethnoveterinary remedies in treating their livestock 60% of the respondents cited that they use ethnoveterinary remedies because there are cheap and sometimes are accessible at no cost. The incomes of rural farmers are seasonal. The AEW said that disease occurrence is high during the beginning of rain season when farmers are expected to buy farming inputs like agricultural seeds and fertilizer. The need for veterinary drugs will be compete with the demand of other farming inputs. This compromises the capacity of the livestock farmers to buy conventional medicine. Hence, ethnoveterinary remedies becomes useful.

Focus group discussions revealed that men have access and control of cattle while women had access only. Whereas women had access and control of poultry while man had access only. This influenced their willingness to use ethnoveterinary remedies on a particular livestock species. This is because socio-culturally women control income from poultry sales while men control income from cattle sales. Observations from the questionnaire interviews and focus group discussions revealed that the older generation (over 40 years) was more knowledgeable and skilled on ethnoveterinary practices than the younger generation (less than 40 years).

Focus group discussions and interviews also showed that farmers who were less educated tended to be more knowledgeable on ethnoveterinary practices. Ethnoveterinary knowledge is often passed on orally from the older generation. The less educated have better opportunity to engage and learn from the older generation. This might also be because, they had spent more time tending livestock enabling them to experiment with various remedies.

The increase in the cost of living and vulnerabilities such as economic trends popmotes the use of ethnoveterinary remedies. Over 90% of the respondents highlighted that they considered use of conventional medicine only when ethnoveterinary remedies take long to respond or fail. According to figure 6 above, 4 out of 10 animal disease conditions that were ranked by the farmers are tickborne diseases. These contribute to a total frequency of 59%. According to the GVO, farmers pay dipping fees to the Department of Veterinary Services. The Department of Veterinary Services have an obligation to supply dipping chemicals and services to the farmers. However, the Ministry of Finance issued an order that all the government revenue collected must first go into national pool. The various

government departments are required to request for funds from the treasury department based on their needs. The funds released by the treasury department are not enough to purchase adequate dipping chemicals to effectively control ticks and tickborne diseases. This may result in farmers resorting to use of ethnoveterinary remedies as disease incidences overwhelm them.

The GVO also said that Zimbabwe has operated under hyperinflationary environment from 2016 to 2020 following the introduction of the local currency. This has affected the operational effectiveness of DVS. Livestock keeping households have been affected due to lack of adequate support on the prevention of diseases by the government. Liquidity crisis, lack of foreign currency and erosion of pensions of the elderly retired rural population has further worsened the problems. This results in the increase the burden of livestock diseases which overwhelm farmers forcing them to depend on ethnoveterinary remedies.

The GVO also said that lack of adequate infrastructure, electricity, and equipment such as refrigerators is affecting the control of diseases such as anthrax. Vaccines ought to be kept under controlled cool temperatures (cold chain environment) for them to be effective. Key GVO went on to say that this is because anthrax is controlled by vaccinations and cannot be treated as it is result in sudden death before farmers notice any clinical signs. ETH4, ETH18 and ETH shared the same views when they said they cannot treat anthrax with ethnoveterinary remedies.

The VEW highlighted the issue of inaccessibility to the furthest villages in Nhakiwa due to poor road network and lack of transport as motorcycles are old and not functional. He also went on to say that cellular phone network is very poor hence it makes it difficult for the villagers to get advice from him over the phone. Hence, they depend on ethnoveterinary remedies. However, the FGDs revealed that the behaviour of some veterinary extension workers forces some livestock keepers to use ethnoveterinary remedies. One worried 33 years old man said:

“My stockcard was taken by the dip attendant last year because I was unable to pay my dipping fees. When I followed up on him. He had lost it and I was told to buy another one. Right now, my cattle are not going to the diptank because I don’t have a stockcard and I am not fully paid up on my dipping fees”

The VEW said that failure of livestock keeping farmers to adhere to the statutory requirements to pay dipping fees and dip their cattle result in the prosecution of farmers. The prosecution of livestock-keeping farmers results in the bad relationships between the DVS staff and the livestock keepers. This further promotes the use of ethnoveterinary remedies by the farmers.

The AEW said that the occurrence of diseases increases and is highest around January and February when it is raining. This is because there is abundance of growing green grass. Ticks take habitat in the green grass and multiply rapidly spreading diseases. 40% of the problematic diseases listed are the tickborne diseases. The AEW also mentioned that around January and February is the time when most rural farmers are focusing on buying fertilizers for their crops and maize fields. This compromises the livestock-keeping farmers capacity to buy conventional medicine and they depend on ethnoveterinary remedies.

As much as it seems that farmers prefer to use ethnoveterinary remedies. There is a belief that the use of ethnoveterinary remedies is slowly fading away as one 71 year old man who attended the FGDs shared that:

“Our children no longer want to adopt to our traditional ways of doing things because they are now educated and are going to these new Pentecostal churches which view our traditional ways of curing diseases as associated with witchcraft”

4.5 Five factors in which ethnoveterinary practices are important to farmers

How important ethnoveterinary practice is to farmers can be described in terms of cost, availability/accessibility, effectiveness, tradition, and the organic nature of most raw materials used in the preparation.

Table 6: How important ethnoveterinary practice is to farmers

Importance	Cost	Availability/ Accessibility	Effectiveness	Tradition	Organic and no side effects
Frequency	38	33	22	14	1
Percentage	95%	82.5%	55%	35%	2.5%

Source: Chandavengerwa, (2021).

Cost

95% of the said that they acquire ethnoveterinary remedies at no cost or cheaply. This is because they get their raw materials from their fields or community forest. Respondent EHT 1 who is a female aged 59 said she uses the ethnoveterinary remedies in poultry because they are no expenses involved. She can access garlic, lemons, and peri-peri plants from her garden. Respondent EHT7 gave a similar treatment regime to respondent EHT1 by saying that he uses per-peri plants from his garden for coccidiosis treatment. In addition, he uses donkey faecal material for chickens that are dropping wings and have weak legs. EHT7 also uses the barks of *mutowa* plant, black sooth from grass-thatched kitchens and salt concoction mixed with water in the prevention of diarrhoea at the beginning of the rain season. EHT30 said she crushes chameleon into powder and uses the powder to treat a cattle eye disease and tearing problems. All these remedies are available at no cost to the farmers.

Some of the ingredients used in ethnoveterinary include salt, sugar, cooking oil, traditional brew, and grease. Used grease can be bought in large quantities at low cost from the market or car repairing companies. The salt, sugar and cooking oil can be accessed at no cost at home or cheaply from a grocery store. Traditional brew can be accessed cheaply from the traditional breweries in the village or from the council beer halls. Respondent ETH4 who is a male aged 51 said that he treats gall-sickness with a concoction comprised of grinded dried *mubvamaropa* barks, traditional bear, cooking oil in a one litre bottle. The remedy is administered orally once a day for three days. The ethnoveterinary practitioner gave an explanation to the treatment of gall-sickness which is associated with drying of stomach contents. He said that the cooking oil softens the stomach contents while the traditional brew replaces the dead microflora in the stomach. The dried *mubvamaropa* barks will act on the parasites causing the disease and the salt is used to improve the test.

Availability/accessibility

Availability/accessibility is explained looking at several factors which include proximity of the veterinary extension services, poor road infrastructure, high transport cost to the animal health service centres and shops and poor mobile phone networks to get advice from veterinary experts.

82.5% of the respondents said that they use ethnoveterinary remedies because they are readily available. Respondent EHT2 said he can access ethnoveterinary remedies anywhere anytime. Respondents EHT18 and EHT22 said they use ethnoveterinary remedies because they do not have money to buy the modern medicine while ethnoveterinary remedies are readily accessible to them. The GVO cited that fuel unavailability are resulting in them failing to access and render assistance to livestock farmers staying in remote areas. The VEW said that these villages are in areas with poor road networks and his motorcycle is not functioning well most of the times as it is now very old and not being serviced regularly. This lack of effective service delivery by the DVS renders the dependence of livestock keeping farmers to ethnoveterinary remedies to be essential.

Figure 11: Ethnoveterinary remedies are readily available at low cost to the farmer



Source: Field data, (2021)

Effectiveness

55% of the respondents mentioned that treatment with ethnoveterinary remedies is effective. All the respondents manage to treat at least 70% of disease ranked to be problematic in cattle. Failure to respond to treatment was noted by some farmers in the treatment of cattle with anthrax, footrot and skin diseases. In poultry only one respondent said that the problem of chickens presenting with twisting of neck does not respond to treatment. Also, there was not much variation in the treatment protocols of both cattle and poultry diseases. This indicates that the level effectiveness of ethnoveterinary remedies is quite high.

However, most famers indicated that some ethnoveterinary treatments take longer to cure the disease. When that happens, they use both traditional remedies and conventional medicine to increase the effectiveness of the treatment. The ethnoveterinary practitioner said that to a certain extent farmer lack adequate knowledge which results in inappropriate use of ethnoveterinary remedies.

Farmers can prepare their own medicine, but these remedies may be less effective because they don't have expertise. As for me I can mix many plant preparations in a single medication. People who I give assistance to know that my medicine work very well. I have been doing this for the past 46 years.

Figure 12: Ethnoveterinary practitioner gathering traditional remedies from a tree bark.



Source: Field data, (2021)

The GVO said the challenges associated with the use of ethnoveterinary remedies are that farmers often report diseases to them late. They would have tried everything and failed. It will also be late for the veterinarian to save the life of the animal as the disease will have progressed to the terminal stages. He was quoted saying that

Antibiotics can only treat bacterial infections. But cannot help to restore organ or multi organ failure. Hence, it is important for farmers to report the disease cases in the early stages of the development of disease. In such situations the chances of recovery of the diseased animal is high.

He also said that he is not totally against the use of ethnoveterinary remedies as sometimes he tells farmers to use ethnoveterinary practices before he comes for intervention. He gave an example of uterine prolapse. He said for cases of uterine prolapse that are reported late. He instructs the farmer to soak the mutton cloth in a very concentrated brown sugar solution. The cloth is then tied firmly around the prolapsed mass for at least 12 hours. The prolapsed mass shrinks and becomes easier to restore into its normal position before suturing. He also gave a second example where he said he tells farmers what to do in cases of emergency suspected chemical poisoning. He gives the farmer the instruction to crush charcoal from burn firewood into fine powder. The fine powder is then mixed with water and given orally to the poisoned animal. This will give doctor enough time to come and treat the poisoned animals before they develop serious complications. He was quoted saying that

The activated charcoal will bind the chemical poison in the gastrointestinal system thereby preventing it to enter the circulatory system where it will have the potential to cause multi organ failure.

Tradition

35% of the respondents said that ethnoveterinary remedies are an important because there are part of their tradition. Practising ethnoveterinary medicine is important in preserving local traditional

knowledge and ensuring that it is passed on to successive generations. Respondent EHT2 acknowledged that treating animals with herbs affords him the pride of making use of the traditional knowledge he got from his grandfather. He perceives it as a tradition and it always reminds him of his grandfather.

Organic and no side effects

One respondent said that ethnoveterinary remedies use plants as remedies. The herbs have no side effects to both the animals and people. Probing was done to the GVO on this issue. He agreed to this and he said that the same concept was being adopted by a great number of dairy farmers who are preferring to do organic farming. He went on to say that organic agricultural produce is fetching higher prices in the market.

4.6 Access and control over livestock assets by men and women in Nhakiwa

Table 7: The analysis of men and women's access/control of cattle and poultry

Livestock class	Men	Women	Comments
Cattle	Access/ Control	Access	Men have both access and control on cattle assets. Women only have access. Men see cattle as a source of wealth and prestige and have control over income from cattle. This reflected as well in their knowledge and skills in treating cattle with ethnoveterinary remedies. However, older women tend to be more knowledgeable in the use of ethnoveterinary remedies.
Poultry	Access	Access/ Control	Women have both access and control on poultry. Men only have access. Women have direct control on the money they make from the sales of poultry. Women tend to be more knowledgeable in treating or preventing poultry diseases using ethnoveterinary remedies.

Source: Chandavengerwa, (2021).

Figure 13: Woman preparing *nhundurwa* as traditional remedy for her chickens



Source: Field data, (2021)

The Harvard analytic tool was used to analyse on how gender and power dynamics may influence the use of ethnoveterinary remedies in different livestock species by rural livestock-keeping households. Society is a social construct of both men and women in households and communities. During focus group discussions it was observed that gender roles and norms are clearly defined in Nhakiwa community with men more directly involved in the rearing of cattle while women were more inclined towards poultry production. This was more visible especially with women less than 40 years of age.

Figure 14: A man treating his cow with ethnoveterinary remedies



Source: Field data, (2021)

During the focus group discussion, 60% of women above 40 years of age indicated that they have both access and control in cattle livestock asset and are actively involved in the use of ethnoveterinary remedies in cattle. 70% of the women under the age of 40 indicated that their involvement in the cattle health and welfare is limited. If the cattle are sick, they inform their husbands or seek for help from male neighbours. All the women in the focus group discussion confirmed that there are directly involved in poultry rearing and make use of ethnoveterinary practice one way or the other when the birds are sick or as a way of preventing poultry diseases.

4.7 The presence of ethnoveterinary practitioners in Nhakiwa area

Table 8: Presence of ethnoveterinary practitioners in Nhakiwa area

Are the ethnoveterinary practitioners present in your area?	Frequency	Percentage
Yes	26	65%
No	9	22.5%
Not sure	5	12.5%

Source: Chandavengerwa, (2021).

65% of the respondents acknowledged the presence of ethnoveterinary practitioners in their area. 22.5% of the respondents said that there are no ethnoveterinary practitioners in their area. 12.5% of the respondents were not sure. Respondent EHT16 who is a man aged 40 and holds a diploma in agriculture said

I am not sure about the presence of ethnoveterinary practitioners, but I have observed that from the way certain people explain information on these traditional medicines shows that they are very knowledgeable.

One of our key informants was an ethnoveterinary practitioner. The assistant researcher was referred to this 67-year-old man by respondents ETH2, ETH7, ETH14 and ETH29 who claimed to have been assisted by him at some instances. The ethnoveterinary practitioner said that his work is independent from the services provided by the government. They do not work together although their mandate is similar. This was what the ethnoveterinary practitioner had to say:

We do not have a knowledge sharing platform with the government officials although our mandate is the same. I think it is because we use different methods of treatment. Ours are traditional and theirs are modern.

Figure 15: Ethnoveterinary practitioner treating an ox while a young boy is watching



4.8 How farmers perceive the support they get from the government

Table 9: The support farmers get from the government on animal health care

Nature of government support	Extension		Consultation
	Advisory	Training	
Frequency	26	14	33
Percentage	65%	35%	82.5%

Source: Chandavengerwa, (2021).

65% of the respondents said they receive advisory services from the DVS on early warning signs of disease outbreaks. This assists them in making the necessary preparations before the outbreak occurs. The impact of diseases on livestock is minimal when they are prepared. 35% of the respondents said that they have received training from DVS. The VEW said that he trains farmers on activities such as dosing, vaccination of lumpy skin disease in cattle and Newcastle disease in poultry. He also said that the trainings did not include ethnoveterinary practices. 82.5% of the respondents mentioned that they seek for help from DVS when ethnoveterinary remedies fail.

Chapter 5: Discussion

Introduction

This chapter will discuss the results of the research utilising the relevant literature from the second chapter of this report. Information was gathered on the capacity of the rural livestock farmers in maintaining the health and welfare of their livestock using ethnoveterinary medicine in UMP District.

Importance of ethnoveterinary practices to rural livestock keeping households

Rural households rely on livestock and poultry in the supply of food. The importance of livestock in food security and rural livelihoods lies in the provision of meat, eggs, milk, draught power, hides & skins, and manure. Animal diseases cause loss in production of meat, milk, and eggs leading to lack of food availability and accessibility. Control of animal disease by conventional means is usually expensive to poorly resourced rural households. Ninety-five percent (95%) of the respondents said that ethnoveterinary practices are essential to them because they are cheap and usually available at no cost.

Kumar, et al., 2021 agreed to the findings of the current study by saying that poorly resourced rural families have low incomes, depend on diverse use of livestock for their livelihoods. The author went on to say that the production of food by these household is difficult. This was further confirmed by the agricultural extension worker who explained that they can be serious competition of resources between livestock and poultry at the beginning of the rain season. The agricultural extension worker said that ticks and pest thrive well in the early rain season because there is plenty of green grass which serves as a good habitat for these pests. This is also the time when farmers are planting their fields and purchasing agricultural inputs like seeds and fertilizers. Both livestock and crop production play an important role in the livelihood support, food security, and local microeconomics in remote rural areas. He justified the importance of ethnoveterinary remedies by saying that they are readily available at no cost. Hence, enable farmers to priorities the purchase of agricultural inputs at the same time maintaining the health of livestock.

Serrat, (2017) said that the other types of capital are so important to the poorly resourced communities because the financial asset tends to be the least available as a source of sustainable livelihood capital. The current study showed that 80% of the ethnoveterinary remedies used in cattle were plant based while 93% of the remedies used in poultry were plant based. These results were consistent with the research done by Maroyi, (2012), in Zimbabwe which revealed that 78% of the ethnoveterinary medicine were gathered from the wild. Vogl, et al., (2016) said that ethnoveterinary medicine remains essential to people's livelihoods for practical (higher accessibility) and financial (lower cost) reasons. Kumar, et al., (2021) and Rafique Khan, et al., (2021) agreed by mentioning that livestock keepers use ethnoveterinary remedies because of their availability and effectiveness. 55% of the respondents commended the effectiveness of ethnoveterinary remedies in treating their livestock. They said they can collect the plant-based remedies from their personal gardens and communal forests.

The study also revealed that use of ethnoveterinary remedies is also an important part of the community's tradition and folk knowledge that is passed on from one generation to the other. This assertion was consistent with the work that was done by Senanayake, (2006) and Rafique Khan, et al., (2021). Both authors stressed that the local knowledge is generated and disseminated by communities, from generation to generation for centuries, to cope with their own socio-economic environments. The respondents said that they acquired the knowledge from their parents and

community elders, while some parents said they teach their children on the use of traditional remedies on livestock.

The livestock keeping farmers' capacity on ethnoveterinary knowledge and skills

The study revealed that farmers have knowledge on solutions to all the problematic diseases which are affecting their livestock and poultry. The findings from the show that the local community use a significant number of locally available plants to maintain the health and welfare of their livestock. In the study the respondents identified ten (10) and eight (8) diseases in cattle and poultry respectively which are problematic to their livestock. The livestock keeping families have ethnoveterinary remedies to these diseases. 106 and 105 treatment options were described in cattle and poultry respectively during the questionnaire interviews. At least 80% of the treatment options derived their raw materials from plants in both cattle and poultry. Household ingredients which include cooking oil, sugar and salt were also used as ethnoveterinary remedies. The findings of the study agreed with Martin, et al., (2001) who said that farmers treat their animals before seeking help from outsiders especially with common diseases that can be diagnosed easily.

However, some livestock keeping farmers who were interviewed revealed that there are some treatments which take long to cure diseases. This was common in skin diseases conditions such as lumpy skin disease and senkobo in cattle. This was later confirmed by the government veterinary officer who was our key informant. The respondents also said that they were not able to treat anthrax disease. Our interview with the government veterinary officer revealed that there are diseases which cannot be diagnosed on time, for example anthrax and heart water. These diseases are associated with sudden death without noticing any clinical signs. Diseases which cannot be diagnosed compromise the capacity of farmer to use ethnoveterinary remedies because the farmers rely on the clinical signs for them to know the correct remedy to use. In poultry the problem of birds twisting the neck was said not to respond to traditional treatments. The researcher agrees with the observations from these farmers because some of these diseases are viral disease. Lumpy skin disease in cattle and Newcastle disease in chickens are viral diseases with no known treatment even with conventional or modern medicine.

The findings of the research revealed that 55% of the respondents mentioned that ethnoveterinary remedies are effective. The interviews on key informants namely the government veterinary officer and the ethnoveterinary practitioner revealed that the failure of treatment with ethnoveterinary remedies can be contributed by many other factors. The ethnoveterinary practitioner said that the lack of effectiveness of ethnoveterinary remedies may be caused by lack of farmer's knowledge and experience on the preparation and appropriate use of these remedies. The government veterinary officer said the farmers may lack the ability to identify all clinical signs associated with the disease complex before administering treatments. He went on to say that what farmers claimed to be tearing and eye disease conditions was probably January disease. This was because January disease was common in the area and some farmers initially focused on treating the eye problems. Toyang, et al., (2007, p12), supported this opinion by citing the need to take a holistic view on sick animals in search of the cause of disease.

Most respondents said that they first try to treat the animals with what they know and can easily and cheaply access. They only seek for assistance from the government when the traditional remedies have failed. The government veterinary officer said that there is a challenge of delayed reporting of diseases to the relevant authorities. He said that this hampers the ability to render timely assistance to the sick animals. He said that by the time the farmers will be trying their treatment options, the disease will be progressing to terminal stages.

Role division between man and women and how this affects the use of ethnoveterinary remedies

Ownership of a variety of livestock species is regarded as typical of most communal farmers in Zimbabwe whereby livestock keeping families rear more than one type of livestock (Mwale, et al., 2005). This is done to spread the risk and capitalise on natural interrelationships among different livestock species. According to Maroyi, (2012) men own more cattle than women while poultry and small ruminants are mainly owned by women. This was consistent to findings and observations from this study. This influences the issue of access and control as well as division of labour in the management of animal health and welfare.

An observation from the interviews showed that generally men are in the cattle business while women were mainly into poultry rearing. When the question on the most prevalent disease affecting their livestock was asked to women, they would usually start by naming poultry diseases. Furthermore, the women were more passionate and elaborate than men when describing the treatment of poultry diseases. A similar trend was observed with men who looked more concerned with the welfare cattle compared to poultry. The same narrative was evident in the focus group discussions. Observations of images on figures 5,14 and 15 show that boys participate in the treatment of cattle from a young age. The observation was supported by Temeche & Asnakew, (2020), who stressed that traditional knowledge on medicinal plants is passed orally from the father to a favourable child who is usually a son. Rafique Khan, et al., (2021) agreed to this assertion by saying that the local knowledge disseminated orally and experientially by communities, from generation to generation for centuries.

However, the narrative changed with older women over 50 years of age. They were more knowledgeable and keener on cattle rearing. Traditionally they are entitled to a cow as dowry from the bridegroom as a special gift to the mother of the bride. The husband cannot control the cattle born from this special bride price even after the death of the woman. They are shared by the woman's brothers. Then at that point women will have direct access and control of their cattle assets without any interference. Hence, they have direct access and control on the cattle assets. This might influence gender with more older women using ethnoveterinary remedies with similar knowledge and passion as men. To a lesser extent the younger women under the age of 40 years who participated in the FGD agreed that they benefit directly from the sales of milk from cattle. So, women are not totally excluded from the cattle business. Men who attended the focus group discussion said that the poultry keeping save a lot of money as women can slaughter, collect eggs, or sell poultry products without much of man's involvement. These factors result in an overlap of knowledge and interest in both man and women on the use of ethnoveterinary remedies in livestock.

The effect of age on the use of ethnoveterinary practices

The semi-structured interviews revealed that generally the elderly above 40 years of age were more knowledgeable about ethnoveterinary practices compared to respondents less than 40 years regardless of gender. Rafique Khan, et al., (2021) and Teklay, (2015) were both in agreement with the results of this study on the issue of the group of over 40 years old respondents being more knowledgeable than the younger generation. Respondent ETH1 who is a lady aged 59 years, confidently said that her family learn from her on the use of ethnoveterinary remedies. Male respondents ETH2 and ETH26 aged 26 and 21 respectively said they consult the elderly or friends when they are not sure of the treatment of certain problems and that is how they learn. Whereas most of the respondents above the age of 40 indicated that they manage disease conditions on their own without seeking for help from outsiders.

The elderly people were more elaborate and generally gave more treatment options than the youth. The focus group discussions ascertained that older man and women were more knowledgeable as the group always requested older people to confirm if the treatment protocol of certain disease conditions were right. The older men were observed to be more confident and experienced. All the respondents in the above 40 years age group sounded equally knowledgeable on ethnoveterinary practices regardless of the level of education. It was difficult to determine the influence of age group level of education in the 40 years and below age group as majority of respondents attended school up to the ordinary level.

The effect of education on use of ethnoveterinary practices

The study revealed that all the respondents in the above 40 years age group sounded equally knowledgeable on ethnoveterinary practices regardless of the level of education. It was difficult to determine the influence of age group level of education in the 40 years and below age group as majority of respondents attended school up to the ordinary level. Hence, the observations by Rafique Khan, et al., (2021) that the illiterate age group respondents have more ethnoveterinary knowledge than the educated informants could not be confirmed in this study.

The perception of livestock keeping farmers on government support on the use of ethnoveterinary remedies

The study revealed that the farmers make their own decisions on the health of their animals. The decisions depend on affordability, availability, accessibility, and traditional reasons. 65% of the respondents said they receive advisory services from the Department of Veterinary Services on early warning signs on disease outbreaks. This assists them in making the necessary preparations before the outbreak occurs. The impact of diseases on livestock is minimal when they are prepared. 35% of the respondents said that they have received training from DVS. The training is offered on activities such as dosing, vaccination against lumpy skin disease in cattle and Newcastle disease in poultry using conventional medicine. 82.5% of the respondents mentioned that they seek for help from DVS when ethnoveterinary remedies fail.

All the farmers reported that they were satisfied by the support they were getting from the government. However, the response maybe biased since the assistant researcher who was asking the questions works for the department of Veterinary services in the study area. However, the GVO and the VEW reported that they were experiencing shortage of resources challenge to effectively deliver services in the maintenance of animal health.

Reflection of the researcher

The research progressed quite well. The data that was gathered was sufficient to answer the first three questions on the reason why livestock keeping farmers use ethnoveterinary remedies, their capacity in terms of knowledge, skills and resources and the roles of man and women on the use of ethnoveterinary remedies in cattle and poultry. However, we did not manage to interview all the 20 women as per our initial plan and sampling. This is because our data collection schedule coincided with peak of the winter season in Zimbabwe. At this time the cases of Covid-19 have risen sharply such that there was a delay in our data collection. We managed to replace the three women with three men who were available during data collection and we maintained the number of our respondents at 40 as per our initial plan. We initially planned to interview two ethnoveterinary practitioners because we expected to get rich data from them as our key informants. We only managed to interview one ethnoveterinary practitioner, because he was the only one present in the area.

The research failed to adequately address the fourth question on the perception of farmers on the support they get from the government on the use of ethnoveterinary practices. This was because we were not able to formulate the research question to adequately capture sufficient data. The definition of what support by government mean was not made clear from the beginning. Also, the research assistant work for the Department of Veterinary Services. There are issues which farmers could not answer freely. The research assistant was chosen because of his great experience in working with farmers on matters to do with animal health. Also, he had a clearance from the Government of Zimbabwe to work in the area during the Covid-19 pandemic.

The lessons I learned from this study are to carefully craft my questions at the beginning of my research. I have also learned that I could have employed a second assistant researcher such as the agricultural extension worker to address the fourth question to minimise the conflict of interest.

Chapter 6 Conclusion

The study was carried out to investigate the capacity of farmers, knowledge, and skills on ethnoveterinary practices upon request by the Commissioner, the Department of Veterinary Services. The main research question being addressed is, what is the capacity of the rural livestock farmers in maintaining the health and welfare of their livestock using ethnoveterinary medicine in UMP District? The sub research questions were created to address the main research question. These included why the livestock keeping households use ethnoveterinary remedies, the knowledge, skills, and resources on use of ethnoveterinary remedies by poorly resourced households, the role of man and women in the use of ethnoveterinary remedies in cattle and poultry and the perception of farmers on the support they get from the Department of Veterinary Services on the use of ethnoveterinary remedies.

The reason why livestock keeping farmers use ethnoveterinary remedies

In conclusion, the study showed that there are several factors that influence farmers to make use of ethnoveterinary remedies in treating or maintaining the health of their livestock. The livestock keeping households use ethnoveterinary remedies because they are cheap. The other factor which also greatly influences use of ethnoveterinary remedies is accessibility. Ethnoveterinary remedies can be accessible at no cost especially if it involves the use of locally available herbs from their personal garden and trees from communal forest.

The cost is also minimal when farmers make use of their household ingredients, traditional brew or used oil. Ethnoveterinary remedies are also used because of their effectiveness. Livestock-keeping farmers have asserted that ethnoveterinary remedies are effective. The ethnoveterinary remedies are also used because there are part of the society's tradition that is passed on from one generation to the other.

The knowledge, skills, and resources on use of ethnoveterinary remedies

The study also revealed that both man and women have ethnoveterinary knowledge to treat various disease conditions affecting their livestock. The findings from the study show that the local community use a significant number of locally available plants to maintain the health and welfare of their livestock. In the study the respondents identified ten (10) and eight (8) diseases in cattle and poultry respectively which are problematic to their livestock. The livestock keeping families have ethnoveterinary remedies to these diseases. 106 and 105 treatment options were described in cattle and poultry respectively during the questionnaire interviews. At least 80% of the treatment options are plant-based in both cattle and poultry. Household ingredients which include cooking oil, sugar and salt were also used as ethnoveterinary remedies.

Most respondents said that they first try to treat the animals with what they know and can easily and cheaply access. They only seek for assistance from the government when the traditional remedies have failed.

Role division between men and women in the use of ethnoveterinary remedies in cattle and poultry

The study also showed that generally men are in the cattle business while women were mainly into poultry rearing. Women were more passionate and elaborate when describing the treatment of poultry diseases than men. At the same time, man showed more enthusiasm and knowledgeable on cattle treatment with ethnoveterinary remedies than women. However, this was not always the case.

The elderly women who are 50 years of age were more knowledgeable on ethnoveterinary remedies and keen on cattle rearing. Traditionally the bridegroom pay dowry in the form of a cow specifically

to the mother of the bride. The husband does not have control over the cattle born from this cow, even after the death of the woman. They are shared by the woman's brothers. Then at that point women will have direct access and control of their cattle assets without any interference. The study also showed that younger women are not totally excluded from the cattle business. Women benefit directly from the sales of milk from cattle. This also influences their passion on the health and welfare of cattle using ethnoveterinary remedies.

The effect of age and education on the use of ethnoveterinary practices

The study showed that older people who are over 40 years of age were more knowledgeable about ethnoveterinary practices compared to respondents less than 40 years. The study also revealed that all the respondents in the above 40 years age group sounded equally knowledgeable on ethnoveterinary practices regardless of the level of education. It was difficult to determine the influence of age group level of education in the 40 years and below age group as majority of respondents attended school up to the ordinary level.

The perception of livestock keeping farmers on government support on the use of ethnoveterinary remedies

The study revealed that farmers receive advisory services, training, and consultation services from the Department of Veterinary Services. Advisory services are important in their ethnoveterinary practices because they give early warning signs on disease outbreaks. Livestock keeping farmers become more prepared and minimise on livestock losses. The training is offered on activities such as dosing, vaccination against lumpy skin disease in cattle and Newcastle disease in poultry using conventional medicine.

Recommendations

The main objective of the research was to investigate the capacity of livestock keeping families in UMP District in maintaining the health and welfare of livestock using ethnoveterinary practices, in order to recommend DVS on appropriate interventions that integrate traditional livestock health care practices into current primary animal health care delivery services thereby improving livelihoods, and food and nutrition security of livestock keepers. Therefore, the Department of Veterinary Services is recommended to support farmers in making better choices:

Design participatory training programs on use of ethnoveterinary practices that target men in cattle production and women in poultry production. The livestock keeping households are involved in mapping assets related to use of ethnoveterinary remedies. The DVS staff and farmers will have an opportunity to share knowledge and experiences on disease diagnoses and treatment using ethnoveterinary remedies. Livestock keepers will learn from each other on various options of treatment with ethnoveterinary remedies through knowledge sharing. Furthermore, they learn on understanding diagnosis of the disease from DVS officers. Livestock keeping households make better decisions when they are more informed and knowledgeable. Farmers will be able to know when to rely on ethnoveterinary practices and when to seek support from the government.

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Appendices

Appendix 1: Questionnaire (NB: The same questions were asked and discussed in the FGDs)

1. What are the main animal health problems you face with your livestock cattle and poultry?

Ndeapi matambudiku ezvirwere zvehombe nehuku amunosangana nawo?

2. Do you have ethnoveterinary practices to solve these problems?

Munoshandisa mishonga yechivanhu here kupedza kana kederedza matambudziko aya?

3. Why do you rely on ethnoveterinary medicine?

Sei muchishandisa mushonga yechivanhu?

4. What is the biggest worry of farmers, can you mention?

Ndezvipi zvirwere zvitatu zvinonetsa zvakananyanya kumombe, ko kukuku?

5. Can you please rank the three most important disease you are struggling with?

Pazvirere zvamataura chinonetsa zvakananyanya, uye chichiteverwa nechipi?

6. Do you have ethnoveterinary practices to solve it?

Pazvirwere zvamataura izvi mune mushonga yechivanhu here yekupedza matambudziko aya?

Uye mune chamunoti ichi hachirapike here?

7. How do you treat your animals?

Pane zvirwere zvamati zvinorapika munozvirapa sei?

8. Do you have ethnoveterinary practitioners area?

Mudunhu menyu mana anamazvikokota here vekurapa nemishonga yechivanhu?

9. Do you call a practitioner, do you do it yourself or do you call your neighbour, does your wife do it or husband, children?

Masvikirwa nedambudziko munodii, munotsvagarubatsiro kuna mazvikokota uyu here, munorapa mega here, munotsvaga rubatsiro kuvavakidzani here?

10. Do you combine ethnoveterinary practices and conventional medicine?

Munombo sanganisa kushandisa mushonga yechivanhu neyechirungu here?

11. Why do you combine?

Sei muchisanganisa?

12. Do you rely on the services of the department?

Munomboshandawo nebazi revetinary here?

13. What is our opinion about the role of the department to support you to solve these problems?

Munoonawo sei rubatsiro runobva kuvetinary mukuderedza matambudziko ezvirwere kuzvipfuyo zvenyu?

Appendix 2: Interviews check list

(3)

JEPHIAS NIIRA M 51YB D'LEVEL

Check list

1.

Cattle health problems	Poultry health problems
Theileriosis, red water Heartwater, trypanosomiasis Blackleg, gallsickness etc Contagious Ophthalmia	Newcastle, ruffled coat, Marek's disease, fowl pox Cholera, Giardiasis Infectious bronchitis

2.

Ethno practice to solve cattle health problems	Ethno practice to solve poultry health problems
rosts, barks, leaves etc	bark, leaves, rosts

3.

Reasons for using ethnoveterinary practices
readily available no cost involved user friendly

4. Three diseases of cattle and poultry ranked in order of importance and remedies

Disease of cattle	Ethno remedy	Disease of poultry	Ethno remedy
Theileriosis		Cholera	
Gallsickness		ruffled coat	
red water		fowl pox	

5.

Animal condition	Treated by ethnoveterinary practitioner	Treat yourself	Treated by family member wife/son/daughter	Treated by your neighbour
Good		self	wife	
Condition				
poor				

Appendix 3: Demographic data

Respondent ID	Sex	Age (Years)	Level of education
EHT1	Female	59	Grade 7
EHT2	Male	26	Advanced level
EHT3	Male	55	Ordinary level
EHT4	Male	51	Ordinary level
EHT5	Female	63	No school
EHT6	Male	42	Grade7
EHT7	Male	45	Ordinary level
EHT8	Female	48	Ordinary level
EHT9	Male	34	Ordinary level
EHT10	Male	58	Form 2
EHT11	Male	69	Grade 7
EHT12	Male	37	Ordinary level
EHT13	Male	62	Grade 7
EHT14	Male	58	Form 2
EHT15	Female	60	Grade 4
EHT16	Male	40	Diploma in Agriculture
EHT17	Female	56	Grade 6
EHT18	Male	59	Form 2
EHT19	Female	43	Ordinary level
EHT20	Male	43	Ordinary level
EHT21	Female	57	Form 2
EHT22	Male	44	Grade 7
EHT23	Male	48	Ordinary level
EHT24	Female	55	Form 2
EHT25	Female	52	Ordinary level
EHT26	Male	21	Grade 7
EHT27	Male	57	Form 2
EHT28	Female	35	Form 2

EHT29	Female	34	Ordinary level
EHT30	Female	32	Ordinary level
EHT31	Male	31	Ordinary level
EHT32	Male	65	Form 2
EHT33	Female	42	Ordinary level
EHT34	Female	38	Ordinary level
EHT35	Male	33	Form 2
EHT36	Female	29	Ordinary level
EHT37	Male	35	Ordinary level
EHT38	Female	24	Ordinary level
EHT39	Female	35	Bachelor of Education
EHT40	Man	32	Ordinary level

Appendix 4: Frequency of usage of ethnoveterinary remedies by respondents in cattle and poultry.

Cattle		Poultry	
Remedy	Frequency	Remedy	Frequency
Zviyo	5	Alovera	31
Nhundurwa	9	Mutiti	17
Alovera	12	Mucherekese	13
Ginger	3	Jatropha	4
Traditional beer	2	Pumpkin seeds	1
Garlic	3	Mubayanyama	2
Lemons	1	Mhiripiri	12
Periperi	2	Mutowa	1
Mupfuta	1	Donkey fecal material	2
Muchecheni	3	Nhundurwa	15
Salt	9	Rufuvhuru	1
Mubvamaropa	17	Brown sugar	3
Cooking oil	4	Hot maize seeds	1
Munyando	1	Grease	1
Masvisvi	1	Used oil	1
Ruvengahonye	4		
Mutiti	5		
Black smokey grass	4		
Mufufu	3		
Mukina	2		
Karunyokadombo	3		
Ziwore	1		
Mafere	1		
Muchecheni	2		

Chameleon	1		
Hot iron	1		
Tobacco	1		
Mutamba	3		
Ash of burnt maize cobs	2		

Appendix 6: Key informant interviews

Interview with ethnoveterinary practitioner

1. What are the main cattle health problems faced by farmers in this area?

Farmers face many diseases in cattle which include red water, lump skin disease, anthrax, worm burden, January disease and eye problems

2. What about the diseases in poultry?

Coccidiosis, Newcastle disease and fowl pox are very common in this area

3. Do you have traditional remedies to solve these problems both in cattle and poultry?

Yes. (The ethnoveterinary practitioner took the assistant to his storeroom where they were dried parts of plants (roots, barks, fruits, and leaves), snail shells. They proceeded to go to his garden where he has a variety of herbs. Along the way he would stop showing him different trees and shrubs and the conditions they treat. Most plants he showed him were the plants which the farmers talked about in the questionnaire interviews

4. Most of the remedies that you showed me are like what many farmers I interviewed. So what makes your services different.

The traditional remedies I give to farmers are cheap and very effective. I usually administer medicine from one plant, but I mix different elements. My medicines are tried and tested. I have been this business for the past 46 years. The ethnoveterinary practitioner said that to a certain extent farmer lack adequate knowledge which results in inappropriate use of ethnoveterinary remedies.

5. You said business. Do you charge farmers and how do you charge?

Yes, I charge for my services and medicine. Farmers can pay in cash or kind. They can pay with chicken, or maize meal. We always want to make it affordable for everyone.

6. Do you work with the department of veterinary services?

Yes. I also take my cattle to the diptank. However, we do not have knowledge sharing platform with the government officials although our mandate is the same. I think it is because we use different methods of treatment. Ours are traditional and theirs are modern.

Interview with the Government Veterinary Officer

1. What are the diseases of cattle and poultry common in your area?

The GVO produced a list with many diseases than the diseases that were mentioned by the farmers. However, some of the diseases mentioned by the farmers were on that list.

2. Why do you think farmers rely on traditional remedies?

Do you think these problems can be solved by traditional remedies or rather do farmers have the capacity to deal with these problems?

To a lesser extent, farmers have capacity to solve the animal health challenges with their knowledge. I believe the traditional herbs can work well in mild disease conditions. If the disease is severe or progresses very fast, ethnoveterinary remedies can be overwhelmed. Also lack of adequate

knowledge on proper diagnosis of the disease can hamper their efforts in trying to manage them. Also, when you look at the list of diseases I have shown you, you can appreciate that some of the diseases are caused by viruses. These diseases don't respond to treatments even with conventional medicine. The best way to control them is through vaccinations. Some diseases like anthrax heartwater, and black leg are associated with sudden death. That is, one doesn't notice any clinical signs.

3. So why do you think farmers use ethnoveterinary medicine.

I think it is in their tradition and culture. Also, this because there are readily available, accessible, and cheap. It is a matter of going into the forest and collect. Moreover, as a country and Department we have been facing some economic problems which have affected our service delivery.

According to the GVO, farmers pay dipping fees to the Department of Veterinary Services. The Department of Veterinary Services have an obligation to supply dipping chemicals and services to the farmers. However, the Ministry of Finance issued an order that all the government revenue collected must first go into national pool. The various government departments are required to request for funds from the treasury department based on their needs. The funds released by the treasury department are not enough to purchase adequate dipping chemicals to effectively control ticks and tickborne diseases. This may result in farmers resorting to use of ethnoveterinary remedies as disease incidences overwhelm them.

The GVO also said that Zimbabwe has operated under hyperinflationary environment from 2016 to 2020 following the introduction of the local currency. This has affected livestock keeping households due to liquidity crisis, lack of foreign currency and erosion of pensions of the elderly retired rural population. Lack of adequate support on the prevention of diseases by the government is also attributed to the unstable economic environment. This results in the increase the burden of livestock diseases which overwhelm farmers forcing them to depend on ethnoveterinary remedies.

Interview with the Veterinary Extension Worker

The VEW said that farmers use ethnoveterinary remedies because of cost and accessibility. The VEW said that as government, they support the farmers with dipping of cattle, vaccination against rabies, anthrax, Newcastle disease and foot and mouth disease. Rabies and anthrax are disease of zoonotic importance while Newcastle disease and foot and mouth disease are diseases of economic importance. Farmers cannot cope on the impacts of these disease on their own. He went on to say that he offers advice to farmers on various issues to with animal health and diseases. Government trains farmers on dosing and vaccination of lumpy skin disease in cattle and Newcastle in poultry using conventional medicine.

The VEW highlighted the issue of inaccessibility to the furthest villages in Nhakiwa due to poor road network and lack of transport as motorcycles are old and not functional. He also went on to say that cellular phone network is very poor hence it makes it difficult for the villagers to get advice from him over the phone. Hence, they depend on ethnoveterinary remedies.

The VEW also said that failure of livestock keeping farmers to adhere to the statutory requirements to pay dipping fees and dip their cattle result in the prosecution of farmers. The prosecution of livestock-keeping farmers results in the bad relationships between the department of Veterinary staff and the livestock keepers. This further promotes the use of ethnoveterinary remedies by the farmers. This is because those farmers will be preferring to rely on themselves.

Interview with the agricultural extension worker

The interest of the agricultural worker was more on the side of food and nutrition security compared to animal health itself. The AEW said that the occurrence of diseases increases and is highest around January and February when it is raining. This is because there is abundance of growing green grass. Ticks take habitat in the green grass and multiply rapidly spreading diseases. 40% of the problematic diseases listed are the tickborne diseases. The AEW also mentioned that around January and February is the time when most rural farmers are focusing on buying fertilizers for their crops and maize fields. This compromises the livestock-keeping farmers capacity to buy conventional medicine and they depend on ethnoveterinary remedies.