MUSIKA

Making Agricultural Markets Work for Zambia

# Smallholder farmers' access and investment in veterinary drugs and services in Zambia

Chisanga Mpundu and Timothy Sichilima

**Musika Development Initiatives (Ltd)**

## Foreword

This report was generated to serve as a reference document for Musika and its implementing partners. Musika Development Initiatives (Musika) is a non-profit company that works to stimulate private sector investment in rural agricultural markets. It does this by helping businesses develop mutually beneficial and transparent commercial relationships with smallholder farmers that integrate the provision of information and technology adoption, and provides long term incentives for farmers to invest in their farming businesses. It provides its clients with high quality, commercially focused technical advice and business model support, and were relevant smart subsidies to bring down the initial risks of doing business with the smallholder market. Musika also supports innovative market-based solutions to environmental issues and strives to ensure that women are key participants in improved agricultural markets. Musika acknowledges and appreciates the financial support from the Swedish Embassy in Lusaka.

**Disclaimer:**

**Acknowledgements**

The authors would like to sincerely thank Indaba Agricultural Policy Research Institute (IAPRI) for organising the Rural Agricultural Livelihood Survey (RALS) from which the data used in this study was obtained. Many thanks also go to the Musika staff who took part in the entire exercise leading up to the collection of this data.

## EXECUTIVE SUMMARY

### *Majority of smallholder farmers rear at least one type of livestock*

This study found that 97% of the agricultural households interviewed were raising at least one form of livestock, and 99% of these households actually owned at least one form of the livestock they were raising. Zambia is estimated to have about 61% of agricultural households both rural and urban according to the 2018 Livestock census report. Of these agricultural households, 72% were raising livestock, with Southern (16%) and Eastern (16%) provinces topping the list.

### *Cattle most susceptible to infections*

The study showed that the livestock type with most disease infections was cattle (53%) followed by village chickens (49%). The livestock with the least infections were pigs and sheep, both at 27% followed by goats (28%). Some of the most common diseases affected by livestock, cattle to be specific, in Zambia include tick borne diseases (e.g. East Coast fever) and Foot and Mouth Disease (FMD). The common diseases for the other livestock include African Swine Fever (ASF) in pigs, and Newcastle Disease (NCD) in chickens.

### *Majority of Pigs, Village chickens and Goats were not getting treated for diseases*

Between traditional and veterinary methods of treating livestock, the study found that veterinary methods were most common among cattle (93%) and sheep (70%) rearing households whereas not treating the infected animals was a practice most prevalent among pigs (71%), village chickens (57%) and goats (48%). Use of traditional methods increased as we moved from large livestock such as cattle (2%) to small ones such as village chickens (23%).

### *Farmers vaccinating animals were likely to deworm and vice versa.*

A cross tab of the two animal vaccinations and deworming showed that there were more farmers that had vaccinated their animals and dewormed them (53%) compared to those that only vaccinated (47%) and those that only dewormed (5%). It was concluded that there was a high chance that farmers that were accessing one form of veterinary service or product were very much likely to access or even adopt another form. The opposite was also true as was seen from the 95% farmers that neither vaccinated nor dewormed. Overall, about 37% of the households raising livestock had at least one type of their livestock vaccinated against at least one disease.

The livestock that was most vaccinated and dewormed was cattle at 73% and 57% respectively, this was followed by sheep. Village chickens were reported to be the least vaccinated (14%) and dewormed (4%). The low deworming levels in village chickens could not be explained by the data albeit they were the second most affected by diseases and very susceptible to various endo-parasites due to their feeding habits.

***Very few farmers accessing veterinary products through FISP***

The main suppliers of veterinary drugs and vaccines were the Government and private commercial sources, with most drugs (48.9%) coming from the latter, and vaccines (48.2%) from the former. There were very few livestock farmers accessing these veterinary products through the Government's Farmer Input Support Programme (FISP) – drugs (1.2%); vaccines (0.7%). This is as a result of the country being mainly focused on crop production. This emanates from the fact that conventional FISP was limited to crop inputs, it is only when the e-FISP was introduced that farmers could access other non-crop inputs. There is therefore a need for aggressive and extensive sensitisation before numbers of farmers accessing non-crop inputs under the program can significantly increase.

Farmers had to cover very long distances to access key agricultural services. FISP collection points were nearer and could be points of access to veterinary services and products. However, the study showed that majority of farmers were not redeeming veterinary products through the FISP e-voucher programme. In fact, the study showed that majority of the farmers were redeeming fertilizers and crop seeds. Other than the access points, public sector extension services provision was not adequately reaching out to the smallholder farmers as it was operating at 40% capacity.

***Government subsidies in some veterinary services affecting crowding in of private sector***

During 2020, the Ministry of Fisheries and Livestock found that it was most expensive to deliver the East Coast Fever (ECF) vaccine to a single calf in Eastern province (ZMW 85.47) compared to Southern province (ZMW 35.65) which had the lowest cost. Compared to the Foot and Mouth Disease (FMD) vaccine which is 100% subsidised, the ECF vaccine (partially subsidized) faces challenges in getting high volumes of cattle vaccinated because farmers are sceptical to pay for one vaccine from the same source (Government) they are getting another vaccine (FMD) for free. FMD is considered a public good while ECF, a management disease. Control of management diseases are the responsibility of the farmer though Government comes in when there is an economic threat associated with not controlling the disease. For ECF,

Government came in and provided a 75% subsidy which ideally was a temporal measure, however, it has remained the case to date. This is probably an issue of the farmer not being well aware of this.

***Livestock market access reduced veterinary costs for farmers***

There was an increase in per cattle costs of veterinary drugs per farmer per year starting at ZMW 51 in 2018, ZMW 80 in 2019 all the way to ZMW 111 in 2020 for the Non-MPF (Musika Partner Firms) farmers. On the other hand, there was an increase of ZMW 13 in costs for the MPF farmers between 2018 and 2019 and then a reduction of ZMW 14 between 2019 and 2020. Overall, MPF farmers observed that there was very little change in veterinary expenses between 2018 and 2020. This could be attributed to the reduced transactional costs for MPF farmers as the MPFs took these veterinary products and services to the rural communities, cutting down on transportation and other related costs.

***Very low farmer investment in animal health***

Smallholder livestock farmers' level of investment in their animals' health still remained very low. The 2017 Annual Household Survey (AHS) observed that farmers that reported an increase in their overall income due to improved market access only invested 0.2% of that income in their animals' health. The following year, 2018, a study of the spin-off effects of improved market access by livestock farmers showed that only 4% of revenue from cattle sales was used for the purchase of livestock veterinary products and services. This is quite odd as one would expect that farmers would reinvest their livestock income in improving their livestock herd health since it is a source of the same revenue.

# Table of Contents

## List of Figures



## List of Tables

## Abbreviations and Acronyms

| | |
|---|---|
| AHS | Annual Household Survey |
| ASF | African Swine Fever |
| CBPP | Contagious Bovine Pleural Pneumonia |
| CSO | Central Statistical Office (Now Zambia Statistics Agency) |
| DRC | Democratic Republic of the Congo |
| ECF | East Coast Fever |
| FISP | Farmer Input Support Programme |
| FMD | Foot and Mouth Disease |
| MFL | Ministry of Fisheries and Livestock |
| MoA | Ministry of Agriculture |
| MPF | Musika Partner Firm |
| NCD | New Castle Disease |
| PSU | Primary Sampling Unit |
| RALS | Rural Agricultural Livelihood Survey |
| SEA | Standard Enumeration Area |
| Vet | Veterinary |
| USD | United States Dollars |

# 1.0 INTRODUCTION

## 1.1 Background

Livestock production among smallholder farmers is as common as crop production in certain rural regions of the country. Rearing of livestock is mainly used for draught power, as an investment, a source of food, and as a quick source of income in the case of small livestock as they are easy to liquidate (Mpundu & Sichilima, 2019).This makes livestock have so much potential to generate income and alleviate poverty among smallholder farmers. The high demand for small livestock such as village chickens and goats both within the country and neighbouring countries such as the Democratic Republic of the Congo (DRC) creates a perfect atmosphere for smallholder farmers to realise the lucrativeness of the various livestock enterprises (Chipasha, 2017; Namonje-Kapembwa & Chiwawa, 2019). As of last livestock census, about 72% of agricultural households were raising livestock. Given the 17.4 million estimated population of people living in Zambia as of 2019, it is expected that demand for food which includes meat and meat products would be on the rise (MFL & CSO, 2019; MNDP, 2020). Lubungu *et al*., (2015) estimates that the demand for meat products is projected to grow by 400% by the year 2027 due to the rise in national income levels as well as a steady increase in urbanisation. In order to meet this growing demand, there would be need to ensure that meat and meat products are readily available to all households and also affordable. For this to be achieved, there is need for increased productivity of livestock in Zambia and this requires improved management systems such as access to improved feeding methods, extension services, and animal health products and services.

Over the past decade, there has not been a sustained positive trajectory of livestock production growth. For instance, there was an increase in the population all types of livestock between the year 2008 and 2014, this was mainly attributed to a reduction in disease incidences (MoA and MFL 2016). However, it has been observed that between 2014 and 2018, there was a reduction in the number of cattle and pigs, with a marginal increase in the population of goats by approximately 44, 911 (MFL & CSO, 2019; MoA & MFL, 2016). The reduction in livestock numbers could be as a result of various factors including prevalence of various livestock diseases, livestock diseases account for over 80% of the livestock mortalities in the country (GoZ, 2017). In 2019, Western province alone reported livestock mortalities from diseases such as Anthrax (139) , New castle (2,209), Heart water (150), Black quarter (266), CBPP (228) among others (Chiwawa, 2019; Lubungu, 2017). In recent years, Zambia has seen a high prevalence of diseases such as the Foot and Mouth Disease (FMD), which was first reported in

2018. This saw the government putting up measures of preventing the spread such as suspending the issuance of animal movement permits, biosecurity measures and mass vaccination exercises (MLF, 2019). Evidence has shown that providing adequate animal health services was imperative to reducing mortalities among all types of livestock, this could explain the reduction in disease incidences between 2008 and 2014 (Lubungu, 2017). However, what is not very clear is how easily accessible veterinary products and services are and how much is being invested in accessing them by rural smallholder farmers. This is what this study sought to investigate.

### 1.2 Objectives

These were the specific objectives of the study;

1. Proportion of households owning livestock and poultry with access to veterinary drugs and services,
2. Types of drugs and services that smallholder farmers have access to,
3. Level of investment (average) in accessing different types of veterinary drugs and services.

In order to answer the above objectives, a quantitative/qualitative study was undertaken using nationally representative data from the 2019 Rural Agricultural and Livelihood Survey (RALS). It was predicted that findings from this study would provide an opportunity for Musika and other relevant agricultural stakeholders to gain insights regarding the current state of affairs on veterinary access to drugs and services, and identify areas of opportunity for investment. This was expected to not only improve the productivity and incomes of livestock farmers, but eventually alleviate many benefiting farmers from poverty.

## 1.3 Data and Methodology

This study, for the most part, used data that was collected for the Rural Agricultural Livelihood Survey (RALS) 2019 which was nationally representative. The RALS 2019 is a panel survey continuing from the RALS 2012 and 2015 surveys. The sampling frame for the survey was based on the 2010 Census of Housing and Population. A stratified two-stage sample design was used. The first stage involved identifying the Primary Sampling Unit (PSU). The PSU was defined as one or more Standard Enumeration Areas (SEAs) with a minimum of 30 agricultural households. The SEA is the smallest area with well-defined boundaries identified on census sketch maps. At the second stage, all households in selected SEAs were listed and agricultural households identified. Listed agricultural households were then stratified into three categories,

A, B, and C, on the basis of total area under crops; presence of some specified special crops; numbers of cattle, goats and chickens raised; and sources of income. Systematic sampling was then used to select 20 households distributed across the three strata in each SEA. The attrition rate of 8.7%, was mainly attributed to households that had moved out of the study area. Therefore, when using the panel data this should be taken into account (Chapoto & Subakanya, 2020).

A total of 7241 households were successfully re-interviewed for the 2019 RALS, however, only 6, 133 households' data were used in analysis for this study as they were the only ones that had reared at least one form of livestock.

Other data sets utilised in this study were the RALS 2012 and 2015, the Musika Annual Household Survey (AHS) 2018, 2019 and 2020 and the Ministry of Fisheries and Livestock (MFL) data on East Coast Fever (ECF) vaccination costs for 2020.

## 2.0 STUDY FINDINGS

### 2.1 Livestock Farmers' Characteristics

The demographic characteristics of a research sample play an important role in highlighting some factors that may have some influence on some variables of interest. Some studies have used demographic characteristics to find out the level of influence they had on yield, adoption of technologies or new practices (Ferreira, 2018; Mpundu & Sichilima, 2020b). Table 2.1 shows the demographic characteristics of the livestock farmers interviewed in this study. The average age of the household head was 52 years, with Muchinga Province recording the youngest household head's age of 50 years and the oldest being in Lusaka (55). There were fewer female headed households (22%) compared to male headed households, majority of the household heads were actually monogamously married (69%). Furthermore, the study showed that the majority of the livestock farmers had completed at least one level of primary education (59%) followed by secondary education (29%).

*Table 2. 1: Demographics table*

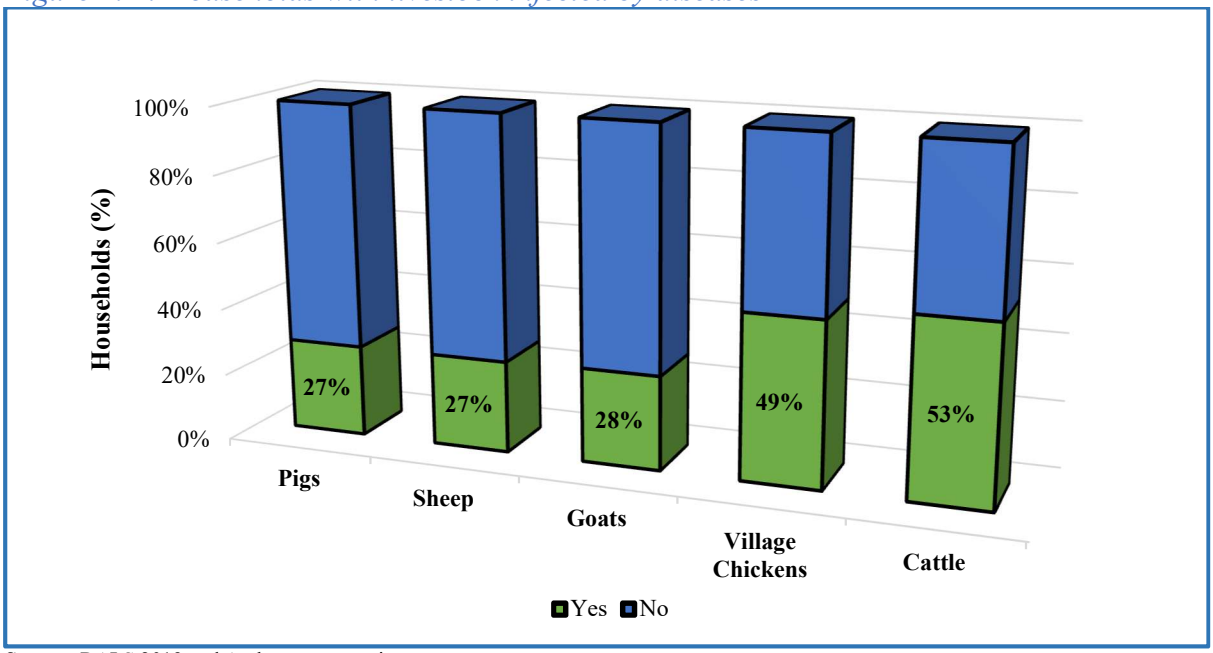
| Characteristics | Central | Copperbelt | Eastern | Luapula | Lusaka | Muchinga | Northern | North-Western | Southern | Western | Total/Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Age (years)** | 53 | 54 | 51 | 52 | 55 | 50 | 51 | 52 | 52 | 53 | ***52*** |
| **Sex** | | | | | | | | | | | |
| *Male* | 80% | 76% | 77% | 77% | 76% | 78% | 83% | 80% | 80% | 75% | ***78%*** |
| *Female* | 20% | 24% | 23% | 23% | 24% | 22% | 17% | 20% | 20% | 25% | ***22%*** |
| **Marital Status** | | | | | | | | | | | |
| *Never married* | 1% | 1% | 0% | 0% | 2% | 1% | 0% | 3% | 1% | 3% | ***1%*** |
| *Monogamously married* | 66% | 72% | 66% | 72% | 73% | 67% | 74% | 73% | 56% | 70% | ***69%*** |
| *Polygamously married* | 12% | 3% | 13% | 6% | 2% | 14% | 10% | 5% | 25% | 6% | ***10%*** |
| *Divorced* | 5% | 6% | 6% | 8% | 6% | 5% | 3% | 6% | 5% | 5% | ***6%*** |
| *Widowed* | 16% | 17% | 13% | 12% | 16% | 12% | 12% | 12% | 11% | 13% | ***13%*** |
| *Separated* | 1% | 0% | 1% | 1% | 2% | 2% | 1% | 1% | 1% | 3% | ***1%*** |
| **Education level** | | | | | | | | | | | |
| *Not educated* | 9% | 8% | 19% | 6% | 13% | 7% | 8% | 10% | 7% | 6% | ***9%*** |
| *Primary* | 60% | 55% | 57% | 64% | 48% | 58% | 65% | 61% | 60% | 59% | ***59%*** |
| *Secondary* | 28% | 34% | 22% | 27% | 32% | 31% | 25% | 26% | 30% | 32% | ***29%*** |
| *Tertiary* | 2% | 3% | 2% | 4% | 7% | 4% | 2% | 4% | 3% | 3% | ***3%*** |

**Source:** RALS 2019 and Authors computations

## 2.2 Livestock Most Affected by Diseases

The growth of the livestock industry in Zambia is hindered by many factors ranging from animal nutrition, management practices, all the way to animal health. But one major setback that seems to be most common among various studies is livestock diseases (Lamy et al. 2012; Lubungu et al. 2016). Diseases in many cases lead to mortality if not treated. Livestock diseases account for over 80% of the livestock mortalities in the country (GoZ, 2017). Figure 2.1 below shows the proportion of households' responses to whether or not their livestock were infected by some form of disease. The study showed that the livestock with most disease infections was cattle (53%) followed by village chickens (49%). The livestock with the least number of households reporting infections were pigs and sheep, both at 27% followed by goats (28%). The low disease infections among goats makes sense as these animals are known to be hardy, with one study highlighting that goats have some genetic characteristics that may make them resistant to some diseases (Pal & Chakravarty, 2020). Low disease prevalence in sheep can be attributed to the fact that the sheep population is very low compared to that of other livestock like goat, with a goat to sheep ratio of 21:1. Village chickens are usually free range and so scavenge for food, this makes them vulnerable to various endo-parasites and that is besides other diseases such as New Castle Disease (Bhat et al., 2014; Kaingu et al., 2010).

*Figure 2. 1: Households with livestock infected by diseases*



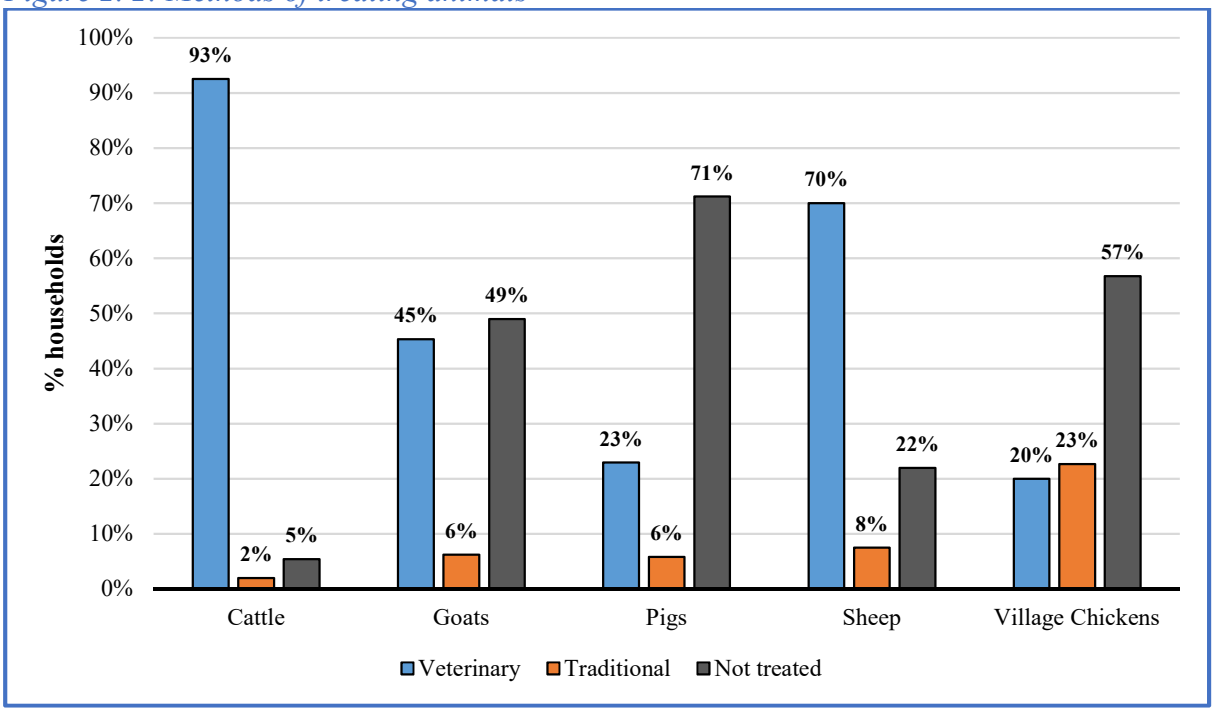

**Source:** RALS 2019 and Authors computations

## 2.3 Level of use of veterinary drugs and services

The livestock herd is only as healthy as method of prevention and treatment used, especially for the infected animals. Because most livestock farmers are smallholder and live in rural areas, they are exposed to traditional methods of treatment of sick animals and the modern ways

which involve accessing veterinary products and services. Overall, majority of the households (44%) that raised livestock had at least one of their livestock types treated using veterinary drugs. Also, 15% of the households treated their livestock using traditional medicines whereas 41% of the households did not treat any of their livestock. Veterinary methods were most common among cattle (93%) and sheep (70%) rearing households whereas not treating the infected animals was a practice most prevalent among pigs (71%), village chickens (57%) and goats (48%). The high proportion of households vaccinating sheep, despite the number of sheep rearing households being low, could be the reason for the low disease occurrences in sheep as shown in figure 2.1 above. Traditional methods increased as we moved from large livestock such as cattle (2%) to small ones such as village chickens (23%), see figure 2.2. Syakalima et al. (2018) found that ethno veterinary, also known as traditional medicine practices, were very common in Zambia, Southern province to be specific. This seems to be case in most rural low-income communities in some parts of Africa (Caudell et al., 2017). This, therefore, may mean that once farmers' incomes improve, they are likely to adopt biomedical veterinary practices which are scientifically proven and safer methods of treating specific diseases. This means that in the initial stages, farmers may need subsidised animal health products and services within their financial means, and then once they start earning more from selling high weighing healthy animals, they can start re-investing in their production as some studies have shown (Sichilima et al., 2019; Mpundu & Sichilima, 2020).

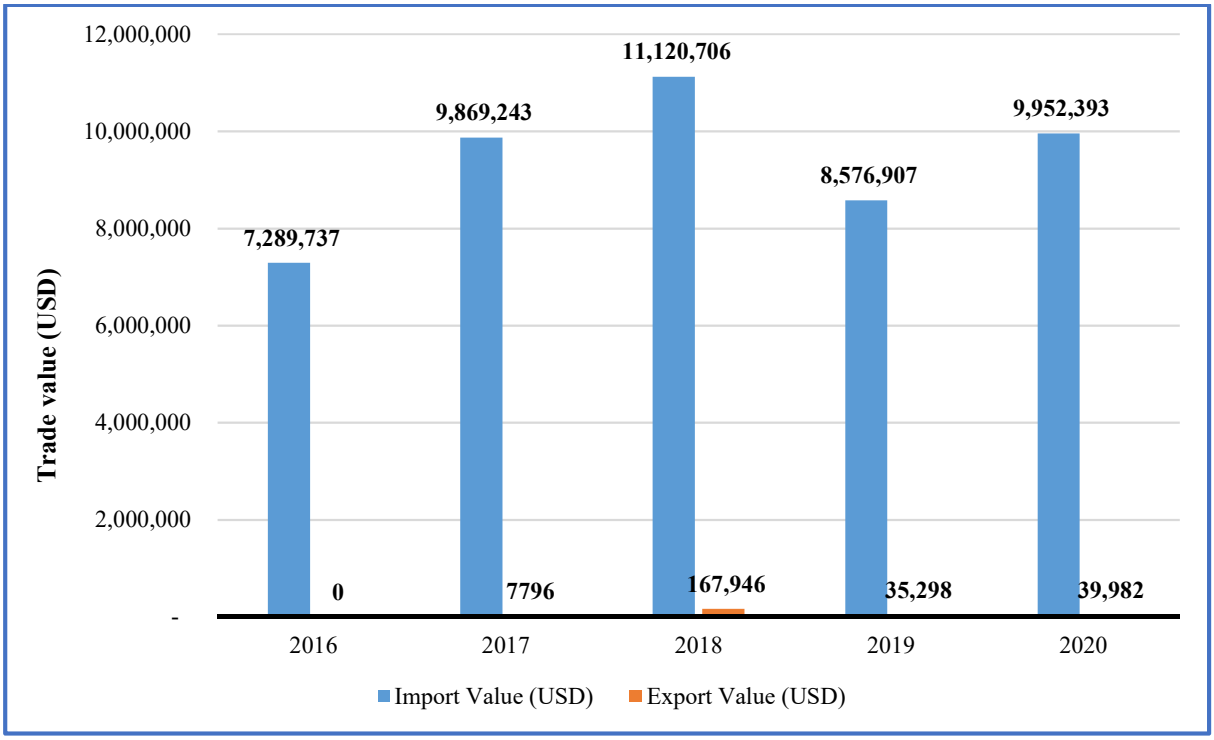
*Figure 2. 2: Methods of treating animals*




**Source:** RALS 2019 and Authors computations

Figure 2.3 shows the import and export USD values for veterinary medicines for Zambia. As can be seen and already highlighted, majority of the veterinary products in Zambia are imported. In the last five years, the highest import (~$11m) and export ($167K) value were in 2018. The trend over the last five years showed that there was a general increase in the value of veterinary medicine imports and exports between 2016 and 2018. This increase could be attributed to the fact that there was an increase in livestock deaths at household level from 2015 to 2019. Then in 2019, the value of imported veterinary products reduced by over $2.5m. This was probably because of the FMD outbreak in 2018 which created a demand for various animal health products, but had subsided by 2019. The 2018 FMD outbreak cost the government K10.8m (~$0.91m) in Chibombo and Chisamba districts of Central province. Other reasons could be that there was carryover stock from 2018, causing the value of veterinary products imported to reduce. This could explain the rise in 2020 when the assumed carryover products had depleted. See figure 2.3.

Figure 2. 3: Veterinary medicines' annual trade value for Zambia



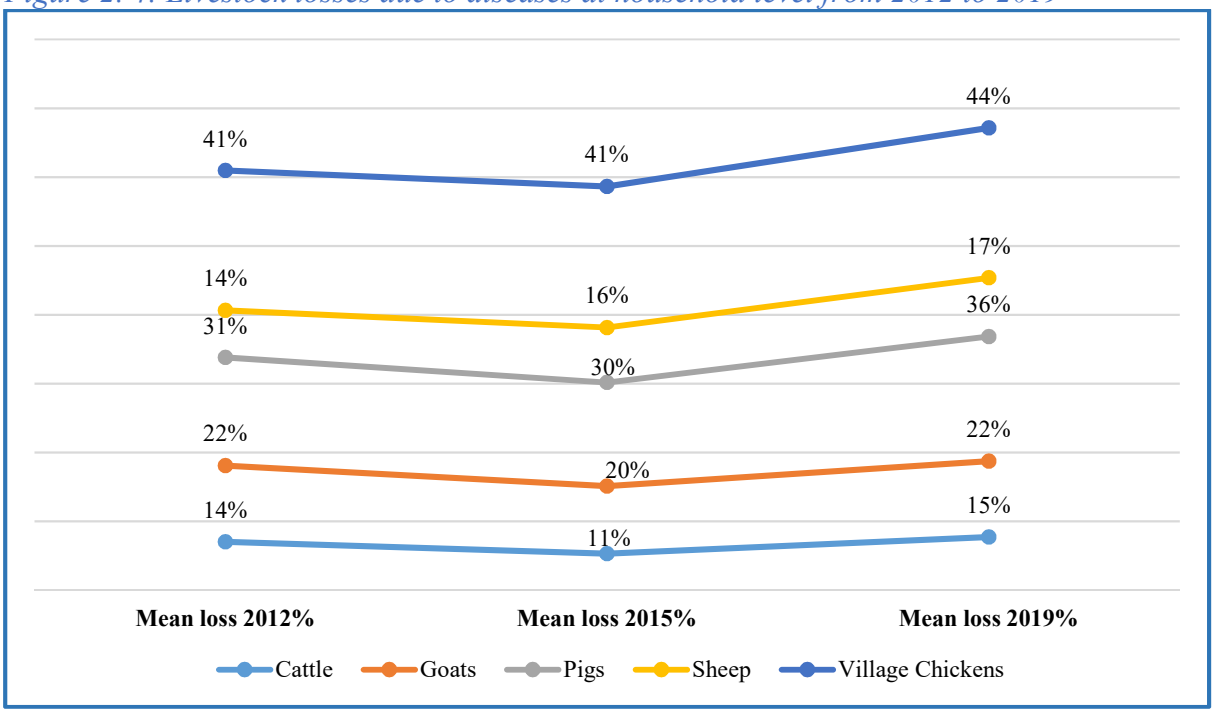

**Source:** UN Comtrade data and Authors' computations

## 2.4 Livestock Mortality Trends and Likelihood of Vet Service Adoption

The sample had 97% of the agricultural households interviewed raising at least one type of livestock, and 99% of these households actually owned at least one type of the livestock they were raising. Zambia is estimated to have about 61% of agricultural households both rural and urban according to the 2018 Livestock census report. Of these agricultural households, 72%

were raising livestock, with Southern (16.2%) and Eastern (16.0%) provinces topping the list (MFL & CSO, 2019). As earlier alluded to, evidence has shown that there was a reduction in livestock diseases and mortality between 2008 and 2014, this study just validated part of those findings as it showed a reduction in mean livestock losses at household level between 2012 and 2015. However, the trends show that there was an overall increase in the number of livestock that was being lost by each household due to diseases between 2015 and 2019 with most losses observed in pigs then cattle. Given that there are about 179,000 households raising over a million pigs in Zambia, it is possible that the number of households reporting disease infections as shown in figure 2.1 above is low yet the actual number of animals dying per household is high, causing the upward trend between 2015 and 2019 (MFL & CSO, 2019). The Parliamentary Committee (2017), on Agriculture, Lands and Natural Resources, reported that livestock diseases accounted for over 80% of livestock mortalities in Zambia. The report further highlighted that diseases such as Foot and Mouth Disease (FMD), Contagious Bovine Pleural Pneumonia (CBPP), African Swine Fever (ASF) and Newcastle Disease (NCD) were the most important for Zambia. A study by Mulemba (2009) showed that Zambia has been struggling with various diseases such as Theileriosis (East Coast Fever and corridor disease), FMD and CBPP for many decades.

*Figure 2. 4: Livestock losses due to diseases at household level from 2012 to 2019*




**Source:** RALS 2012; RALS 2015; 2019 and Authors computations

With decades of disease prevalence in Zambia's livestock sector, the only way to increase the livestock population is to improve the level of access that farmers have to veterinary drugs and

services. Some of these services include vaccinations and deworming. Overall, about 37% of the households raising livestock had at least one type of their livestock vaccinated against at least one disease. As shown in table 2.2, a cross tab of these two services showed that there were more farmers that had vaccinated their animals and dewormed them (53%) compared to those that only vaccinated (47%) and those that only dewormed (5%). From these findings we could conclude that there was a high chance that farmers that were accessing one form of veterinary service or product were very much likely to access or even adopt another form. The opposite was also true as could be seen from the 95% farmers that neither vaccinated nor dewormed their animals. This was evident from the positive (0.55) relationship exhibited between the two variables when a pairwise test was done. To ensure that numbers of farmers with access to animal health services improve, there is need for both the public and private sector to work together through interventions and policies that support the success of these interventions. The Ministry of Fisheries and Livestock released the National Livestock Development Policy document in 2020 which, among other things, aimed at promoting the establishment of animal clinics and improving livestock service delivery through routine vaccinations and livestock diseases surveillance programmes (MFL, 2020).

Table 2. 2: Cross tab - vaccination vs deworming

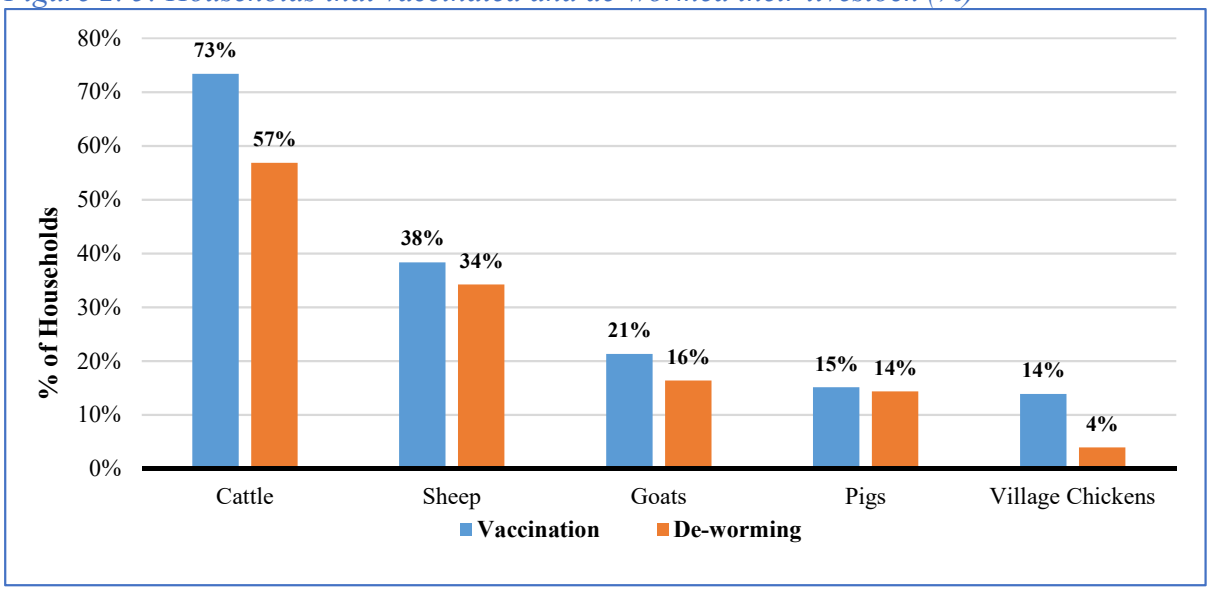
| | **Did you deworm?** | |
|---|---|---|
| **Did you vaccinate?** | ***Yes*** | ***No*** |
| ***Yes*** | 53% | 47% |
| ***No*** | 5% | 95% |

**Source:** RALS 2019 and Authors computations

Vaccinations and deworming are a big part of livestock health programme and not themselves being an animal health programme. Vaccinations have definitely led to eradication and control of various animal diseases (Berge & Vertenten, 2018). Other studies have shown benefits to animal health practices such as deworming include but are not limited to better health and immunity as well as increased weight gain and reproductive performance (Maier, 2019). Figure 2.5 below shows the proportion of households that dewormed and vaccinated each type of livestock. As seen in the figure below, the livestock that was most vaccinated and dewormed was cattle at 73% and 57% respectively, this was followed by sheep. Village chickens were reported to be the least vaccinated (14%) and dewormed (4%). The low deworming levels in

village chickens could not be explained by the data albeit they were the second most affected by diseases (see figure 2.4 above) and very susceptible to various endo-parasites due to their feeding habits.

*Figure 2. 5: Households that vaccinated and de-wormed their livestock (%)*



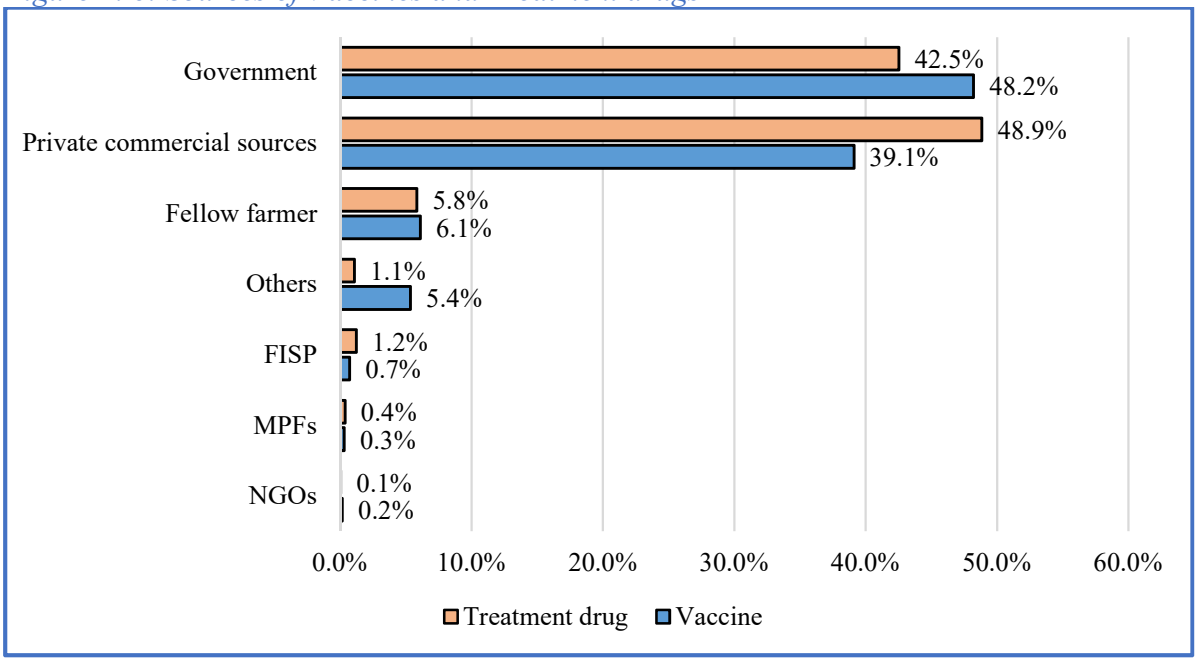

**Source:** RALS 2019 and Authors computations

## 2.5 Common Sources of Veterinary Drugs and Services

For farmers to access various veterinary products and services, there should be a reliable source preferably near their homesteads and a willingness to access which is mostly motivated by commercialisation of livestock production. Farmers are more willing to invest in their animal's health, and agricultural production generally, if their main reason for production is to sell – hence the importance of farmers' improved access to markets (Mpundu et al., 2019; Sichilima et al., 2019; USAID, 2009). In this study, the main suppliers of veterinary drugs and vaccines were the Government and private commercial sources, with most drugs (48.9%) coming from the latter, and vaccines (48.2%) from the former. There were very few livestock farmers accessing these veterinary products through FISP – drugs (1.2%); vaccines (0.7%). This emanates from the fact that conventional FISP was limited to crop inputs, it's only when the e-FISP was introduced that farmers could access other non-crop inputs which will need aggressive and extensive sensitisation before numbers of farmers accessing can significantly increase. The fact that crops have a structured output market that is guaranteed through the Government's Food Reserve Agency (FRA) gives farmers an incentive to invest more in crops than livestock. Improving livestock farmers' access to both input and output markets can strongly incentivise the farmers to invest and reinvest heavily in livestock production overall. This, once catalysed, is expected to crowd in both suppliers of livestock input and buyers of

livestock and livestock products leading to increased farmer incomes and employment opportunities for other key stakeholders such as aggregators, transporters, skin processors etc.

*Figure 2. 6: Sources of Vaccines and Treatment drugs*




**Source:** RALS 2019 and Authors computations

### *2.6: Access and Methods of Veterinary Services Utilized by Livestock Farmers*

In trying to assess the methods farmers used to control ticks, the study found that apart from cattle farmers, majority of the rest had not used any type of veterinary methods. The study found that 15% of cattle farmers used dipping services whilst 59% used spraying services, refer to table 2.3. Spraying was the most common service among all types of livestock. The low levels of access to veterinary drugs and services could be attributed to long distances that farmers had to cover to access some of these veterinary services as shown in figure 2.6 below. Moreover, extension provision which is key in raising awareness and improving knowledge levels regarding the importance of application of veterinary drugs is currently low. The public sector livestock extension service was operating at 40% capacity (GoZ, 2017) against the recommended veterinary and livestock extension staff to livestock unit ratio of 1 to1,500 (MFL, 2016).

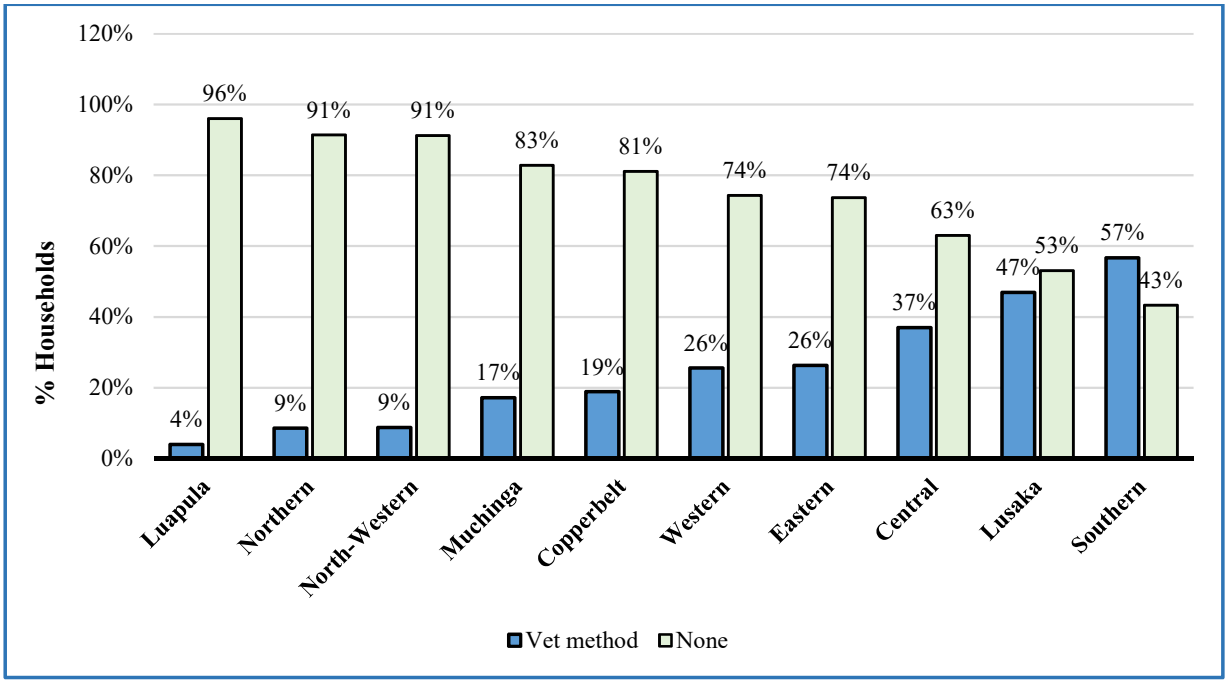
*Table 2. 3: Methods smallholder farmers had access to in tick control*

| Livestock | Dipping | Spraying | Injectable | Others | None |
|---|---|---|---|---|---|
| *Cattle* | 15% | 59% | 4% | 2% | 20% |
| *Goats* | 2% | 20% | 2% | 1% | 74% |
| *Pigs* | 1% | 14% | 3% | 2% | 81% |
| *Sheep* | 5% | 36% | 3% | 1% | 55% |
| *Village Chickens* | 0% | 5% | 0% | 4% | 90% |

**Source:** RALS 2019 and Authors computations

Table 2.3 above shows the actual vet methods farmers used to control ticks in their livestock by the type of livestock that was treated. Figure 2.7 below shows the proportion of households that used vet methods to control ticks versus the households that did not use any methods at all by their respective provinces. The study found that majority of the farmers that treated using the methods were from Southern (57%), Lusaka (47%), Central (37%), Eastern (26%) and Western (26%) provinces. These results make sense as the 2018 livestock census showed the top five provinces raising cattle were these same ones, cattle can be used as a proxy for livestock but definitely not a perfect proxy.

*Figure 2. 7: Proportion of farmers that used vet services to control ticks*

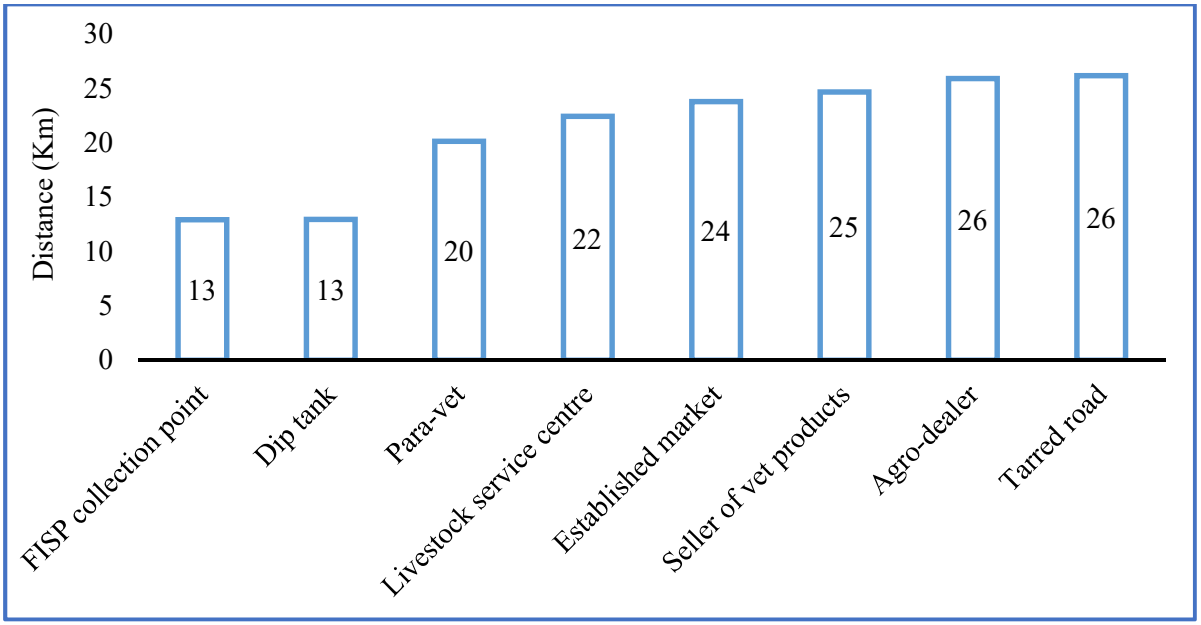



**Source:** RALS 2019 and Authors computations

Farmers had to cover very long distances to access key agricultural services. FISP collection points were nearer and could be points of access to veterinary products. However, the study showed that majority of farmers were not redeeming veterinary products through the FISP e-voucher programme. In fact, the study showed that majority of the farmers were redeeming

fertilizers and crop seeds. Farmers were asked the top three things they redeemed and the results showed that less than 1% of households had veterinary products redeemed as their first and second products, and not more than 4% redeemed veterinary products as their third product. Others said they redeemed products they did not intend to redeem. When asked the top three products they would have loved to redeem instead, about 2% said they would have wanted to purchase veterinary products as their first and second products whilst 10% chose it as their third product[1]. All this is telling us that majority of small scale farmers had distance as a deterrent to accessing veterinary services but also that the behaviour of farmers played a role. The current focus among smallholder farmers is crop production, maize especially, hence the majority getting seed and fertilisers. Most of them get these veterinary chemicals as a way of ensuring that they have swiped all their cash out of the e-voucher card and not as a first choice or priority. But this is not to say the FISP e-voucher is bad, in fact it is a very good avenue for farmers as it gives them an opportunity to diversify and access various non-crop products and services. However, the agribusinesses' possible minimal to lack of stocking non-crop products such as vet drugs could have played a major role because as earlier indicated, Zambia's agricultural sector is more crop- than livestock-centric. Refer to figure 2.8.

*Figure 2. 8: Distances to key service providers and facilities*



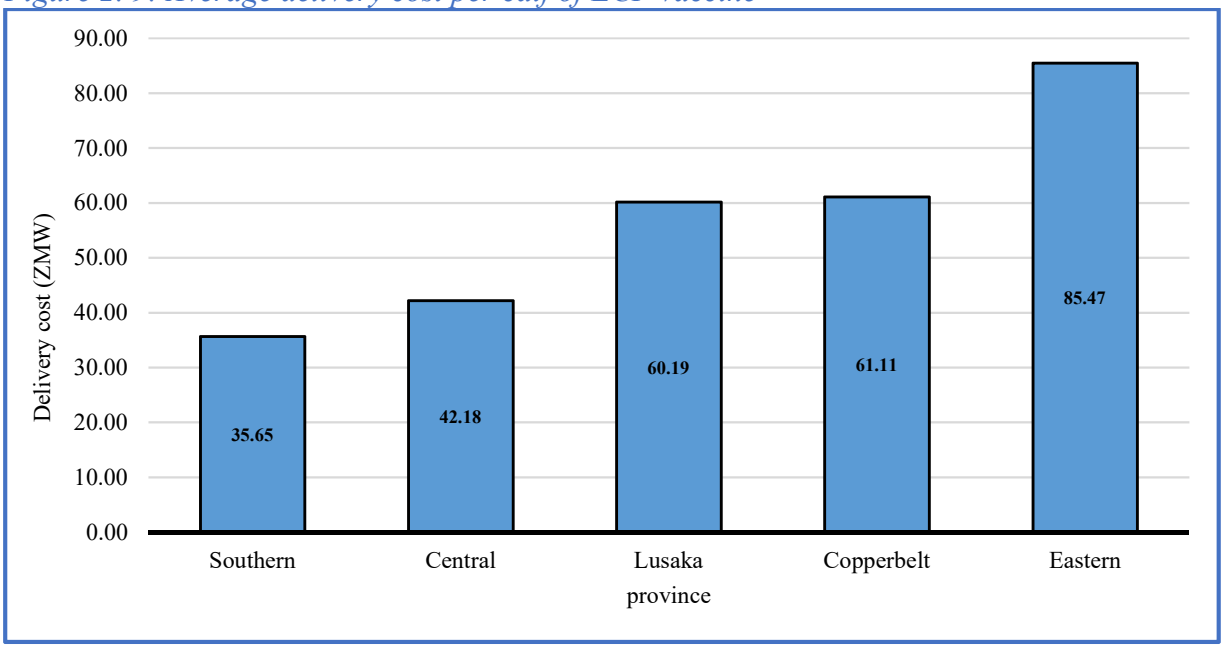

**Source:** RALS 2019 and Authors computations

[1] See Appendix 1 for figure.

## 2.7 Costs of Veterinary Service Delivery and Farmers' Level of Investment

Veterinary costs vary from place to place and drug to drug. Some drugs and services cost more than others due to high costs of producing or procuring the drugs. In fact, some of the challenges that farmers in Northern province were facing in accessing veterinary drugs and services were expensive drugs that their incomes could not afford and long distances to their nearest veterinary access points (Chisongo, 2019). Basically, what determines the cost of vaccinations, for instance, is mainly three parameters: cost of producing/purchasing the drug, cost of delivering the drug from the source to the farmer, cost of materials for administering the drug. Due to limitations in data, this study focused on one vaccination to just give an idea of the costs associated with farmers accessing veterinary drugs, in this case the ECF vaccine. During 2020, the Ministry of Fisheries and Livestock found that it was most expensive to deliver the ECF vaccine for one calf in Eastern province (ZMW 85.47) compared to Southern province (ZMW 35.65) which had the lowest cost. Compared to the FMD vaccine which is 100% subsidised, the ECF vaccine (partially subsidized) faces challenges in getting high volumes of cattle vaccinated because farmers are sceptical to pay for one vaccine from the same source (Government) they are getting another vaccine (FMD) for free (Makungu & Maseko, 2020). FMD is considered a public good while ECF, a management disease. Control of management diseases are the responsibility of the farmer though government comes in when there is an economic threat associated with not controlling the disease. For ECF, Government came in and provided a 75% subsidy which ideally was a temporal measure, however, this has remained the case to date. This is probably an issue of the farmer not being well aware of this. Although subsidies are good for increasing adoption of subsidised products and farmer incomes, they also tends to distort markets by crowding out the private sector, as 100% subsidisation makes the vaccine a public good (Hemming et al., 2018; Lang, 2019).

*Figure 2. 9: Average delivery cost per calf of ECF vaccine*

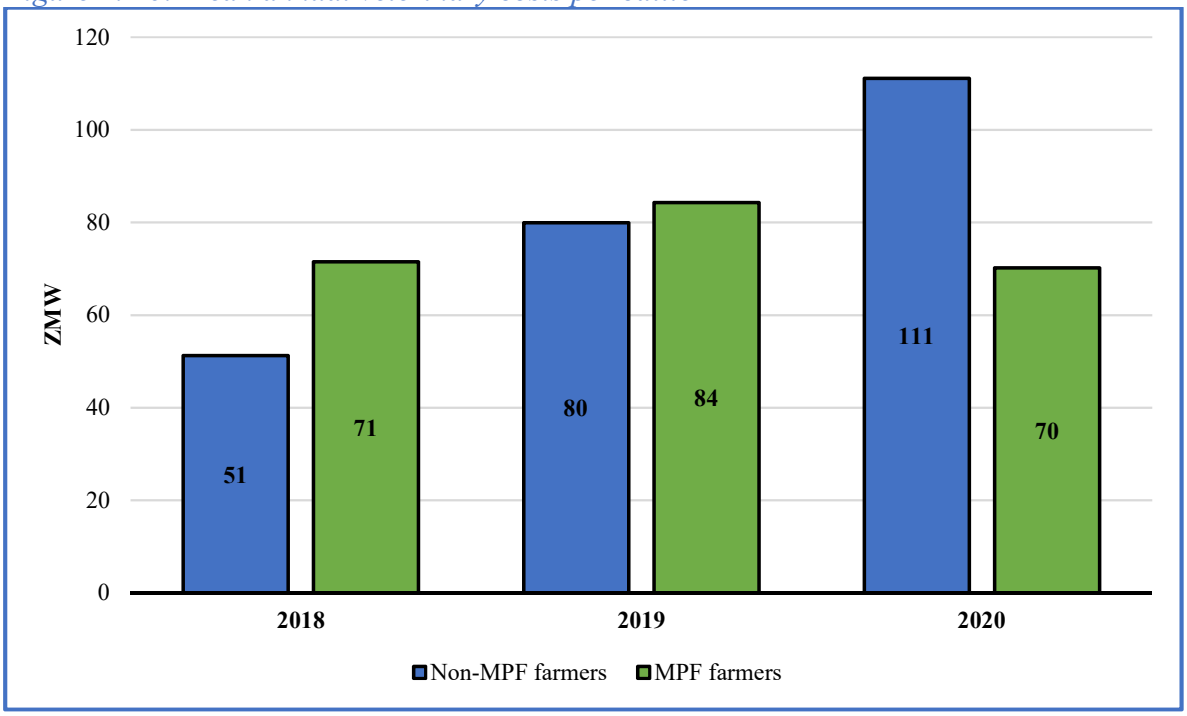



**Source:** Ministry of Fisheries & Livestock, 2020

Having seen what constitutes veterinary costs, the study attempted to understand the monetary extent to which farmers go in investing in their animals' health. Using Musika's Annual Household Survey data for three years, the study compared the level of yearly investment between MPF and Non-MPF cattle farmers. The MPF farmers (Treatment) ideally are those that had improved access to veterinary markets whereas the Non-MPF farmers had no access to any improved veterinary markets (Control). Figure 2.10 shows that there was an increase in per cattle costs of veterinary drugs per farmer per year starting at ZMW 51 in 2018, ZMW 80 in 2019 all the way to ZMW 111 in 2020 for the Non-MPF farmers. On the other hand, there was an increase of ZMW 13 in costs for the MPF farmers between 2018 and 2019 and then a reduction of ZMW 14 between 2019 and 2020. Overall, MPF farmers observed that there was very little change in veterinary expenses between 2018 and 2020. This could be attributed to the reduced transactional costs for MPF farmers as the MPFs took these veterinary products and services to the rural communities, cutting down on transportation and other related costs. Additionally, farmers with improved access to markets are more informed and are able to invest in prophylactic drugs and methods ultimately reducing disease incidences and cost of veterinary care. Normally, many livestock farmers have a tendency of treating livestock diseases than preventing them which leads them to spending more. Inflation on veterinary drugs and inputs, especially that majority of these drugs are imported, coupled with increases in disease occurrences ultimately justify the annual increase in expenses for the treatment group

despite being exposed to the same risk factors (Lubinga et al., 2020). These finding just showed a glimpse of the numerous benefits that farmers get from having improved access to markets.

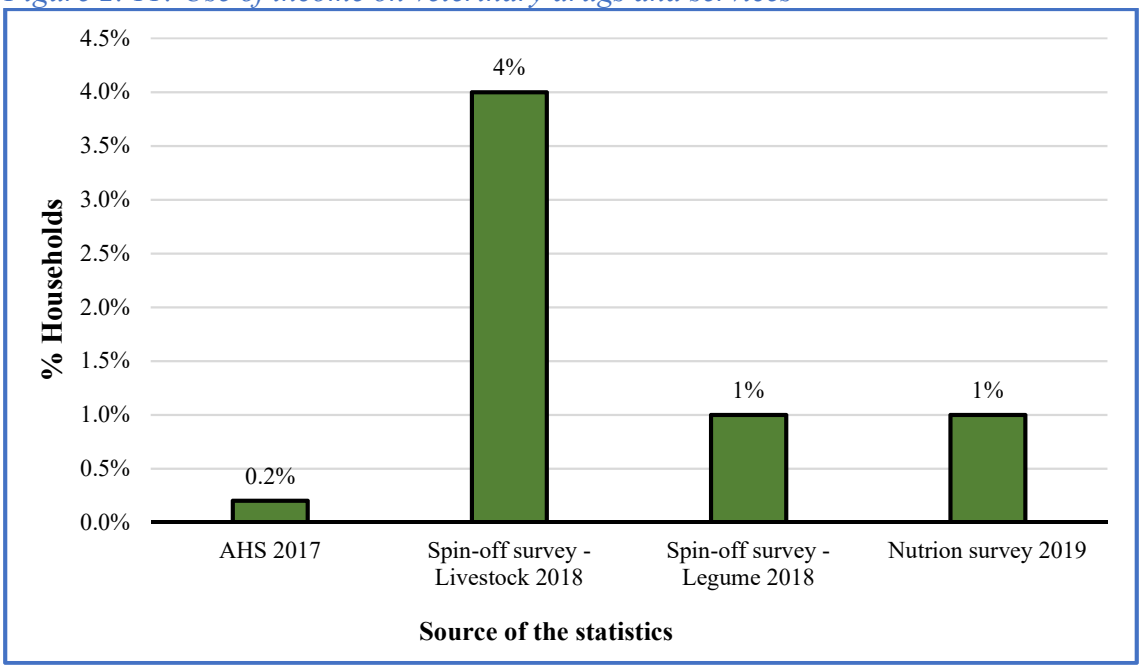
*Figure 2. 10: Mean annual veterinary costs per cattle*




**Source:** AHS 2018; 2019; 2020

A review of some studies conducted by Musika over the years showed that smallholder livestock farmers' level of investment in their animals' health still remained very low. The 2017 AHS observed that farmers that reported an increase in their overall income due to improved market access only invested 0.2% of that income in their animals' health. The following year, 2018, a study of the spin-off effects of improved market access by livestock farmers showed that only 4% of revenue from cattle sales was used for the purchase of livestock veterinary products and services. This is odd because you would expect that farmers would like to reinvest their income to improve their livestock herd health since it is a source of the same revenue. However, this low investment could be due to two things: 1) the highly subsidised government offered veterinary services that farmers access even for free in some cases or 2) the farmers are sticking to their basic and common animal health disease prevention practices in Zambia such as dipping, or spraying and vaccinations. The former does not cost much; it could explain our findings. To gain some perspective, the study also reviewed a legume spin-off study 2018 and the 2019 Musika Nutrition baseline survey and found that in both studies with different target areas, only 1% of the farmers interviewed in each study spent their incomes on veterinary drugs and services. Refer to figure 2.11.

*Figure 2. 11: Use of income on veterinary drugs and services*




**Source:** AHS 2017; Spin-off studies 2018; Nutrition baseline 2019

# 3.0 CONCLUSION AND RECOMMENDATIONS

## 3.1 Conclusion

This study aimed to answer three objectives: 1) Proportion of households owning livestock and poultry with access to veterinary drugs and services; 2) Types of drugs and services that smallholder farmers have access to; 3) Level of investment (average) in accessing different types of veterinary drugs and services. In answering these objectives, the study found that a majority of cattle (93%) and sheep (70%) farmers had access to veterinary drugs and services. However, majority of the goat, pig and village chicken farmers opted to not treat their livestock. The most common veterinary services livestock farmers accessed were deworming and vaccinations, with cattle and sheep farmers reported to have accessed these services more than any other livestock farmers. Despite farmers having been exposed to ethno veterinary practices through traditional teachings in Zambia culture, majority of the farmers, specifically cattle and sheep, opted to use scientifically proven veterinary medicine products and methods to prevent and cure livestock diseases.

Overall, there were very low levels of investment in animal health by farmers over the past years. This was mainly attributed to crop-oriented type of agriculture common in Zambia and Zambian agricultural policies, lack of livestock commercialisation sense among livestock farmers and some government subsidies such as those for the FMD and ECF vaccine.

## 3.2 Recommendation

1. The authors recommend that vet service providers widen the scope to provide drugs and services for goats, pigs and poultry which may commence with market linked sensitisation.
2. There is need to exploit the opportunity of local production/manufacturing of vaccines and drugs seeing that most of these are actually imported.
3. There is an opportunity for R&D relating to ethnovet as they are vital in marginalised communities and can be integrated into commercial veterinary service provision where access to commercial drugs is almost zero – this could also be unique to us considering most of our inputs are imported but also farmers trust vets and if we have professionals recommending ethnovet practices as alternatives, adoption would increase.

4. Information provision to the farmers must be a public good and this can create a demand for various vet products and services, making it lucrative for both the farmers and suppliers to invest in veterinary products and services on both ends of the value chain.

5. Commercial actors/off takers must integrate vet services into their operations for farmers to not only have the market incentive but for the commercial actor to obtain the desired quality and quantities of livestock and livestock products. Additionally, a grading system that allows for farmers to access better prices if they invest in veterinary care can easily be instituted based on empirical evidence. The integration is a win-win for all players; commercial off taker, veterinary service provider, and the farmer. All other recommendations can only be implemented if this system is in place.

6. Government needs to extensively and consistently inform the farmers on which diseases are public goods and which are not, so that the farmers do not maintain the behaviour of waiting on government for diseases that are supposed to be managed at farmer level. Overall information provision MUST be a public good.

## 4.0 REFERENCES


Berge, A. C., & Vertenten, G. (2018). *The importance of preventive health and vaccination programmes in ruminant production*. Time to Vaccinate. https://www.timetovaccinate.com/downloads/Preventive%20Health%20and%20vaccination%20Programmes-%20Whitepaper.pdf

Bhat, S. A., Khajuria, J. K., Katoch, R., Wani, M. Y., & Dhama, K. (2014). *Prevalence of Endoparacites in Backyard Poultry in North Indian Rgion: A prformance Based Assessment Study*. *9*(8), 479–488. https://doi.org/10.3923/ajava.2014.479.488

Caudell, M. A., Quinlan, M. B., Quinlan, R. J., & Call, D. R. (2017). Medical pluralism and livestock health: Ethnomedical and biomedical veterinary knowledge among East African agropastoralists. *Journal of Ethnobiology and Ethnomedicine*, *13*(1), 7. https://doi.org/10.1186/s13002-017-0135-1

Chapoto, A., & Subakanya, M. (2020). *The Rural and Agricutural Livelihood Survey 2019*. IAPRI. http://www.iapri.org.zm/research-reports/technical-papers

Chipasha, H. (2017). Smallholder goat farmers' market participation in Choma District, Zambia. *AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT*, *17*(01), 11691–11708. https://doi.org/10.18697/ajfand.77.16175

Chisongo, M. (2019). *Livestock disease prevalence in relation to climate change under climate resilient livestock management project (CRLMP)* (p. 17). Ministry of Fisheries and Livestock.

Chiwawa, D. H. (2019). *2019 WESTERN PROVINCE ANNUAL REPORT DEPARTMENT OF VETERINARY SERVICES PREPARED*. 32.

Ferreira, T. (2018). *Does education enhance productivity in smallholder agriculture? Causal evidence from Malawi* (p. 41). www.ekon.sun.ac.za/wpapers

Hemming, D. J., Chirwa, E. W., Dorward, A., Ruffhead, H. J., Hill, R., Osborn, J., Langer, L., Harman, L., Asaoka, H., Coffey, C., & Phillips, D. (2018). Agricultural input subsidies for improving productivity, farm income, consumer welfare and wider growth in low- and lower-middle-income countries: A systematic review. *Campbell Systematic Reviews*, *14*(1), 1–153. https://doi.org/10.4073/csr.2018.4

Kaingu, F. B., Kibor, A. C., Shivairo, R., Kutima, H., Okeno, T. O., Waihenya, R., & Kahi, A. K. (2010). *Prevalence of gastro-intestinal helminthes and coccidia in indigenous chicken from different agro-climatic zones in Kenya*. 5.

Lamy, E., van Harten, S., Sales-Baptista, E., Guerra, M. M. M., & de Almeida, A. M. (2012). Factors Influencing Livestock Productivity. In V. Sejian, S. M. K. Naqvi, T. Ezeji, J. Lakritz, & R. Lal (Eds.), *Environmental Stress and Amelioration in Livestock Production* (pp. 19–51). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-29205-7_2

Lang, A. (2019). Heterodox markets and 'market distortions' in the global trading system. *Journal of International Economic Law*, *22*(4), 677–719. https://doi.org/10.1093/jiel/jgz042

Lubinga, F., Sichilima, T., Mpundu, C., & Sebele, M. (2020). *Impact of Covid-19 on Agribusiness SMEs*. 16.

Lubungu, M. (2017). Factors affecting the livestock herd size among smallholder households in Zambia. *Tropical Animal Health and Production*, *49*. https://doi.org/10.1007/s11250-017-1366-9

Lubungu, M., Sitko, N. J., & Munguzwe, H. (2016). *Factors Limiting Smallholder Cattle Commercialization in Zambia*. https://doi.org/10.13140/RG.2.2.27878.01607

Maier, G. (2019, February). *Dewormers and Vaccinations in beef cattle.pdf* [Power Point PDF]. https://ucanr.edu/sites/nichemarketing/files/341583.pdf

Makungu, C., & Maseko, A. (2020). *CASE STUDY EAST COAST FEVER INFECT-AND-TREAT IMMUNISATIONS (ECF ITMI) ADOPTION STUDY - A THEMATIC ANALYSIS* (p. 16). Ministry of Fisheries and Livestock.

MFL. (2020). *National Livestock Development Policy 2020-2024*. MFL.

MFL, & CSO. (2019). *The 2017/2018 Livestock and Aquaculture Census*. www.mfl.gov.zm

Ministry of Livestock and Fisheries. (2019). *Ministerial Statement the Status of FMD Countrywide.pdf*. Parliament. http://www.parliament.gov.zm/sites/default/files/images/publication_docs/Ministerial%20Statement%20the%20Status%20of%20FMD%20Countrywide.pdf

Ministry of National Development and planning. (2020). *ZAMBIA SUSTAINABLE DEVELOPMENT GOALS VOLUNTARY NATIONAL REVIEW 2020*. https://sustainabledevelopment.un.org/content/documents/26305VNR_2020_Zambia_Report.pdf

MoA, & MFL. (2016). *SECOND NATIONAL AGRICULTURAL POLICY*. http://extwprlegs1.fao.org/docs/pdf/zam183104.pdf

Mpundu, C. (2018). *Assessment of effects of improved market access on rural smallholder farmers: A case study of a livestock intervention*. 23.

Mpundu, C., Lubinga, F., & Sichilima, T. (2019). *Annual Household Survey 2019*. 43. https://www.musika.org.zm/research-reports/

Mpundu, C., & Sichilima, T. (2019). *Gender and Decision Making in Agriculture: A case of Mazabuka, Mumbwa and Mongu Districts.* (p. 28) [Baseline]. https://www.musika.org.zm/research-reports/

Mpundu, C., & Sichilima, T. (2020a). *Annual Household Survey 2020*. 53.

Mpundu, C., & Sichilima, T. (2020b). *Key climate change coping strategies used by smallholder farmers in Zambia* (p. 34). Musika Development Initiatives Ltd Zambia. https://www.musika.org.zm/research-reports/

Mulemba, H. (2009). *Agriculture: Future Scenarios for Southern Africa – The Livestock Sector in Zambia and Rising Food Prices*. International Institute for Sustainable Development. https://doi.org/10.4135/9781412963893.n343

Namonje-Kapembwa, T., & Chiwawa, H. (2019). *VALUE CHAIN ANALYSIS OF GOATS IN ZAMBIA: CHALLENGES AND OPPORTUNITIES OF LINKING SMALLHOLDERS TO MARKETS*. 41.

Pal, A., & Chakravarty, A. K. (2020). Disease resistance for different livestock species. In *Genetics and Breeding for Disease Resistance of Livestock* (pp. 271–296). Elsevier. https://doi.org/10.1016/B978-0-12-816406-8.00019-X

Paliarmentary Committee. (2017). *Agriculture, Lands and Natural Resources Report 2017* (p. 62) [Paliarmentary report]. Paliarment of Zambia. http://www.parliament.gov.zm/sites/default/files/documents/committee_reports/MAIN%20REPORT-AGRICULTURE.pdf

Sichilima, T. (2017). *Annual Household Survey 2017*. 27.

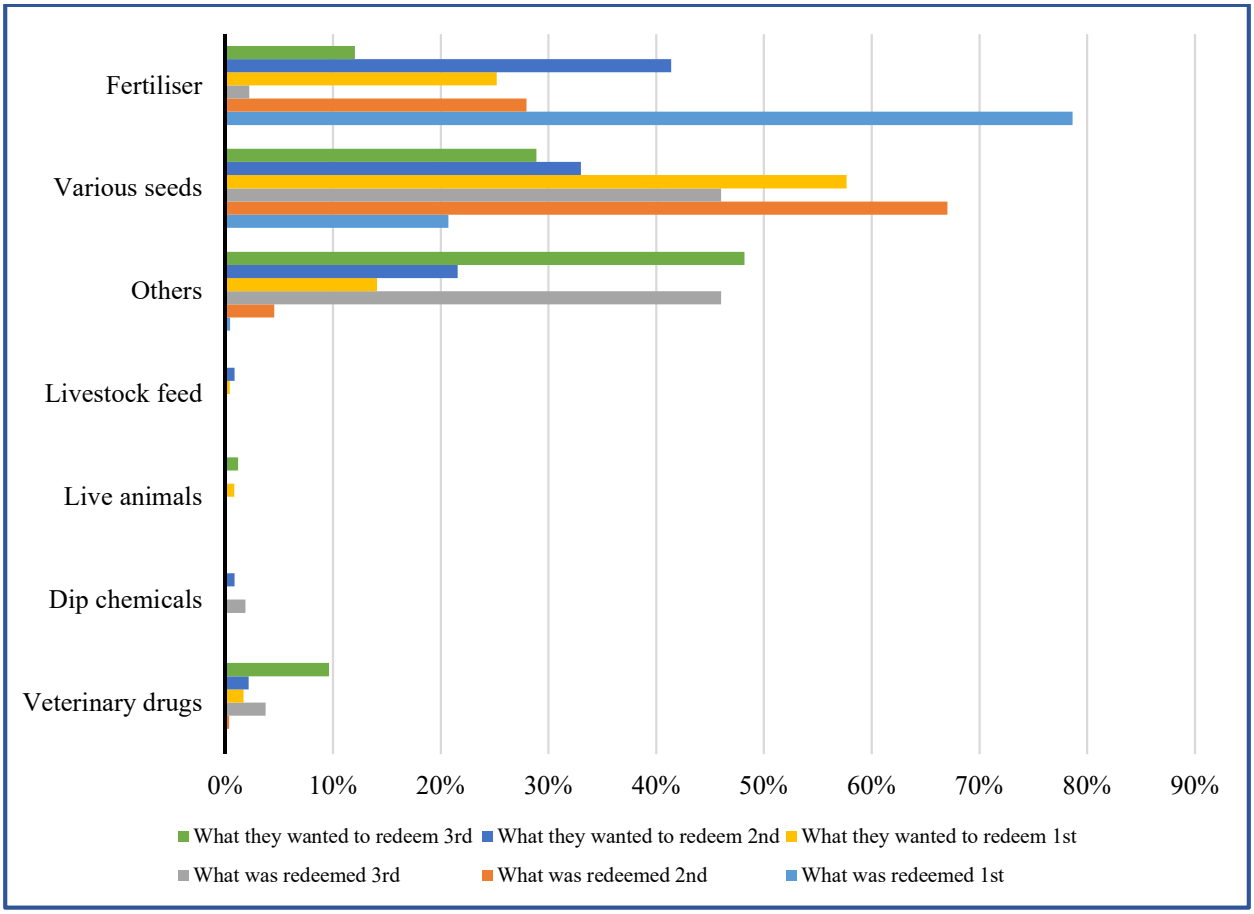
Sichilima, T., Mpundu, C., & Lubinga, F. (2019). *Nutrition Baseline Survey 2019*. 39.

Syakalima, M., Simuunza, M., & Zulu, V. C. (2018). Ethnoveterinary treatments for common cattle diseases in four districts of the Southern Province, Zambia. *Veterinary World*, *11*(2), 141–145. https://doi.org/10.14202/vetworld.2018.141-145

USAID. (2009). *Annual report*. PROFIT. https://pdf.usaid.gov/pdf_docs/Pdaco084.pdf

## Appendix A

*Figure 2. 12: Households that accessed and intended to access vet products via FISP*




**Source:** RALS 2019 and Authors computations

## Chi-square and Pairwise Test Results

In testing the significance of the relationship between vaccinating or not, and deworming or not, the study used a chi-square test and found a p-value of 0.00 which means the relationship was significant at 5%. Cramer's V value gives the relative strength of association, and in this study a value of 0.5536 was found meaning that the two categorical variables tabulated were moderately associated. The relationship proved significant yet does not show between which responses the significance lies. To find that out, a two sample test of proportion between the two groups i.e. 1. Yes, we dewormed, 2. No, we did not deworm, within the two groups of those that vaccinated and those that did not vaccinate, showed that there was a significant difference among the farmers that vaccinated between those that dewormed and those that did not. That basically means there were significantly more farmers that that dewormed among the farmers that vaccinated. Also, there was a significant difference between the farmers that dewormed and those that did not, among the farmers that did not vaccinate. This means there

was a significantly higher proportion of farmers that did not deworm at all compares to those that dewormed among the farmers that did not vaccinate. Refer to Table 2.2.

**Chi2 test results:**

p-value = 0.00

Cramer's V = 0.5536

**Pairwise Correlation Results:**

pwcorr score = 0.5536