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# Understanding the Characteristics of Community Animal Health Workers

A Case Study in Sierra Leone

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## ABSTRACT

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As seen in Sierra Leone in 2014, infectious disease outbreaks such as the Ebola epidemic cause health and economic disruption. National public health capabilities are vital to provide resilient healthcare systems that tackle disease outbreaks. As most communities in Sierra Leone are dependent on livestock rearing, the risk of contracting zoonotic diseases is high. The protection of livestock is therefore crucial to safeguard livelihoods. Due to this urgency of tackling animal health, initiatives to provide livestock healthcare services such as the introduction of Community Animal Health Workers (CAHWs) have been launched in Sierra Leone. A descriptive analysis of existing animal healthcare systems among communities that do not have a CAHW was carried out to understand the potential impact of the CAHW programme. The primary findings indicated that no sound animal healthcare system in these communities is in place, suggesting that there is a gap to fill in terms of veterinary services. However, it is important that the recruited CAHWs are motivated as this better ensures the provision of sustainable and effective services. To this end, I use qualitative and quantitative research to identify the basic characteristics and features of motivation among CAHWs and how this differs by recruitment. The recruitment strategy is divided into CAHWs who have been elected by; the community (through participatory processes) or by the paramount chief. The features of CAHW motivation is measured by analysing community ties, personality traits and effort. Results from qualitative interviews showed that CAHWs are intrinsically motivated - and their personality traits are also suggestive of this. There are no differences in basic characteristics (age, education etc.), effort and personality traits across the two recruitment strategies, however there was a difference in community ties. Paramount chief candidates show closer ties to their communities. Further analysis of the link between these characteristics and motivation (as assessed by motivation tests) will better establish what this study has inferred.

*Keywords:* Community Animal Health Workers, Sierra Leone, motivation, community ties, personality traits, effort, Public Service Motivation, Big Five Inventory, recruitment strategy

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# 1. INTRODUCTION

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Zoonotic diseases are diseases that can be passed on from animals to humans and vice versa. These are a large health hazard. Around 60% of all human diseases and 75% of all emerging infectious diseases originate from animals. These staggering figures indicate the importance of tackling such issues (Aylward, 2012; Xuequan, 2016; Gill, 2017). Small animals such as a bat can carry up to 137 different virus species that can be transmitted to humans. Due to such health hazards, many efforts have been directed towards preventing the spread of zoonotic diseases (Gill, 2017). Among these efforts, NGO and scientific work has been conducted, including the Nairobi-based International Livestock Research Institute (ILRI). The ILRI mapped the top 20 geographical hotspots of emerging zoonotic diseases and disease outbreaks. The report indicated that such diseases burden the world's poor livestock holders. Therefore, the burden of human illness and the profitability of livestock of the poor small-scale livestock farmers in the developing world needs to be addressed (Aylward, 2012).

An example of a zoonotic disease that demonstrates the importance of strengthening disease surveillance systems and the collaborative efforts necessary to detect and respond to such outbreaks, is the recent Ebola Virus epidemic in West Africa. Guinea and Sierra Leone were among the countries that were most affected by the 2014-2015 Ebola outbreak. With the highest global infant and maternal mortality rates, the health status of the people of Sierra Leone remains among the worst. This high burden of disease is attributed to; poverty, illiteracy, limited access to safe drinking water, poor hygiene, overcrowded housing and limited access to quality healthcare services. The impact of this epidemic indicated that millions of people will benefit from stronger, resilient healthcare systems with more effective disease surveillance (The World Bank, 2016).

Focusing on livestock is essential to tackle the issue of poor human health in Sierra Leone. As the human population continues to grow, livestock production increases to keep up with this increased demand. Livestock are a basic asset (economically and socially) for a significant share of the population in the developing world, and livestock production is the main economic activity for many households (Riviere-Cinamond & Eregae, 2003). In turn, vulnerability to zoonotic diseases is exacerbated. Infectious-disease outbreaks that turn into epidemics and pandemics cause loss of life and economic disruption (Sands, Mundaca-Shah, & Dzau, 2016). Therefore, protecting livestock is key for safeguarding livelihoods during emergencies such as animal illnesses (Riviere-Cinamond & Eregae, 2003; Leyland, Lotira, Abebe, Bekele, & Catley, 2014).

Due to the urgency of tackling animal health, initiatives to refocus the delivery of livestock healthcare services are being taken. One such initiative has been the introduction of Community Animal Health Workers (CAHWs). This involves training selected representatives in basic animal healthcare with the objective of supplementing the existing professional system responsible for delivering such services (Mugunieri, Omiti, & Irungu, 2004b). CAHWs engage in the prevention and treatment of animal diseases (Mugunieri, Irungu, & Omiti, 2004a; Regassa, Tessema, Buono, & Heine, 2015). Poor livestock health can both impair productivity and contribute to an increase in poverty, which signifies the importance of

CAHWs' work (Peeling & Holden, 2004). CAHWs in Sierra Leone are provided with basic animal healthcare training to identify early warning signs, so that the spread of zoonotic diseases such as anthrax, brucellosis etc. can be minimised.

Furthermore, in many developing countries, including Sierra Leone, there are large gaps in skills, systems and infrastructure. A rigorous assessment of public healthcare capabilities and reforms is therefore crucial to combat illnesses (Sands, Mundaca-Shah, & Dzau, 2016). Aside from the lack of staff, low health worker motivation negatively impacts worker performance and may even result in emigration (Mathauer & Imhoff, 2006). Enhanced health worker motivation leads to improved performance, thereby improving human health (Franco, Bennett, & Kanfer, 2002; Luoma, 2006).

Following worker motivation, the most basic aspect in personnel policy is the selection of public employees. One of the fundamental question is regarding the type of individual that should be selected. Therefore, effective recruitment strategies are crucial, to hire the most effective, motivated staff. Some of the key criteria for client acceptance and long-term sustainability are; genuine grassroots participation in the selection processes, candidate's origin and consequently strong community support for their work, individual reputation as a local livestock healer and so on (Peeling & Holden, 2004). Thus, it is very important to investigate the characteristics of these CAHWs and how they differ based on the recruitment strategy. The recruitment strategy of the CAHW programme in Sierra Leone consists of two parts. The community and the paramount chief (an African chief whose authority extends over the entire chiefdom) made a list of CAHW elects (around three candidates each) per community. After which, one of these candidates were randomly selected per community. Therefore, CAHWs elected by the community or the paramount chief, represents the recruitment strategy.

The goal of this thesis is to explore the features of existing institutions (if any) for animal healthcare in communities that do not have a CAHW, and the characteristics of the recruited CAHWs. Information regarding the features of motivation (community ties, personality traits and effort) among CAHWs is studied, and comparisons across the recruitment strategies is made. To provide such insight the following research questions will be addressed:

- 1) In communities that do not have CAHWs, what institutions for animal healthcare are currently in place, if any?
- 2) What are the features of the recruited CAHWs?
  - a. What are the features of public service motivation, effort and community ties of the recruited CAHWs?
  - b. What are the basic characteristics of the recruited CAHWs?
  - c. How does the recruitment strategy affect the characteristics of the recruited CAHWs?

The first research question is of a descriptive nature and provides the basis for research question 2. The current animal healthcare situation is analysed using qualitative data retrieved from communities that do not have a CAHW. A substantial portion of the existing literature focuses on CAHWs and therefore, the management of animal healthcare prior to the introduction of CAHWs is studied. This is achieved by

providing qualitative insight into whether the introduction of CAHWs just formalizes existing roles, sidelines existing animal health practitioners or provides communities with an animal healthcare system that was previously not in place. Research question 2 analyses the characteristics of the recruited CAHWs. Question 2a analyses their public service motivation, effort and community ties, using qualitative interviews. The next question 2b, quantitatively measures their average characteristics; age, gender, education etc. Finally, question 2c investigates how these characteristics, including community ties, personality traits and effort, differ based on the recruitment strategy. This is measured using a quantitative approach with regression analyses.

From a policy perspective, this subject area is relevant as the health status in Sierra Leone is among the worst in the world. Investigating the recruitment of CAHWs will enhance our understanding of the effectiveness of these workers and their potential contribution towards tackling zoonotic diseases. Moreover, this research provides information regarding the most suitable recruitment strategy to select individuals with favourable characteristics. In terms of scientific contribution, multiple studies have been undertaken in the field of human health, however, this type of research is rarely conducted in the animal health field. Information on the selection criteria is largely anecdotal. Recruitment strategies may result in selecting CAHWs whose qualities do not always suit communities. Therefore, considering the qualities and appropriate selection mechanisms of CAHWs are of primary importance for the development of sustainable animal healthcare systems (Riviere-Cinnamond & Eregae, 2003). The question of strengthening health worker motivation in developing countries has received little attention (Mathauer & Imhoff, 2006). A focus on the features of motivation among CAHWs will provide scientific contribution in this field.

## **2. CONTEXT**

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### **2.1 EXISTING CAHW PROGRAMMES**

CAHW programmes have been studied in various African countries. Mugunieri et al. (2004a) mentioned that reforms in the livestock sector are meant to increase efficiency of animal health service delivery but did not fare that well in marginal areas. Therefore, community-based animal health worker programmes were introduced to bridge this gap. CAHWs became more accessible to livestock keepers than formal veterinary service providers. As a result, livestock keepers had access to treatment, without having to travel long distances. This indicates the importance and popularity of CAHW programmes in Africa. Additionally, multiple authors investigated the benefits of CAHWs. Jones, Deemer, Leyland, Mogga and Stem (1998) found that community-based animal health services (CAHS) are a viable, cost-effective method to deliver essential animal healthcare services. Interventions that strengthen the contributions of livestock to livelihoods are expected to have a positive influence on poverty. Those with access to the CAHWs scored their quality of life higher, on average, than those without access (Peeling & Holden, 2004). Furthermore, CAHWs have had positive impacts on the eradication of rinderpest in Ethiopia and South Sudan, and the reduction in mortality rates in Kenya. (Leyland, Lotira, Abebe, Bekele, & Catley, 2014).

Nonetheless, previous research highlights some challenges of these CAHW programmes. Some producers lacked the means to pay for veterinary drugs (influencing the treatment given) and therefore, under dosing was common (Leyland, Lotira, Abebe, Bekele, & Catley, 2014). Therefore, it is important that the CAHWs are encouraged to offer their services. Those currently offering such services should be recognised and registered, to tackle this issue (Mugunieri, Irungu, & Omiti, 2004a). Clearly there is potential for CAHWs to improve disease reporting in some African countries (Allport et al., 2005). Limited research has been conducted regarding CAHWs in Sierra Leone, and therefore, this thesis aims to bridge this gap.

### **2.2 ANIMAL HEALTH IN SIERRA LEONE**

Animal health in Sierra Leone is very poor. This is because the 11 year long civil war left the public and animal health services destroyed. For a population of around 6 million, there are only 70 qualified physicians, out of which, only 5 are qualified veterinarians. The lack of veterinary services in Sierra Leone has had a significant impact on the control and prevention of zoonotic diseases, which is destructive to both animals and human health and wellbeing (FAO, 2012). The animal health sector in Sierra Leone needs support to combat animal health emergencies and to improve animal health. Thus, improvements in surveillance for early detection of both human and animal diseases is vital. Shortages of staff, weak infrastructure, absence of disease control measures and low funding are some of the many struggles faced. It is crucial to address such challenges to ensure that Sierra Leone reduces its vulnerability to disease outbreaks in animals. Therefore, animal healthcare service delivery must be explored and improved upon (Campbell, 2017).

An example of poor healthcare services in Sierra Leone, can be seen by looking at the prevalence of rabies, among many other animal health diseases (such as Ebola). There has been no national rabies control programme since before the civil war in Sierra Leone. The tragedy of rabies and its impact upon lives and livelihoods is mainly due to the lack of knowledge on prevention and treatment measures. Therefore, there is considerable room for improvement in reporting and reducing risk. This can be tackled through the provision of information to those at elevated risk. Similar measures are crucial to prevent the spread of other animal diseases in Sierra Leone as well. With the limited veterinary infrastructure, disease reporting, equipment and so on, rural communities are increasingly vulnerable to diseases. Particularly, children are at risk, contributing to Sierra Leone's striking infant mortality rate (the highest in the world) (FAO, 2012).

### **2.3 ONE HEALTH PROGRAMME (OHP)**

This thesis is a part of the One Health Programme (OHP) that the Global Health Security Agenda is providing support for in Sierra Leone. This programme is aimed at promoting multi-sector application of knowledge and skills to tackle animal, human and environmental health challenges. The purpose of the OHP is to address zoonotic disease and emerging pandemics by containing and detecting threatening diseases that affect the economy and livelihoods of communities (Massaquoi, 2017). Policy makers in Sierra Leone are working to improve healthcare provision and integrate the global OHP into national policy. A core component is to design and implement a One Health Disease Surveillance System, which is a cost-effective policy strategy for preventing and controlling community diseases. This project is a collaborative effort between the Ministry of Agriculture, Forestry, and Food Security (MAFFS), the Ministry of Health and Sanitation (MoHS), Njala University (Sierra Leone), and an international research team coordinated by Wageningen University (Netherlands). Eligible communities have been identified by MAFFS and communities where the OHP is to be implemented were randomly selected. The impact of the programme on the quality of disease surveillance reporting, community health knowledge, health seeking behaviours and human and animal health levels are investigated.

325 communities have been subjected to this OHP. For each of these communities, a community meeting is called where the job opening as a CAHW is presented to the community. A candidate is selected through group discussion with the community together with MAFFs, representing the community selection. In addition, each of these communities also provide a list of candidates that are not selected through a participatory selection. In this strategy, local politicians ask paramount chiefs to provide a list of candidates from each community. This approach represents a "business as usual" model where selection is coordinated through the chiefs. The communities and the paramount chiefs were informed about the selection criteria. After a list of paramount chief and community candidates has been made, these candidates took a selection test (quantitative, English reading & writing, and animal rearing skills). Each candidate is informed whose nomination (either community or chiefly institution) led to his/her selection.

CAHW nominees successfully passing the test and selected in a random procedure are then invited to a 21-day training. In the two days after the training the One Health Platform will be established where it is emphasised how Community Health Workers (CHWs), CAHWs and herbalists are supposed to work together. CAHWs will use the knowledge and expertise acquired during the training to provide basic

veterinary services to community members and report on the symptoms associated to a set of priority diseases defined by the Sierra Leone government. Their weekly reports need to be submitted to their supervisors and they need to keep a journal in which they record their activities. They will be working together with the other Health Workers in the community (CHWs and herbalists) performing similar tasks for human health. This informational report is aimed at informing government action and defining future policy goals.

These CAHWs are entrepreneurs providing public animal healthcare services to their community members. They determine their own work hours and charges for their services. After they were trained as a CAHW, they received an initial package of veterinary drugs (for free) to jump start their career. After which, it is their duty to provide services to their community in exchange for cash or kind. It is also their responsibility to replenish their veterinary drugs to ensure the sustainability of their profession. This thesis is a part of the OHP and uses the data gathered here in addition to independent qualitative interviews.

## 3. LITERATURE REVIEW AND HYPOTHESES

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### 3.1 MOTIVATION

Motivation is defined as “the willingness to exert and maintain effort towards organisational goals” (Franco, Bennett, & Kanfer, 2002; Mathauer & Imhoff, 2006). The welfare of citizens depends on the performance of state service providers, which is affected by motivation. A motivated and qualified workforce is vital to improve the productivity and quality of health services. The main challenge is to create motivation, and little is known about the motivational factors important for health workers in resource-poor-settings (Dieleman, Toonen, Touré, & Martineau, 2006). Motivation is extremely multi-faceted and often perceived differently. As a result, motivation is challenging to directly measure. Therefore, features that may affect motivation (community ties, personality traits and effort) and can be reasonably measured in this context, have been identified and analysed.

Financial incentives are important sources of motivation and have received much attention. In many African countries, low salaries of health workers are a major contributory factor for poor service quality (such as attitudes towards patients, informal fee charges etc.) and an increase in migration. Despite the importance of financial incentives, empirical evidence increasingly shows that financial incentives alone do not yield the needed performance of workers (Alhassan, et al., 2013). Non-financial rewards ensure the staff feels valued and recognised, while salaries and allowances are the main discouraging factor. This is because, if salaries are unsatisfactory, health workers are likely to be more concerned with covering their basic needs rather than working hard for their public service post. This is in align with Herzberg’s theory that salaries and working conditions alone are insufficient to retain staff and contribute to better performance (Dieleman, Cuong, & Martineau, Identifying factors for job motivation of rural health workers in North Viet Nam, 2003; Willis-Shattuck, et al., 2008; Ashraf, Bandiera, & Jack, 2014). Higher degrees of prosocial motivation are found when job ads stressed career incentives. Therefore, those motivated by the impact of their work on community welfare perform better (Deserranno, 2014; Dal Bo & Finan, 2016). This clearly highlights the importance of financial and non-financial incentives as sources of motivation.

Street-level bureaucrats are public field-workers who interact directly with citizens in implementing and delivering public services (Winter, 2002). Such workers are often held accountable by their peers. This is due to high interaction with clients. Judgement by peers and accountability are very important aspects of their performance. Especially, in scenarios where workers are acknowledged as having autonomy (such as CAHWs), their performance will be judged (Hupe & Hill, 2007). Ashraf, Bandiera and Lee (2014), find that recruiting agents with career incentives have the potential to improve service delivery, as more talented agents are hired. Higher wages and career incentives tend to attract candidates with better outside options (other job opportunities) and higher skills. Motivation is extremely important for such individuals, as this affects public welfare.

Ideally, bureaucratic jobs should be distributed in a way that maximizes social welfare. However, the allocation of resources may be affected by nepotistic considerations. As a result, the recruitment process may fail to target key drivers of bureaucratic performance. Therefore, different recruitment procedures may result in recruiting workers with differing characteristics. Therefore, motivation (using the three features of

motivation stated previously), including basic characteristics (such as age, gender etc.) will be compared across the recruitment strategies (elaborated in section 4). This will provide insight on whether top-down (initiated by authority – paramount chiefs) or bottom-up (initiated by the community for the community) recruitment strategies result in the election of individuals possessing characteristics suggestive of higher motivation. Essentially, this helps answer the question on whether community members or paramount chiefs have a better idea on the best fit for the position as a CAHW.

## **3.2 HYPOTHESES**

Research question 1, 2a and 2b are of a descriptive nature, and as they are purely exploratory there are no suitable hypotheses for these questions. Research question 1 is on animal healthcare institutions (if any) in communities without a CAHW. This question provides background information on existing animal healthcare services in Sierra Leone. Based on the history in Sierra Leone of zoonotic disease outbreaks (Ebola, Rabies etc), it is likely that the animal healthcare institutions in place are insufficient/of poor quality. This will be explored in research question 1. Research question 2a is regarding the characteristics of the recruited CAHWs and is addressed by qualitatively analysing public service motivation. Next, research question 2b quantitatively provides descriptive statistics on the average characteristics of CAHWs. These characteristics include age, gender, level of education, formal training and experience with animals. This question provides insight on the type of individual selected by this programme. All three questions are answered by means of qualitative interviews.

Research question 2c on the other hand, is regarding recruitment strategy and whether this results in the selection of individuals with different characteristics. As explored shortly already, there is literature on recruitment strategy and its effects on performance – therefore several hypotheses have been formulated for this question. These hypotheses are presented below, with an expanded literature review for each hypothesis. For question 2c, measuring individual differences is done by comparing differences in basic characteristics, community ties, personality traits and effort between CAHWs elected by the community and CAHWs elected by the paramount chief.

### **3.2.1 Basic Characteristics**

Corruption is responsible for economic distortion in many African countries, including post-war Sierra Leone. Issues such as tribalism and nepotism still affect politics in Sierra Leone, particularly due to the multi-ethnicity of the country (Kargbo, 2014). Therefore, the role of nepotism in recruitment strategies is analysed. Differences between paramount chief and community elects are expected, given the possibility of nepotistic considerations. It is hypothesised that the basic characteristic of CAHWs may differ as paramount chief candidates may elect individuals based on their personal relationships, rather than electing the most suitable candidate through collective debates and discussions (like in the case of community election). Therefore, the following hypothesis is tested: *H1: Basic characteristics of the CAHWs differ based on the recruitment strategy.*

### **3.2.2 Community Ties**

Mathauer and Imhoff's (2006) study in Benin and Kenya indicated that health workers highly value recognition from patients, superiors and colleagues, influencing motivation and staff performance. This is also stressed by Manongi and Marchant (2006). Good working relationships and relations with the community emerged to be a key determinant of motivation among workers. Comparable results are found in a study conducted by Dieleman, Cuong and Martineau (2003), and Manongi and Marchant (2006). Client satisfaction, surveys, community dialogue and interaction are used to convey appreciation and strengthen motivation. As non-financial incentives such as community recognition are important components of motivation, community ties are measured.

Among CAHWs, community interaction is high and relations with the community are crucial. CAHWs require information about community diseases and therefore, community members must be forthcoming and willing to share disease information. CAHWs also need to convince community members to seek treatment and educate them on the benefits of good health practices. To ensure the success of their work, this requires a level of trust, good relations and cooperation with their community. The bottom-up approach emphasizes community participation and local decision making, while top-downers are typically far removed from the target population's perspective, as they are less likely to focus on contacts with citizens themselves (DeLeon & DeLeon, 2002; Nikkhah & Redzuan, 2009).

Paramount chiefs may lack sufficient information to choose a candidate with the closest relationship with community members (as the paramount chief is responsible for all the communities in that chiefdom). Bottom-up approaches allow every member of the community to be involved in the nomination of candidates and voice their opinions about who is best for the job. Moreover, communities are sensitised to the job and aware of how dependent the success of the job is on the relationship between the health worker and community members. Therefore, it is hypothesised that service providers selected through participatory processes will have stronger community ties. This leads to hypothesis: *H2: Community elected CAHWs have higher community ties than paramount chief elects.*

### **3.2.3 Personality Traits**

Evidence supports that, personality traits play a key role in determining performance. As a result, services in developing countries can be strengthened through personality traits of workers (Callen, Gulzar, Hasanain, Khan, & Rezaee, 2015). The focus of much research has been on the relationship between personality and motivation. However, fewer studies focus on describing the link between personality and achievement motivation. Achievement motivation can be sub-divided into intrinsic and extrinsic achievement motivation. Extrinsic achievement motivation (EAM) relates to external rewards such as money or praise, whereas intrinsic achievement motivation (IAM) emphasizes working for the sake of working (Hart, Stasson, Mahoney, & Story, 2007). Hart et al. (2007) finds that individuals high in IAM are elevated in conscientiousness, openness, and extroversion (though extroversion had a weaker effect). Individuals possessing personality traits resembling high IAM are expected to perform better.

The personality traits of the CAHWs will be analysed and comparisons across paramount chief and community candidates are made. As stated previously, bottom-up approaches are more democratic and resembles community participation. In terms of electing individuals with favourable characteristics, it is expected that the wisdom of the community may be more superior (in comparison to a more authoritarian, top-down approach via paramount chiefs) as they select candidates through participatory processes, consulting other community members (from the same community as the CAHW). Therefore, the most effective, motivated staff is expected to be hired by those chosen by participatory selection processes (Peeling & Holden, 2004). Community elects may possess characteristics resembling high intrinsic motivation (higher conscientiousness, extroversion and openness, and lower neuroticism) (Hart, Stasson, Mahoney, & Story, 2007). Therefore, the following hypothesis is tested: *H3: Community elected CAHWs possess personality traits resembling higher intrinsic motivation than paramount chief elects.* This will provide some basic information regarding the type of individual elected (their personality traits) and with future research, motivation can be confirmed.

### **3.2.4 Effort**

Beckers et al. (2004) study on full-time Dutch workers indicated that overtime workers appeared to be more motivated, non-fatigued and with favourable work characteristics (such as high job variety and high job demand). Such workers report significantly more work motivation, in comparison to low-overtime workers. Moreover, Branislav (2014) found that in Slovakia, the length of working hours is significantly and positively affected by income and working independently. So, workers are motivated to work longer hours when they are promised higher wages – such as those who work independently. For this thesis, the work hours of CAHWs are studied. These workers are entrepreneurs and determine their own work hours. Based on the arguments presented by Branislav (2014), CAHWs are expected to work long hours. There seems to be a relation with flexible work hours and higher job satisfaction and commitment (Scandura & Lankau, 1997). Work hours among CAHWs resembles financial and non-financial incentives affecting motivation. Longer hours result in higher wages, highlighting the financial incentive attached to effort. Additionally, longer hours resemble high commitment and dedication to serve their community due to accountability (non-financial incentive), indicating intrinsic motivation.

Differences in work effort (hours worked with animals) among CAHWs is expected. As the knowledge of the community is expected to be superior to that of the paramount chiefs (in terms of electing suitable candidates), community members are expected to elect individuals that are known to be hard working – with solid experience working with animals, given their prior interaction with these individuals. Additionally, internal incentives such as the degree of autonomy and accountability is necessary to ensure best performance (Hicks & Adams, 2003). It is expected that those selected by their community feel a greater sense of accountability and responsibility (as their own community elected them) and as a result, spend more hours working as a CAHW (to ensure better performance). Hours spent working with animals is used to measure the time they allocate to their job as a CAHW. This reflects their general motivation and experience with animals. Therefore, hypothesis four is tested. *H4: Community elected CAHWs spend more time working with animals than paramount chief elects.*

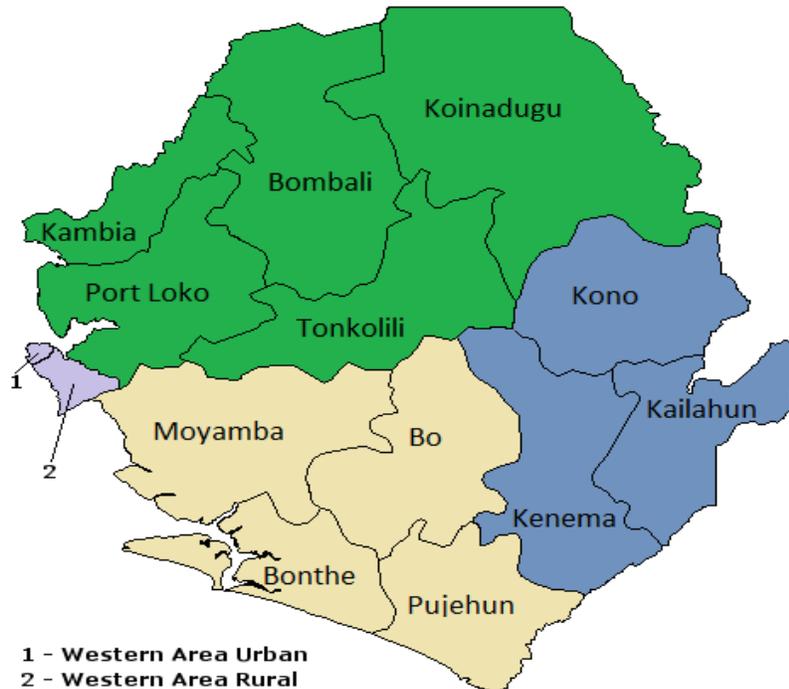
## 4. METHODOLOGICAL DESIGN

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Qualitative and quantitative methods are used in this thesis to provide both numerical (quantitative) and descriptive (qualitative) insights. One of the main advantages of including both these methods is that it strengthens the validity of the data and creates a better understanding of the context (Bamberger, 2000).

### 4.1 STUDY SITE

The study site is in Kono District, the Eastern Province of Sierra Leone (see figure 1). Its capital city is Koidu. The Kono District borders the Republic of Guinea to the East and is divided into 14 chiefdoms. The targeted regions of this research are in 7 of the 14 chiefdoms. These 7 chiefdoms are: Fiamma, Gbense, Lei, Toli, Soa, Gbane Kandor and Mafindor. These chiefdoms are chosen due to their dependence on livestock rearing.



*Figure 1: Districts of Sierra Leone.*

*Retrieved from:*

*[https://commons.wikimedia.org/wiki/File:Sierra\\_Leone\\_Colored\\_Provinces\\_with\\_Districts.png](https://commons.wikimedia.org/wiki/File:Sierra_Leone_Colored_Provinces_with_Districts.png)*

## **4.2 QUANTITATIVE DESIGN**

### **4.2.1 Sample Selection**

This study considers 375 communities in Kono District, Sierra Leone that have been randomly selected from within the 7 chiefdoms. 325 communities where the OHP is implemented were then randomly selected. Communities where the OHP is not implemented, represents the “pure” control group. These (50) communities do not have a CAHW.

The intervention looks at the potential of different recruitment strategies to motivate worker performance. Out of the 325 One Health communities, 289 communities passed the selection test. Out of these communities, 80 communities only had an eligible community candidate and 17 communities only had an eligible paramount chief candidate. 97 communities elected an individual that was both a paramount chief and community candidate (duplicate candidates). If communities select different candidates than the selection procedure through paramount chiefs, and both candidates pass the selection test, a lottery is organised to determine who is invited for the 21-day CAHW training. Through this lottery a paramount chief or community candidate is randomly assigned to these communities. This is a sample of 103 communities, which has been used for the quantitative analysis.

The control group represents status quo selection procedure where CAHWs are selected by the paramount chiefs and the treatment group represents the selection procedure where CAHWs are selected by the community through a participatory process. There are 51 communities with paramount chief candidates and 52 communities with community candidates (one CAHW per community). As this sample was subject to the lottery and was randomly selected into each treatment arm, causal differences between paramount chief and community candidates can be inferred. Blocked random assignment to the treatment was used to select communities in each condition/treatment arm. Communities have been blocked based on the chiefdom that these communities belong to. Block randomisation increases the probability that each treatment arm contains an equal number of communities (Bruhn & McKenzie, 2009; Efird, 2010).

### **4.2.2 Data**

Each CAHW candidate was invited to participate in the CAHW survey. Open Data Kit (ODK) software was used to collect data from the CAHW surveys. The CAHW surveys were conducted by trained enumerators. Using the CAHW survey, research question 2b and 2c were analysed. Question 2b identifies the average characteristics of the total sample of CAHWs. The results of research question 2c investigates the differences between paramount chief and community CAHW candidates by analysing basic characteristics including some features of motivation (community ties, personality traits and effort). The following section provides a description on the measurement strategy of these features of motivation.

### **4.2.3 Measurement Strategy**

#### **Community Ties**

Community ties among CAHWs is measured using multiple survey responses. Good working relationships, community dialogue and interaction are crucial for community ties and motivation. As mentioned previously, to ensure the success of CAHWs work, trust and community relations are crucial. Therefore, the interaction that CAHWs have with their community - in terms of physical presence (number of years lived in the community, plans to live in the community in the next five years, number of family members in the community, nights spent in the community) and trust (borrowing and lending money) is measured (see table 1). These variables broadly cover aspects measuring community ties and have been used to create the composite variable community ties.

#### **Big Five Inventory (BFI)**

The big five personality trait taxonomy has been developed by analysing thousands of trait adjectives used by individuals to describe themselves, and others. This has been used to measure CAHW personality traits. The five personality traits are: Extroversion, conscientiousness, agreeableness, neuroticism, and openness. Extroversion is described by traits such as outgoing, sociable and adventurous. Agreeableness refers to the cooperative and collectivistic orientation towards others which is associated with traits such as kindness, cooperative and unselfishness. Conscientiousness is the degree to which an individual follows social norms and goal-oriented behaviour. Such an individual would express traits such as being responsible, deliberate and organised. Neuroticism indicates the emotional stability of an individual and traits associated with this personality include emotional, temperamental and anxious. Lastly, openness to experience measures the level of acceptance to new or unconventional thoughts and experiences. Imaginative, curiousness and foresightedness are traits associated with this personality type (Hart, Stasson, Mahoney, & Story, 2007).

The BFI measures personality traits using a five-point Likert scale (see appendix B). Respondents are asked to rate to which degree they see themselves as a person who engages in a variety of affective, behavioural and cognitive responses. Based on these results, personality traits are measured (Hart, Stasson, Mahoney, & Story, 2007; Callen, Gulzar, Hasanain, Khan, & Rezaee, 2015). The questions offer the CAHW respondents with responses such as “is reserved”, “does a thorough job” etc. attached to the statement “I see myself as someone who”. The respondent agrees or disagrees with this statement based on a five-point Likert scale – disagree strongly, disagree a little, neither agree nor disagree, agree a little, or agree strongly (see appendix B). Different personality traits were attached to these responses and the values attached to each response provided insight as to which personality type (extroversion, agreeableness, conscientiousness, neuroticism, openness) is most prominent. This distinguishes the motivation of the CAHW, as those with higher big five motivation scores (depending on which personality type) tend to work more and are motivated (Callen, Gulzar, Hasanain, Khan, & Rezaee, 2015). The work of Hart et al. (2007) indicates that collectively, the Big Five Inventory (BFI) better predicted IAM compared to EAM. This is because EAM is more affected by situational factors, whereas, IAM is relatively immune from many contextual factors. As a result, this thesis focuses on IAM.

The BFI scale is a universal test and retains significant levels of reliability and validity (Rammstedt & John, 2007). For a valid test of the Big Five personality traits, survey items need to be translated accurately and this requires similar cultural meaning in the target population. The BFI may not prevent culture-specific interpretations, resulting in the mis-interpretation of the results. For example, “is reserved” may be interpreted more as modesty than as silent (Gurven, Von Rueden, Massenkoff, Kaplan, & Lero Vie, 2013). The statements of the BFI test have been translated into the local language (Krio language) mainly spoken among these communities, limiting issues of misinterpretation. For example, “gets nervous easily” has been translated to “kin panic quick” and “is generally trusting” has been translated to “quick for believ people” and so on. Such translations have made it easier for locals to understand what is being asked, but it also means that the official test cannot be mirrored, since languages and cultures do not have identical representations for certain traits.

### **Effort**

Another feature of motivation that is measured in this thesis is effort. As stated in the literature review, those working independently tend to work longer hours. Additionally, those working over-time seem to be more motivated. Therefore, hours spent working with animals in a week is studied. This is labelled as effort. Respondents are asked to state how many hours they spend on several activities (such as wage labour, leisure, working with animals etc) in two-hour slots for all seven days of the week. After which, the average number of hours spent on each of these activities is computed for each respondent. This is a very rough estimate of hours spent and little can be done to improve upon this measure, as pre-existing data was used. However, it is useful to make general comparisons across various activities.

An overview of all the variables mentioned above is presented in table 1 and has been gathered from the CAHW surveys.

Table 1: Measurement strategy and data

Outcome variables	Data source <sup>1</sup>	Measurement strategy
Y <sub>1</sub> : Basic characteristics	1. S1Q4	Each characteristic is assigned per respondent.
1. Age (years)	2. S1Q3	
2. Gender (female/male)	3. S1Q12	
3. Level of education (years)	4. S2Q6	
4. Formal training (yes/no)	5. S2Q1	
5. Households owning animals (yes/no)	6. S2Q4	
6. Not owning animals but does have experience with animals (yes/no)		
Y <sub>2</sub> : Community ties	Living in the community: - S1Q13a - S1Q13b - S1Q14 Family in the community: - S5Q1 Lend money to you: - S5Q2 Borrow money from you: - S5Q12 - S5Q13	Community ties = $(Y_{2a} + Y_{2b})/2$  Y <sub>2a</sub> : Number of family members living in the community, years lived in the community, nights slept in the community (integer) (S1Q13a, S1Q13b, S5Q1, S5Q13): $\Sigma Y_{2a}/n$  Y <sub>2b</sub> : Number of questions answered with 'yes' (S1Q14, S5Q2, S5Q12): $\Sigma Y_{2b}/n$  The variables included in Y <sub>2a</sub> and Y <sub>2b</sub> are standardised <sup>2</sup> .
Y <sub>3</sub> : Personality traits	I see myself as someone: - S6Q1 - S6Q10	Y <sub>3</sub> : Re-scaled from 0-1  $\Sigma Y_3$ (For each personality type)
Y <sub>4</sub> : Effort	Hours spent on work with animals (response #3): - S3Q15 - S3Q20	Y <sub>4</sub> : Number of hours spent on work with animals (integer): $\Sigma Y_4$

## Regression Analysis

Research question 2b regarding CAHW characteristics, computes the averages of the variables mentioned in table 1 (Y<sub>1</sub>) for the total sample. Research question 2c includes the treatment (recruitment strategy) and

<sup>1</sup> All this data has been gathered from the CAHW survey

<sup>2</sup> Standardisation is the process where similar data received in differing formats is transformed into a common format, in order to make comparisons. This creates a z-score, which is the number of standard deviations from the mean of a data point. Standardisation =  $[\text{mean } (\mu) - \text{value you want to convert } (X)] / \text{standard deviation } (\sigma)$

therefore, requires the use of regression analyses. The regression below indicates how basic characteristics, community ties, personality traits and effort were analysed and compared across the recruitment strategy.

$$(i) \quad Y_i = \beta_0 + \beta_1 T_i + \beta_2 X_i + \varepsilon_i$$

The dependent variable ( $Y_i$ ) represents the outcome variables for observation  $i$ . These outcome variables are: Age, gender, level of education, formal training, experience with animals, community ties, personality traits and effort. The independent variable ( $T_i$ ) is a binary variable that takes on the value 1 and 0 (represents the treatment), which indicates a CAHW being selected by the community (1) or by the paramount chief (0). The variable  $X_i$  represents the blocking variable. This variable is included because blocked randomisation is used in this thesis (blocked by 7 chiefdoms).  $\varepsilon$  is the error term, with mean zero, and is standard normally distributed. The regressions are computed using an Ordinary Least Squares (OLS) regression technique and as the sample is randomly selected, no control variables are included. Individual regressions for each outcome variable of interest is run. Using this regression (i), the coefficient of the independent variable ( $\beta_1$ ) represents the average treatment effect (ATE). The direction and size of this coefficient is examined. Results are computed per individual CAHW - represented as  $i$ .

## 4.3 QUALITATIVE DESIGN

### 4.3.1 Sample Selection

10 “pure” control communities<sup>3</sup> in Fiamra and Gbense chiefdom (randomly selected from a pool of 17 communities from both these chiefdoms) and 10 communities included in the OHP (those with a CAHW) in Gbense chiefdom (randomly selected from a pool of 32 communities from this chiefdom), were chosen for the qualitative interviews. The CAHW was interviewed in each of the communities included in the OHP, and an animal rearer was interviewed in each of the 10 “pure” control communities. The selected CAHWs in this sample were all community elects. Despite the communities being randomly selected from within these chiefdoms, the chiefdoms themselves were chosen based on ease of access, due to time and financial constraints. Due to logistical issues, only 8 communities<sup>4</sup> with a CAHW were interviewed. Therefore, 18 interviews were conducted in total. These interviews were conducted around 3 months after the CAHWs were trained. Given the small size of this sample, it is challenging to make generalisations across other chiefdoms.

This sample is used for the qualitative analysis to answer research question 1 and 2a. Table 2 presents the summary statistics of this sample. All animal rearers interviewed are male with an average age of 38 (ranging between 25 and 65 years old). In this sample the largest ethnic group is Kono (80%) followed by Kissi (10%) and Kuranko (10%). The CAHWs interviewed are all Kono, 62.5% male and with an average age of 28 (ranging between 24 and 45 years old).

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<sup>3</sup> Communities without a CAHW where the OHP was not implemented.

<sup>4</sup> Only 8 interviews were conducted as 2 CAHWs that were included in the original sample, were not found as they were not residing in the community.

Table 2: Summary statistics of qualitative interviews

Animal rearers (N=10)	Mean	SD	Minimum	Maximum
Gender (Male=1)	1	0	1	1
Age	38.4 years	18.0	25	65
Ethnicity	0.8 Kono, 0.1 Kissi, 0.1 Kuranko	-	-	-
CAHWs (N=8)	Mean	SD	Minimum	Maximum
Gender (Male=1)	0.63	0.32	0	1
Age	28.1 years	7.7	24	45
Ethnicity (Kono=1)	1	0	0	1

Less CAHWs than animal rearers because 2 were not found in their communities.

#### 4.3.2 Data

Animal rearers were interviewed to understand the practices these individuals undertake in the absence of a CAHW, to determine if animal healthcare services currently exist. CAHWs (community elects) were also interviewed to measure their public service motivation. These interviews (see appendix A) lasted for less than an hour and took place during a span of 5 days, and 2 interviews<sup>5</sup> were conducted per day.

#### 4.3.3 Measurement Strategy

18 semi-structured interviews<sup>6</sup> are used to gather focused, qualitative data to complement the quantitative results. The benefits of using semi-structured interviews are: questions can be prepared ahead of time (keeping the interviewer prepared and providing structure), it allows interviewees the freedom to express their views and can provide reliable, comparable qualitative data. The same topics are addressed in each interview and excerpts from the transcripts are used to strengthen and verify the hypotheses

The qualitative interviews were not conducted myself because of the following drawbacks: not being trained on conducting interviews, misinterpretation due to language barriers and being too close to the study - which may have resulted in inferring outcomes based on knowledge from literature and expectations. Therefore, two enumerators carried out the qualitative interviews.

The questions were structured and formulated based on previous literature and insights from the two trained local enumerators in Sierra Leone. The enumerators received scripts in English which they then translate to Kono or Krio during the interview. Responses and quotes were written down in English. These two enumerators<sup>7</sup> are trusted hard working individuals who have been previously trained on informed consent and the content of the OHP. They were recommended by the research assistants and had an incentive to do a respectable job - as it could result in future recommendations for enumerator positions (or higher). Furthermore, these individuals provided feedback after the pilot interviews on how the interview questions

<sup>5</sup> It took time to reach some communities due to bad roads (occasionally not motorable). Therefore, two communities were interviewed each day.

<sup>6</sup> Semi-structured interviews offer a balance between the flexibility of an open-ended interview and the focus of a structured ethnographic survey. Such interviews can uncover rich descriptive data on the individual experiences of participants and can move the innovation process from general topics (domains) to more specific insights (factors and variables).

<sup>7</sup> This does not refer to the same pool of enumerators that conducted the CAHW surveys.

could be improved. For these reasons, the quality and accuracy of the data is improved. Of course, the quality of the data could be further improved by hiring professionals that have been thoroughly trained on qualitative methods with a high level of education. However, given the current context, this is the most feasible option (due to resource constraints).

### **Perry Public Service Motivation (PSM)**

Public-service motivation is referred to as, “an individual’s predisposition to motives grounded primarily or uniquely in public institutions” (Perry, 1996; Houston, 2000). Public administrators are associated by an ethic to serve the public. These workers are motivated by a desire to serve the public interest and therefore, are assumed to be intrinsically motivated (Houston, 2000). The PSM scale can be valuable to gather empirical evidence on public administration and has been used to measure differences in motivations among businesses, governmental samples etc. (Perry, 1996). As a result, the PSM scale represents an emphasis on intrinsic motivation and provides a tool to measure motivation of CAHWs (public service providers). This tool is comprised of 40 questions that measures 6 traits - attraction to policymaking, commitment to policymaking, social justice, civic duty, compassion, and self-sacrifice (Callen, Gulzar, Hasanain, Khan, & Rezaee, 2015). The questions of the semi-structured CAHW interviews have been constructed to probe some of the statements that measure these 6 traits. These questions were coded and assigned to different subject areas (see appendix C) and were then compared across the different interview responses.

Furthermore, semi-structured interviews were also conducted in the communities that do not have a CAHW. Since these communities did not have a point person (within the community) providing animal healthcare services, an animal rearer in the community was interviewed. This individual was interviewed to understand community animal healthcare practices. The subject areas for the animal rearer interviews were created based on a personal understanding of suitable grouping of questions. Responses were grouped into these subject areas and summarised for each respondent.

## 5. RESULTS

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### 5.1 QUALITATIVE RESULTS

#### 5.1.1 Existing Institutions for Animal Healthcare

This section covers the analysis of research question 1: *“In communities that do not have CAHWs, what institutions for animal healthcare are currently in place, if any?”*

Respondents were first asked about their opinions on veterinary healthcare services within their community. The consensus among all respondents was that there is no such point person for veterinary services in the community. Of the 10 respondents, 5 mentioned that animal disease is frequent and serious in their communities, whereas some stated that their animals are in good health. Interviewee #6 specified that animal health is an issue as they lack the necessary skills for taking proper care of their sick animals. Interviewee #4 stressed the importance of animals to their community. When animal diseases occur, the nearest veterinary officer is contacted. However, 4 interviewees stated that these services are costly (exact figures are not mentioned). Interviewee #1 stated that the veterinary officers also complain that there are too few officers to take care of the animals in the district. Two respondents expressed their dissatisfaction with not being selected for the OHP. In addition, some communities benefit from CAHWs working in nearby communities and are very thankful for such services. However, it is also mentioned by 3 respondents that these neighbouring CAHWs lack the necessary drugs, and therefore, are not always helpful.

Respondents were then asked about animal disease treatment practices, to gather information on their current knowledge on the treatment of sick animals. 8 respondents expressed that they use local practices (locally made herbs) to treat their animals and the remaining 2 respondents stated that they either consult a neighbouring CAHW or wait for a vet. Vets are only contacted for severe cases. However, communities living further away from Koidu (capital in Kono district) incur larger costs<sup>8</sup>. Some vets are said to visit the communities, but interviewee #4 stated that this is infrequent. Overall, most interviewees mentioned that they use local practices (which have been successful) but confirm that despite western medication being the best approach, it is expensive and not of easy access. Interviewee #1 mentioned not having the knowledge to provide animal healthcare services and that the little knowledge he does have, is from experience (echoed by 5 other respondents). Despite most individuals being successful with treating their sick animals using local methods, all were not confident enough to render their services to community members in exchange for payment or compensation (as they aren't trained). Most individuals just provide advice and assistance to close relatives and friends free of charge. Furthermore, interviewee #7 stated that in their community they focus on agriculture and therefore, there is not such a high dependency on animals.

Lastly, responses regarding treatment practices were compiled. When unable to treat sick animals, respondents reported that they slaughter them. Interviewee #6, #8 and #9 mentioned that following the slaughter, the sick animals are sold for meat. This is risky according to interviewee #9, as negative outcomes may arise from the consumption of sick animals. According to interviewee #6 the community is aware that

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<sup>8</sup> As the veterinary officer needs to be compensated for transport costs.

eating sick animals is not the best solution but nevertheless, most individuals still do so. Interviewee #8 stated that most individuals eat the sick animal despite warnings from the town chief and mentioned that “our people don’t believe that it will affect them if they eat such animals or dead animals”.

These interviews describe in qualitative terms, which institutions are currently in place for animal healthcare. What the results show is that there is no point person for animal health services in these communities. Communities here (apart from one) are heavily dependent on animals. Most individuals use local practices to treat their animals and report lacking proper training in the field of animal health. In addition, vets are expensive and hard to access. This shows that there does not seem to be a sound animal healthcare system with easy access in place. This was stressed upon in the responses of some interviewees, who mentioned that sick animals are sold for meat when unsuccessfully treated. Such unsafe practices can be responsible for causing the spread of zoonotic diseases. CAHWs in neighbouring communities seem to be appreciated by these communities. The lack of necessary knowledge and skills to sustainably treat animals, highlights the potential value and benefits the CAHW programme.

Mugunieri et al. (2004a) mentioned that CAHWs are more accessible to livestock keepers than formal veterinary service providers, reducing the need to travel long distances (to reach formal veterinarians). This is highlighted in the qualitative findings. Research from Peeling and Holden (2004) in less developed countries show that communities who had access to neighbouring CAHWs are positively impacted, compared to those that did not have access to any animal health practitioners. Furthermore, Jones, Deemer, Leyland, Mogga and Stem (1998) showed that CAHW interventions are expected to have a positive influence on poverty in Sudan. Given these findings, it is possible that this CAHW programme will positively influence Sierra Leone. The results show that there is a gap to fill, in terms of veterinary services. Long term studies should be conducted to confirm if in fact, CAHW programmes are suitable to fill this gap, resulting in positive outcomes.

### **5.1.2 PSM, Effort and Community Ties Among CAHWs**

Research question 2a: “*What are the features of public service motivation, effort and community ties of the recruited CAHWs?*” is addressed in this section.

After training the CAHWs, the OHP promised to provide these individuals with an initial package of veterinary drugs to begin their career. However, there were logistical drawbacks during the process of delivering these drugs. Therefore, not all individuals received a complete package of drugs (or any drugs at all) at the time of the survey and qualitative interviews. The drugs were delivered after the surveys and interviews were conducted and therefore, responses regarding drugs refers to the initial package that these workers were promised.

The qualitative interviews began with questions regarding job commitment/desire to serve the public interest. This includes questions about their work days (effort) and whether they serve other communities. All interviewees are community elected candidates and only two respondents do not live in their communities (reside in Koidu). When asked how many days a week they work, all individuals stated that they work at least two days a week. Interviewee #5 mentioned working almost every day and interviewee #2 and #8 stated not having specific work days. Furthermore, only 2 respondents do not provide their services to other communities and interviewee #4 said that “being able to help other communities gives me

pleasure and great joy”. Interviewee #2 mentioned: “At the moment my services are limited to just this community. I would love to extend my services to other communities but almost all of the neighbouring villages have a CAHW”. Such a response can be interpreted as both positive and negative. This indicates the individuals drive to serve other communities, while signalling the limitations to expand their work.

Respondents were then asked their opinions on animal health and the treatment methods used. All CAHWs (apart from one) mentioned that animal health has improved. Interviewee #2 stated that: “Generally, the health condition of the animals in this community is somewhat encouraging. Outbreaks are not that frequent and the few that showcase once in a while are controllable, and that makes me feel happy.” Likewise, all respondents expressed their happiness when disease outbreaks are infrequent in the community. Interviewee #2 went on to say that frequent cases of diarrhoea do occur but expressed a lack of skills to address such situations. Alternatively, interviewee #8 mentioned that animal health is very poor in this community and stated that “this state of ill-health among the animals is very worrying, as there is every possible tie for humans to be affected too.” When asked about treatment methods individuals mentioned that Western and traditional methods are used, and that most cases are successfully treated.

Questions regarding their role as a CAHW were posed, and the concept of social justice and job satisfaction was discussed. All respondents indicated the importance of the role of a CAHW to improve animal health and create awareness among the community. When asked about their likes and dislikes of the job, statements such as: “I like the fact that I am helping to address the problems of animal health in my community. The role of a CAHW has made me recognised within the community”, “I generally love caring for animals...”, “The fact that I am saving my community in this capacity is of a huge morale for me” and “I hate seeing cases that I am unable to render any form of assistance to” were mentioned. The main grievances were regarding the lack of drugs and unrealistic expectations from the community to successfully treat all cases of sick animals. Some respondents did not report any grievances regarding their work.

CAHWs mentioned their love of caring for animals and seemed to have a strong desire to serve the public. These responses indicate the desire for positive pro-social impact and pro-social motivation (Deserranno, 2014). However, the lack of drugs has hindered their work. Salaries and allowances are a main discouraging factor (Dieleman, Cuong, & Martineau, Identifying factors for job motivation of rural health workers in North Viet Nam, 2003). As seen in Kenya’s health sector, inadequate salaries are very de-motivating (Mbindyo, Gilson, Blaauw, & English, 2009). In the long run however, this may not be a concern; once the CAHWs acquire the full package of drugs, charge for their services and are able to replenish their drugs.

Questions on community ties were also asked. The consensus among the CAHWs is that the community has been supportive, co-operative and happy about the appointment of these individuals. Statements like: “I guess they are very happy. This is evident in their co-operation and the kind of support they are providing in ensuring that animals live in good health”, “They are very happy and that is evident in the way they co-operate and support my work. I always feel excited when the community appreciates my effort” were mentioned. Furthermore, female CAHWs stated that the community was very happy that their community candidate, being a woman, got through the training successfully.

Recognition is highly influential. These results are in align with research work conducted in Benin and Kenya by Mathauer and Imhoff (2006). In their study, it was found that health workers highly value recognition from patients, superiors and colleagues. Manongi and Marchant (2006) and Mathauer and Imhoff (2006) also stated that appreciation from clients is crucial for the successful conduct of health workers. Similarly, this seems to play a vital role among CAHWs in Sierra Leone.

Finally, questions regarding the provision of free/selfless services were asked. All respondents stated that they would love to provide free services but given the cost of replenishing drugs this is unlikely. Interviewee #3 stated: “I am very much passionate about animals and their health. Being aware that the drugs need replenishing, I think I will talk with the owner to give it consideration”. Interviewee #6, #7 and #8 say they would provide their services for free during emergency cases, “because in all of these cases the health of the animals comes first. Everything else is secondary, but that will be for specific cases like emergencies”. Therefore, most would like to provide free services and some even do so when the situation is critical.

Overall, CAHWs receive recognition from their communities, enjoy the work they do and see value in their own role. Motivation is enhanced when staff feels valued and recognised (Ashraf, Bandiera, & Jack, 2014), and it seems that the communities are very supportive, co-operative and appreciative of their CAHWs. Praise and the desire to serve the public interest, act as factors for intrinsic motivation (Houston, 2000; Hart, Stasson, Mahoney, & Story, 2007). Additionally, the CAHWs mentioned that they would like to provide services for free; and reported working over two days a week and whenever necessary. The PSM scale represents an emphasis on intrinsic motivation. Therefore, these individuals show characteristics suggestive of intrinsic motivation.

## **5.2 QUANTITATIVE RESULTS**

### **5.2.1 Basic Characteristics of CAHWs**

The quantitative findings compiled below provide results for research question 2b: “*What are the basic characteristics of the recruited CAHWs?*”

These results are presented in table 3. The average age of a CAHW is 29 years old (with a maximum age of 62 and a minimum age of 18), 13% are female, the average level of education is 10 years (with a maximum of 15 and a minimum of 3), 98% of the respondents or their household members have experience with animals and 12% have formal training in animal healthcare. Additionally, only 2 respondents (who are community candidates) do not own any animals, but these respondents or their household members do have experience raising or taking care of animals.

The results demonstrate that most respondents have experience with animals and an average level of education (as this is around 10 years with a low standard deviation from the mean). This indicates that these CAHWs possess certain characteristics that could benefit their job. However, very few have received formal training on animal healthcare.

Table 3: Summary statistics of quantitative surveys

	N	Mean	SD	Minimum	Maximum
Age	103	29.242	9.178	18	62
Gender (Female=1)	103	0.126	0.334	0	1
Education	102	10.185	2.544	3	15
Owning animals (Yes=1)	103	0.981	0.139	0	1
Formal training (Yes=1)	103	0.126	0.334	0	1

*N=102 as one respondent refused to answer. Formal training refers to training given by a school, the government, or an NGO in animal healthcare.*

## 5.2.2 Differences in Basic Characteristics and Features of Motivation by Recruitment Strategy

The quantitative findings compiled below provide results for research question 2c: “How does the recruitment strategy affect the characteristics of recruited CAHWs?” This question has been answered using regression analyses to make comparisons across the treatment and control group (paramount chief and community candidates, respectively).

First, differences in basic characteristics based on recruitment is analysed. Table 5 shows the results of testing hypothesis *H1: Basic characteristics of the CAHWs differ based on the recruitment strategy*. The regression results are all insignificant. Table 4 indicates that community candidates are around 1 year younger, have less formal training (by 6% points), are less likely to own animals (by 4% points), are slightly more educated (by less than a year) and are more likely to be female (by 2% points) than paramount chief candidates. However, these coefficients are small and statistically insignificant. Therefore, the null hypothesis is not rejected.

Table 4: Regression results of basic characteristics

	(1)	(2)	(3)	(4)	(5)
	Age	Female	Education	Owning animals	Formal training
Treat	-1.098 (1.769)	0.023 (0.040)	0.078 (0.488)	-0.037 (0.026)	-0.056 (0.066)
Constant	33.745*** (3.340)	0.065 (0.075)	11.266*** (0.487)	0.943*** (0.068)	0.184* (0.111)
<i>N</i>	103	103	102	103	103
Chiefdom fixed effects	Yes	Yes	Yes	Yes	Yes
Controls	No	No	No	No	No

*Robust standard errors in parentheses. N=102 for education as one respondents refused to answer. Female, owning animals and formal training are dummy variables. Regressions are blocked by chiefdom (# chiefdoms=7).*

\* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

The findings indicate that community and paramount chief candidates are similar in basic characteristics. This may be because paramount chiefs and community members have similar views about the “most suitable” candidate for the job. In 97 communities the same individual was elected by both the paramount

chief and the community. This could be due to the lack of choice of suitable candidates or due to the size of the communities (limited number of inhabitants). As candidates are required to pass a selection test, this may limit the pool of candidates to select from, further explaining why paramount chiefs and community members elect similar candidates. Further, this may also signal that nepotistic considerations may not be influencing the election of CAHWs (when recruited by paramount chiefs). Alternatively, paramount chiefs may influence community members choice of candidates, by suggesting that the community selects members that the paramount chief deems fit for the job (affecting the election process). However, individuals elected both by the paramount chief and the community did not enter the randomisation to treatment (see section 4.2.1) and therefore, this threat is unlikely to occur.

To test the second hypothesis: *H2: Community elected CAHWs have higher community ties than paramount chief elects*, a regression analysis using the composite variable community ties, is conducted. When the CAHWs were asked the question “Is there someone who would lend you money without interest and without a guarantor?” 69% answered yes. Out of these 69%, 86% mentioned that these individuals are from their community (same community as the CAHW). These results are presented in table 5 and provides descriptive insights into the general ties to the community. In most cases, those from their own community agreed to lend money to the CAHW.

*Table 5: Statistics of lending money*

	N	Mean	SD	Minimum	Maximum
Lending to you	103	0.689	0.465	0	1
Same community	71	0.859	0.350	0	1

*N=71 because only those that responded yes to the previous question, responded to the next question. Both these variables are dummy variables.*

Table 6 below shows that there are significant differences ( $\beta=-0.183$ ,  $p<0.05$ ) in community ties based on the recruitment strategy and therefore, the null hypothesis is rejected. There is a negative relationship between the treatment and community ties. Community candidates have lower community ties (measured by standard deviation units) compared to paramount chief candidates. Past research identified that good working relationships and relations with the community are key determinants of motivation among workers (Mathauer & Imhoff, 2006). This significant difference indicates that paramount chief elects may be more motivated than community elects.

Furthermore, the drivers of these significant differences have been analysed by regressing the components of community ties. Results show (see table 6) that paramount chief candidates are significantly more likely to; live in the community in the next five years, let a community member borrow money from them and let a higher number of individuals borrow money from them. These variables are the factors driving the significant differences in community ties between paramount chief and community candidates.

Table 6: Regression results of community ties

	(1)	(2)	(3)	(4)
	Community ties	Five years in community	Borrow from you	Number borrowing from you
Treat	-0.183** (0.092)	-0.197** (0.091)	-0.173** (0.082)	-0.820* (0.451)
Constant	0.247** (0.109)	0.798*** (0.133)	0.939*** (0.095)	3.827*** (0.476)
N	103	101	103	79
Chiefdom fixed effects	Yes	Yes	Yes	Yes
Controls	No	No	No	No

Robust standard errors in parentheses. Community ties are measured in standard deviation units as this variable is standardised. Regression (2) and (3) are dummy variables measuring whether the respondent is planning to live in the community in the next five years and if there is someone in the community that the respondent would let borrow money from them (respectively). Regression (4) measures how many individuals the respondent will let borrow money from them (from their community). N=101 for regression (2) as one paramount chief and community candidate answered, “do not know”. N=102 for regression (3) as one community candidate refused to answer. N=79 for regression (4) due to several missing values. Regressions are blocked by chiefdom (# chiefdoms=7).

\* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$

Higher community ties among paramount chief elects may be due to the election of individuals that are “popular/known” in the community. Paramount chiefs are chiefs of multiple communities (as they are chiefs of an entire chiefdom), explaining the election of individuals that are well-known. Such individuals are expected to have closer ties to their communities, explaining the significant differences in the variables regarding trust (borrowing money from the CAHW) and physical presence in the community (living in the community in the next five years). Community members probably have more information regarding the individuals residing in their communities and therefore, will not always elect the individual that is well-known. So, paramount chiefs could be electing individuals based on “popularity” (community ties affect the recruitment) and as a result, the recruitment strategy leads to significant differences in community ties.

These results contribute to the literature on distributive politics/ resource distribution. The results are suggestive that chiefs may not be inefficient when selecting CAHWs. Paramount chief elects have closer ties to their communities, indicating that this may positively affect their intrinsic motivation (as recognition is an important factor affecting motivation). Therefore, chief-led elections may result in a more efficient selection of health workers, suggesting that their level of expertise in selecting suitable workers with strong community ties is higher. However, this can only be confirmed by identifying worker performance through long term studies and confirming motivation with the use of motivation tests. As a result, definitive conclusions cannot be made based on these findings.

The hypothesis: *H3: Community elected CAHWs possess personality traits resembling higher intrinsic motivation than paramount chief elects*, is also tested with the use of regression analyses. Scores for the 5 different personality traits are computed and dummy variables for each type is created - as individuals can

have the same score for many different personality traits. Regressions are run for each personality type against the treatment (see table 7). In comparison to paramount chief candidates, community candidates are less extroverted (by 11% points), conscientious (by 1% point) and neurotic (by 2% points) and are more agreeable (by 8% points) and open (by 11% points). Despite large coefficient, the results show that these differences are insignificant. As a result, the null hypothesis is not rejected.

All personality traits are insignificant; however, openness is nearly significant at the 10% level ( $p=0.120$ ). Furthermore, the standard errors are quite large. This will shift with a larger sample size and should result in a smaller standard error. Therefore, it is important to consider the effects a larger sample may have on these results.

*Table 7: Regression results of personality traits*

	(1)	(2)	(3)	(4)	(5)
	Extrovert	Agreeable	Conscientious	Neurotic	Open
Treat	-0.111 (0.095)	0.081 (0.095)	-0.012 (0.089)	-0.022 (0.044)	0.113 (0.072)
Constant	0.291** (0.134)	0.418*** (0.159)	0.468*** (0.152)	0.166 (0.108)	0.324** (0.144)
<i>N</i>	103	103	103	103	103
Chiefdom fixed effects	Yes	Yes	Yes	Yes	Yes
Controls	No	No	No	No	No

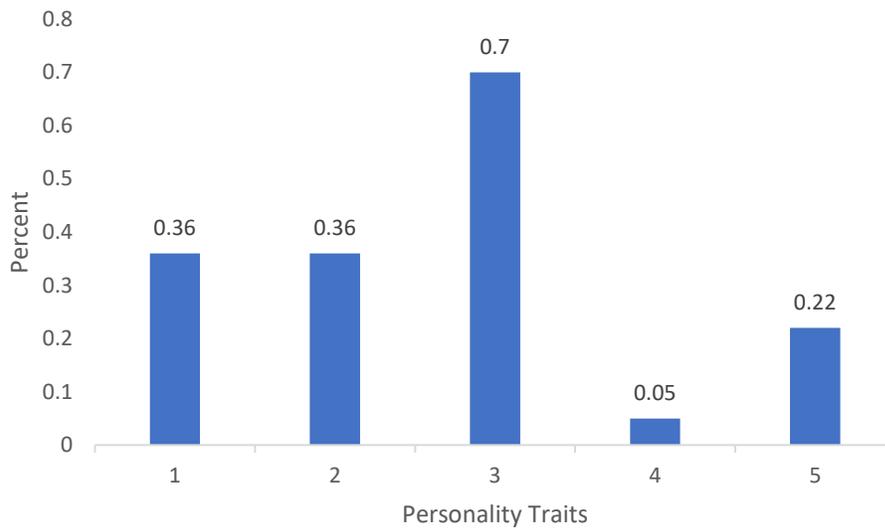
*Robust standard errors in parentheses. Personality traits are dummy variables. Regressions are blocked by chiefdom (# chiefdoms=7).*

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Summary statistics for the distribution of personality traits across the whole sample are presented in figure 2. 36% are extroverted, 36% are agreeable, 70% are conscientious, 5% are neurotic and 22% are open. Therefore, the most prominent personality type is conscientiousness, whereas only a very small proportion of the sample are neurotic.

Conscientiousness and extroversion is positively related to achievement motivation, and neuroticism is negatively associated with achievement motivation (Cheng & Ickes, 2009; Komarraju & Karau, 2009; Hart, Stasson, Mahoney, & Story, 2007). Furthermore, a study conducted on families in the United States of America (across different life-spans) showed that high conscientiousness was associated with intrinsic career success (Judge, Higgins, Thoresen, & Barrick, 1999). Additionally, based on results gathered from 1447 government employees in Australia, openness was positively related to individual and organizational proactivity. Moreover, conscientiousness was a stronger predictor of individual task proficiency, whereas the reverse was true for neuroticism (Neal, Yeo, Koy, & Xiao, 2012). Therefore, these findings are suggestive that both paramount chief and community candidates possess personality traits resembling IAM.

Moreover, a study across 56 nations shows that Africa (Botswana, the Democratic Republic of the Congo, Ethiopia, Morocco, South Africa, Tanzania, and Zimbabwe) scores significantly lower on the BFI Neuroticism scale and higher on the BFI conscientiousness scale. Additionally, Africa scored lower on openness than other regions (Schmitt, Allik, Mccrae, & Benet-Martinez, 2007). These findings are in align with the results of this thesis, as the most prominent personality trait is conscientiousness, whereas only a small proportion are neurotic (and open).



1 = Extrovert	2 = Agreeable	3 = Conscientious
4 = Neurotic	5 = Open	

Figure 2: Personality traits

Finally, hypothesis 4 (*H4: Community elected CAHWs spend more time working with animals than paramount chief elects*) is tested by analysing time spent working with animals. Time spent on other activities is also analysed to provide insight on where most work effort is targeted and how this compares to hours spent working with animals. As presented in table 8, community candidates seem to spend less time on all these activities; leisure, work with animals, farm work and non-farm work. However, these differences are insignificant. As there are no significant differences in hours spent on work with animals, the null hypothesis is not rejected. However, community candidates spend slightly more time on wage labour in a week, in comparison to paramount chief candidates. This difference is statistically significant ( $\beta=2.303$ ,  $p<0.05$ ) and indicates that community elects have more wage paying job opportunities than paramount chief elects. This explains why community candidates spend slightly less time on other activities (although insignificant).

Table 8: Regression results of hours spent on certain activities

	(1)	(2)	(3)	(4)	(5)
	Leisure	Work with animals	Farm work	Non-farm work	Wage labour
Treat	-0.828 (2.624)	-0.556 (1.917)	-2.646 (3.120)	-0.177 (1.899)	2.303** (1.220)
Constant	26.510*** (3.361)	7.992 (5.143)	38.040*** (5.903)	5.634** (2.465)	-0.471 (0.793)
<i>N</i>	103	103	103	103	103
Chiefdom fixed effects	Yes	Yes	Yes	Yes	Yes
Controls	No	No	No	No	No

Robust standard errors in parentheses. Measured as hours spent in a week. Regressions are blocked by chiefdom (# chiefdoms=7).

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Summary statistics of the entire sample are presented in table 9. On average, CAHWs spend 29 hours on leisure, 7 hours on work with animals, 33 hours on farm work, 5 hours on non-farm work and 1 hour on wage labour during a week. Much of their time is spent on farm work and leisure, which is followed by work with animals. The results indicate that CAHW work (working with animals) is a side job and not their main occupation. Despite their dependency on livestock, it seems that most of their time is spent on the farm. This is probably because of the high dependency on subsistence agriculture in Sierra Leone. These individuals seem to already be working long hours, affecting the time they have left to spend working as a CAHW. Further, as mentioned in the qualitative analysis, the incomplete delivery of the initial package of drugs is an obstacle to their (CAHWs) work. Access to veterinary drugs may increase their workload and thereby affect work hours. This is an aspect that was not controlled for in this research and therefore, needs to be acknowledged when analysing such results.

Table 9: Summary statistics of hours spent on certain activities

	<i>N</i>	Mean	SD	Minimum	Maximum
Leisure	103	28.835	13.084	2	68
Work with animals	103	7.010	9.488	0	60
Farm work	103	32.854	16.254	0	72
Non-farm work	103	5.320	9.631	0	60
Wage labour	103	1.282	6.090	0	46

Measured as hours spent in a week. Hours spend working with animals includes time spent owning or taking care of animals. Non-farm work includes activities such as trading, weaving, carpenter, mason etc. and wage labour includes activities such as timber, mining etc.

### 5.2.3 Comparison of Lottery and Non-lottery Communities

289 CAHWs passed the selection test and a lottery was conducted to randomly assign paramount chief or community candidates to 104 of these communities (see 4.2.1). The remaining 185 communities did not enter the lottery. Out of these 185 communities, 62 communities elected paramount chief candidates and

123 communities elected community candidates. Comparisons between the lottery (104) and non-lottery (185) communities have been made to identify how representative the communities entering the lottery are.

Regression analyses for the non-lottery communities are conducted to compare the results to the lottery communities. However, as these non-lottery communities have not been subjected to randomisation, causal comparisons cannot be made. The results are presented in table 10. Among non-lottery candidates: community candidates have a ( $p < 0.1$ ) higher level of education and own less animals than paramount chief candidates (unlike lottery candidates), personality traits do not differ by recruitment (similar to lottery candidates), community candidates spend ( $p < 0.01$ ) less time working on the farm than paramount chief candidates (unlike lottery candidate), there are no differences in wage labour (unlike lottery communities) and finally, there are no differences in community ties (unlike lottery communities). To conclude, there seem to be some differences between these samples. Therefore, based on mean comparisons, the 104 CAHWs show some deviations from the larger sample.

Table 10: Regression results of non-lottery and lottery CAHW candidates

	Non-lottery candidates	Lottery candidates
<b>Basic characteristics</b>		
Age	-0.387 (1.399)	-1.098 (1.769)
Gender (Female=1)	0.019 (0.039)	0.023 (0.040)
Education	0.673* (0.397)	0.078 (0.049)
Owning animals (Yes=1)	-0.031* (0.016)	-0.037 (0.026)
Formal training (Yes=1)	0.022 (0.047)	-0.056 (0.066)
<b>Personality traits</b>		
Extrovert	0.008 (0.079)	-0.111 (0.095)
Agreeable	-0.006 (0.080)	0.081 (0.095)
Conscientious	0.010 (0.069)	-0.012 (0.089)
Neurotic	-0.027 (0.024)	-0.022 (0.044)
Open	-0.096 (0.066)	0.113 (0.072)
<b>Hours spent on various activities</b>		
Leisure	3.453 (2.163)	-0.828 (2.624)
Work with animals	0.312 (1.450)	-0.556 (1.917)
Farm work	-6.832** (2.766)	-2.646 (3.120)
Non-farm work	2.713* (1.467)	-0.177 (1.899)
Wage labour	0.331 (0.425)	2.303** (1.220)
Community ties	-0.034 (0.069)	-0.183*** (0.092)

Robust standard errors in parentheses. Hours spent on various activities is measured per week. Non-farm work includes activities such as trading, weaving, carpenter, mason etc. and wage labour includes activities such as timber, mining etc. Regressions are blocked by chiefdom (# chiefdoms=7).

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 6. DISCUSSION

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### 6.1 LIMITATIONS

Despite communities being randomly selected among targeted chiefdoms for the qualitative interviews, different candidate types were not selected in the CAHW interviews. Only community candidates were interviewed, which may affect the findings, if paramount chief candidates were interviewed as well. Furthermore, the sample is small and therefore, may not be representative and generalisable across other chiefdoms. While this may be fine for exploratory studies, the sample is too small to draw general conclusions from. This hinders the reliability and validity of the findings. However, the quantitative results refer to both candidate types and consists of a larger sample, complementing the qualitative findings.

Moreover, the enumerators conducting the interviews had to both conduct the interviews and take down notes. This affected the depth of information gathered and could be tackled by recording the interviews which are then translated afterwards. However, due to budget and time constraints it was not possible to do so. Furthermore, direct quotes were written down in English. As a result, content may have been “lost in translation”. Therefore, findings obtained from these interviews need to be analysed and interpreted with caution. Additionally, interviewers that have undergone thorough long-term training on qualitative research would be ideal candidates to conduct these interviews. However, given the limitations (financial, time etc.) this was not possible, but should be considered in future research nevertheless.

Guaranteeing unfiltered/honest responses is a frequent problem in qualitative research due to social desirability bias. This is the inclination to answer questions that are viewed favourably by others. This leads to skewed results. For example, this problem is likely to be prominent for questions such as “What is your opinion on the impact or role of a CAHW? /What do you like and do not like about your current job as a CAHW?”. Interviewees may respond positively to indicate their pleasure with the programme in general. These responses are valuable as they send signals regarding the demand for the CAHW programme, however, do not directly answer the questions asked.

The variable used to measure effort is heavily dependent on the context. Some communities mention that animal health is under control and diseases are infrequent. Many complain about the lack of veterinary drugs. Such instances affect work hours. In addition, what makes a good worker is dependent on work culture, environment, nature of the work and many other factors (Petty & Hill, 2005). CAHWs who are very efficient will spend less time treating animals compared to those that are less efficient. This measure does not take such factors into account. Furthermore, hours worked is based on self-reports which are subject to biased results. Also, effort has been measured in two-hour slots, which is a very rough estimation of time allocation. Therefore, this measure does not accurately represent motivation. In a broader context, such findings may not be applicable. However, both groups suffer equally from this limitation and therefore, it will only introduce noise and not bias.

Community ties include variables measuring physical community presence and trust (if money is borrowed from or lent to the CAHW). This measure consists of some drawbacks. Presence does not always indicate stronger community ties. Individuals that have lived in a certain community for years, can have little to no involvement in their communities. Additionally, low income countries are considered to have many market frictions enhancing the importance of informal institutions (Ghani & Reed, 2014). Therefore, informal institutions may play a crucial role in these communities. This means that approaching community members may be the only way to receive financial support. Consequently, the presence of informal institutions, rather than trust with the community is measured. Once again, since both groups suffer equally from these drawbacks, this will only introduce noise into the quantitative analysis.

There are a few problems with the BFI test. First, this measure fails to capture gender differences. Second, it is a broad and heterogenous test. A suboptimal account of human personality structure is provided, and therefore, such a measure is a simplified model of personality. More dynamic models considering personality-learning processes would be better (Boyle, 2008). Third, there are some concerns regarding fake responses, to portray a certain personality type. As personality is a highly subjective measure, many self-report instruments like this have been shown to have doubtful reliability and validity (Boyle, 1985). Having said that, many studies show that most people do not significantly distort responses (Hogan, Barrett, & Hogan, 2007). Regardless, measuring personality traits is very challenging. However, there is little alternative. Although observational tests would correct for some of these limitations, other concerns will arise (such as Hawthorne effects). As a result, despite its problems, this remains to be the most suitable measure of personality traits in a short amount of time.

Complications may also arise from the treatment. Recruitment strategies themselves may be affected by nepotism. Although some CAHW candidates have been stated as community elects in the data, paramount chiefs could have prompted the community to choose these candidates. This threat is lowered by dropping out individuals from the sample that were elected by both the paramount chiefs and the communities. However, it is still important to consider this limitation.

## **6.2 RESEARCH OPPORTUNITIES**

Concrete improvements of this thesis provide avenues for future research opportunities. The quality and accuracy of the qualitative interviews can also be improved upon by conducting these interviews with a larger sample (purposely selecting from both recruitment types) and tape-recording them. Multiple individuals could be used to translate these interviews to ensure that accurate translations are made. By doing so, the robustness and generalisability of these results could be enhanced.

Hours spent working with animals can be tested in the long run to analyse how big the impact of the incomplete initial package of drugs, affects work effort. This will provide insight regarding the impact external factors may have had on work effort. The measure for effort can also be improved by asking the interviewees to state the number of hours they spend on certain activities, rather than providing them with rough two-hour slots.

Furthermore, the goal of CAHW programmes is that CAHWs can purchase veterinary drugs themselves to continue their work successfully. Another aspect for future work is to analyse the CAHWs' distance to the market and accessibility to these drugs. Such research will indicate the sustainability of this programme.

Motivational issues are transitional and therefore, longitudinal research should be conducted to capture these changes (Willis-Shattuck, et al., 2008). Long-term research will provide an understanding on whether personality traits, effort and community ties change over time. It may be that in the long run when the "novelty" of the job wears out and it becomes repetitive or tedious, motivation will decline. A long-term study could analyse the *actual* motivation for the position. Additionally, as motivational factors are influenced by context, cross country research is beneficial. This allows for the comparison of contextual factors (Willis-Shattuck, et al., 2008). There are two distinct effects of recruitment that should be further investigated. Individuals may be elected because of their features of motivation, or it may be that their election into these positions results in a change of their behaviour. For example, community ties may change after their election. The same can be said for effort. Certain individuals may be selected because of their hard-working nature, or they may tend to work harder once elected. Therefore, long term studies will be beneficial to understand these relations by disentangling whether CAHWs inherently possess certain characteristics, or if the recruitment strategies influenced or changed the behaviour of CAHWs.

As previously mentioned, the recruitment itself may be corrupt (paramount chiefs influencing community members choice of candidates). Interviewing community members by indirectly asking them why they elected such individuals is one feasible way of understanding if corruption is in play. This can be done by withholding the purpose of the interviews - to prevent socially desirable responses. Unfortunately, it is difficult to measure this ethically without deceiving the respondent. Therefore, the extent to which such factors can be measured or controlled for, is limited.

Understanding why there are similarities across recruitment strategies can be achieved by analysing the selection process. Further, findings from observational studies/interviews with community members will complement these findings and can be used to cross check the consistency of responses. Alternative designs could be used to limit social desirability bias. Some approaches include: Randomised response technique (answering of the surveys anonymously), self-administration of the questionnaire (to limit face-to-face interaction) and the use of proxy subjects (interviewing close friends or acquaintances of the subject) (Nederhof, 1985). Future research could make use of such approaches

Furthermore, the findings of this thesis indicate that CAHWs possess certain features associated with motivation. Motivation tests conducted on the CAHWs can be used to infer correlations with these results. Furthermore, analysing how best to motivate these workers by comparing the effectiveness of financial and non-financial incentives could be investigated. Ashraf, Bandiera and Lee (2014), find that individuals with higher degrees of prosocial motivation are found in the districts where the job ads stressed career incentives. This can have the potential to improve service delivery and describes a situation in which individuals that self-select themselves into these jobs tend to be more motivated. Identifying comparisons between CAHWs that have been recruited and those that self-select into such positions could provide interesting results (regarding which method results in the selection of more motivated staff).

Cowley and Smith (2014) found that on average, in comparison to private sector workers, public sector workers tend to be more intrinsically motivated. However, this difference is dependent on the level of corruption in the country. Those with higher levels of corruption may inhibit the number of intrinsically motivated individuals joining the public sector. Governments can affect the mission of the public sector to influence the level of motivation among workers. In comparison to private sector workers, public sector workers are more intrinsically motivated. While this is the case for many countries, it is not universal (Cowley & Smith, 2014). Therefore, research regarding differences in intrinsic motivation between public and private sector animal health workers in Sierra Leone could be conducted.

Finally, gender differences are another area for future research. In Kenya, women tend to find female CAHWs more accessible and available to provide advice. This may be because female CAHWs are less mobile. Counterintuitively, men expressed that female CAHWs are constrained by family obligations (making them less available - especially at odd hours), are not strong enough to handle and treat cattle and are too constrained by local customs (restricting travel at odd hours) (Leyland, Lotira, Abebe, Bekele, & Catley, 2014). In southern Sudan, women have been selected and trained as CAHWs and are vocal in their participation in community development. There is substantial room for further incorporation of women into this profession. Understanding why this line of work is male dominated in Sierra Leone and if this is an efficient allocation of labour can be analysed. Qualitative community interviews, comparing skills and available work hours between men and women could accomplish this. Understanding local norms will also be complementary.

### **6.3 RECOMMENDATIONS**

The descriptive results clearly indicate that animal healthcare is lacking and that CAHWs may be able to bridge this gap. Governments and donors can use such results to provide financial support towards expanding CAHW programmes across the country (beyond the Kono district) to communities dependent on livestock rearing.

Resource availability, adequate supplies (such as veterinary drugs) and appropriate infrastructure can significantly improve morale and are important sources of motivation (Willis-Shattuck, et al., 2008; Alhassan, et al., 2013). In Kenya, CAHWs tend to leave their work due to economic and drug availability reasons (Riviere-Cinnamond & Eregae, 2003). Further, in Guinea, low priority given to primary animal healthcare by the government, a lack of resources, and weak marketing systems for livestock products (such as veterinary drugs) affect the sustainability of these services. Improvements in transport and creating efficient drug supply markets has been stated to help tackle this (Sones, 2002). Securing links with private veterinarians/pharmacies for the purchase of veterinary drugs and technical assistance is one such policy recommendation. Several countries in sub-Saharan Africa have initiated such a policy reform (Catley, Delaney, & McCauley, 1998).

Moreover, government control of veterinary drugs is essential. In Somali CAHWs may sell adulterated drugs, under-dose, or encourage over-use of drugs. Therefore, it has been argued that CAHWs should only operate where they can be supervised (Catley A. , 1999). This is also mentioned by CAHWs in South Sudan.

A lack of support and supervision (visits by government veterinary staff) of CAHWs is detrimental to their long-term sustainability and effectiveness. (Leyland, Lotira, Abebe, Bekele, & Catley, 2014). Therefore, supervision and ensuring easy access to veterinary drugs are crucial for the sustainable provision of animal health services in Africa. The long-term sustainability of the CAHW programmes hinges on the integrity of cost recovery practices and the technical abilities of the CAHWs themselves in serving their customers (Catley, Delaney, & McCauley, 1998). Guidance about financial matters is crucial to ensure the financial viability of CAHWs (Catley, Delaney, & McCauley, 1998)

The actual implementation of services will affect motivation (Mbindyo, Gilson, Blaauw, & English, 2009). Ensuring well-defined and supported linkages between veterinarians (public and private) and para-veterinary professionals is supported in Africa (Sones, 2002; Leyland & Catley, 2002). This can be facilitated by conducting weekly meetings where issues affecting health worker performance is discussed (Mbindyo, Gilson, Blaauw, & English, 2009). Further, community-level supervision and open discussion of roles and expectation of CAHWs is beneficial (Catley, Delaney, & McCauley, 1998). Therefore, involving communities and other professionals should be a focus to ensure the sustainability of CAHW programmes.

Only 2 respondents of the CAHW surveys mentioned that they do not provide their services to other communities, whereas all the other CAHWs do so. Additionally, one of the CAHWs mentioned that he would love to extend his services, but all other communities have a CAHW. This indicates that it might be more efficient to train one CAHW responsible for serving many communities. This will increase the CAHWs reach and may even result in this profession being their main source of income (affecting work hours). This may be more effective, in comparison to the concentration of a few CAHWs in close proximity to one another. As a result, one such recommendation would be to train a single CAHW responsible for a few communities within a certain range/distance.

Finally, the results indicate that across the recruitment strategies CAHWs are similar in most characteristics. However, paramount chief elects seem to be closer to their communities. Therefore, these candidates may be the most motivated and a better choice of candidate (as community ties are a key determinant of motivation, affecting performance). Future research is necessary to confirm this recommendation.

## 7. CONCLUSION

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Communities that do not have CAHWs reported that they don't have any institutions currently in place providing animal healthcare services. Most individuals attempt to treat their own animals or contact district veterinarians that are usually hard to access and expensive. This highlights a gap that exists in terms of veterinary services. Therefore, CAHW programme may have the potential to positively benefit communities in the Kono district. This provides an avenue for future research to make comparisons on the impacts of this programme to communities that have and have not been exposed to the OHP. Furthermore, the qualitative results show that CAHWs value their work and are close to their communities, suggestive of high intrinsic motivation. However, such results arise from a small sample size and therefore, bold conclusions cannot be inferred without further research.

The quantitative results regarding the type of individual recruited as a CAHW, show that the average CAHW is a 29-year-old male with a level of education of 10 years, who does have experience with animals and does not have any formal training. Additionally, characteristics across the community and paramount chief elects were analysed. The recruitment strategies do not result in statistically significant differences in basic characteristics, effort and personality traits. CAHWs seem to be motivated in general, given their personality traits and qualitative interview responses. Additionally, these CAHWs spend most of their time working on farms indicating that this is their main occupation (unlike working with animals). However, community ties significantly differ between paramount chief and community candidates. Contrary to the expectations of this thesis, paramount chief candidates have higher community ties than community candidates. Since community ties positively affects motivation, recruitment of CAHWs by paramount chief's may result in hiring individuals that possess characteristics suggestive of higher motivation.

To conclude, nepotism does not seem to affect the features of motivation. If at all, it may result in higher motivation among paramount chief candidates. However, it is important to note that conclusions on nepotism and motivation need to be complemented with further research and additional motivation tests.

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## **APPENDIX A: SEMI-STRUCTURED INTERVIEWS**

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### **“Pure” control community questions**

*Enumerator Note: First approach the town chief (or whoever is available, such as the deputy town chief, youth leader etc.) and ask him the following questions before proceeding.*

#### Town chief interview

Interviewee: Position, Gender, Community, Chiefdom –	
Interview text	Comments
<p>Is there someone that the community consults when their animals are sick?</p> <p><i>Enumerator Note: If yes, please contact this person and interview them.</i></p>	
<p>If no, what procedure is taken when animals in the community are sick? Are these animals even treated?</p> <p><i>Enumerator Note: In this case, please proceed to contact an available animal rearer and interview them.</i></p>	

*Enumerator Note: Please read the informed consent.*

*Enumerator Note: Please indicate who you are interviewing here – animal rearer/animal health practitioner. Please circle who you are interviewing below.*

#### Interview with the animal health practitioner or an animal rearer

Interview number #: Gender, Community, Chiefdom –		
Label	Interview text	Comments
<b>Q1</b>	What is your age?	
<b>Q2</b>	What is your ethnicity?	
<b>Q3</b>	Do you currently live in this community?	
<b>Q4</b>	Can you tell me about animal diseases in this community and the frequency of diseases?	
<b>Q5</b>	<p>Do you recall how many of these cases were treated successfully?</p> <p><i>Enumerator Note: If they do not remember exact numbers, that is fine, just attempt to gather information regarding <b>examples of such situations</b>.</i></p>	

<p><b>Q6</b></p>	<p>What is your opinion on the status of animal health in this community?</p> <p><i>Enumerator Note: This question refers to the general health of animals in their community. Are cases of sick animals rare or frequent? Are these cases generally serious or not?</i></p>	
<p><b>Q7</b></p>	<p>Do you have your own animals?</p> <p>If yes, how many?</p>	
<p><b>Q8</b></p>	<p>Do you treat them yourself?</p>	
<p><b>Q9</b></p>	<p>How did you become the point person for veterinary services for your community?</p> <p><i>Enumerator Note: If this individual is an animal rearer <b>only</b> looking after his/her own animals, skip this question.</i></p>	
<p><b>Q10</b></p>	<p>If you provide these services for others, who do you provide for?</p> <p><i>Enumerator Note: We want to know if these services are only provided for close relations, or for any one that requires this service.</i></p>	
<p><b>Q11</b></p>	<p>How do you provide these services? Do community members approach you, or do you approach them?</p> <p><i>Enumerator Note: This is only in the case that these services are provided for others. Please find out <b>examples/scenarios</b>.</i></p>	
<p><b>Q12</b></p>	<p>How did you acquire the knowledge for providing such services?</p>	
<p><b>Q13</b></p>	<p>Do you receive payment/compensation for your services?</p> <p>If yes, how do you receive such payment/compensation – in cash or kind?</p> <p><i>Enumerator Note: Please try to find <b>examples of situations</b>, of when the</i></p>	

	<i>respondent provided their service for free or for payment/compensation.</i>	
<b>Q14</b>	<p>What techniques do you use to treat sick animals?</p> <p><i>Enumerator Note: By techniques I mean western or local practices.</i></p>	
<b>Q15</b>	<p>Do you use any medication or equipment to treat sick animals?</p> <p>If yes, how did you acquire such items?</p> <p><i>Enumerator Note: This includes any sort of treatment equipment (such as injections) and medication.</i></p>	

Thank you for your participation! You have reached the end of this interview.

## CAHW questions

*Enumerator Note: Please read the informed consent.*

Interview number #: Name, Gender, Community, Chiefdom –		
Label	Interview text	Comments
Q_1	What is your age?	
Q_2	What is your ethnicity?	
Q_3	Do you currently live in this community?	
Q_4	<p>Can you tell me about animal diseases in this community and the frequency of diseases?</p> <p>What do you think about this? /How does this make you feel?</p>	
Q_5	<p>Do you recall how many of these cases were treated successfully?</p> <p><i>Enumerator Note: If they do not remember exact numbers, that is fine, just attempt to gather information regarding <b>examples</b> of such situations.</i></p>	
Q_6	<p>What is your opinion on the status of animal health in this community?</p> <p><i>Enumerator Note: This question refers to the general health of animals in their community. Are cases of sick animal rare or frequent? Are these cases generally serious or not?</i></p> <p>What do you think about this? /How does this make you feel?</p>	
Q_7	<p>What is your opinion on the impact or role of a CAHW?</p> <p>How important is this role, in general?</p> <p><i>Enumerator Note: I am interested about how the role of a CAHW in <b>GENERAL</b> is perceived by the interviewee. Do they think this position is important in <b>GENERAL</b>?</i></p>	
Q_8	What do you like and do not like about your current job as a CAHW?	

	<i>Enumerator Note: Try to find some examples and scenarios that may explain their answers.</i>	
<b>Q_9</b>	How much time do you spend a week on this job?	
<b>Q_10</b>	Do you provide services only for this community, or for other communities too?  Why?	
<b>Q_11</b>	How often has there been disease outbreaks in this community since you became a CAHW?  What do you think about this? /How does this make you feel?	
<b>Q_12</b>	How were you elected as a CAHW - from the community of the paramount chief?	
<b>Q_13</b>	What was the reaction from the community when you were selected as the CAHW?  What do you think about this? /How does this make you feel?	
<b>Q_14</b>	Have you always been the point person to provide veterinary services?  If yes, for how long?  If no, who had this role before (if any)?  <i>Enumerator Note: Please include at what point in time this individual was appointed as a CAHW.</i>	
<b>Q_15</b>	Over the past year have you had many cases of sick animals that needed to be treated?  If yes, how many?  Did you attempt to treat all these cases?	
<b>Q_16</b>	How did you find out about these cases? Did the community members directly approach you?	

	<p>Can you give me an example of this?</p> <p><i>Enumerator Note: Try to find out a <b>scenario</b> of how they treated such animals and how they found out about such cases.</i></p>	
<b>Q_17</b>	<p>Are there any instances of when you treated an animal and did not collect any pay/compensation for it?</p> <p>If yes, how many instances?</p>	
<b>Q_18</b>	<p>In <u>some</u> cases, <b>would</b> you provide your services for free?</p> <p>If yes, in what cases and for whom?</p> <p><i>Enumerator Note: This question can be asked in the case that the individual has NOT provided their services for free, or as a favour. Then we ask the respondent if they WOULD do so.</i></p>	
<b>Q_19</b>	<p>What techniques do you use to treat sick animals?</p> <p><i>Enumerator Note: By techniques I mean western or local practices.</i></p>	
<b>Q_20</b>	<p>Do you use any medication or equipment to treat sick animals?</p> <p>If yes, how did you acquire such items?</p> <p><i>Enumerator Note: This includes any sort of treatment equipment (such as injections) and medication.</i></p>	

Thank you for your participation! You have reached the end of this interview.

## APPENDIX B: BIG FIVE INVENTORY SCALE

Instruction: How well do the following statements describe your personality?

I see myself as someone who ...	Disagree strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree strongly
... is reserved	(1)	(2)	(3)	(4)	(5)
... is generally trusting	(1)	(2)	(3)	(4)	(5)
... tends to be lazy	(1)	(2)	(3)	(4)	(5)
... is relaxed, handles stress well	(1)	(2)	(3)	(4)	(5)
... has few artistic interests	(1)	(2)	(3)	(4)	(5)
... is outgoing, sociable	(1)	(2)	(3)	(4)	(5)
... tends to find fault with others	(1)	(2)	(3)	(4)	(5)
... does a thorough job	(1)	(2)	(3)	(4)	(5)
... gets nervous easily	(1)	(2)	(3)	(4)	(5)
... has an active imagination	(1)	(2)	(3)	(4)	(5)

Scoring the BFI-10 scales:

Extraversion: 1R, 6; Agreeableness: 2, 7R; Conscientiousness: 3R, 8; Neuroticism: 4R, 9; Openness: 5R; 10 (R = item is reversed-scored).

Figure 3: Big Five Inventory (Rammstedt & John, 2007)

# APPENDIX C: INTERVIEW CODING TREE

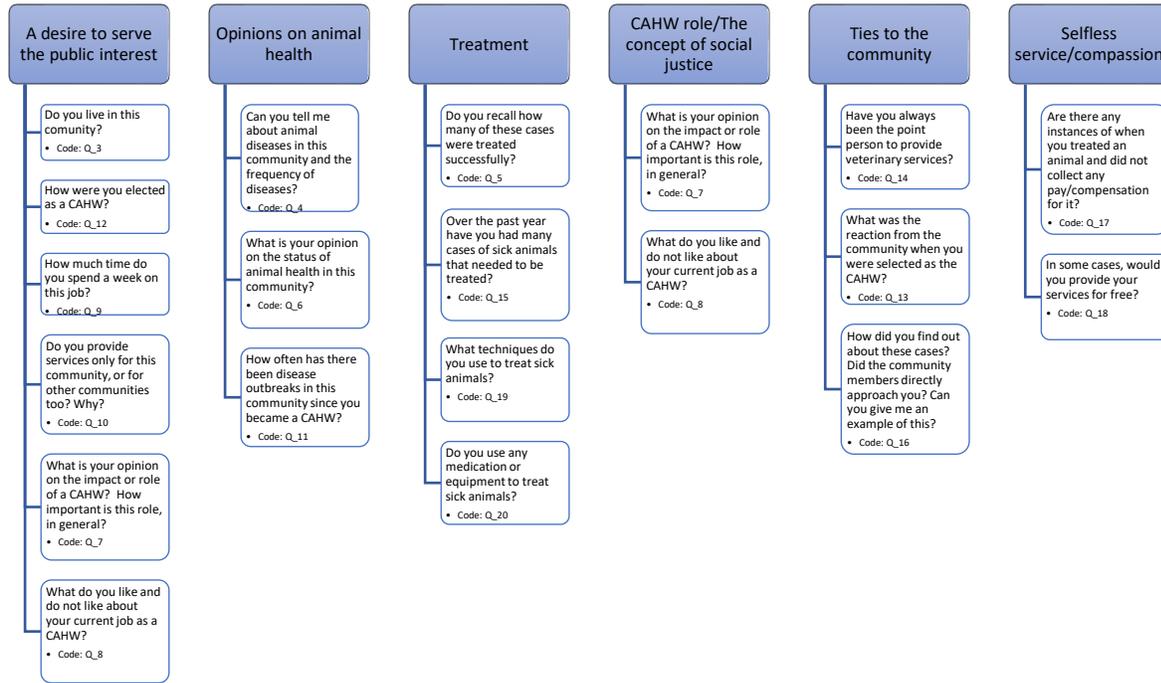


Figure 4: CAHW interview

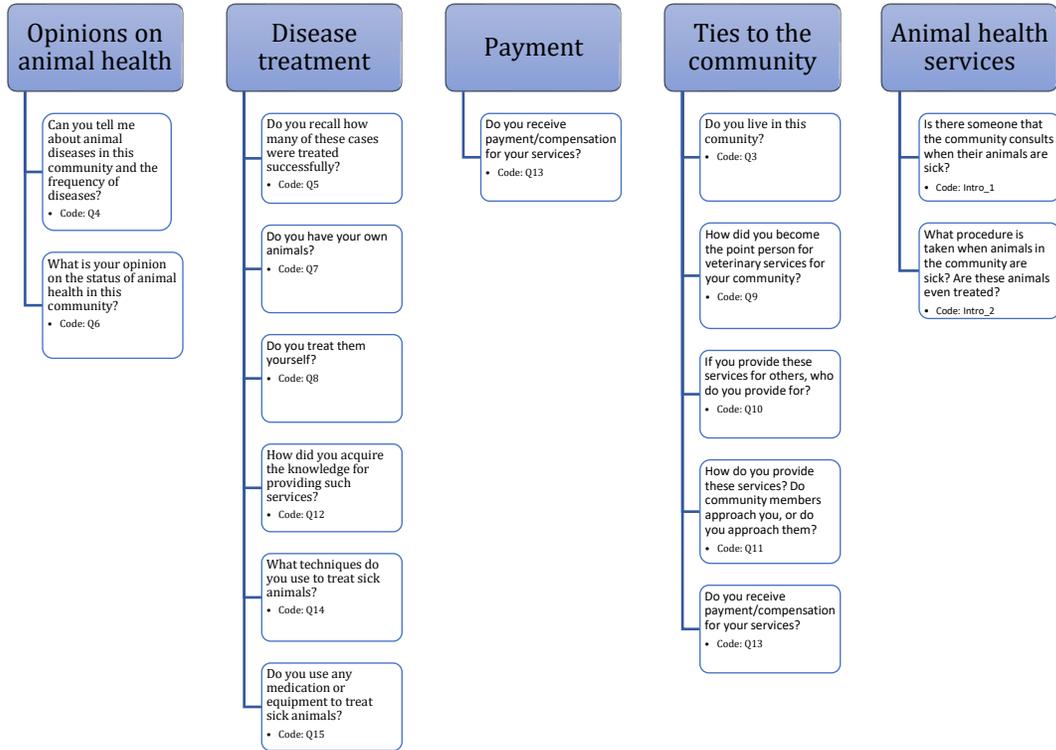


Figure 5: "Pure" control interview