

Sustainable Improvement Alternatives to Animal Health Service Delivery Constraints in the Daffiama-Bussie-Issa District of the Upper West Region of Ghana

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Abstract— Livestock production plays a key role in the livelihoods of rural people, serving as a source of employment, income, food, and security against the uncertainties of crop production. Yet delivering quality, affordable, and sustainable animal health services remains a major constraint in developing countries, including Ghana. This study explores the sustainable improvement alternatives to animal health service delivery constraints in Daffiama-Bussie-Issa District, Ghana. A total of 150 livestock farmers were randomly selected from fifteen communities and interviewed using semi-structured questionnaires. Statistical Product and Service Solutions (SPSS/IBM) version 20.0 was used to compute all descriptive statistical variables. Chi square analysis was done to check for the effect of some variables on others at a significant level of 5%. The study showed that 42.7% of the respondents were between 46-60 years. However, age had no influence on veterinary service patronage ($X=8.672$, $df=3$, $p=0.34$). Sixty-four percent of the respondents had no educational background. Also, education did not influence veterinary service patronage ($X=2.357$, $df=5$, $p=0.798$). Majority (41.3%) of the respondents traveled over 16 km to access animal health service providers. All (100%) of the respondents who had access to veterinary drugs practiced self-medication. The study revealed government animal health service providers as a sustainable animal health delivery channel. Based on these findings, livestock farmers should be encouraged to consult veterinary service providers before administering drugs and vaccines to their livestock.

Keywords— Animal health; constraints; Daffiama-Bussie-Issa; service delivery; sustainable.

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I. INTRODUCTION

The delivery of quality veterinary service remains a major constraint in developing countries [1], [2] including Ghana. An important reason for the limited success in quality veterinary service delivery is that factors influencing participation in veterinary services are not well known in sub-Saharan Africa [3], [4]. Interaction between animal health service providers and farmers regarding antimicrobial use is essential [5]. This is because farmers have been found to use antimicrobials without prescription, thus complicating animal health delivery systems and posing a threat to public health [6]–[12]. Nonetheless, animal health service providers often focus on the fundamental aspect of livestock production with or without prioritizing the needs of the livestock keepers [5]. Meanwhile, the raising of livestock provides the basic needs of about 70% of the world's poor in developing countries,

such as boosting their crops cultivation, health care needs, household income, and education, as well as serving as a security against the uncertainties of crops yields [13]–[16]. However, poor livestock keepers in remote areas often lack access to affordable curative and preventive animal health services [17], [18].

Livestock diseases, including *Contagious Bovine Pleuropneumonia* (CBPP) and *Peste des Petits Ruminants* (PPR) just to mention a few, continue to affect livestock production negatively and cause animal food losses to livestock keepers and consumers [19]–[21]. Providing quality animal foods and sustainable animal health services to livestock-dominated communities is paramount to reducing economic losses and ensuring food security and human health risks associated with zoonotic diseases [22], [23]. An increase in agricultural production and productivity, for that matter livestock production, is important to provide rural incomes, to

support the increasing numbers of people dependent on this industry [24]–[26], and to meet the needs of the fast-growing urban population.

Effective animal health care is required for healthy animals to enable them to produce to their full capacity to ensure that animal protein is sustainably available all year round. Therefore, this study was carried out to determine the sustainable improvement alternatives to animal health service delivery constraints.

II. MATERIALS AND METHODS

A. Sampling Technique, Data Collection and Research Design

Fifteen (15) communities were randomly selected within the Daffiama-Bussie-Issa district (DBI). Ten (10) farmers (respondents) were randomly sampled from each of the fifteen communities for questionnaire administration. Semi-structured questionnaires were used to collect data from the respondents. A qualitative research design was used for the study. A sample of the questionnaire used is shown in Appendix I. The questionnaire was pretested prior to data collection.

TABLE I
DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS (FARMERS)

Variables	Parameters	Frequency	Percentages
Age group	<30 years	13	8.3
	30-45	50	33.3
	46-60	64	42.7
	60+	23	15.3
	Total	150	100
Household size	1-5	59	39.3
	6-10	59	39.3
	11-15	23	15.3
	16-20	2	1.3
	20+	7	4.7
	Total	150	1
Level of education	Non-formal	3	2.0
	Primary	18	12.0
	JHS	14	9.3
	SHS	11	7.3
	Tertiary	8	5.3
	None	96	64.0
	Total	150	100

From Table 1, 42.7% of the respondents were between 46 and 60 years of age, and a few (8.3%) were less than 30 years of age (<30). Many the respondents fell within the working age group, indicating they have the capacity or strength to raise livestock. The impact of age on the patronage of agricultural technologies, including veterinary service, is mixed. Although Adam and Ohene-Yankyera [27] indicated that age is often associated with experience, and can positively impact the adoption of agricultural technologies, Okereke [30] found a negative impact of age on the patronage of veterinary services in Nigeria. Onono et al. [31] found that apart from age, other forces influence veterinary service patronage in developing countries. The present study showed that age does not influence veterinary service patronage ($X=8.672$, $df=3$, $p=0.34$). The study again showed that age had no association with decision-making on sustainable

B. Data analysis

Statistical Product and Service Solutions (SPSS/IBM) version 20.0 was used to compute all descriptive statistical variables. The results were presented in tables and figures. Chi-square analysis was done to check for the effect of some variables on others at a significant level of 5%.

III. RESULTS AND DISCUSSIONS

Almost all respondents or about 97.3% of farmers were males, and the remaining (2.7%) were females (Table 1). This shows that there is little involvement of women in the livestock industry in the area. It is attributed to the fact that males are the heads of the family, and any livestock raised by women is automatically owned by men. This is supported by Adam and Ohene-Yankyera [27], Mensah and Fosu-Mensah [28] and Zoma-Traoré, et al. [29], who found that males were the dominant household heads dominating in decision-making concerning livestock. Even though males dominated the livestock production sector in the study area, gender had no influence on veterinary service patronage ($X=3.078$, $df=2$, $p=0.215$). However, gender had an effect on determining sustainable improvement alternatives to animal health service delivery constraints ($X=20.878$, $df=4$, $p<0.001$).

animal health delivery alternatives ($X=1.161$, $df=6$, $p=0.979$). Also, age did not affect the treatment of sick animals by the respondents in the absence of veterinary professionals ($X=16.151$, $df=9$, $p=0.064$).

A large percentage (39.3%) of respondents in the study area had a household size between 1 and 5, and the least (1.3%) had a household size between 11 and 15. This means majority of the respondents have a relatively small household size. Household provides available labor for agricultural activities [32], especially in developing countries [28], [29]. Okereke [30] found a positive influence on larger family sizes to participate in veterinary services and other agricultural activities due to the availability of enough labor. However, the present study found no effect of family size in veterinary service participation, as majority of the respondents had small household sizes and were still willing to participate in

veterinary services and adopt other agricultural technologies. This is supported by Legesse et al. [33], who found that larger family size will least patronize veterinary services and other agricultural technologies because of resource competition.

64% of the respondents had no educational background, and only a few (5.3%) had tertiary education. The present study found no effect of educational background on the patronage of veterinary services ($X=2.357$, $df=5$, $p=0.798$), which contradicts Legesse et al. [33, who found that the educational background of farmers had a great influence on their patronage of veterinary services and other agricultural technologies; this is because education broadens their thinking capacity, approach, and utilization of relevant information. Also, the study revealed no influence of education on determining sustainable improvement alternatives to animal health service delivery constraint ($X=10.122$, $df=10$, $p=0.430$). However, the study showed that education had an influence on the treatment of sick animals in the absence of veterinary professionals ($X=31.783$, $df=15$, $p=0.007$).

A few (14.7%) of the respondents reared cattle, while the remaining (85.3%) did not (Fig. 1). Furthermore, 56.1%, 92%, and 100% of the respondents reared sheep, goats, and poultry, respectively. The study revealed the following group of livestock kept by the respondents; large ruminants (cattle), small ruminants (sheep and goats), mono-gastric (pigs and poultry), and other micro livestock such as pigeons and rabbits. This is not surprising because livestock plays an important role in the lives and livelihood of the rural poor, serving as a source of saving bank, food, income, and for socio-cultural purposes. This is backed by Chen et al. [15], Adams et al. [25], and Campbell et al. [34], who indicated that livestock serves as an important source of wealth and saving and insurance against the uncertainties in crop production and alleviates livestock farmers from poverty. All the respondents (100%) indicated that they had no funding source for livestock production apart from the little they get from the sales of their food crops. Most (88.7%) of the respondents patronize veterinary services, while the remaining (11.3%) do not patronize veterinary services. The following percentages were recorded for the various channels of animal health service delivery used by the respondents in the study area; 97.0% for government veterinary service providers, 2.2% for private service providers, and 0.7% for traditional medicine.

Most respondents prefer governments' veterinary professionals as their animal health service delivery channel to any other channels of animal health service delivery. According to the respondents, their choice is based on the fact that the government service providers are well-trained to deliver animal health services and are also the only channel in the area. This is supported by Kebede et al. [35], who reported that farmers prefer government veterinary service providers because their services are less expensive, available, and effective.

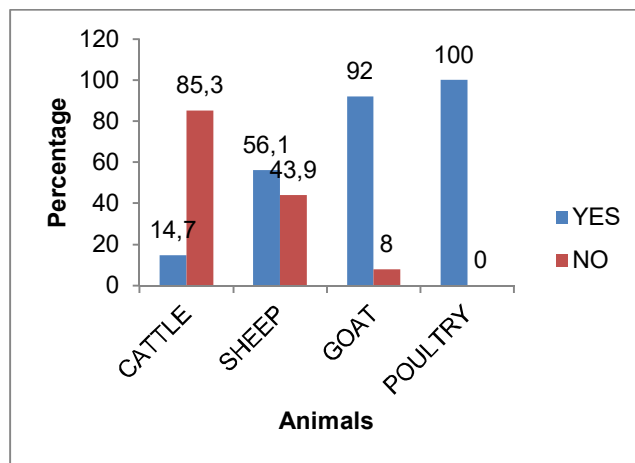


Fig. 1 Types of animals kept by the respondents

These service providers are few in the area resulting in competition among farmers. This means that farmers will waste some of their productive time looking for animal health service providers, slowing down productivity. Even though the private practice has been recently encouraged in Ghana, the Veterinary Service Directorate of the Ministry of Food and Agriculture has been the main animal health service provision source. The present study explores sustainable improvement alternatives to animal health service delivery constraints. Privatization was one of the alternatives for refocusing animal health service delivery and was preferred by many countries in sub-Saharan Africa, including Ghana [35].

However, the present study's findings revealed that privatization was a disadvantage to marginalize and remote areas as the private service providers are profit-oriented and often concentrated on urban areas where they can get pets to treat frequently to meet their daily gains. This is backed by Cheneau et al. [36], who reported that private practitioners might focus on urban areas leaving rural communities. For this reason, Community-Based Animal Health Workers (CBAHWs) were introduced to help deliver animal health services to rural and marginalized areas [37].

The present study revealed that, according to the respondents, CBAHWs, as an alternative animal health service delivery channel, are no longer in operation. The collapse of the CBAHWs scheme was attributed to the loss of support from both Veterinarians and Para-Veterinarians. The scheme's collapse harms the delivery of animal health services as it widens the gap that the government attempted to bridge by adopting the decentralization policy, leaving many remote areas without adequate animal health service providers. Mockshell et al. [38] reported that Government Para-Vets (GPVs) are the most preferred and have more widespread use by farmers than CBAHWs and Private Para-Vets (PPVs). In recent times, one health approach to tackling animal health has been recommended [39]. 41.3% of the respondents traveled 16 km and above to access animal health service providers and 5.3% traveled between 11 and 15 km to access animal health services (Fig. 2).

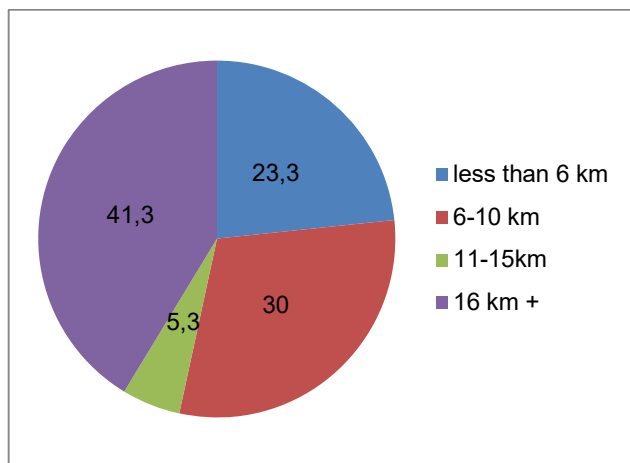


Fig. 2 Distance traveled by the respondents to access veterinary services

From Table 2, the majority (68.1%) of the respondents indicated that government veterinary staff visited them yearly, and a few (1.4%) indicated that they were visited daily. For

32.9% of the respondents, long distance was the major problem they faced in getting veterinary assistance, and 2.0% each was recorded for lack of drugs and difficulty in communication (Table 2). Adams and Ohene-Yankyera [27] also reported a similar incident as one of the major reasons for farmers not participating in veterinary services in Northern Ghana. Kebede et al. [35] also reported long distances from service centers among client-related problems in accessing veterinary services in North Gondar, Ethiopia. This implies that farmers stand the chance of losing their livestock in the event of an emergency situation. In the absence of veterinary treatment, the respondents used the following alternatives to salvage their sick animals. 48.3% of respondents resorted to home consumption of their sick animals without prior knowledge of the disease-causing the ill health in such animals, and only 4.7% used traditional medicine to treat their sick animals (Table 2). For animal health service providers (Veterinary Technical Officers), lack of means of transport (for example, motor bike) was ranked first (1st) as the major challenge they faced in the delivery of animal health services.

TABLE II
FREQUENCY OF GOVERNMENT VETERINARY STAFF VISIT, PROBLEMS IN GETTING VETERINARY SERVICES AND SOURCE OF ASSISTANCE IN THE ABSENCE OF VETERINARY STAFF

Variable	Parameters	Frequency	Percentage (%)
Frequency of visit by government veterinary staff	Daily	2	1.4
	Weekly	5	3.5
	Monthly	38	27.0
	Yearly	94	68.1
Problems in getting veterinary assistance	Lack of information	31	20.7
	Difficulty in communication	3	2.0
	Long distance	49	32.7
	Lack of drugs	3	2.0
	Lack of commitment of veterinary staff	24	16.7
	Lack of money	40	26.7
Source of assistance in the absence of veterinary staff	Traditional medicine	7	4.7
	Self-medication	18	12.0
	Sale of sick animal	50	33.3
	Home consumption	72	48.0
	Others	3	2.0

Lack of accommodation, untimely supply of vaccines, and other logistics were other challenges they faced in delivering animal health services. According to the service providers, these challenges can be ameliorated sustainably by the provision of means of transport, timely supply of vaccines, and education programs should be organized by the Veterinary Service Department (VSD) of the Ministry of Food and Agriculture (MoFA) for farmers on the need to care for their animals. On the part of farmers, their challenges can be ameliorated sustainably by employing an adequate number of veterinary professionals, and these service providers should be evenly distributed across the country. Service providers undertake the following activities in their respective operational areas; vaccinations, disease surveillance, home and farm visits, meat inspection, and animal movement permit issuance.

52.3% of the respondents had access to veterinary drugs, and 47.7% did not have access to veterinary drugs. The majority of respondents who had access to veterinary drugs (76.3%) used antibiotics and 23.7% indicated they had access

to de-wormers. For respondents who did not have access to veterinary drugs, 95.8% indicated that veterinary drugs were not available, 2.8% of them said veterinary drugs were expensive and 1.4% indicated both lack of veterinary drugs and expensive nature. All (100%) of the respondents who had access to veterinary drugs practiced self-medication. The study findings revealed that most respondents had access to veterinary drugs, particularly antibiotics. In related studies, Turkson [40] reported that self-medication was the most method used by farmers in order to meet their animal health needs. According to Turkson [40], self-medication is the practice in which a farmer buys drugs and vaccines and administers them without seeking a veterinary professional's consent. 38.9% of respondents indicated diarrhea as the common condition they encounter in their herds, and 14.1% encountered pneumonia (Fig. 3).

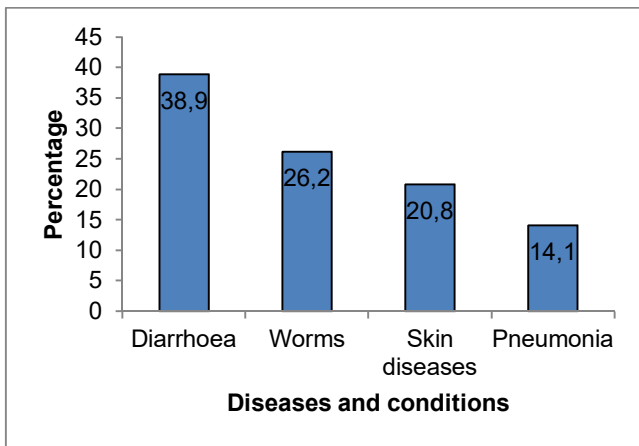


Fig. 3 Diseases and conditions commonly encountered by the respondent

For the season of the year in which these conditions are encountered, the majority of the respondents, or about 74.7%, observed these conditions or diseases in the early rainy season and 3.3% in the late dry season (Fig. 4). 43.0% of the respondents show that environmental conditions are thought to be the cause of these conditions. 33.6% of the respondents attributed the cause of these conditions or diseases to infections. 11.4% of the respondents indicated that poor housing was the cause of these conditions. 10.7% of the respondents associated the causes of these conditions with feeding problems, and few, or about 1.3% of the respondents, attributed the cause to traumatic wounds. 53.5% of respondents indicated that services provided by the government veterinary service providers were not affordable, whereas 46.5% indicated that the services were affordable.

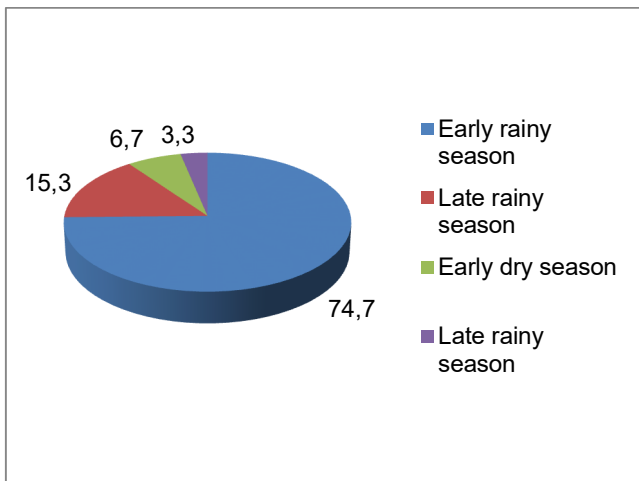


Fig. 4 Season of the year diseases and conditions are encountered by the respondents

A half or 50% of the respondents showed that they spent above GHC100 (approximately \$18) on their animals per year, 39.4% of the respondents spent between GHC50 (approximately \$9) and GHC100 and 10.6% of the respondents spent less than GHC50 (Fig. 5). Adams and Ohene-Yankyera [25] also reported similar incidence by farmers in Sudan and Guinea savannah areas stating that the cost of veterinary service is not affordable. A large number (93.1%) of the respondents indicated that they vaccinated their animals, and 6.9% did not vaccinate their animals. From

Fig. 6, only 17% of the respondents vaccinated their cattle against Contagious Bovine Pleuropneumonia (CBPP) and 83% did not vaccinate their cattle against CBPP and other diseases. For sheep and goats, only 31.7% vaccinated them against Peste des Petits Ruminant (PPR), and 68.3% did not vaccinate them against PPR. All (100%) vaccinate their poultry against New castle disease. Even though most respondents indicated that they vaccinated their animals, most vaccinations were limited to poultry and against Newcastle disease. A few of them vaccinated their animals against Contagious Bovine Pleuropneumonia (CBPP) and Peste des Petits Ruminant (PPR). Conditions or diseases encountered most by service providers include; suspected rabies and Newcastle disease cases (in the dry season), suspected pneumonia cases, Orf, worm infestation, and diarrhea (in the rainy season). These conditions were remedied with antibiotics, de-wormer, multivitamins, and supportive care for the viral diseases. Service providers also indicated that their operational areas had no veterinary clinics, and farmers accessed them by bicycle and phone. Most respondents encountered diarrhea as the most common condition observed in their herds, consistent with what the service providers reported. They also reported that the condition is encountered early in the rainy season. According to them, environmental conditions are thought to cause the condition they observed in their herds.

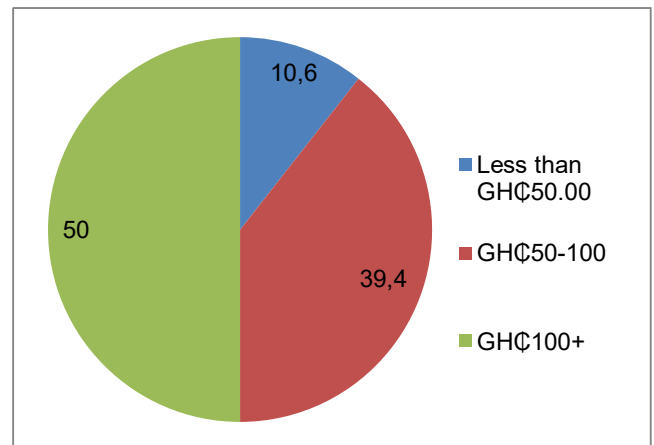


Fig. 5 Amount spent on animals per year

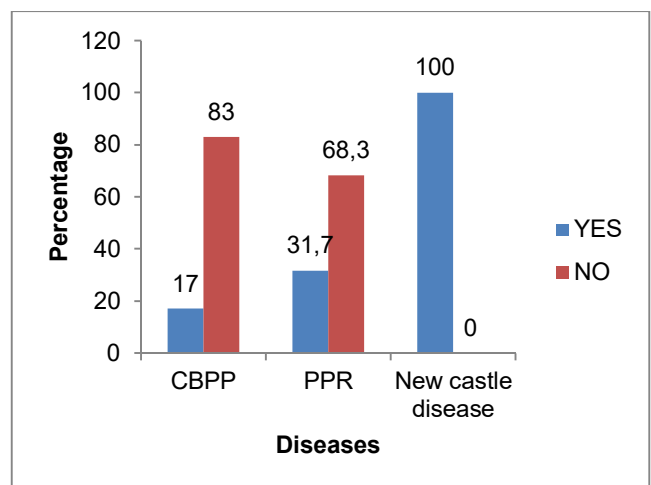


Fig. 6 Diseases respondents vaccinate their animals and poultry against

IV. CONCLUSION

The present study revealed an inadequate number of veterinary service providers (Veterinary Technical officers) in the area. The practice of self-medication without prior knowledge of drug withdrawal periods was common among respondents. The study found government animal health service providers as a sustainable animal health service delivery alternative. However, according to the respondents, other sustainable improvement alternatives to animal health service delivery such as the CBAHWs scheme and private service providers, were not found in the study area. Animal health service providers also lack means of transport and other logistics that could facilitate the delivery of animal health services. The aforementioned negatively affects sustainable animal production and the availability of animal protein all year round.

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APPENDIX I
QUESTIONNAIRE FOR LIVESTOCK FARMER

A. BIOGRAPHIC INFORMATION

1. Sex: M F
2. Age: <30 30-45 46-60 60+
3. Name of community.....
4. Number of individual in the household: 1-5 6-10 11-15 16-20 21+
5. Educational Background: Non-Formal Primary JHS SHS Tertiary None
6. Type of animals kept: Cattle Sheep Goats poultry All
others.....
7. Do you have any source of funding for livestock production? Yes No
8. If yes, what is the source?
9. Do you patronize veterinary service? Yes No
10. If yes, which of the animal health delivery channels do you use?
Government Veterinary service providers
Private veterinary service provider
Community-Based Animal Health Workers
Traditional medicine
Veterinary Drug Shop Operator
11. If no, why

B. ANIMAL HEALTH SERVICE DELIVERY ASSESSMENT

1. How far is the animal health service provider from the livestock keeper? 0-5 Km
6-10 Km 11-15 Km 16 Km+
2. Does the community have Community-Based Animal Health Worker (CBAHW)?
Yes No
3. If yes, what are his/her activities?
4. How effective are his/her activities? Poor Average Effective Very effective
5. How frequent do Government veterinary staff visit your community? Daily Weekly Monthly Yearly
6. What are your problems in getting veterinary assistance? Lack of information Difficulty in communication
Long distance Lack of drugs
Lack of commitment of veterinary staff Lack of money others (specify).....
7. What can be done to overcome these problems sustainably?
8. In the absence of veterinary treatment, what do you do with the sick animal?
Traditional medicine Self-medication Sale of sick animal Home consumption
Others (specify)

C. DISEASE MANAGEMENT

1. Do you have access to veterinary drugs? Yes No
2. If yes, what type of drug do you buy? Antibiotics Dewormers Acaricides
Others (specify)
3. If no, why? Drugs are not available Drugs are expensive Not sold to farmers All of the above
Others (specify)
4. Who administers the drugs? Self-medication Professional vet Officer CBAHW Traditionalist
Others (specify)
5. What are the common diseases or conditions you encounter? Diarrhea Pneumonia Worms
Skin diseases others (specify)
6. During what season of the year? Early rainy season Late Rainy Season Early Dry Season Late Dry
season
7. What are some of the causes of these diseases? Infections Environmental conditions Traumatic wounds
Feeding problems Housing Water problems others (specify)...
8. Are the treatment provided by the government veterinary service affordable? Yes No
9. How much do you spend on your animals in a year? <GHC50 GHC50-100 GHC100+
10. Which of the animal health channels do you use most? Professional Vet CBAHW Traditional medicine
Vet drug shop operator
11. Which of the animal health delivery do you prefer

PERSONNEL

REASONS

- Veterinary professional []
- CBAHW []
- Traditional medical practitioner []
- All the above []
- None []

12. Do you vaccinate your animals? Yes [] No []

13. If yes, against what diseases?

CATTLE:

CBPP [] TB [] Anthrax [] Black leg [] All [] None [] Others.....

GOATS:

PPR [] Anthrax [] All [] None [] others

POUTRY:

Newcastle disease [] Avian Influenza [] Fowl pox [] All [] others.....

If no, why?

QUESTIONNAIRE FOR SERVICE PROVIDER

Demographic characteristics of service provider

1. Age; 10-25 [] 26-35 [] 36-45 [] 46-55 [] 60+ []
2. Sex: M [] F []
3. Operational area
4. Position/Rank: Doctor [] Technical Officer [] Technical Assistant [] Others (specify)..
5. What are the Animal Health activities you undertake in the communities?
 Dry season.....
 Wet season
6. What are the conditions or diseases you encounter most?
 Dry season
- Wet season
7. How do you remedy the situation?
8. What are the problems confronting you in the delivery of health care to the communities? Rank the problems
 1.....
 2.....
 3.....
 4.....
 5.....
9. What can be done to overcome these problems sustainably?

10. Does the community have a vet clinic? Yes [] No []
11. If no, how do the farmers get access to you? By foot [] By bicycle [] By vehicle [] Phone call [] others (specify)