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Research Article

Field Assessment of Major Livestock Diseases and Health Management Practices in Assosa Zone Areas

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Abstract

A preliminary disease survey in livestock and health management practices comprising cattle, goats, and poultry was undertaken. This study was conducted to identify livestock diseases, determine the method of diagnosis, and evaluate the disease management system within the period of 2020 to 2022. A semi-structural questionnaire was developed. 86 animal owners, who have large number of animals, participated in three districts Assosa, Bambasi, and Homosha each consisting of 52, 18, and 16 respondents respectively. The mean average number of cattle, goats, and poultry per farm was 10.1, 10.8, and 2003.3 in that order. According to respondents 93% of tell us the first disease was trypanosmiasis, followed by parasites 70.9%. Newcastle disease 75.6% of respondents was the most common disease in poultry, and Peste des petites ruminants (46.5% of respondents) was the most common in small ruminants. Most respondents explained that there was low satisfaction in veterinary supply. In Homosha, Assosa and Bambasi district identification of diseases diagnosis only by clinical sign was 100%, 80.7% and 33.3% respectively. Season of outbreak vary according to diseases type and infected species. The majority of goat and sheep outbreaks occurred in the winter (keremt) and autumn, but cattle outbreaks were prevalent in the spring followed by summer (bega). The total morbidity was 16.8% and total mortality was 7.1%. In Bambasi, the average morbidity was 2.8% and average mortality was 0.1%. The morbidity in Homosha was 62.5% and mortality was 26.1%. In Assosa districts the morbidity was 7.6% and mortality 3.7%. The morbidity of cattle was 13.2% and mortality was 5.5%. The morbidity of goat was 51.7% and mortality was 23.3 %. The morbidity in poultry farms was 26.8% and mortality 11.2%. This Study revealed that there were different disease outbreaks in the Assosa zone and management in livestock Production is poorly practiced. This is the greatest threat to livestock production and productivity. Therefore, preventive measures should be taken to sustain livestock health.

Keywords

Assosa Zone, Diagnostic Methods, Health Management, Outbreak

1. Introduction

Background: Most smallholder farmers in Africa depend on livestock for their livelihoods. Among the livestock, cattle, horse, Poultry, Sheep and Goat play an important economic and social role in the overall production system of large and small scale farmers. These animals important for main source of draft power, wealth accumulation purposes and income

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generation, production of wool, leather and meat production [6]. In Ethiopia, mortality and morbidity of livestock species due to widespread endemic diseases is high and ranks first in Africa in the health burden of zoonotic diseases [4, 10]. Because of these reasons, Ethiopia is unable to export livestock and livestock products to the lucrative world market. Furthermore, trade with Middle East countries is frequently hampered and sometimes imposed due to diseases [1]. The existing animal health intervention options have not been able to control or eradicate those rampant animal diseases. Low performance of drugs and insufficient vaccination coverage are the main problems in the country [3].

Knowing the type and extent of the common and significant health problems of livestock in the area is very important for veterinarians, researchers, and other responsible governmental and nongovernmental bodies. Despite the use of some scanty veterinary services, information on animal health management system was never a significant focus of research in this area. These kinds of health information can assist in the development of herd health strategies, enabling the selections of possible intervention approaches and to improve the level of adoption there by increase milk yield, meat and egg production in potential areas [5].

The study was undertaken to determine information gaps, constrains identification & characterization of the management aspects of animal health along with instituting targeted interventions for the improvement of livestock production & productivity. So common diseases found in the area, method of diagnosis, available veterinary drugs and vaccines should be known. Information, technologies, and knowledge are generated every day but its adoption at the farmers and its impact in the overall national economy is very low. Livestock production and productivity in our country were masked by poor nutritional value in both quantity and quality and poor animal health management. Animal husbandry constraints lead to epidemics, which increased livestock morbidity and mortality. Information on animal disease and husbandry practices are limited, in this regard; we assess the animal health and management practices in livestock in Assosa zone, Benishangul Gumuz region, northern western Ethiopia. There for the objectives of the current study was to assess the major diseases of livestock and its husbandry practice, to measure morbidity and mortality during outbreaks, to know the method of diseases diagnosis, to understand control techniques and to support the improvement of disease mitigation systems.

2. Materials and Methods

2.1. Study Area

The study conducted in the Assosa zone, Benishangul Gumuz region, northwestern Ethiopia. Benishangul Gumuz Regional state is situated in western part of Ethiopia, between 090 17'-12.06" N latitude and 340 10'-37.4" E longitude. The region bordered with Sudan Republic in the West, Amhara region in the North and North – East, in the Southern with Gambella regional state, and in South and South East direction by Oromia region. The average annual temperature is 16-39 0c; its annual rain fall is 650–1,900 mm. The region covers a total area of 5,033, 592 hectar/50,380 Km2 or 4.4 % total of the country, with altitude ranges from 580 – 3300 m.a.s.l with 75% low land/kola/ (below 1,500 m.a.s.l). According to in Benishangul Gumuz region the number of cattle, sheep and goat population was 592,228, 61,335 and 446, 323 respectively. Assosa zone is located in Benishangul Gumuz region, the lowland agro ecological zones of western part and the climate is characterized by bimodal rainfall consists of rain season, called Keremt (June-November), dry season, called Bega (December-May). The agro ecology is mid and low land and mixed agricultural farming system. In According to [2] in Assosa zone the number of cattle, sheep, goat, donkeys, poultry and beehives are 69420, 11542, 154346, 17670, 352960, 36263 respectively but there is no horse, mules and camels.

Study design and sampling: A cross-sectional survey with Purposive sampling method was used to select animal owners in this study.

2.2. Selection of Study Farms and Farmers

This study included model farmers, with a focus on farm owners who have livestock and kept a large number of animals. During the entire study period, all volunteer farm owners, as well as coverage, access to vet clinics, and extension services, were taken into account.

Target population: The study districts included Assosa, Bambasi, and Homosha. Three peasant associations selected in each district. Overall 86 purposively selected model farms included in the interview. The respondents comprising either of farm owners, farmworkers, and agricultural development agents (ADA), veterinarians and farm managers were involved during face to face interview. The dominant type of livestock species were selected as a target, that means the animal with large in number in the house hold count as a target species and details of interviewed about that specific target species in the household.

2.3. Sample Size Determination

The number of respondents for unknown population calculated using the formula $(Z/2)^2 \times p \times q / e^2$ and assuming minimum variation (5%) between farm owner's management systems and farming types [7]. According to the formula number of respondents were $(1.96)^2\ 0.05 \times 0.95 / (0.05)^2 = 73$ but to increase precision the number of respondents increase to 86.

2.4. Questionnaire Preparation

A structural and semi structural questionnaire comprising of both qualitative and quantitative data developed for this study. A questionnaire was developed to measure participants'

knowledge about livestock outbreaks with one year period, major diseases found in the area, disease diagnostic methods and control, prevention and treatment methods. The questionnaire was pre-tested before administration to the interviewees. Farmers gave responded to different animal diseases as they recognize via their gross rooted knowledge of local names of diseases and symptoms. Animal health personnel's were involved to further disease identification and clarification based on physical examination history.

2.5. Livestock Mortality

Three-year retrospective cross sectional study conducted from October 2020 to September 2022 to characterize outbreaks, livestock mortality and outbreak control methods in the selected farms.

2.6. Data Analysis

Data analyses in SPSS version 20 used for statistics. For data involving frequencies, descriptive statistics employed to analyze the collected information in the study areas. The One way ANOVA used to determine the morbidity and mortality.

3. Result and Discussion

This is the first survey narrating in livestock disease distribution and health management practices undertaking the field of animal health management. The study was included livestock profile, diseases distribution, disease management practices, and morbidity and mortality of livestock in the three-year period (2020 to 2022) in this Assosa zone of Benishangul Gumuz region.

3.1. Animal Profile

A total of 86 volunteer respondents were participated in the survey the number of respondents in Assosa, Bambasi and Homosha was (52, 18 and 16) respectively. As Table 1 shown that the average number of cattle, goat and poultry per farms were 10.1, 10.8 and 2003.3 in that order. The target species selection was depending on the number of livestock available in individual farm owners.

Table 1. *Herd structure and size.*

Number of respondents with target species	Assosa	Bambasi	Homosha
Poultry	4	0	2
Cattle	44	18	12
Goat	4	0	2
Animal profile	Assosa zone (Assosa, Bambasi and Homosha model farms)		
Number of animals in herd (Cattle)		Length of year of establishment (Cattle)	
Minimum number	2	Minimum number	2
Maximum number	50	Maximum number	48
Mean number	10.1	Mean number	17.6
Mean Lower and upper bound of 95%	8.35 - 12.42	Mean Lower and upper bound of 95%	15.2 - 20.4
Number of animals in herd (Goat)		Length of year of establishment (Goat)	
Minimum number	5	Minimum number	1
Maximum number	18	Maximum number	23
Mean number	10.67	Mean number	9.33
Mean Lower and upper bound of 95%	6.7 - 14.7	Mean Lower and upper bound of 95%	2.0 - 17.0
Number of animals in herd (poultry)		Length of year of establishment (Poultry)	
Minimum number	10	Minimum number	1
Maximum number	4000	Maximum number	15
Mean number	2003.33	Mean number	5.67
Lower and upper bound of 95%	673.3 - 3324.9	Lower and upper bound of 95%	- 10.3

3.2. Common Diseases in Assosa Zone

As Table 2 shown that Trypanosomosis was the most common disease in cattle in the Assosa zone (93% of respondents tell us the first disease was trypanosmiasis), followed by parasites (70.9% of respondents). Newcastle disease (75.6% of respondents) was the most common disease in poultry, and Peste des petites ruminants (46.5% of respondents) was the most common in small ruminants. According to previous study [8] the major diseases causing morbidity and mortality in livestock were Contagious Bovine Pleuropneumonia (CBPP), LSD, PPR, Internal and external parasites, Anthrax, Pasturolosis, Blackleg, FMD, and Trypanosomosis. NCD were important poultry diseases in the area. In addition similar to the current study, [9], 98.55%, 97.01% and 89.55% of respondents were noted as (Trypanosomosis, CBPP and NCD) respectively the highest priority animal diseases and Kebeles animal health workers retrospective case book clinical cases indicated that, 25.37% of Trypanosomosis, 31.23% of CBPP, and 28.30% of pasteurellosis, were recorded as highest morbidity rate.

Table 2. *Common diseases at the study Districts.*

Diseases	Prevalence in each Districts			Prevalence total
	Homosha	Assosa	Bambasi	
Trypanosomosis	14/16 (87.5%)	50/52 (96.1%)	16/18 (88.9%)	80/86 (93%)
CBPP	9/16 (56.2)	18/52 (34.6%)	16/18 (33.3%)	33/86 (38.4%)
Parasite	9/16 (56.2%)	41/52 (78.8%)	11/18 (61.1%)	61/86 (70.9%)
Brucellosis	2/16 (12.5%)	8/52 (15.4%)	4/18 (22.2%)	14/86 (16.3%)
Pasturolosis	-	22/52 (42.3%)	18/18 (100%)	40/86 (46.5%)
FMD	2/16 (12.5%)	17/52 (32.7%)	11/18 (61.1%)	30/86 (34.9%)
Black leg	-	22/52 (42.3%)	14/18 (77.8%)	36/86 (41.8%)
NCD	13/16 (81.1%)	40/52 (76.9%)	12/18 (66.7%)	65/86 (75.6%)
PPR	2/16 (12.5%)	27/52 (51.9%)	11/18 (61.1%)	40/86 (46.5%)
Enterobacter	-	13/52 (25%)	6/18 (33.3%)	19/86 (22.1%)
Coccidiosis	-	16/52 (30.7%)	7/18 (38.8%)	23/86 (26.7%)
Orf	2/16 (12.5%)	7/52 (13.5%)	1/18 (5.6%)	10/86 (11.6%)
Pneumonia	3/16 (18.7%)	10/52 (19.2%)	-	13/86 (15.1%)
LSD	1/16 (6.2%)	15/52 (28.8%)	8/18 (44.4%)	24/86 (27.9%)
Mastitis	-	12/52 (23.1%)	9/18 (50%)	21/86 (24.4)

3.3. Access of Veterinary Service Delivery

3.3.1. Diseases Control with Treatment

Major drugs found in the study area were Diminazene aceturate, Isometamidium chloride, Albendazole, Amprolium, Oxy tetracycline, penstrep, antibiotics, ivermectin, amitraz and deltamethrin. But these drugs not found enough. The availability of listed drugs was very limited and lack of drug supplements, so animals exposed to diseases in the study area. As shown in Table 3 below most of the respondents in all study districts explained that farmers take their animal to clinics during the animal become sick.

Table 3. *Frequency of treatment practice.*

Treatment regime	Treatment regime			
	ones per month	two per month	during disease occur	vary according to disease
Homosha	4 (25%)	6 (37.5%)	6 (37.5%)	0 (0%)
Assosa	7 (13.4%)	18 (34.6%)	20 (38.4%)	7 (13.5%)
Bambasi	5 (27.7%)	1 (5.5%)	2 (11.1%)	6 (33.3%)
Total	16/86 (18.6%)	25/86 (29.1%)	28/86 (32.6%)	13/86 (15.1%)

3.3.2. Health Record

The respondents in this study area do not record animal health by themselves, but animal health workers do. As shown in Table 4 the majority of respondents record the vaccination followed by treatment and deworming. To control internal parasites 32.6% of the respondents farmers of the study areas deworm their animals, where as 67.4% do not deworm their animals and have not given an idea for this purpose. Almost all of them deworm their animal whenever the animals become sick.

Table 4. *Animal health record by animal health worker at the study area.*

Health record	Deworming	Treatment and spray	Vaccination	Pregnancy diagnosis
Frequency	28	30	64	4
Percent	32.6%	34.9%	74.4%	4.7%

As shown in Table 5 in each study district, the level of satisfaction with the treatment supplement varied. Half of the farmers (50%) in Homosha district were low satisfaction with veterinary supplements due to a lack of good diagnosis, lack of health care, lack of (drugs, vaccines, and other facilities). In Bambasi and Assosa almost half of the respondents were moderately satisfied with treatment and other veterinary cares. In other study [9] unstrategic treatment and vaccination service, lack of veterinary diagnostic equipment's, lack of veterinary drugs and vaccine, less monitoring and evaluation system leads to animal to become sick. In addition similar to the current study [6] farmers are not fully aware of taking to veterinary vaccination and treatment centers due to different challenges; traditional beliefs that awaiting the sick animal for self-recovery; unable to afford medicines, treat their animals personally or due to long distance to veterinary service delivery centers.

Table 5. *The farmer's level of satisfaction by treatment supplied.*

Districts	level of satisfaction			
	High	Moderate	low	Not satisfied
Homosha	6 (37.5%)	2 (12.5%)	8 (50%)	0 (0%)
Assosa	18 (34.6%)	31 (59.6%)	0 (0%)	3 (5.8%)
Bambasi	6 (33.3%)	6 (33.3%)	4 (22.2%)	2 (11.1%)
Total	30 (34.9%)	39 (45.3%)	12 (13.9%)	5 (5.8%)

As shown in Table 6 in Homosha, Assosa and Bambasi district diagnosis of animal diseases only by clinical sign was

100%, 80.7% and 33.3% respectively. In Homosha, Bambasi and Assosa district diagnosis of animal diseases both in clinical sign and laboratory was 0%, 33.3% and 19.2% respectively. Almost all veterinary diagnosis methods in the Assosa zone were based solely on clinical signs. The majority of veterinary survies, such as drugs and vaccines, were provided by the public, but in Bambasi and Homosha, nearly half of the animal owners used traditional medicines in addition to modern medicine. Brokers were common in the study area, in addition to governmental supplements of animal drugs. In Homosha district relatively large number, 12.5% of respondents use drugs distributed by brokers followed by Assosa (3.8%). There were no respondents who use drugs distributed by brokers in Bambasi district.

Table 6. Diagnosis method and treatment.

Method of diagnosis			Treatment given by broker		
Clinical sign		Both laboratory and clinical sign	Yes	No	No idea
Homosha	16 (100%)	0 (0%)	2 (12.5%)	14 (87.5%)	0 (0%)
Assosa	42 (80.7%)	10 (19.2%)	2 (3.8%)	47 (90.4%)	3 (5.8%)
Bambasi	6 (33.3%)	6 (33.3%)	0 (0%)	18 (100%)	0 (0%)
Total	64 (74.4%)	16 (18.6%)	4 (4.7%)	79 (91.9%)	3 (3.5%)

3.4. Morbidity and Mortality

3.4.1. Outbreak Investigation

Different outbreaks were present in different species of animals in each study district, according to reports and casebooks of animal health workers. In all species of animals, Homosha had the highest epidemics, followed by Assosa, and Bambasi had the smallest number of outbreaks. The occurance of high morbidity and mortality may be due to agro ecological, diagnosis and health management difference across districts. The severity of the outbreak varies across districts, peasant associations, and farm levels.

3.4.2. Season Outbreak

There were outbreaks in different time and different species of animals in livestock; however, most of the participants in the survey explained that season of outbreak vary according to diseases type and infected species. The majority of goat and sheep outbreaks in the Assosa zone occurred in the winter (keremt in Amharic) and autumn, but cattle outbreaks were prevalent in the summer (bega in Amharic) and spring.

3.4.3. Diseases Symptom in Outbreak

During outbreak there were various symptoms occurred on animals such as, loss of appetite, paralysis of the neck, discharge from the nose and mouth, loss of wing, emaciation, diarrhea, salivation, swelling of lymph nodes and abdomen area, vesicle within the hoof, mouth, and lip, eating mud, Coughing, bleeding on all parts of the skin, not eating or drinking but in good health, weakness, rough hair coat, stomatitis, oral, nasal, and ocular discharge, nodule on lung. The diseases causing for morbidity and mortality in livestock were Contagious Bovine Pleuropneumonia (CBPP), LSD, PPR, Internal and external parasites, Trypanosomosis, and NCD were also considered important diseases in the area. Similar to this study in pervious study [8], PPR was top-priority disease cause for outbreak in Goat.

3.4.4. Morbidity and Mortality in Outbreak

As shown in Table 7 in Assosa zone, total morbidity was 16.8% (10.3%-23.4% CI) and total mortality was 7.1%. In Bambasi, the average morbidity was 2.8% and average mortality was 0.1%. The morbidity in Homosha was 62.5% and mortality was 26.1%. In Assosa districts the morbidity was 7.6% and mortality 3.7%. The morbidity of cattle was 13.2% (6.7%-19.7% CI) and mortality of was 5.5% (2.4%- 8.6%). The morbidity of goat was 51.7% (4.7% - 98.7%CI) and mortality was 23.3 % (3.8%-42.9%). The morbidity in poultry farms was 26.8% (2.3-55.9%CI) and mortality 11.2% (-4.3-26.6%). Almost similar to the current study, [8] there were almost similar mean morbidity and mortality of cattle 39.9% and 4.7% respectively. In addition the mean morbidity and mortality of goat was 36.9% and 14.7% respectively but the mortality of goat in this study with higher difference from the previous study mortality of 14.71%.

Table 7. Morbidity and mortality of livestock during outbreak.

Categories	Mortality and morbidity		Categories	Mortality and morbidity	
Species	Mean Mortality (95% CI)	Mean Morbidity (95% CI)	District	Mean Mortality (95% CI)	Mean Morbidity (95% CI)
Cattle	5.5% (2.4%- 8.6%)	13.2% (6.7%-19.7%)	Homosha	26.1% (17.2%-35.4%)	62.5% (44.3%-80.7%)
Goat	23.3 % (3.8%-42.9%)	51.7% (4.7%-98.7%)	Assosa	3.7% (0.6%-6.8%)	7.6% (2.3%-12.9%)
Poultry	11.2% (-4.3-26.6%)	26.8% (2.3%-55.9%)	Bambasi	0.1% (0.01%-0.3%)	2.8 % (3.1%-8.6%)
Total	7.1% (4.0%-10.2%)	16.3% (10.3%-23.4%)	Total	7.1% (4.0%-10.3%)	16.8%(10.3%-23.4%

CI= Confidence interval

Homosha and Assosa had a mean difference in morbidity and mortality of 54.9% and 22.8% respectively with significance difference (P=0.00), while Homosha and Bambasi had a mean difference in morbidity and mortality of 59.7% and 26.1% respectively with statistically significance difference (P=0.00). The mean difference of morbidity and mortality between Assosa and Bambasi was 48.6 and 31.0% respectively with not statistically significant (P= 0.25). The mean difference of morbidity and mortality of poultry versus cattle was 13.6% and 5.7% respectively with statistically not significance (P=0.27 and 0.34 respectively). The mean difference of morbidity and mortality of poultry versus goat was –(24.6% and 12.2%) and 5.7% respectively with statistically not significance (P=0.27 and 0.34 respectively). The mean difference of morbidity and mortality of Goat and Cattle was 38.5 and 17.8% respectively with statistically significant (P=0.003 and 0.003 respectively).

Table 8. Mean difference in morbidity and mortality.

Categories	Morbidity and mortality respectively		Categories	Morbidity and mortality respectively	
Species	Mean difference	P- value	District	Mean difference	P- value
Poultry vs Cattle	13.6% &5.7%	0.27 &0.34	Homosha vs Assosa	54.9% & 22.8%	0.00
Poultry vs Goat	-24.6% &-12.2%	0.14 &0.13	Homosha vs Bambasi	59.7% & 26.1	0.00
Goat vs Cattle	38.5%&17.8%	0.003 &0.03	Assosa vs Bambasi	48.6% & 31.0%	0.25

4. Conclusion and Recommendation

Livestock production needs improved animal health, feed, and breeding to attain their maximal production and intensification besides other inputs. This Study revealed that there were different disease outbreak and the management in livestock Production is poorly practiced in the study area. In all species of animals, Homosha had the highest epidemics, followed by Assosa, and Bambasi had the smallest number of outbreaks. The occurrence of high morbidity and mortality vary in agro ecology, diagnostic system and health management practice. The severity of the outbreak varies across districts, peasant associations, and farm levels. However most of the participants in the survey explained that season of outbreak vary according to diseases type and infected species. There were higher morbidity and mortality of livestock in Assosa zone due to different diseases and poor management practice, so this is a greatest threat for livestock production and productivity in Assosa zone. There for preventive measure should be taken to sustain livestock health by perform animal diseases surveillance, and animal drugs and veterinary diagnostic materials should be full filled.

Abbreviations

NCD	New Castle Diseases
CBPP	Contagious Bovine Pleuropneumonia
LSD	Lumpy Skin Diseases
PPR	Peste Petites Ruminants
FMD	Foot and Mouth Diseases
Orf	Sore Mouth Disease

Author Contributions

Betelihem Yirdaw is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

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Research Fields

Betelihem Yirdaw: Veterinary Epidemiology, Clinical Medicine, Veterinary Immunology, Veterinary Microbiology, Vector Borne Diseases, Veterinary Parasitology