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Assessment of Live-Stock Mortality Rate in Selected Villages of Assosa Zone and Ma'o-Komo District

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Abstract: Aim: The present study was carried out to analyses morbidity and mortality rate in livestock in selected village areas Assosa zone and Ma'o - Komo district of the Region. Materials and Methods: A single visit survey conducted and totally 130 voluntary animal owners interviewed and necessary data regarding to livestock were collected from each animal owners. The collected data were analyzed statistically by Chi-square in excel for evaluation of Chi-square analysis. Result: Overall morbidity and mortality rates in cattle were 40.9% & 4.9%, in sheep 43.8% and 22.4%, and in goat 37.3%, 14.9% and in equine 11.7% and 7.0 % respectively. Depend on age category high proportion morbidity rate (94.16%) was scored by cattle age of 1-3 years and high proportion mortality rate scored by cattle age of >3 years this may be due to reproductive problems and use of drought power which are major challenges under village conditions in study area. In sheep high proportion of morbidity recorded in sheep age of > 1 year and high proportion of mortality were recorded at age of 6 months – 1year and in goat proportion of morbidity and mortality recorded in age of > 1 year and 6 months – 1 year which is 76.11%, 44.59% respectively. Chi-square analysis during goat data analysis revealed that the morbidity and mortality were statistically significantly ($p< 0.0175$). Conclusion: There was high /statistically significant livestock morbidity and mortality in the study area and causes livestock loss or reduction of livestock production and productivity. So, mortality and morbidity studies provide important information to determine the health status and guidelines for control and prevention practices, which will ultimately help in increasing the production and productivity and then improve the economic status of livestock owners.

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Introduction

The livestock sector plays an important role in the socio-economic development of our region and our country as an important source of income for farmers and the poor rural community. The success of the livestock sector depends on the good health of the livestock which helps to increase productivity. Considering that any alteration of the sanitary soil will shatter the hope of the livestock sector; despite the progress made in zootechnical practices, clinical medicine and diagnostic techniques, morbidity and mortality due to various causes continue to be higher (Shaikh, S. R., 2009). According to a study conducted on morbidity and mortality in cattle, including 7 (seven) districts of the Benishangul Gumuz region, it was found that the overall morbidity and mortality rate in cattle, sheep, goats and horses was 21.46% respectively, 22.1%, 22.52% and 6.75% Asmamaw, et. al., 2017).

Higher morbidity among adults might be associated with stress during high infestation of tsetse flies and shortage of forage at the beginning of rainy season of the year (Palanivel, *et. al,* 2007). Benishangul Gumuz Region had a total of 1.317424 million livestock (1.08% of the country's total livestock population), out of which 0.777915, 0.100013, 0.431216 and 0.00828 million comprises of cattle, sheep, goat and equine (0.63%, sheep 0.082%, goat 0.35%, equine 0.69% of country's total cattle population of Ethiopia respectively) CSA, 2016.

Total number of milking cows in the region was 85,500 and the average daily milk yield in liters per cow is 1.25 Lt Milk productions from cattle for the region, during the year 2009 - 2010, was estimated to be 0.82% of bovine milk production of the state (CSA, 2010).

Since Benishangul Gumuz Region contributes a significant amount of milk and meat production, this study has been undertaken to study the morbidity and mortality in cattle, sheep, goat and equine in this Region.

Methods And Materials

Description of Study Area

Benishangul Gumuz Regional state is situated in western part of Ethiopia, between 09^0 17'-12·06" N latitude and 34^0 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 ^{0}c; its annual rain fall is 650 – 1,900 mm. The region covers a total area of 5,033, 592 hectar /50,380 Km^2 or 4.4 % total of the country. Out of the country's total 1,128, 176 sq., it covers 4.44% of land area, with altitude ranges from 580 – 3300 m.a.s.l with 75% low land/kola/ (below 1,500 m.a.s.l), 24% mid land /weina dega/ 1,500 – 2,500 m.a.s.l), and high land /dega/ cover over 2,500 m.a.s.l) with 5 (five) indigenous and other ethnic groups (FITCA, 2003).

This study was conducted on smallholder farms in the mixed crop-livestock production system, which practiced in the arid and semi-arid areas of Benishangul Gumuz region. The study areas were selected in consultation with livestock health directorate in the Benishangul Gumuz Bureau of Agriculture and rural development and Animal health diagnostic control and prevention laboratory. In the context of mixed crop-livestock production system, two districts from the Assosa zone namely (Kurmuk and Bambasi) and Maho-komo special districts.

Animal husbandry in the area is characterized by a smallholder extensive management system. Cattle, goat, equine and sheep are the predominant animal species kept integrated with crop production. Cattle are the dominant animal species followed by goats, and sheep. Dairy cattle of local breeds (indigenous) are the dominant animals kept by farmers targeted mainly for milk, meat, income generator and for drought power purposes.

Study Design

A single visit survey was designed and employed during from May 20, 2019 - June 30, 2019, intended to collect a retrospective one-year data set (May 20, 2019 - June 30, 2019) of livestock mortality. The study utilized type of Questionnaire survey and principles of data collection and interpretation. Animal owners, both men and women, participated in the identification of causes and assessment of livestock mortality and related constraints having negative impact /causes economic losses/ on the production and productivity of livestock.

Attempts were made to select tree representative districts and one special district of the region judgmentally and the study kebeles were selected randomly by constructing a list of villages in selected study districts, but with some restrictions on the selection imposed based on accessibility to villages by vehicle or proximity to road and distribution of study animal population. Accordingly, Six villages from Bambasi district (womba, mender - 42, mender - 48, shobora and Amba - 16), three kebeles from kurmuk (Abadi, Horazb, and Dul-hode) district and four kebeles from Maho-komo (Tongo – 01, Shoshor, Taja jalisi, and Gure) district with a total of 13 (thirteen) kebeles and ten animal owners from each village of all selected districts (Table 1).

A total of 130 livestock owners were interviewed and information regarding demography, morbidity and mortality was recorded on a questionnaire format from May 20, 2019 - June 30, 2019 on the basis of farmer's interview. Depending on the information collected from the livestock owners the diseases occur in the area were trypanosomosis, internal parasites, external parasites, Anthrax, Black leg, CBPP, PPR, and pasteurellosis were the major diseased recorded in the area.

Questionnaire Survey

Quantitative and qualitative data regarding livestock mortality were generated through the questionnaire survey, and key informant interviewed. Questionnaire formats were developed and standardized by experts. A semi-structured questionnaire was used to collect data on animal diseases and economic losses due animal deaths, costs for treatment during the study season.

Livestock Mortality

Livestock in the context of this study are cattle, goat, sheep and equine excluding poultry: - One-year retrospective data (May 20, 2019 - June 30, 2019) on livestock mortality (Death), born, sold, bought and earned experiences were collected from selected livestock owners in the area in order to determine the economic losses due animal diseases and mortality rates in the areas. Each participant farmer was asked about the births, slaughtered, earned, sold, death bought, treatment cost and history of livestock in the end of the year (May 2019 - June 2019). In addition, other relevant information related to causes of death, farm animal management practices, disease occurrences, and disease prevention and control practices was collected.

Table 1. Structure of districts selection in study of mixed crop-livestock production system

Production System	Region	Zone	Districts	Villages Selected	No. of Livestock Interviewed
Maixed Crop-Livestock Production	Benishangul Gumuz	Assosa zone	Bambasi	Womba	10
				Mender-42	10
				Shobora	10
				Mender - 48	10
				Amba -16	10
				Sonka	10
			Kurmuk	Dul hode	10
				Abadi	10
				Horazab	10
		Maho-komo	Maho-komo	Taja jalisi	10
				Gure	10
				shoshora	10
				Tongo - 01	10

Table 2. Distribution of animal population maintained by livestock owners

Variables	Class	Population size on age category	No. of deaths on age category
Cattle	Calf	62	7
	Young stock	137	8
	Adults	961	19
	Total	***1160***	***34***
Goat	Kid	246	9
	Young stock	148	66
	Adults	680	15
	Total	***1074***	***90***
Sheep	Lamps	47	20
	Young stock	93	40
	Adults	259	7
	Total	***399***	***67***

Table 3. Overall morbidity and mortality rate in Livestock during study period

Animal species category	No. of diseased animal	Morbidity rate %	Number of died	Mortality rate %
Cattle	463	39.91	55	4.72
Goat	396	36.87	158	14.71
Sheep	170	43.8	87	21.80
Equine	4	5.7	2	2.35

Table 4. Economic loss due treat cost of infected animals

Species of animal	Number of Animal diseased	Average cost of treatment per animal	Frequency of visiting vet clinic in a year for a single animal	Total cost of treatment in a year
Cattle	463	30	5	45,083
Sheep	396	7	3	3,789
Goat	170	7	3	7,680
Equine	10	18	2	180
Total loss due treatment cost of sick animal				**56,732**

Table 5. Losses recorded due to deaths of sick animals

Animal species	Classes	No. of deaths on age category	The estimated price of each animal on category	Total losses
Cattle	< 1 year	7	2500	17,500
	1-3 year	8	4200	33,600
	>3 year	19	10400	197,600
Goat	< 6 months	9	370	3,330
	6 months – 1 year	66	600	39,600
	> 1 year	15	2500	37,500
Sheep	< 6 months	47	400	18,800
	6 months – 1 year	93	700	65,100
	> 1year	18	5500	99,000
Equine	< 1 year	-	-	-
	1-3 year	2	3000	6000
	>3 year			
Total losses				**518,030**

Statistical analysis: The collected data were compiled and analyzed by Chi-square in excel analysis in the light of the objective of study to analyzed morbidity and mortality rates and factors affecting those rates. Morbidity rates and mortality rates were calculated on the basis of total prevalence during the period. Different formulae used for morbidity and mortality rates (Dana, *et. al*, 2001) were as below:

Morbidity rate =

$$\frac{\text{Number of infected animals in the study area}}{\text{Total animal population in study area}} \times 100$$

Mortality rate =

$$\frac{\text{Number of died animals in the study area}}{\text{Total animal population in study area}} \times 100$$

Chi-square (X^2) analysis: For chi-square analysis of age-wise distribution of diseases/deaths, contingency table was made by using disease/death (1 and 0) in rows and age (young, young stocks and adult) in column. Similarly for species-wise distribution of deaths, contingency table was made by using disease/death (yes and no) in rows and animal species (cattle, sheep, goat and equine) in column. The chi-square analysis for analyzing the categorical data by comparing the observed frequencies with expected frequencies done by using following formula,

$$X^2 = \sum \frac{(o - E)^2}{E}$$

Where:

E = expected

X^2 = chi-square

O = observed

Results

The major diseases causing morbidity and mortality in livestock were identified by group informants/respondents/. And diseases such as Contagious Bovine Pleuropneumonia (CBPP), LSD, PPR, Internal and external parasites, Anthrax, Pasteurellosis, Blackleg, FMD, Trypanosomosis, and NCD were also considered important diseases in the area.

In small ruminants, respiratory disease related to Pest des petites ruminantum (PPR), was found to be top-priority disease problems in the areas and important diseases incriminated for mortality of livestock.

Estimates of mortality in each district

Analysis of mortality was done based on data from each district (Bambasi, Ma'o-komo, and Kurmuk districts illustrated below in the Figures (1, 2 and 3).

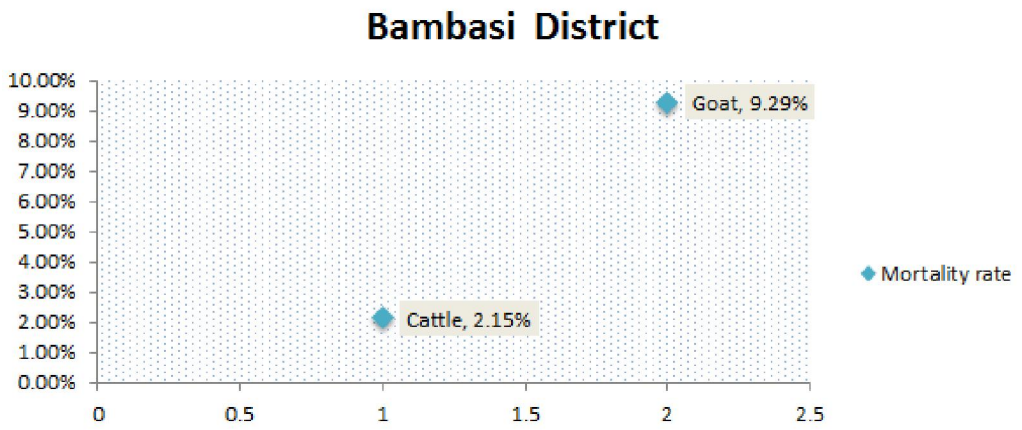

Figure 1. The annual mortality rate in each animal species Bambasi district

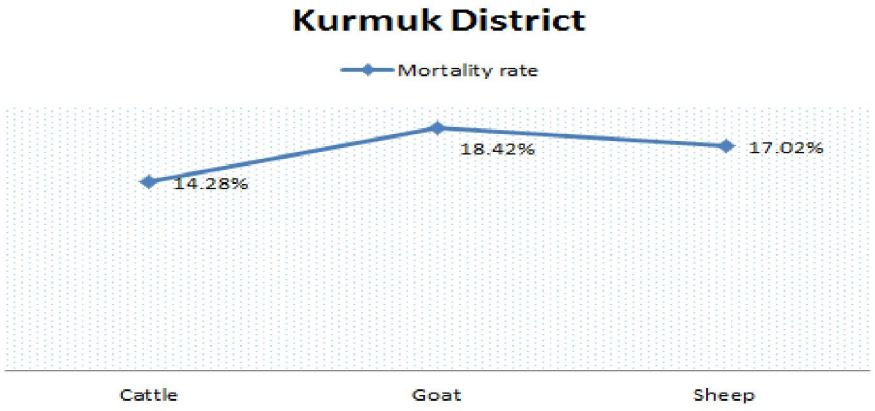

Figure 2. The annual mortality rate in each animal species Kurmuk district

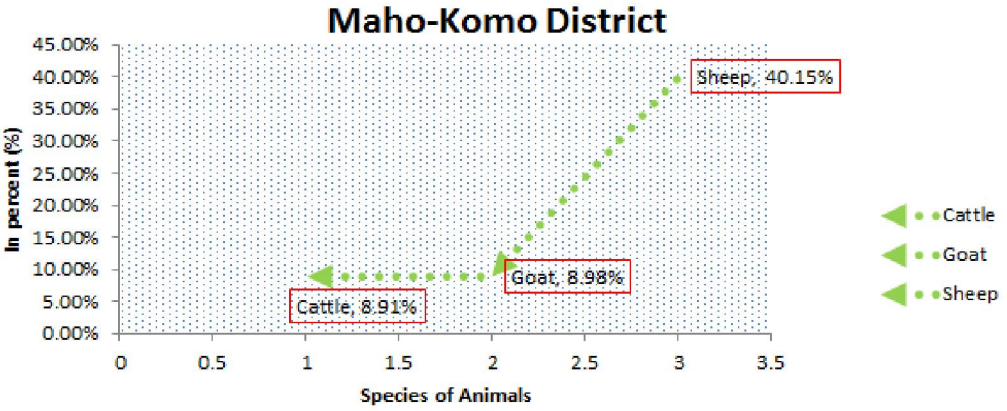

Figure 3. The annual mortality rate in each animal species Maho-komo district

Depending on the above figures (1, 2, and 3), among all districts, the highest mortality was reported in Ma'o-Komo district with mortality of 40.15 % in sheep followed by 18.42% % in goat and 17.02 in sheep in Kurmuk district mortality rate were recorded.

Table 6. The annual mortality and the distribution in different age groups of livestock for the three districts

Variables	Class	Population size on age category	No. of deaths on age category	Mortality rate in percent (%)
Cattle	< 1 year	62	7	0.60%
	1-3 year	137	8	0.68%
	>3 year	961	19	1.63%
	Total	***1160***		
Goat	< 6 months	246	97	9.03%
	6 months – 1 year	148	66	6.14%
	> 1year	680	15	1.39%
	Total	***1074***		
Sheep	< 6 months	47	20	5.01%
	6 months – 1 year	93	40	10.02%
	> 1year	259	7	1.75%
	Total	***399***		

The proportion of mortality in animals among diseased with age categories were: in cattle less > 1year 11.29% (7/62), 1-3 year 5.84% (8/137) and <3 year 11.45% (19/166), in goat age of < 6 month 39.43% (97/246), 6 month - 1year 44.59% (66/148) and > 1 year 23.81% (15/63) and in sheep <6 month 42.55%(20/47), from age of 6 month - 1year 43.01% (40/93) and > 1 year 38.89% (7/18) and the proportion of mortality was not statistically significant.

Table 7. Age-wise morbidity and mortality in cattle

	No. of cattle diseased and died on age category					
cattle	**Young (< 1 year)**	**Middle age (1 - 3 year)**	**Adult (>3 year)**	**Total**	**X^2**	**P value**
Diseased	55	129	147	331	3.138	0.2082
Died	7	8	19	34		
Total	62	137	166	365		

Table 8. Age-wise morbidity and mortality in shoat

	No. of shoat diseased and died on age category					
sheep	**< 6 months**	**Middle age (6 months- 1 year)**	**Adult (>1 year)**	**Total**	**X^2**	**P value**
Diseased	27	53	11	91	0.11	0.9486
Died	20	40	7	67		
Total	47	93	18	158		
Goat						
Diseased	149	82	48	279		
Died	97	66	15	178	0	0.0175
Total	246	148	63	457		

Chi-square analysis of overall mortality data: The Chi-square analysis of overall proportion of mortality rate in cattle, and in sheep with respect to age showed that age not statistically significant ($p > 0.2082$) and ($p > 0.9486$) respectively, and it is statistically significant in goat ($p<0.0175$), effect while age had no significant effect on mortality rate in cattle and sheep (Table: 9 and 10).

Highest morbidity rate in livestock on age category

High overall morbidity rate 12.67%(147/1160) was observed in adult age group cattle followed by calves at age of 1 -3 year 11.12% (129/1160) and 13.87% (149/1074) in goat age group of < 6 months and sheep at age group of 6 months - 1 year 13.28% (82/399) (Table-8 and 9): This might be due to adult animal were exposed to poor management practices and provision of drought power of the increased their

susceptibility to diseases and environmental stress than young animals (Duguma, *et. al,* 2012), reproductive stress in peak production and dry season of the year (Palanivel, *et. al,* 2007). To avoid this situation, health groups and peoples working in animal husbandry sectors should give more attention to educate the farmers to provide extra rations during high production period, use of animals for drought power, during infestation of high tsetse infestation season of the year and more information to avoid management problems in cattle.

Discussion

A total of 130 livestock owners were interviewed and information regarding the demography, morbidity and mortality rates was recorded. A total of 1,160 cattle, 1,074 goat and 399 sheep of different age group were possessed and maintained by these respondent livestock owners selected for the study in the area. According to the information collected from the respondents almost all of the economy of community in the study area were depends on livestock and crop mixed farming mainly, cattle, sheep and goat.

Efficient livestock production and limited losses are important for farmers to realize maximum benefits from their livestock resources. Livestock mortality is the most frustrating part of keeping livestock and as such a terrible waste and a killer of profit in which the producer has to wait another year before he/she can make up for the loss. A fuller understanding of the causes of livestock deaths and mortality patterns helps in identifying the major management problems in the herds and areas for improvement, veterinarians, and policy makers in the management of livestock health.

This study revealed that mortality of livestock is a significant problem of livestock production in the mixed crop-livestock production system of selected sites of the study. According to this study the annual livestock mortality was 4.72% in cattle, 14.71% in goat, 21.80% in sheep and 2.35% in equine. This results are highly different from the livestock mortality rate reported by (Asmamaw, *et. al,* 2017), in this region which is 21.46% in cattle, 22.10% in sheep, 22.52% in goat and 6.75% in equine, this may be due at that time the provision veterinary service and availability of drugs for treatment not balance with its demand.

According to this study the annual mortality recorded in cattle 4.72 % is slightly different from mean annual livestock mortality rate 9.2% (in Amhara Region) and 14.0% (in Oromia Region). This result is consistent with previous studies in Ethiopia and Eastern Africa (Swai et al., 2010) that reported livestock mortality in a range of 8.5–14.2 %).

The study conducted by Asseged and Birhanu (2004) around Addis Abab 19.7% in young animals was higher, and also report of study by (Wudu *et al.,* 2008) in and around Debre Zeit is 18%, report by (Lobago *et al.,* 2006) in Selale, Oromia is 17.4%, in young animals of age less than one year and 16% young stock age of 1-3 year, in Wolaita Soddo reported that it is 38.1% by (Assefa *et al.,* 2014), in Bako (Tadesse *et al.,* 2004) and 20.8% mortality in Tanzania (Msanga and Bee, 2006) higher than the present study. The mortality difference may be due to differences in herd and breed composition, as a result of many of the previous studies were done on crossbred dairy cows in smallholder farms in different areas.

The indigenous breeds were dominated herd composition as compared to cross breed in these study areas, which is assumed to be less susceptible to diseases and environmental effects.

Wymann *et al.,* (2006), reported slightly low livestock mortality (10%) in traditionally young stock handling practices as compared to 16–25% mortality in intensively managed calves. Mortality differences in relation to livestock management, *i.e*., between traditional and intensive management system, could be explained by the free grazing practice in traditionally managed animals increases the possibility of acquiring sufficient immune system. In general, livestock mortality at farm level of above 5% is considered to be high and should not be economically tolerable (Moran, 2011).

In the present study livestock mortality rate was found to be no more difference on age categories, with the highest mortality reported in adult animals of age 3 year and above (1.63%) followed by young stock age of 1-3 year (0.68%), and 0.60% in calf age of less than one year.

From the overall mortality, the proportion of livestock mortality was 1.51% in cattle of age less than one year, 1.72% in cattle age of 1-3 year and 4.10 % of animal age of 3 year and above. According to this study the proportion of livestock mortality in cattle age of less than one (1.51%), which is different from the study conducted in Oromia and Amhara region in cattle of the same age group, that range from 44.6% and 48.6% respectively (Lobago et al., 2006; Woldemariam et al., 2014).

In small ruminants, lamb and kid mortality in smallholder farm conditions is one of the main factors that adversely affect small ruminant production and reproductively. The degree to which lambs and kids survive to marketable age is recognized as one of the key indicators of the efficiency of sheep and goat production. The mean annual mortality reported in lambs and kids in the present study revealed that mortality is an important problem in the smallholder production of small ruminants in the mixed crop-livestock production system. In the present study the

annual mortality rates in kids and lambs in the area was 9.03% in kids and 5.01 % in lambs of age less than six months, similar to the mortality rate of lambs and kids reported in early age these animals, 5.3% (in Amhara) (Woldemariam et al., 2014) and 8.9% (in Oromia) Lobago et al., 2006).

In this study, on the other hand the annual mortality rate of small ruminants of different species and age groups were 10.02% in sheep age group of six months - one year old and 1.75 % in sheep age of one year and above. Similarly, in a got age of six months – one year was 6.14% and 1.39% age of one year and above in the present study.

However, high lamb mortality has been reported in Amhara Region; 40% lamb mortality in South Gondar (Woldemariam et al., 2014) and 51.5% in Debre Berhan (Bekele et al., 1992). In traditionally managed small ruminant flocks, an estimated 10 – 50% lamb and kid mortality was recorded annually before weaning (Mugerwa et al., 2000). Petros et al. (2014) reported high mortality of kids: 30.3% within one month of age and 38.3 – 46.8% within two to three months of age in Adamitulu Jedo-kombolcha in the Rift valley of Ethiopia and 34.2% mortality on-farm (Debele et al., 2011).

The overall wastage of lambs and kids as a result of pre-parturient death and birth-to-weaning mortality in the mixed crop-livestock production system at present study was between 5.01 – 10.02% for lambs and 6.14 – 9.03% in kids. The mortality variation among study regions could be explained by variations in farm management, availability of feed, and presence or absence of non-infectious and infectious diseases. Low survival rate or high mortality may be related to low standards of small ruminant husbandry.

Infectious and non-infectious causes of livestock mortality were not identified in the present study regions in young stock. Regardless of species, disease was the most important cause of livestock mortality in the mixed crop-livestock production system. Among causes and diseases, trypanosomosis transmitted by tsetse flies causing diarrhea and different stresses on animals infected by this disease and other animal diseases causes major problems were identified by the interviewed investigations. The most important conditions multifactorial causes diseases and respiratory infections, mainly reported in young animals of less than three months of age, have been reported as the most important causes of young stock mortality worldwide (Radostitis, 2005).

In the present study, specific infectious diseases such as trypanosomosis, CBPP, FMD, Pasteurellosis, LSD, blackleg, anthrax, external parasites (ticks and lice), internal parasites in large animals, and in small ruminants PPR, NCD in poultry were reported by key informants.

It is well understood that African trypanosomosis is generally a disease of adult cattle rather than one of calves and small ruminants. However, some researchers reported a 2.95% prevalence of trypanosomosis in calves less than one year old (Gechere et al., 2012) around Arba-minch, Ethiopia. Rowlands et al. (1994) has also reported 18% prevalence in young cattle between 6–36 months of age and an annual calf mortality rate of 8–24% in the first 12 months of life.

The main causes of stock mortality are directly associated to the production and the management system. Other study reports demonstrated that diarrhea and pneumonia are the most important constraints in food animal production (Lema et al., 2001, Shiferaw et al., 2002; Gitau et al., 2010). Tropical environments with high temperatures and humidity introduce many potential diseases to milk-fed calves that impair replacement stock (Moran, 2011).

Although effort was not done to identify causative agents during this study, the diseases occur the area according to the information collected from listed above. Environmental and management factors also hasten the occurrence of such conditions (Inamdar, 2012).

Other causes of mortality reported in this study include malnutrition, small weight at birth, exposure to predators, naval infection as animals are unattended during calving and lambing, dehydration, as young stock are allowed to join the dam and travel long distance without water, and lack of veterinary services.

Malnutrition was also stated as a major problem of young stock mortality, next to disease. This could be related to poor management in feeding or supplementing animals. Malnutrition is more pronounced in young animals as a result of human milk competition with calves. In the mixed production system, residual suckling is the only source of feed for calves and only happens twice a day. The calf suffers from starvation until it starts grazing, which is usually after one and a half or two months of age. Lambs and kids are left with their dams and are free to suckle; malnutrition could be associated with poor offspring-mothering relationship such as poor mothering instinct, multiple litters, and miss-mothering. Reports confirmed that starvation, miss-mothering, and exposure to cold weather are common causes of lamb and kid mortality (Mugerwa et al., 2000; Petros et al., 2014).

Management factors in animals, unhygienic shelter, poor ventilation, overcrowding, and absence of regular cleaning and disinfection predispose stock to various diseases, especially respiratory tract diseases, and lead to high mortality.

Conclusions

Livestock husbandry is the main source of livelihood for hundreds of thousands of rural community of the region. Undoubtedly, ruminants represent a vital contribution to food security and human welfare in rural households. Mortality of livestock appeared to be one of the major constraints of livestock production in the region, hampering the development of replacement stock. Regardless of species and production system, a high loss of livestock was reported in adult age and young stocks.

Diseases and malnutrition appeared to be the most important causes of young stock mortality across the species and the production systems studied. Among diseases, trypanosomosis, CBPP, FMD, Pasteurellosis, LSD, blackleg, anthrax, external parasites (ticks and lice), internal parasites in large animals, PPR, NCD in poultry were most common challenges of raising livestock. The study also revealed malpractices in livestock management among the studied producers, including poor management, poor care, and health management due to insufficient drugs and material, specially related Deltametrine pour on to control tsetse flies and trypanosomosis.

While many herders appeared to be aware of the challenges of livestock, they seemed not to have adequate knowledge to deal with the challenges. However, many of the health problems of livestock can be controlled by sufficient and quality nutrition and good husbandry practices.

Recommendations

Based on the above conclusions the following recommendations are forwarded:

• Endemic infectious diseases impacting health in all the production systems, and supporting further research.

• A broad range of preventive measures are fundamental to optimal livestock health

• Proper nutrition is critical for livestock growth and health.

• Proper young stock management procedures such as adequate intake of good quality feed; as a result any of the endemic diseases could be largely prevented and controlled.

• Suitable health and feeding practices during the third trimester of pregnancy paramount important.

• Awareness creation for farmers on the existing livestock management technologies (feeding regimes, immunization, deworming, etc.)

Research Priorities

- Research into priority the livestock diseases such as occur in the study areas.
- Research should be conducted into the improvement of young stock and livestock production and use of possible production and reproduction technologies that are available.

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Conflict of interest

All authors are employees of Benishangul Gumuz Regional Bureau of Agriculture and Natural Development and Regional Animal Health Diagnosis and Follow up Laboratory of the Region. Study funding was provided by the above mentioned organization experts Animal Health professional. Author's contribution all of the authors participated in conducting the studies in one or more researches conducted in the region regarding to animal health.

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