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Assessment on Major Health Constraints of Livestock Development in Eastern Zone of Tigray: The Case of "Gantaafeshum Woreda" Northern Ethiopia

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Abstract

A study was conducted to identify major health constraints of livestock, giving emphasis to cattle, sheep, goats and poultry in GantaAfeshum district, Eastern Zone of Tigray from March 2013 to June 2013. Questionnaire survey and case observational study methods were carried out for data collection. In the questionnaire survey, 120 livestock owners were interviewed and respondents indicated that the major farming system practiced in the area were mixed crop livestock production. Respondents view towards the major constraints of livestock production in the locality indicated that lack of adequate veterinary services were considered to be the dominant production challenges in the area. On the health aspect, they also confirmed that the most important diseases affecting cattle's were FMD (17.7%), Pneumonic Pasteurelosis (15.5%), Ectoparasitic/tick infection (14.9%), Anthrax and GIT Parasitism (each with equal response of 11.5%). In sheep and goats GIT-Parasitism (16.1%), pneumonic-pasteurelosis (15.9%), coenuruses (15.8%) and Ectoparasite infection (15.4%) were regarded as the most important diseases. Furthermore, Newcastle disease (79.1%) followed by foul pox (11.6 %) and Coccidiosis (6.7%) were considered as the most important diseases in poultry. Case observational studies were also conducted at the district veterinary clinics (Bizet and Adigrat) and a total of 465 diseased animals were tentatively diagnosed based on history and clinical signs. Among the diseases which were diagnosed, Ectoparasitism (35.55%), endoparasitic problems (25.4%), Mastitis (8.6 %), Pneumonic Pasteurelosis (7%), and FMD (6.64%) were the most frequently observed diseases (cases) in cattle. In sheep and goats, Pneumonic Pasteurelosis (28.85%), endoparasitic problems (22.8%), Ectoparasitism (16.78%), FMD (7.4%), Bloat (4.7%) and sheep and Goat pox (4.7%) were commonly encountered diseases. In Poultry, Newcastle Disease (60%), foul pox (18.3%) and Coccidiosis (11.7%) were found to be commonly encountered health problems. Overall results indicated that shortage of animal feeds, poor management practices, lack of adequate veterinary services and livestock health problems (diseases) were the major constraints existing for livestock development in the area and hence there is a need to expand the veterinary services in terms of quality and quantity in order to tackle the problems associated with livestock health and to boost the awareness of the livestock producers of the community.

Keywords: Constraints; Health; Livestock

Introduction

Animal production has been considered as the main component of agricultural development in most parts of Sub-Saharan Africa. Like in many developing countries, domestic animals play a crucial role in Ethiopia. They provide food in the form of meat and milk, and non-food items such as draft power, manure and transport services as inputs into food crop production and fuel for cooking. Livestock are also a source of cash income through sales of the above items, animal hides and skins. Furthermore, they act as a store of wealth and determine social status within the community. Ethiopia is known for its high livestock population, being the first in Africa and tenth in the world [1,2]. The recent livestock population estimates that the country has about 52.1 million heads of cattle, 24.2 million sheep, 22.6 million goats and 44.9 million poultry. The population of these animals in Tigray region is 4,201,501 cattle, 4, 506, 64 shoats and 155,434 chickens of which woreda Ganta Afeshum have the proportion of 51, 514 cattle, 60, 040 sheep, and 30, 050 goats respectively and 67, 769 chickens [2]. Despite the large number of livestock in the region the sector is characterized by low productivity and, hence, income derived from this sector of agriculture could not impart significant role in the development of the region's economy [3]. The low productivity is attributed to high disease incidence and parasite burden, low genetic potential of indigenous breeds, inadequate management, poor nutrition and reproductive performance. Among these constraints, diseases have numerous influences on productivity and fertility of herds. The effect of livestock diseases could be expressed in terms of losses due to mortality and morbidity, loss of weight, slow down growth, poor fertility performance and decrease physical power.

The International Livestock Research Institute (ILRI) in collaboration with the Ministry of Agriculture and Rural Development (MoARD) have initiated a 5 year project entitled "Improving Productivity and Market Success" (IPMS) of Ethiopian farmers. The project aims at contributing to a reduction in poverty of the rural poor through market oriented agricultural development [4]. In line with this the Tigray regional sate government has set a GTP (growth and transformation plan) on economic development of the region (especially the rural farmer) and one of the sectors that have given due attention in this plan is agriculture focusing on improving the production of livestock's and crops. Livestock productivity of the region is planned to improve by providing research aided extension to increase market oriented livestock in quality and quantity. According

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to this vision, milk production of the region is planned to increase from 302,108-367503 tones, egg production from 6,132-9,569 tones, honey production from 4,264- 6,132 tones and to aid 30,375 crossbreed calf's every year to the existing number 11, 674 so as to reach 151,875 based on manmade hybrid system. The plan also gives special emphasis to improve the health status of the regions livestock by increasing vaccination, veterinary services and reducing communicable diseases by 50-70% and hence increase total productivity by 15% [5].

In tropical high land areas including Tigray, livestock health problems is high due to environmental factors like high temperature and humidity, topography structure of sloppy area exposed to flood so easy to infect soil borne diseases and stress factors. The second major factor for the high prevalence and incidence of diseases in these areas is related with weak animal health services [4]. Despite the wide spread of different animal health problems in the tropical countries, experiences has shown that information on animal health was never a significant focus of research [6]. However, knowing the type and extent of the common and major health problems is very important so that Veterinarians, researchers and other responsible governmental and non-governmental bodies can assist in the development of herd health strategies and the selections of possible interventions that will ultimately assist in poverty alleviation, by improving the productivity of the animals as it is already set by the regional governments plan. This particular study is therefore, carried with the following objectives.

- To identify the major health constraints/ livestock diseases/ in the area
- To evaluate the extent of veterinary services in the woreda
- To evaluate the awareness of the farmers on maintenance of animal health

Materials and Methods

Description of the Study area

The study was conducted in 5 selected peasant associations (PAs) locally called "Tabias of Ganta Afeshum, which is one of the 7 woreda of the eastern zone of Tigray (excluding Adigrat and Wukiro towns) (Figure 1) from March 2013- June 2013. The area is located at 115km North of Mekelle and 960 North of capital city of Ethiopia, Addis Ababa. The district share boundaries with Hawzien in the south, Enticho in the west, Gulomahda in the north, and Saesi Tsaedaemba in the East parts [7] and is situated at an elevation of 2457 meters above sea level. It has three agro climatic zones: low lands, mid land and high land with a bimodal rain fall pattern, in which the long rain season starts from end of June to beginning of September and short rain season stays from January to March. The average annual rainfall of the area varies between 300 and 400 mm [8]. Livestock are main components as main factors for the livelihood of the community to undertake agricultural activities and also as source of income. The livestock population of the woreda includes 51,514 cattle, 60,040 sheep, 30,050 goats, and 67,769 poultry (chickens) respectively.

Study animals

A total of 465 diseased animals (256 cattle, 63 goats, 86 sheep and 60 chickens) presented to Bizet and Adigrat veterinary clinics plus total number of cattle, sheep, goats and poultry owned by the farmers involved in the interview were considered as study animals.

Study design

A cross sectional study design in the form of clinical follow up, questionnaire survey and semisructured questioner methods were used to collect the data needed for the study.

Sample size and sampling procedure: In the present survey, 5 peasant associations (Pas) namely Hagereselam, Mugulat, Adekney, Kita, and Semret were selected purposively based on transport accessibility, degree of livestock production practices and agro ecological differences. From each PAs, 24 households were randomly selected for the interview and hence a total of 120 households were included in the study. All livestock owned by the sample households were considered as study animals which comprise cattle, sheep, goats and poultry and case observational Study used to asses and adders the most appears clinical cases affect livestock development.

Data collection: A detailed and organized semi structured questionnaire was designed in an attempt to generate base line information related to livestock production with particular emphasis on major livestock health and production problems. The questionnaire was framed in such a way that farmers could give information that are recent and easy to recall and it was filled directly by interviewing randomly selected livestock owners from different villages of the 5PAs. Informal group discussion with animal health staffs had also been held

Figure 1: Map of Tigray region showing the selected woreda (study site).

to generate relevant information about livestock health problems in the study area. On top of the above a direct clinical observational study were also conducted at the woreda's veterinary clinics to appreciate and strengthen the questionnaire survey finding.

Data analysis

The data, obtained in this study were analyzed using descriptive statistics and the ranking of the different types of diseases obtained in the study were done by using the rank index formula as described by Musa et al. [9].

Rank index=sum of (3 X number of household ranked first + 2 X number of household ranked second + 1 X number of household ranked third) for an individual preference, reason or criteria divided by the sum of (3 X number of household ranked first + 2 X number of household ranked second + 1 X number of household ranked third) for overall reasons, criteria or preferences.

Results and Discussion

Demographic features

Majority of the respondents included in the study were male (86%) and the rest female (14 %). The maximum and minimum ages were 64 and 25 years respectively. Regarding educational status, 73% of the respondents' were illiterate. Respondents' family size proportion showed that 41% and 59% have family members less or equal to 15 years of age and greater than 15 years of age respectively.

Livestock herd size and composition

Chickens comprise the largest proportion of the livestock herd in the study site, followed by sheep, cattle and goats respectively. Heifer and cows dominate (54%) the most shares of cattle herd followed by Castrated ox (25.4%).Meanwhile, small ruminants flock is primarily composed of female animals representing 72% in sheep's and 69 % in goats.

Farming system and farm size

This study revealed that the livestock production system of the area was mixed crop livestock type of which livestock herd is dominated by Poultry and sheep. All of the interviewed farmers keeping livestock (N=120) indicated that they practice both crop and livestock production. This finding were found to be in line with the study conducted by Nibret and Basaznew [10], Tesfaye [11] and Yohanes [12] which were conducted in Lay-Armacheho, Metema and Alamata areas respectively. Though relatively larger land as compared with grazing land was allocated for the production of crops, the yield obtained from crops like wheat, barley, Teff, maize, pea and bean is not enough for family income and food source. Therefore additional income was generated from their livestock production. The total cropping land of the study "Tabias" (Semret, Mugulat, Hagereselam, Adekney and Kieta) were 0.9, 0.83, 0.78, 0.63 and 0.48 hectar respectively (Table 1). There was no private grazing land in the study woreda (Table 1).

Livestock health care system

This study revealed that they take to maintain their livestock health as productivity can't be achieved without proper health maintenance, and the respondent responded that that they did nothing other than vaccination (68.3 %) of their animals at times of campaign and concerning treatment at times of illness, 56.6 % of the breeders responded that they use modern treatment while 43.4 % them said traditional (Table 2).

Veterinary clinic availability and degree of service

This study revealed that the availability of clinics near to their residence and degree of services they get from these clinics and 75% of the respondents claimed that there is shortage of animal health centers in the woreda because for one thing the available clinics are too far from their residence and for the other thing even the available clinics are not well equipped with facilities to provide adequate veterinary service (Table 3).

Variables	Land use	Adekeney	Hagere- Selam	Kieta	Mugulat	Semret
Own-land	Cropping	0.45± 0.33	0.56± 0.43	0.33±0.22	0.51 ± 0.50	0.65 ± 0.32
	Grazing	-	-	-	-	-
Rented land	Cropping	0.18± 0.33	0.22± 0.30	0.15± 0.25	0.32 ± 0.45	0.25 ± 0.07
	Grazing	-	-	-	-	-
Total land		0.63	0.78	0.48	0.83	0.90

Table 1: Land holding per hectar (mean ± SD) and land use pattern in the study area.

Parameters		Number of respondents (N=120)			
		Yes	%	NO	%
Animals health		101	84.2	19	15.8
proper management		43	35.8	77	64.2
Vaccination		82	68.33	38	31.77
Type of treatment	Modern	68	56.6	52	43.4
	traditional	52	43.3	68	56.6

Table 2: Livestock health care system in the study area.

parameters	Respondents' response by percentage		
	Yes %	No %	Not that much %
Vet. Clinic distance near to residence	30 (25%)	90 (75%)	-
Adequate veterinary services	35 (29.2%)	75 (62.5%)	10(8.33%)
Distance factor from vet. Clinic to residence	78 (65%)	15(12.5%)	27(22.5 %)

Table 3: Veterinary clinic availability and degree of service in the study area.

Major diseases of livestock

The respondent responded that the most prevailing diseases affecting their cattle's were FMD (17.7 %), Bovine pasteurelosis (15.5 %), Ectoparasitic/tick infection (14.9%), Anthrax and GIT- parasitic infestation (each with equal response percentage of 11.5%) respectively (Table 4). This might be due to feed shortage and inadequate veterinary service. The present study is in agreement Gebremedhin [13], reported that FMD, Pasteurelosis and Anthrax are the major cattle diseases in Astbiwomberta. On the other category Belete [14], reported that Mengemite infection, Fascioloisis, Fleas and lice infestation in fogera areas the problems and prevalence were lower in cattle.

Major diseases of shoats

The respondent responded that n shoats the most commonly existing problems were GIT parasitism (16.1%), pneumonic pasteurelosis (15.9 %), Coenuruses (15.8 %), and tick infestation (15.4 %) respectively (Table 5). The present finding is in agreement with the finding of Nibret [10], which was conducted in Lay-Armacheho. On the other hand slightly different with that of Gebremedhin [13], reported that Coenuruses as the most prevailing problem of sheep and goat in AtsebiWonberta area. While the current finding absolutely different from Gizachew [15], reported that ORF is the main problem of Shoats. This might be due to agro ecological difference of the study site. On the other category Fasciolosis, Mengemite infestation and Anthrax diseases were lower with prevalence of distribution 8.9, 7.8 and 7.3 % respectively in the study site (Table 5).

Major diseases of poultry

The respondent responded that the most prevalent diseases in

Disease/ disease causing agent	Local (vernacular name)	Relative degree of importance according to respondents			Index	Percentage (%)	Over all rank
		1st	2nd	3rd			
Infectious							
Anthrax	Taffia	15	9	18	0.115	11.5	4
Black leg	Wekie	-	14	13	0.058	5.8	7
Pasteurelosis	Mieta	25	12	10	0.155	15.5	2
FMD	Eichlam	27	14	16	0.177	17.7	1
Parasitic							
Ticks	Kuridid	23	13	10	0.149	14.9	3
Menges	Ekeke	7	10	14	0.078	7.8	6
Git-parasitism	W/tesietagan	11	19	10	0.115	11.5	5
Fasciolosis	Effel	8	7	11	0.069	6.9	7
Fleas and lice	KunciKumal	-	12	9	0.047	4.7	8
Miscellaneous							
Reproductive problems	-	2		2	0.007	0.7	11
Bloat	Nefihi	-	2	3	0.009	0.9	10
Colic	Kuritset	-	3	4	0.014	1.4	9
Lamness	Sinkale	-	1	-	0.003	0.2	12

Index = sum of (3 for rank 1st + 2 for rank 2nd + 1 for rank 3rd) given for a given diseases divided by the sum of (3 for rank 1st + 2 for rank 2nd + 1 for rank 3rd) for overall diseases.

Table 4: Major disease of livestock in the study areas.

Disease/ Disease Causing agents	Local name	Relative degree of importance according to respondents			Index	Percentage (%)	Over all rank
		1st	2nd	3rd			
Infectious							
Anthrax	Taffia	8	7	11	0.068	6.8	7
Black leg	Wekie	7	6	9	0.058	5.8	8
Pneumonic Pasteurelosis	Mieta	18	17	23	0.159	15.9	2
Parasitic							
Ticks	Kuridid	27	9	12	0.154	15.4	4
Menges	Ekeke	11	9	8	0.081	8.1	6
Git-parasitism	w/tesietagan	17	23	19	0.161	16.1	1
Coenuruses	Zarti	20	19	16	0.158	15.8	3
Fasciolosis	Effel	9	17	6	0.093	9.3	5
Fleas and lice	KunciKumal	-	8	6	0.030	3	9
Miscellaneous							
Reproductive problems		1	2	4	0.015	1.5	10
Bloat	Nefihi	1	1	2	0.009	0.9	11
Colic	Kuritset	-	1	3	0.004	0.4	11
Lameness	Sinkale	1	1	1	0.005	0.5	12

Table 5: Major diseases of shoats in the study area as ranked by the respondents.

Disease	Local Name	Frequency	Percentage	Overall rank
Newcastle disease	"Kudem"	95	79.1 %	1
Foul pox	-	14	11.6%	2
coccidiosis	-	8	6.7 %	3
Others		3	2.5 %	4

Table 6: Major disease of poultry in the study area.

Most Frequently Encountered Diseases/ Disease causing agents	Frequency (percentage)	Bovine N= 256	Caprine and ovine (Shoats) N= 149	Poultry N= 60
Ecto parasitism (tick infestation, menges, lice and fleas)	116 (24.95%)	91 (35.55%)	25 (16.78%)	0
Endo parasitism (Fasciolosis, Coenuruses, Heamonchosis)	99 (21.3 %)	65(25.4%)	34 (22.8%)	0
Pneumonic Pasteurelosis	61(13.12%)	18 (7%)	43(28.85%)	0
Anthrax	14 (3%)	8 (3.1%)	6 (4%)	
Mastitis	27 (5.8 %)	22(8.6%)	5 (3.35%)	
Black leg	4 (0.86 %)	4(1.56%)	0	
Newcastle disease	36 (7.7 %)	0	0	36(60.0%)
Foul pox	11(2.4 %)	0	0	11(18.3)
Coccidiosis	7(1.5%)	0	0	7(11.7%)
FMD	28 (6%)	17(6.64%)	11 (7.4)	0
Bloat	15(3.2%)	8 (3.1%)	7 (4.7%)	0
Sheep and goat pox	5 (1.1 %)	0	5 (3.35%)	0
Dermatophillosis	7 (1.5%)	0	7 (4.7)	-
Reproductive Problems (Dystocia and RFM)	13 (2.8%)	8 (3.1%)	5 (3.35%)	
Unidentified cases	22 (4.73 %)	12 (4.68%)	4 (2.68%)	6(10%)
Total	465 (100%)	256(55.6%)	149 (32 %)	60(12.9%)

N= Number of case

Table 7: Clinical diagnosed diseases at Bizet and Adigrat Veterinary clinics in the study area.

poultry were new castle disease (79.1%) (Table 6). On the other category Foul Pox and Coccidiosis were occur at relatively lower prevalence (Table 6). The present finding is in agreement with Yohanes [12], reported that poultry disease is an endemic problem in general all over the country.

Clinical/observational study

The present study showed that diagnosed the disease based on their history and clinical sign observed at the district of veterinary clinics (Bizet and Adigrat). Among the diseases which were diagnosed, (24.95%) *Ectoparasitic infestation*, (21.3%), *gastrointestinal parasitism*, *Pneumonic Pasteurelosis* (13.12%), *FMD* (6%), *Mastitis* (5.8 %), and *Anthrax* (3%), were the most frequently observed diseases in cattle (Table 4). On the other hand in Shoats; *pneumonic pasteurelosis* (28.85%), *GIT parasitism* (22.8 %), *Ectoparasitic infestation* (16.78 %) and *FMD* (7.4 %), were the commonly observed cases (Table 5). While the diseases which were diagnosed in Poultry *New castle diseases* (60%), *Foul pox* (18.3%) and *Coccidiosis* (11.7%) were the most commonly observed ones (Table 6).The clinical finding obtained in the present study is not in agreement with the finding from the questionnaire survey. This might be due to the perception of farmers towards parasitic problems and Vaccination practices that are currently being under taken against the common bacterial and viral diseases outbreak of these diseases in the region in the past two or three years (Table 7).

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