

Livestock disease priorities and health services in the highland crop-livestock and lowland pastoral systems in Ethiopia

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Introduction

Ethiopia has the largest livestock population in Africa with 59.5 million cattle, 29.5 million sheep, 30.2 million goats, 8 million equines, 1.2 million camels and 49 million poultry. As such, livestock are extremely important for the country's economic development, food and nutrition security, and poverty reduction. However, the off-take rate and per capita consumption of livestock products is one of the lowest in the world. Technical, institutional, infrastructural, environmental and policy challenges in the livestock sector are key constraints for livestock development. High disease prevalence, coupled with poor veterinary service, is a major constraint for livestock development in Ethiopia.

A Veterinary Service Rationalization Road Map has been initiated to increase the participation of the private sector in the veterinary service sector. To kick-start implementation of the road map, the European Union funded project, 'Health of Ethiopian Animals for rural Development' (HEARD), has been officially launched in March 2019. The project will address the challenges in the Ethiopia's veterinary service delivery system. The International Livestock Research Institute and the Ethiopian Veterinary Association coordinate the component to strengthen capacity development and piloting public-private partnerships. The project plans to introduce improved herd health interventions at village levels in Oromia, Somali and Amhara regions.

The project was launched with stakeholder workshops involving service providers from the public and private sector were organized to identify the gaps in veterinary service. The gaps identified include limitations in policy and strategy (policy makers attention, legal and regulatory frameworks, vaccination strategy, extension service on animal diseases and veterinary service, and disease reporting system) and poor access to services and inputs (drugs in quantity, quality, variety and affordability). A baseline assessment of the disease priorities and satisfaction of livestock keepers with the health services was conducted in the three project regions. Similar baseline studies have also been conducted by the International Livestock Research Institute (ILRI) for Drought Resilience and Sustainable Livelihoods Program (DRSLP), Regional Pastoral Livelihoods Recovery and Resilience Project (RPLRP) and Livestock and Fisheries Sector Development Project (LFSDP). In this report a synthesis analysis of the available data from these projects was conducted to collate and document livestock diseases and health services in Ethiopia. The information generated can be used as a baseline for monitoring and evaluating the progress of the HEARD project.

Methodology

Source of data

The data used for this report was obtained from baseline survey studies of four livestock development projects: Drought Resilience of Sustainable Livelihood program (DRSLP I and II), Regional Pastoral Livelihoods Resilience Project (RPLRP), Livestock and Fishery Sector Development Project (LFSDP) and Health of Ethiopian Animals for Rural Development (HEARD). The DRSLP projects are being conducted by the MoA. The projects aimed to improve the livelihoods of the pastoral and agro-pastoral communities, with particular focus on the Arid and Semiarid Lands (ASAL) of Ethiopian Somali; Afar; Oromia (Borena zone); and the Southern Nations, Nationalities and Peoples region (SNNP). The RPLRP project operated in Afar, Somali, Oromia and SNNP regions pastoral/agropastoral system. The LFSDP project is funded by the World Bank to strengthen the livestock development sector. The HEARD project is implemented by the International Livestock Research Institute (ILRI), the MoA and the Somali, Oromia and Amhara regional livestock development bureaus. The project is supported by the EU under the 11th European Development Fund, NIP Reference No: FED/2017/040-392. The project is being implemented in Somali, Amhara and Oromia regions.

Sampling and data collection

Stratified clustered sampling approach was used to draw representative samples for the surveys. The survey sampling was stratified at different stages: by livelihood zone, agro-ecological zone, regional state, Woreda and Kebele level. The DRSLP projects were in the lowland pastoral/agropastoral systems. The LFSDP and HEARD projects operate in the highland, mid land and lowland mixed crop-livestock systems. Four kebeles and two kebeles were sampled for the DRSLP and LFSDP projects and for the HEARD project, respectively. The sampling frame and data structure is shown in Table 1.

All the data used in this report were collected using household surveys. The data for the DRSLP and LFSDP projects were collected by ILRI for the MoA. The HEARD project data were collected by ILRI for as the project baseline data. The data were collected on various aspects of the households including Household demographics, physical assets, Livestock holding and composition, crop technology adoption and use, sources of livelihoods, and access to services. The data for the current analysis and report included livestock diseases and animal health services. When the reported diseases were clearly identified using the local disease names by the respondents, the disease names were recorded and translated into their veterinary names by the local veterinarians. In cases where mentioned diseases were not clear, the local names or the clinical sign was reported. It should be mentioned that

the identified diseases were solely based on the respondents' perceptions. Further laboratory confirmation may be required.

TABLE 1. SOURCE OF DATA AND DATA STRUCTURE

Region	Project	No. of woredas	Production system	Agro-ecology	Household sample size for:				
					cattle	sheep	goat	chicken	camel
Afar	DRSLP I	6	Pastoral	1	237	227	275	-	360
	RPLRP	7	Pastoral/AP	2	328	129	58	-	116
Amhara	HEARD	4	Mixed	2345	442	414	309	165	-
	LFSDP	11	Mixed	23	218	129	27	173	-
Benishangul	LFSDP	3	Mixed	2	29	6	50	62	-
Gambela	LFSDP	1	Mixed	2	28	7	11	22	-
Oromia	DRSLP II	12	Pastoral	1	459	205	372	123	540
	HEARD	4	Mixed/P	1234	453	414	342	163	-
	LFSDP	16	Mixed/P	23	297	101	63	167	-
	RPLRP	9	Pastoral/AP	234	1249	183	99	-	73
SNNP	DRSLP II	11	Pastoral	1	231	109	153	--	-
	LFSDP	9	Mixed/P	23	174	53	21		-
	RPLRP	6	Pastoral/AP	12	726	-	-	-	-
Somali	RPLRP	8	Pastoral/AP	124	170	178	152	-	111
Tigray	LFSDP	4	Mixed	3	46	24	21	46	-
Overall		111			4192	1351	1611	593	1200

Agro-ecological zones: 1. Arid lowland, 2. dry/submoist lowland, 3. Moist highland, 4. Submoist midhighland,, 5.

Subalpine highland

Drought Resilience of Sustainable Livelihood program (DRSLP); Regional Pastoral Livelihoods Recovery and Resilience Project (RPLRP); Livestock and Fishery Sector development Project (LFSDP); Health of Ethiopian Animals for Rural Development (HEARD) Project.

Results and discussion

Livestock diseases

Cattle diseases

Diseases reported

Twenty-six cattle diseases were identified by the interviewed livestock keepers in the surveyed woredas. The respondents were asked to name up to three key diseases to identify livestock keepers' priority diseases. Livestock disease priorities could be determined based on livestock keepers' responses: (i) proportions of households affected (i.e. % of respondents reporting diseases), (ii) proportions of a herd affected, (iii) direct ranking or scoring of diseases by respondents, and (iv) mortality rates. Cattle diseases reported by the respondents were grouped into five categories, namely respiratory diseases, neurological

diseases, skin diseases, gastro-intestinal tract (GIT) parasites, external parasites and systemic diseases.

Based on the proportions of households reporting being affected by the diseases, the priority diseases categories are presented in Table 2. Overall, across the eight regions surveyed, the proportions of households reporting respiratory, skin and neurological diseases were the largest, being reported by 14.6, 14.9 and 14.2% of the respondents. However, neurological diseases in Afar and Somali and skin diseases in Benishangul were of lesser importance, whereas systemic diseases are the most important diseases in Somali and Benishangul.

The proportion of respondents reporting their herds were affected appears to be small when the diseases were aggregated into diseases categories. A clearer picture emerges when the proportions of respondents affected by the diseases were calculated for specific diseases. The proportion of households affected by the diseases could still be higher than reported here since some of the respondents recorded as not reporting the diseases might have other reasons for not reporting other rather than being free from the diseases.

TABLE 2. PERCENT OF RESPONDENTS (OUT OF THE TOTAL PARTICIPATING IN THE SURVEY) REPORTING THE DIFFERENT DISEASE CATEGORIES AFFECTING THEIR CATTLE HERDS IN EIGHT REGIONS OF ETHIOPIA

	Afar	Amhara	Benshangul	Gambella	Oromia	SNNP	Somali	Tigray
External parasites	2.7%	31.4%	1.1%	0.0%	14.4%	5.8%	0.0%	4.3%
GIT parasites	2.4%	15.2%	2.9%	0.6%	9.5%	2.0%	6.2%	3.3%
Neurological	0.2%	40.9%	6.9%	28.6%	22.4%	10.3%	0.0%	4.3%
Respiratory	18.5%	21.4%	8.6%	22.3%	23.0%	12.1%	7.1%	3.8%
Skin diseases	11.8%	25.0%	5.2%	28.6%	19.6%	9.9%	13.5%	5.4%
Systemic diseases	3.5%	8.5%	9.8%	3.6%	9.5%	8.6%	20.4%	2.2%
Other	0.1%	0.1%	0.9%	0.0%	0.5%	0.9%	0.0%	2.2%
Overall	5.8%	15.9%	5.2%	7.7%	12.5%	6.7%	9.6%	3.3%

The top priority diseases/parasites/disease signs across disease categories were CBPP, LSD and coughing in Afar; tick, rabies and diarrhea in Amhara; Trypanosomiasis, Pasteurellosis and pneumonia in Benishangul; CBPP, LSD and rabies in Gambella; Pasteurellosis, CBPP and LSD in Oromia; Anthrax, CBPP and LSD in SNNP; trypanosomiasis, LSD and Pasteurellosis in Somali; and dermatophilosis, schistosomiasis and tick infestation in Tigray.

The most frequently reported respiratory diseases were CBPP being reported by 11.8 to 89.3%, of the respondents, Pasteurellosis (10.7 to 39.6% of respondents), and coughing (9.6

to 37.3% of the respondents). The proportions of respondents reporting the respiratory diseases in each of the eight regions are shown in Fig. 2. Similarly, proportions of respondents reporting GIT parasitic, external parasitic, skin, neurological and systemic diseases in the eight regions are shown in Figs. 3 to 6.

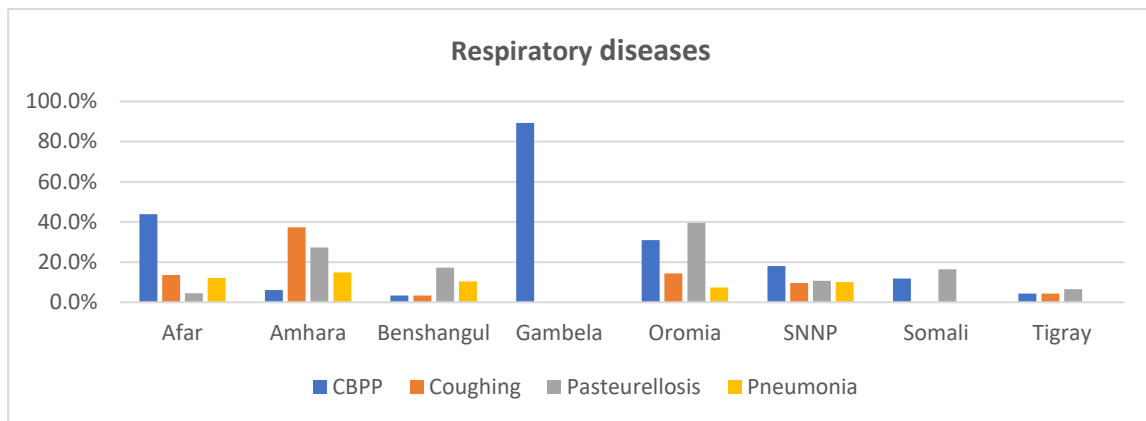


FIGURE 1. PER CENT OF RESPONDENTS REPORTING RESPIRATORY DISEASES AFFECTING THEIR CATTLE HERDS IN EIGHT REGIONS OF ETHIOPIA (CBPP: CONTAGIOUS BOVINE PLEUROPNEUMONIA)

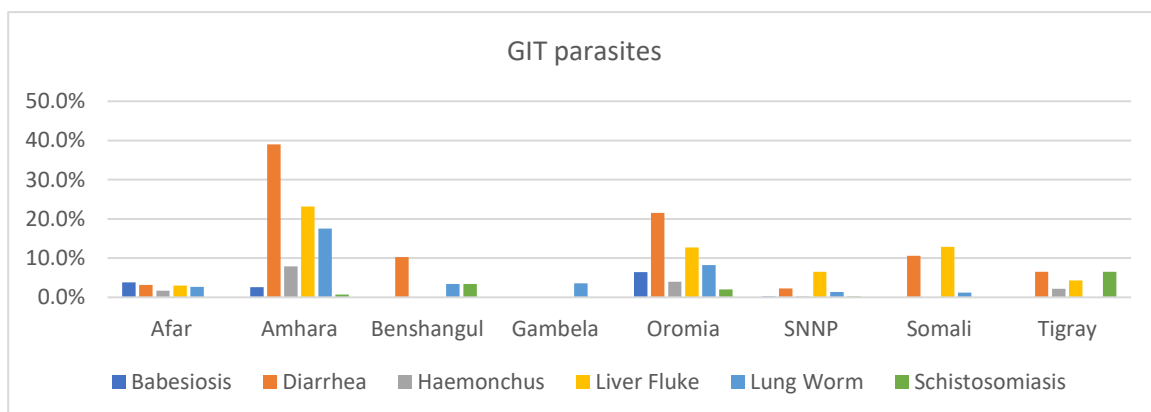


FIGURE 2. PER CENT OF RESPONDENTS REPORTING GIT AND EXTERNAL PARASITES AFFECTING THEIR CATTLE HERDS IN EIGHT REGIONS OF ETHIOPIA

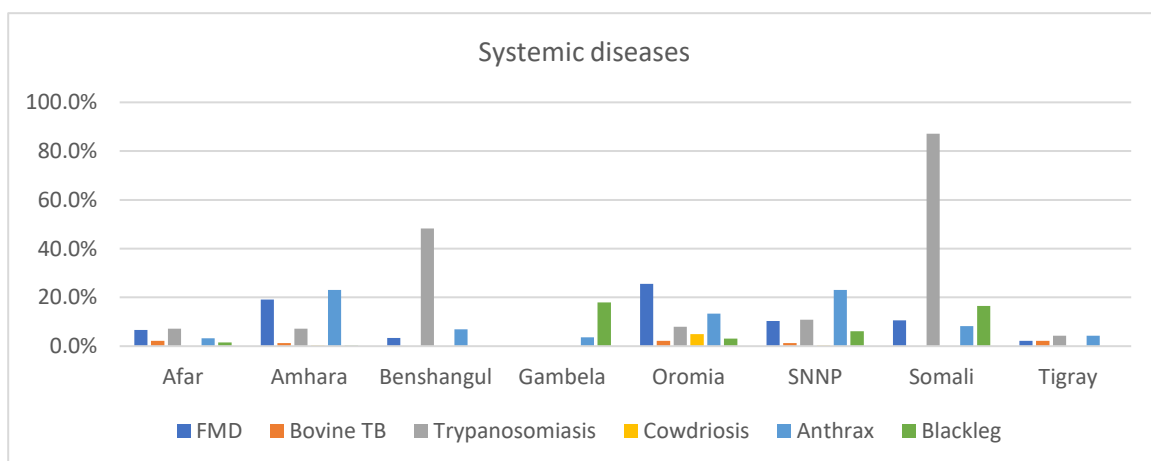


FIGURE 3. PER CENT OF RESPONDENTS REPORTING SYSTEMIC DISEASES AFFECTING THEIR CATTLE HERDS IN EIGHT REGIONS OF ETHIOPIA

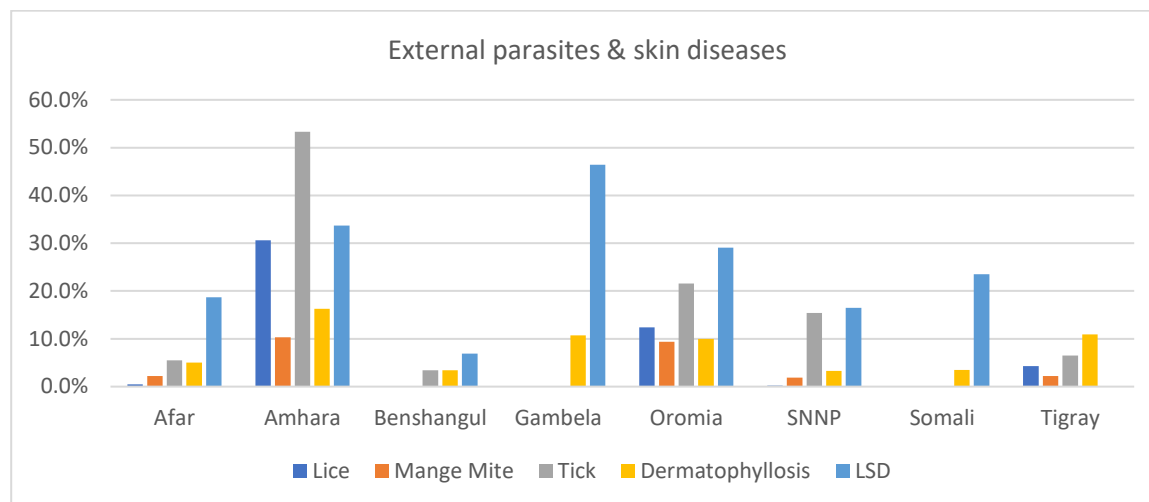


FIGURE 4. PER CENT OF RESPONDENTS REPORTING EXTERNAL PARASITES AND SKIN DISEASES AFFECTING THEIR CATTLE HERDS IN EIGHT REGIONS OF ETHIOPIA

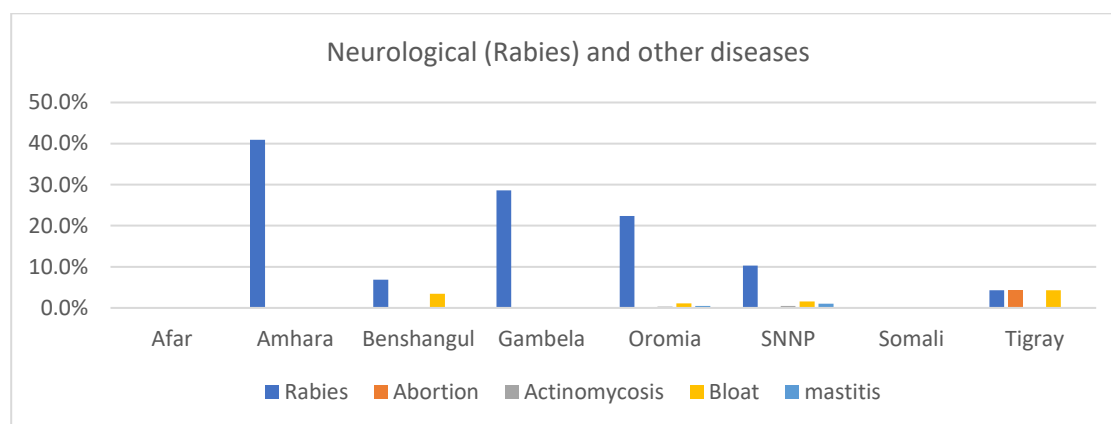


FIGURE 5. PER CENT OF RESPONDENTS REPORTING NEUROLOGICAL AND OTHER DISEASES AFFECTING THEIR CATTLE HERDS IN EIGHT REGIONS OF ETHIOPIA

Disease epidemiology may well be determined by agroecological factors. The results in Table 3 clearly show agro-ecological variation in disease distribution. Systemic diseases are among the top three disease categories in arid lowlands, but not in the other zones. External parasites are more important in the highlands than in the lowlands. Neurological diseases are among the top three disease categories in moist and sub-moist zones (sub-moist lowlands and submoist subalpine highlands). However, there are equally important diseases in all zones. Respiratory and skin diseases are among the top three disease categories in all agroecological zones, but respiratory diseases were reported by the largest proportions of the respondents in the lowlands and drier highlands (subalpine highlands).

Most frequently reported diseases across the disease categories are CBPP, LSD and rabies in Arid lowlands; tick, rabies and coughing in moist highlands; CBPP, Pasteurellosis and LSD in submoist/dry lowland; tick, liver Fluke and CBPP in subalpine highlands; and tick infestation, Pasteurellosis and LSD in submoist mid-highlands.

TABLE 3. PROPORTIONS OF RESPONDENTS REPORTING DISEASE CATEGORIES AFFECTING THEIR CATTLE HERDS IN DIFFERENT AGRO-ECOLOGICAL ZONES OF ETHIOPIA

Disease category	Arid lowland	Dry/Sub-moist lowland	Sub-moist mid-highland	Moist highland	Subalpine highland
External parasites	1.8%	6.3%	22.5%	19.2%	9.4%
GIT parasites	3.1%	5.0%	10.4%	12.5%	3.0%
Neurological	9.3%	10.7%	27.3%	33.9%	2.6%
Respiratory	12.0%	20.1%	20.4%	15.8%	10.9%
Skin diseases	12.3%	13.4%	23.6%	16.1%	7.7%
Systemic diseases	10.9%	8.4%	8.8%	7.2%	4.7%
Other	0.0%	0.2%	0.9%	0.6%	0.0%
Overall	7.2%	8.9%	13.4%	12.0%	5.2%

Proportions of herds affected

Disease priorities were established based on the proportion of respondents reporting the diseases (Table 2). However, livestock keepers could have their own criteria for determining the relative importance of diseases. One criterion could be how much the disease infected their herd, i.e. the proportion of herds affected by the diseases (Table 4).

On the average across the eight regions, 52.03%, 22.77%, 10.58%, 3.36%, and 4.93% of the respondents reported that 0-15%, 16-50%, 51-75%, 76-99% and 100% of their herds were affected by diseases. Fifty-three to 57% of the respondents reported at least 0-15% of their herds were affected by all the disease categories, except external parasites which was reported by 38.9% of the respondents to affect 0-15% of their herds. Respiratory and systemic diseases were reported to be more infectious than the other diseases, being reported by 22.08% and 16.2% of the respondents to affect 51-99% of their herds. However, there are some variations across regions. The importance of diseases and the proportions of herds affected by diseases in the eight regions surveyed are reported in Table 4.

TABLE 4. PROPORTION OF RESPONDENTS (OUT OF THOSE REPORTING THE DISEASES) REPORTING THE PROPORTION (0-100%) OF CATTLE AFFECTED IN THEIR HERDS BY DISEASE CATEGORIES IN EIGHT REGIONS OF ETHIOPIA

		0-15%	16-50%	51-75%	76-99%	100%
Afar	External parasites	44.4%	25.9%	22.2%	7.4%	0.0%
	GIT	37.5%	25.0%	16.7%	12.5%	4.2%

	Neurological	100.0%	0.0%	0.0%	0.0%	0.0%
	Respiratory	50.3%	30.8%	14.6%	4.3%	0.5%
	Skin	34.7%	43.2%	21.2%	0.0%	0.8%
	Systemic	40.0%	40.0%	17.1%	2.9%	0.0%
Amhara	External	39.5%	34.4%	17.5%	3.2%	5.4%
	GIT	50.0%	37.5%	7.9%	2.0%	1.3%
	Neurological	36.9%	50.4%	11.0%	1.7%	0.0%
	Respiratory	57.5%	33.2%	8.4%	0.0%	0.9%
	Skin	56.0%	36.0%	7.6%	0.0%	0.4%
	Systemic	43.5%	42.4%	11.8%	2.4%	1.2%
Benshangul	External	100.0%	0.0%	0.0%	0.0%	0.0%
	GIT	0.0%	37.9%	0.0%	20.7%	37.9%
	Neurological	49.3%	0.0%	0.0%	0.0%	49.3%
	Respiratory	30.2%	10.5%	30.2%	19.8%	10.5%
	Skin	65.4%	0.0%	32.7%	0.0%	0.0%
	Systemic	23.5%	6.1%	11.2%	23.5%	34.7%
Gambela	External	0.0%	0.0%	0.0%	0.0%	0.0%
	GIT	100.0%	0.0%	0.0%	0.0%	0.0%
	Neurological	50.0%	24.8%	24.8%	0.0%	0.0%
	Respiratory	43.9%	20.2%	35.9%	0.0%	0.0%
	Skin	56.3%	43.7%	0.0%	0.0%	0.0%
	Systemic	83.3%	0.0%	16.7%	0.0%	0.0%
Oromia	External	47.9%	25.7%	18.1%	4.9%	4.2%
	GIT	55.8%	35.8%	7.4%	1.1%	0.0%
	Neurological	56.7%	29.9%	10.3%	2.7%	0.4%
	Respiratory	60.9%	28.7%	8.7%	1.3%	0.9%
	Skin	57.7%	32.7%	8.2%	1.0%	0.5%
	Systemic	61.1%	27.4%	8.4%	2.1%	2.1%
SNNP	External	46.6%	25.9%	15.5%	5.2%	6.9%
	GIT	60.0%	35.0%	5.0%	5.0%	0.0%
	Neurological	43.7%	30.1%	19.4%	2.9%	2.9%
	Respiratory	59.5%	24.0%	10.7%	4.1%	1.7%
	Skin	64.6%	24.2%	6.1%	4.0%	1.0%
	Systemic	50.0%	26.7%	11.6%	7.0%	4.7%
Somali	External	0.0%	0.0%	0.0%	0.0%	0.0%
	GIT	51.6%	24.2%	24.2%	0.0%	0.0%
	Neurological	0.0%	0.0%	0.0%	0.0%	0.0%
	Respiratory	49.3%	16.9%	16.9%	8.5%	8.5%
	Skin	78.5%	8.9%	8.9%	4.4%	0.0%
	Systemic	78.9%	4.9%	7.8%	6.9%	2.0%
Tigray	External	32.6%	67.4%	0.0%	0.0%	0.0%
	GIT	87.9%	12.1%	0.0%	0.0%	0.0%
	Neurological	100.0%	0.0%	0.0%	0.0%	0.0%
	Respiratory	71.1%	0.0%	13.2%	0.0%	13.2%
	Skin	40.7%	20.4%	0.0%	0.0%	40.7%
	Systemic	50.0%	50.0%	0.0%	0.0%	0.0%

Mortality rate

Loss of animals due to diseases could be the ultimate criterion for determining the priority of diseases, though non-fatal diseases that affect a large proportion of herds could equally be important. Cattle mortality rates, calculated as the number of cattle died as a proportion of

total cattle in a herd, ranged from 0.01 to 0.08 (Table 5). Mortality rates of zero in Benishangul, Gambela and Tigray should be considered with caution as the rates were calculated based on small sample sizes of 27, 56 and 35, respectively. Overall, across regions, the highest mortality rates resulted from systemic and respiratory diseases and in Arid and dry lowlands.

The top killer diseases are shown in Fig. 7. The respiratory diseases CBPP and coughing and the systemic diseases anthrax, black leg, bovine TB and trypanosomiasis inflicted the highest mortality

TABLE 5. CATTLE MORTALITY RATES DUE TO DISEASES IN DIFFERENT REGIONS AND AGROECOLOGICAL ZONES OF ETHIOPIA

Region	Mortality	Agro-ecology	Mortality	Disease category	Mortality
Afar	0.08	Arid lowland	0.05	External	0.00*
Amhara	0.01	Moist highland	0.01	GIT parasite	0.01
Benshangul	0.00*	Submoist/dry lowland	0.04	Neurological	0.02
Gambela	0.00*	Subalpine highland	0.00*	Systemic	0.04
Oromia	0.02	Submoist midhighland	0.01	Respiratory	0.03
SNNP	0.04	Overall	0.02	Skin	0.02
Somali	0.07			Other	0.00*
Tigray	0.00*			overall	0.02
Overall	0.02				

* calculated from small sample sizes.

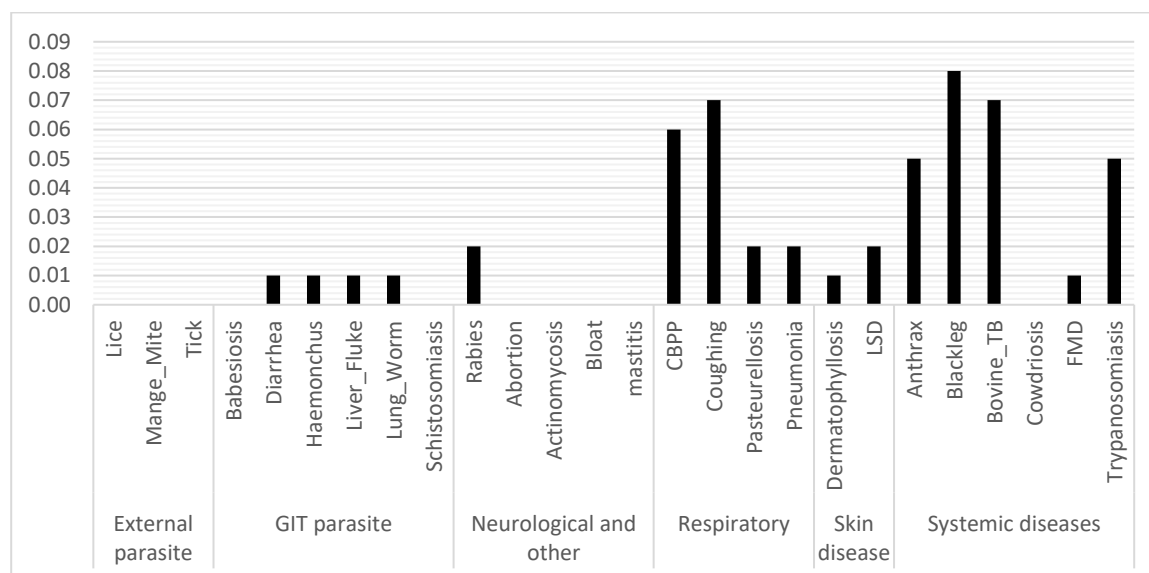


FIGURE 6. AVERAGE CATTLE MORTALITY RATE (AS A PROPORTION OF TOTAL CATTLE IN A HERD) DUE TO DISEASES IN ETHIOPIA

Livestock keepers' responses

To assess livestock keepers' awareness and/or availability of livestock health service in the different geographic regions and production systems, respondents (only those that reported their herds were affected) were asked for the measures they would have taken to control disease outbreaks. The major responses of livestock keepers to disease outbreaks overall across the eight regions in order of priority measures were to call official veterinarians, try to treat sick animals by themselves using modern medicine bought from drug shops as well as elicit sources and using traditional methods/herbs reported by 25.3, 20.6 and 17.8% of the respondents, respectively. However, the high proportion of respondents reporting use of elicit/illegal drugs and treating their animals by themselves (36.8%) relative to visits to official veterinarians (21.4%) for GIT parasites is a great concern.

Since response of households to disease outbreaks varied depending on their livelihood activities, analysis of responses was conducted by disaggregating households into pastoral, agro-pastoral and mixed crop-livestock producing households (Fig. 8). The responses were also aggregated into diseases categories. Although the main responses to disease outbreaks were similar under the three systems, a higher proportion of the respondents in the highland mixed crop-livestock system buy drugs and treat sick animals by themselves and call/visit government veterinarians, whereas traditional treatment of sick animals is more practices in the pastoral and agropastoral systems. These practices are similar for all the disease categories (Fig. 8).

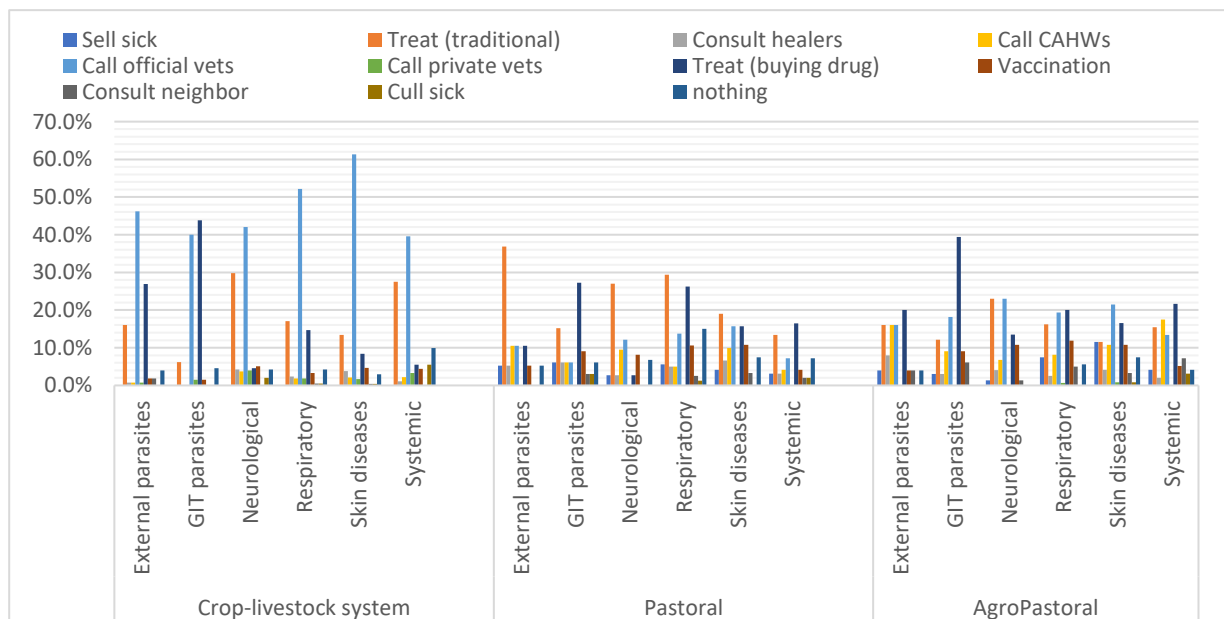


FIGURE 7. RESPONSE OF LIVESTOCK KEEPERS (% OF RESPONDENTS OUT OF THOSE REPORTING DISEASES) TO OUTBREAKS OF DISEASES IN THREE LIVESTOCK PRODUCTION SYSTEMS IN ETHIOPIA

Sheep diseases

Diseases reported

Across regions, the most frequently reported sheep diseases were respiratory, skin diseases, neurological diseases and GIT parasites (Table 6). However, most of the respondents did not report that their sheep were affected by any of the diseases, the highest average percentage of reports across regions being 22.8% for respiratory diseases. However, the percentage of respondents reporting diseases were as high as 100% in Somali region, though the sample sizes were too small ranging from three for GIT parasites to 102 for respiratory diseases. Diseases reported at least by 10% of the respondents were skin and respiratory in Afar, external and GIT parasites, respiratory diseases in Amhara, GIT in Benshangul, Neurological in Gambella, respiratory, neurological and skin diseases in Oromia, respiratory in SNNP, and all disease categories in Somali. None of the diseases were reported by more than 10% of the respondents.

TABLE 6. PERCENT OF RESPONDENTS REPORTING DISEASES BY DISEASE CATEGORIES AFFECTING THEIR SHEEP FLOCKS IN EIGHT REGIONS OF ETHIOPIA

	Afar	Amhara	Benshangul	Gambela	Oromia	SNNP	Somali	Tigray
External parasites	7.5	22.0	0.0	0.0	16.8	4.0	100.0	0.0
GIT parasites	2.8	17.6	11.1	2.4	18.0	8.1	100.0	5.6
Neurological	2.6	15.8	5.6	9.5	22.5	8.7	100.0	1.4
Respiratory	11.9	21.5	2.8	4.8	24.6	14.2	100.0	2.8
Skin diseases	23.5	19.0	0.0	0.0	19.3	7.0	100.0	4.2
Systemic diseases	3.0	11.3	3.3	5.7	11.1	3.7	100.0	8.3
Other diseases	0.3	0.1	0.0	0.0	0.2	0.6	0.0	0.0
Overall	7.2	16.1	3.9	3.3	16.9	7.3	100.0	3.6

The per cent of respondents reporting the specific diseases were much higher than the average for the disease categories. The most frequently reported respiratory diseases were CCPP in Afar, Pasteurellosis in Amhara, Pasteurellosis in Benishangul, CCPP in Gambella, Pasteurellosis and CCPP in Oromia, and CCPP in SNNP, being reported by 27.5%, 50.3%, 16.7%, 28.6%, 40%, 27%, respectively (Fig. 9).

Among the neurological diseases, coenuruses was reported by about 23-40% of the respondents in Amhara, Gambella, Oromia, and SNNP. The disease was reported by 100% of the 12 respondents in Somali region. Among external parasites, tick, lice, mange mite and

sheep ked were reported by 19-29% of the respondents in Amhara and Oromia regions and 3-11% in Afar and SNNP regions (Fig. 11). PPR was the most reported systemic diseases, being reported by up to 23% of respondents, followed by FMD, Anthrax and black leg (Fig. 12).

The skin disease sheep and goat pox and orf were reported by up to 51% and 29.2% (Fig. 13). Another important skin disease locally known as *Qodimus* was reported in Afar, Somali and Oromia regions. The most important GIT parasites were liver fluke, diarrhea (which could be a sign of GIT infection) and lung worm in almost all the eight regions and haemonchus in the highland regions (Fig. 14). A GIT disease or disease symptom known locally as *Abati* was also reported by about 19% of the respondents in Benishangul, Oromia and Amhara.

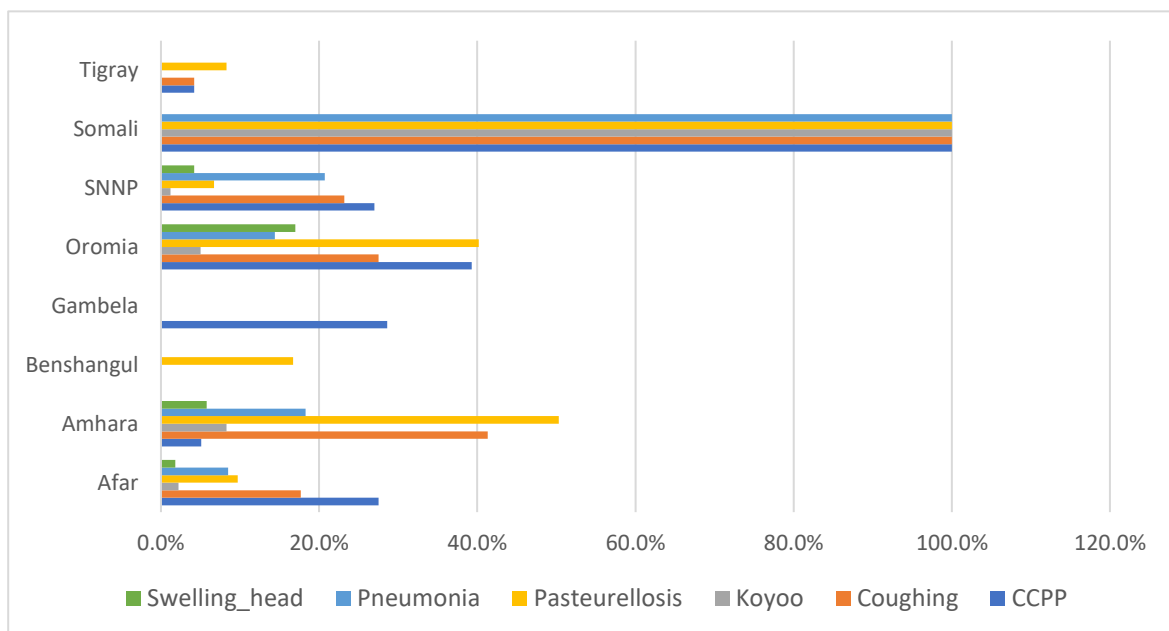


FIGURE 8. PER CENT OF RESPONDENTS REPORTING RESPIRATORY DISEASES AFFECTING THEIR SHEEP FLOCKS IN EIGHT REGIONS OF ETHIOPIA

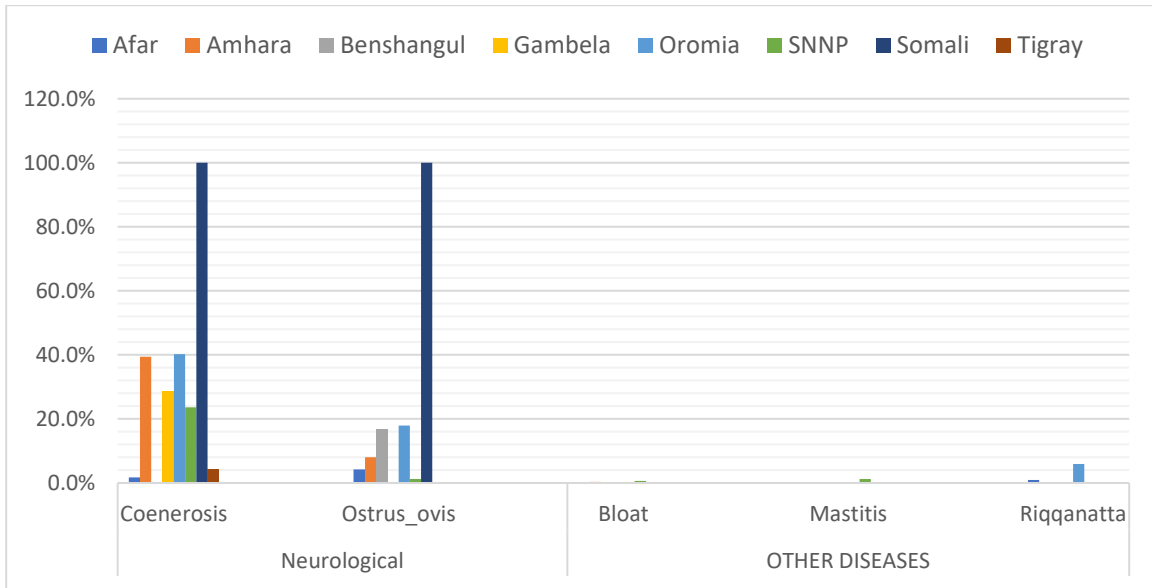


FIGURE 9. PER CENT OF RESPONDENTS REPORTING EXTERNAL PARASITES AND SKIN DISEASES AFFECTING THEIR SHEEP FLOCKS IN EIGHT REGIONS OF ETHIOPIA

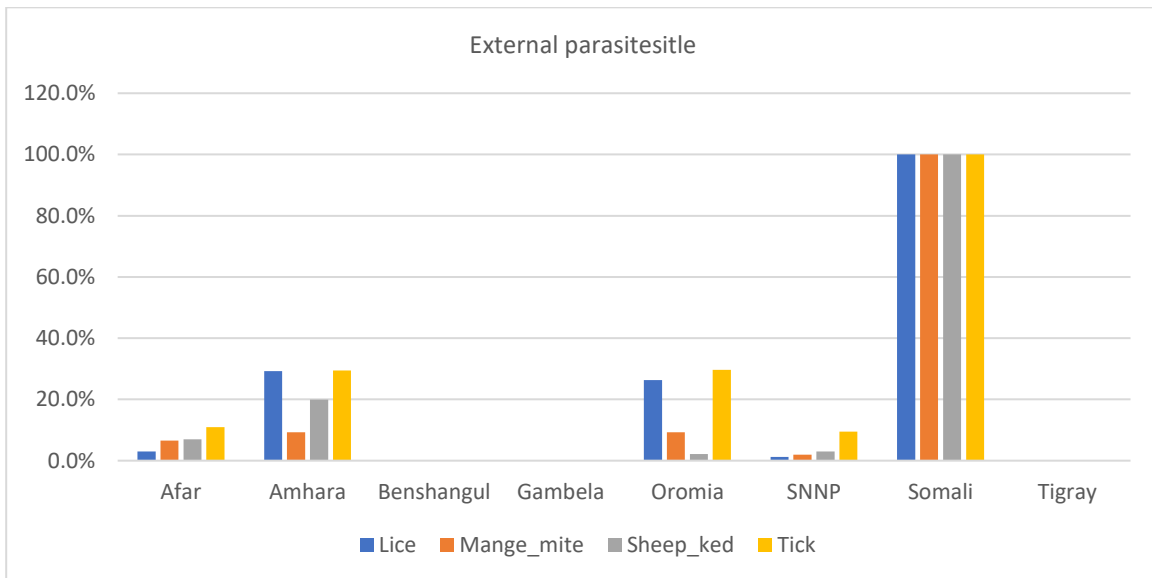


FIGURE 10. PER CENT OF RESPONDENTS REPORTING EXTERNAL PARASITES AFFECTING THEIR SHEEP FLOCKS IN EIGHT REGIONS OF ETHIOPIA

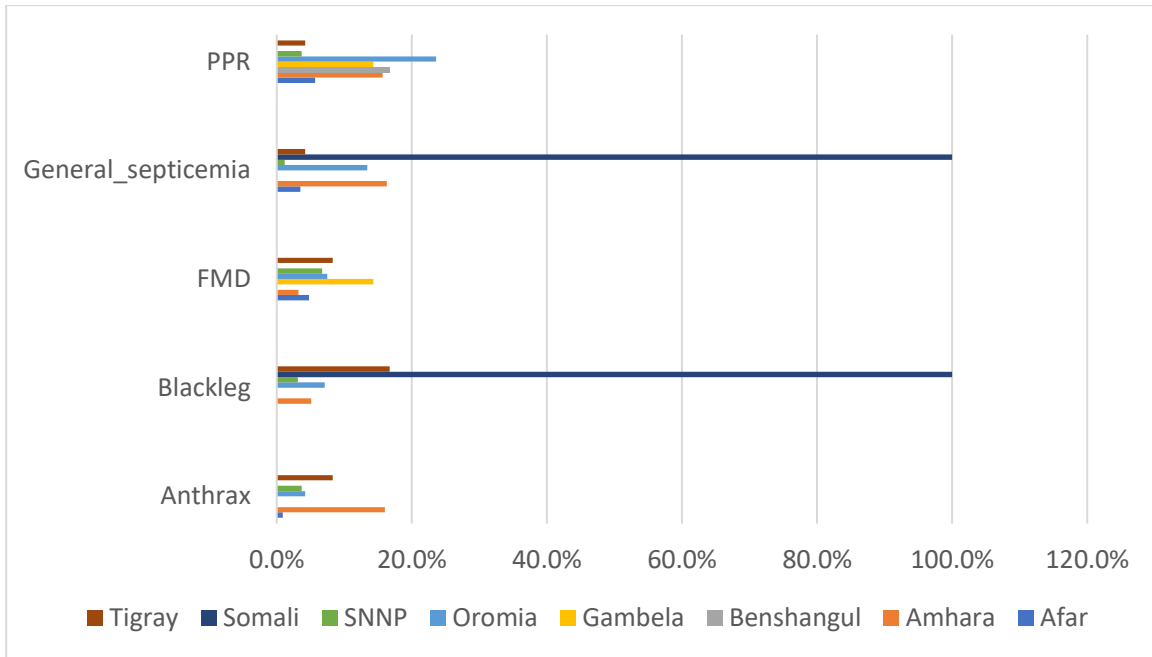


FIGURE 11. PER CENT OF RESPONDENTS REPORTING SYSTEMIC DISEASES AFFECTING THEIR SHEEP FLOCKS IN EIGHT REGIONS OF ETHIOPIA

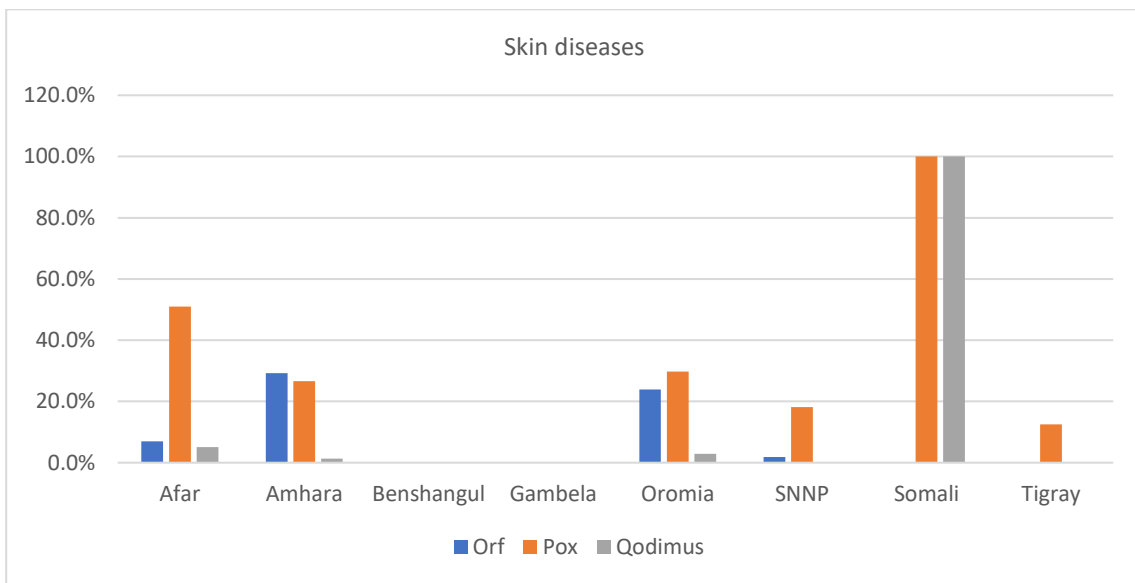


FIGURE 12. PER CENT OF RESPONDENTS REPORTING SKIN DISEASES AFFECTING THEIR SHEEP FLOCKS IN EIGHT REGIONS OF ETHIOPIA

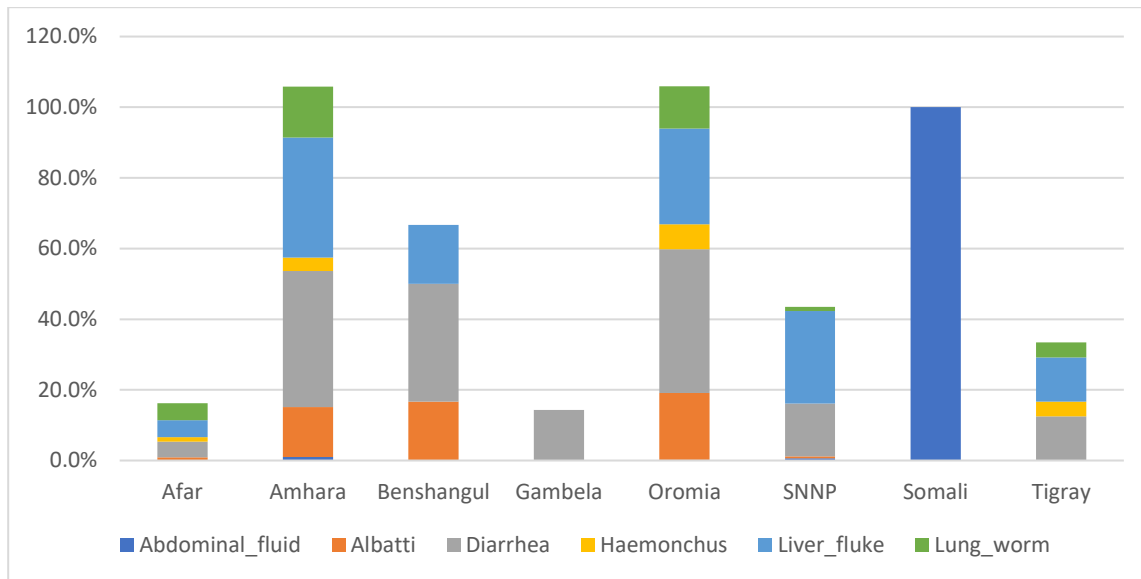


FIGURE 13. PER CENT OF RESPONDENTS REPORTING GIT PARASITES AFFECTING THEIR SHEEP FLOCKS IN EIGHT REGIONS OF ETHIOPIA

Sheep disease distribution across major agro-ecological zones is presented in Table 7. Respiratory and skin diseases are more important in arid and sub-moist/dry lowlands, being reported by around 20% of the respondents. The rest of the diseases were reported by less than 10% of the respondents in these zones. In the sub-moist mid-highlands, respiratory diseases, external parasites, skin and neurological diseases are the priority diseases. Besides respiratory diseases, which are equally important in all zones, GIT parasites were reported by a larger proportion of the respondents in moist highlands than in the other zones. Very few of the respondents reported diseases in the submoist/dry, cold highlands, with the highest proportion of respondents reporting respiratory diseases.

TABLE 7. PROPORTIONS OF RESPONDENTS REPORTING DISEASE CATEGORIES AFFECTING THEIR SHEEP FLOCKS IN DIFFERENT AGRO-ECOLOGICAL ZONES OF ETHIOPIA

	Arid lowland	Sub-moist/Dry lowland	Sub-moist mid-highland	Moist highland	Subalpine highland
External parasites	8.3%	11.1%	21.0%	16.3%	7.1%
GIT parasites	8.1%	10.2%	16.6%	18.5%	4.0%
Neurological	3.9%	15.2%	18.4%	14.2%	1.6%
Respiratory	17.3%	20.7%	21.9%	19.6%	11.9%
Skin	21.4%	19.9%	19.3%	14.6%	-
Systemic	7.7%	7.3%	11.9%	9.0%	2.9%
Overall	10.2%	12.6%	16.3%	14.2%	4.8%

Proportions of flocks affected

On the average across the eight regions, 44.9%, 30.7%, 16.0%, 4.7%, and 3.6% of the respondents reported that 0-15%, 16-50%, 51-75%, 76-99% and 100% of their flocks were affected by diseases. The proportions of respondents reporting at least 0-15% of their flocks being affected by diseases ranged from a maximum of 48.7% for respiratory to a minimum of 37.1% for systemic diseases.

The most infectious diseases affecting 51-99% of the flocks are systemic, skin and neurological diseases, being reported by 35.1%, 20.7 and 19.5% of the respondents. However, there are some variations across regions. Diseases affecting 51-99% of the flocks in Afar, Amhara, Benshangul, Gambela, Oromia, SNNP, Somali and Tigray are respiratory, external parasitic, systemic, systemic and neurological, external parasitic, systemic, Respiratory and skin diseases, respectively. The proportions of respondents reporting the diseases affecting 51-99% of their flocks in the eight regions were 22.8%, 18.6%, 100.0%, 100.0%, 23.1%, 30.0%, 44.1%, and 33.3%, respectively. The importance of diseases and the proportions of flocks affected by diseases in the eight regions surveyed are reported in Fig. 15.

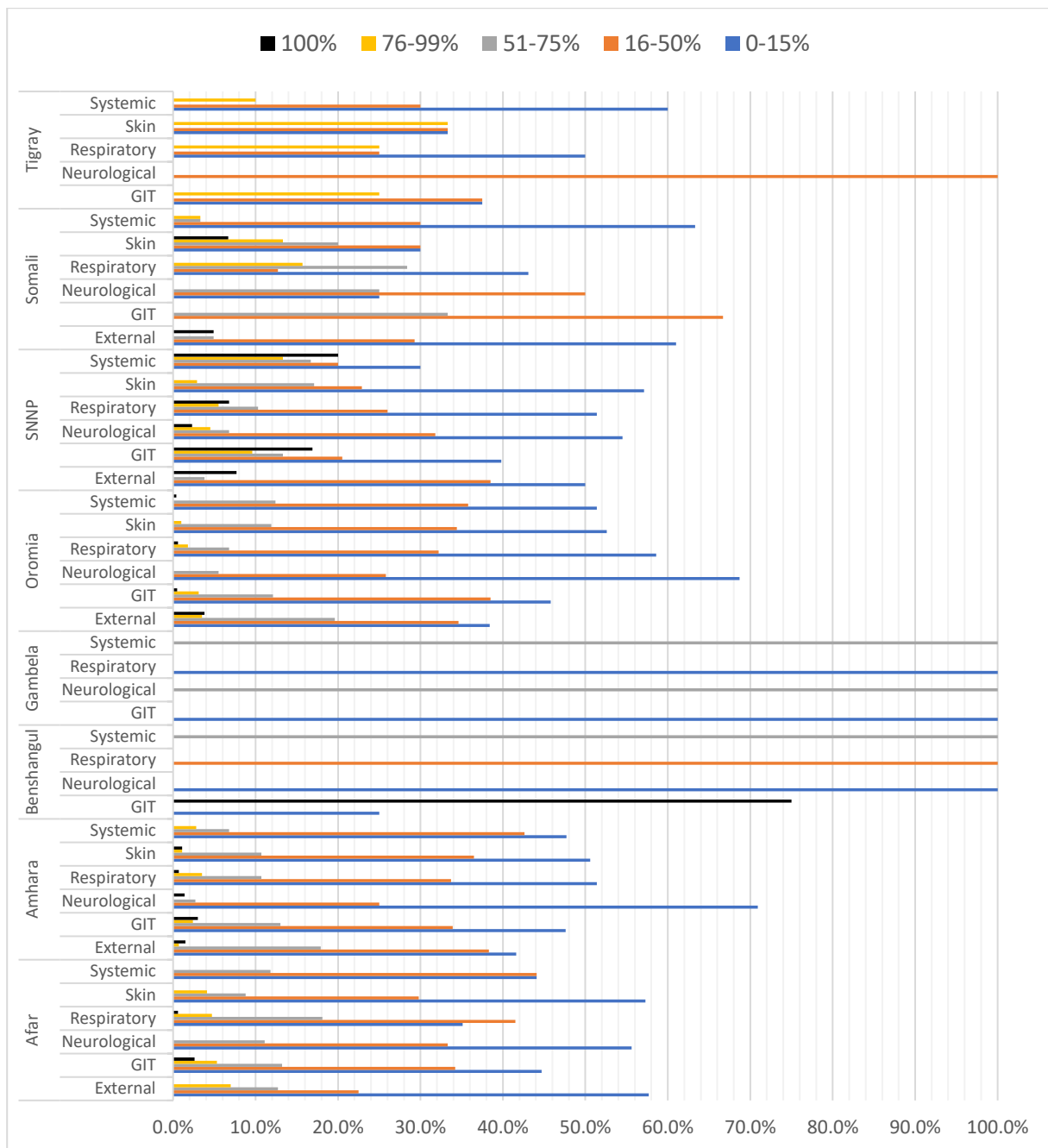


FIGURE 14. AVERAGE PROPORTION (%) OF SHEEP IN A FLOCK AFFECTED BY DISEASES IN EIGHT REGIONS OF ETHIOPIA (BASED ON % RESPONDENTS REPORTING THE DISEASES)

Sheep mortality rates

During the year preceding the survey year, sheep mortality rates due to diseases ranged from 0.03 to 0.25 (Table 8). Overall across regions, the highest mortality rates are caused by external parasites and respiratory diseases. The highest mortality rates were reported from Benishangul and Gambella regions and in subalpine highlands.

The top killer diseases are shown in Fig. 16. Diarrhea, liver fluke, coenerosis, CCPP, Pasteurellosis, sheep and goat pox, anthrax and PPR are the top killer diseases. Diseases or

diseases syndromes locally known as *koyyoo* and *swelling of head* also resulted in high mortalities.

TABLE 8. SHEEP MORTALITY RATES DUE TO DISEASES IN DIFFERENT REGIONS AND AGROECOLOGICAL ZONES OF ETHIOPIA

region	Mortality	Agro-ecology	Mortality	Disease category	Mortality
Afar	0.05	Arid lowland	0.02	External parasites	0.04
Amhara	0.03	Moist highland	0.03	GIT parasites	0.03
Benshangul	0.25	Submoist/dry lowland	0.03	Neurological	0.01
Gambela	0.14	Subalpine highland	0.04	Other diseases *	0.02
Oromia	0.03	Submoist midhighland	0.03	Respiratory	0.04
SNNP	0.04	Overall	0.03	Skin diseases	0.03
Somali	0.04			Systemic diseases	0.03
Tigray	0.05			Overall	0.03
Overall	0.03				

* other diseases include Bloat, Foot rot, Mastitis and *Riqqanatta*

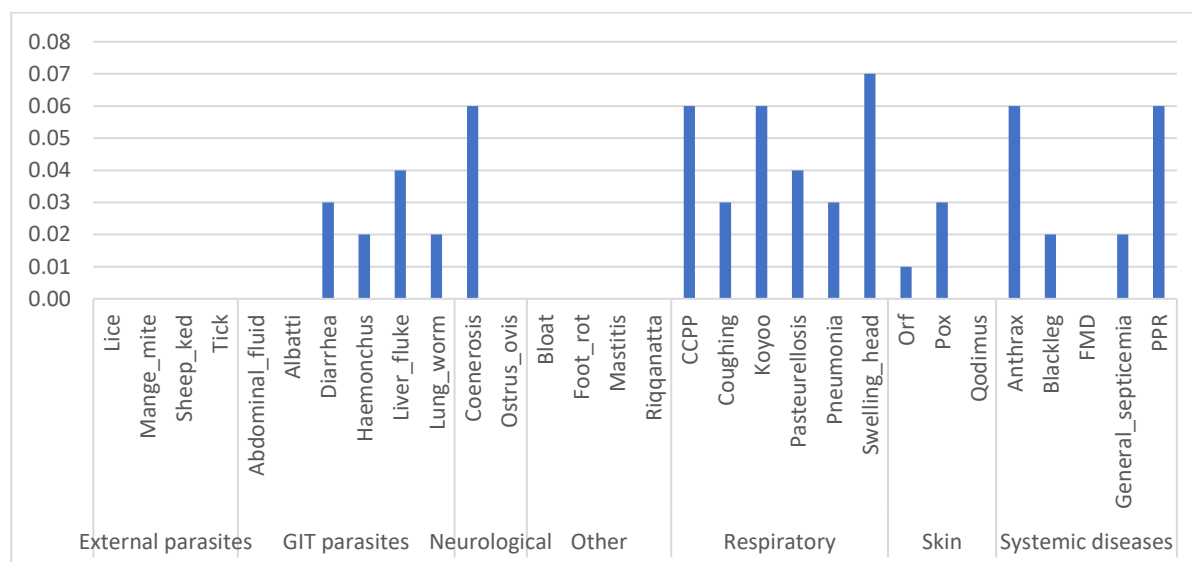


FIGURE 15. AVERAGE SHEEP MORTALITY RATE (AS A PROPORTION OF TOTAL SHEEP IN A FLOCK) DUE TO DISEASES IN ETHIOPIA

Livestock keepers' responses

To assess livestock keepers' awareness and/or availability of livestock health service in the different geographic regions and production systems, respondents (only those that reported their herds were affected) were asked for the measures they would have taken to control disease outbreaks.

The primary responses to disease outbreaks are to call official veterinarians or CAHWs, try to treat sick animals by the farmers/pastoralists using drugs bought from market and/or using traditional medications/methods (Fig. 17). There is not much variation in the responses to the different disease categories. However, there are some variations among the production

systems. In mixed crop-livestock systems, the primary response is to call/visit official veterinarians, followed by treating sick animals using modern drugs and traditional medication. On the contrary, in pastoral and agropastoral systems, traditional treatment and use of drugs to try and treat sick animals by the pastoralists and agropastoralists themselves are practiced by most of the respondents.

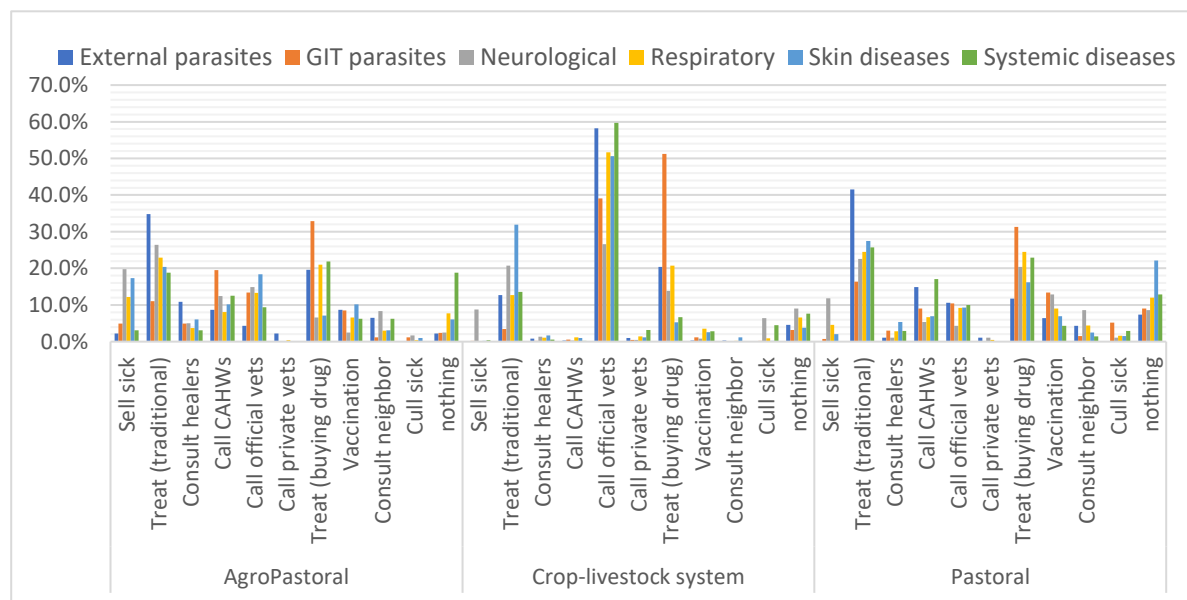


FIGURE 16. RESPONSE OF LIVESTOCK KEEPERS (% OF RESPONDENTS OUT OF THOSE REPORTING DISEASES) TO OUTBREAKS OF DISEASES IN THREE LIVESTOCK PRODUCTION SYSTEMS IN ETHIOPIA

Goat diseases

Diseases identified

On the average across the survey regions, 26.1% of the respondents reported their flocks were affected by diseases during the year preceding the survey year. Among the six disease categories (respiratory diseases, neurological diseases, skin diseases, gastro-intestinal tract (GIT) parasites, external parasites and systemic diseases), respiratory, skin and Systemic diseases were reported as the most important goat diseases, being reported by 29.1, 28.5 and 28.6% of the respondents.

The proportions of households reporting goat diseases across the eight regions were between 5.7 and 100% (Table 9). By region, the disease categories that were reported by the highest number of the respondents are skin diseases in Afar; skin, respiratory and neurological diseases in Amhara; external parasites and systemic diseases in Benishangul; external parasites, systemic diseases and GIT parasites in Gambella; neurological, respiratory and skin diseases in Oromia and SNNP; respiratory, skin systemic diseases in

Somali; and external parasites, systemic diseases and respiratory diseases in Tigray regions. The proportions of respondents reporting the specific diseases are shown in Fig. 18.

The goat population in the highlands is very low and thus the number of respondents. The number of respondents in the moist highlands and subalpine highlands were about 24 and 12, respectively. The most important goat diseases are respiratory, skin and neurological diseases in the arid lowlands, skin, respiratory, and neurological diseases in the dry/submoist lowlands, and neurological, respiratory and skin diseases in mid-highlands, in order of importance (Table 10).

TABLE 9. PERCENT OF RESPONDENTS REPORTING DISEASES BY DISEASE CATEGORIES AFFECTING THEIR GOAT FLOCKS IN EIGHT REGIONS OF ETHIOPIA

	Afar	Amhara	Benshangul	Gambela	Oromia	SNNP	Somali	Tigray
External parasites	4.9%	15.1%	33.5%	38.6%	13.0%	6.6%		38.10%
GIT parasites	3.6%	13.4%	19.7%	22.7%	12.8%	7.8%		13.50%
Neurological	1.4%	30.6%	12.0%	6.1%	22.5%	29.2%		7.90%
Respiratory	8.5%	31.1%	19.7%	15.6%	19.3%	19.9%	100.00	19.00%
Skin diseases	20.9%	33.0%	15.3%	9.1%	17.8%	16.4%	100.00	15.90%
Systemic diseases	3.0%	11.4%	29.6%	40.0%	6.3%	5.9%	100.00	32.40%
Other	0.3%	1.3%			0.2%			
Overall	5.7%	19.1%	19.4%	20.2%	13.0%	12.2%	100.00	18.80%

TABLE 10. PROPORTIONS OF RESPONDENTS REPORTING DISEASE CATEGORIES AFFECTING THEIR GOAT FLOCKS IN DIFFERENT AGRO-ECOLOGICAL ZONES OF ETHIOPIA

	Arid lowland	Submoist/dry lowland	Submoist mid-highland
External	4.2%	10.6%	16.4%
GIT	4.0%	9.7%	13.0%
Neurological	12.0%	17.0%	26.7%
Respiratory	19.0%	17.2%	24.3%
Skin	18.4%	19.1%	21.7%
Systemic	8.6%	6.2%	12.2%
Others	0.3%	0.1%	0.8%
Overall	9.6%	11.2%	16.3%

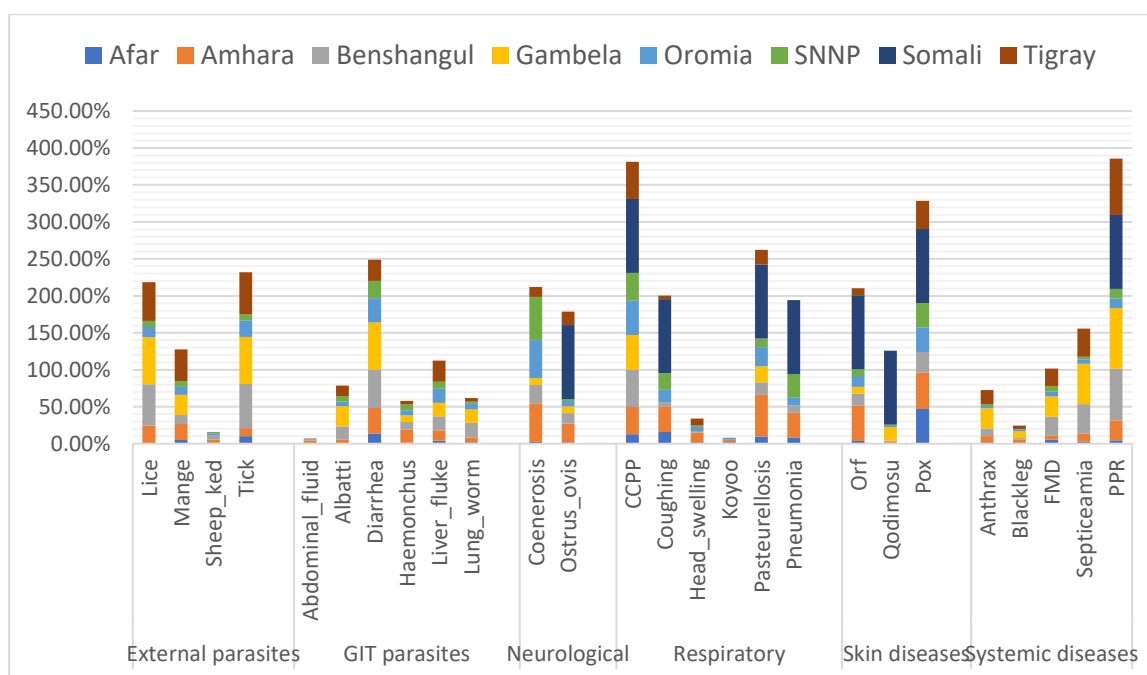


FIGURE 17. PER CENT OF RESPONDENTS REPORTING DISEASES AFFECTING THEIR GOAT FLOCKS IN EIGHT REGIONS OF ETHIOPIA

Proportions of flocks affected

The most important goat diseases affecting 51-99% of the flocks are external and GIT parasites and respiratory diseases, as reported by 24.5%, 16.4% and 11.5% of the respondents. From 42 to 77% of the respondents reported at least 0-15% of their flocks were affected by diseases (Table 11).

TABLE 11. AVERAGE PROPORTION (%) OF GOATS IN A FLOCK AFFECTED BY DISEASES IN ETHIOPIA (BASED ON % RESPONDENTS REPORTING THE DISEASES)

	0-15%	16-50%	51-75%	76-99%	100%
External	42.4%	31.0%	19.8%	4.7%	2.1%
GIT	48.6%	30.7%	11.9%	4.5%	4.2%
Neurological	66.8%	21.5%	7.6%	3.9%	0.3%
Respiratory	53.8%	28.4%	12.8%	3.8%	1.2%
Skin	57.2%	29.6%	10.5%	1.7%	0.9%
Systemic	53.6%	35.3%	8.0%	1.9%	1.2%
Others	76.9%	7.7%	7.7%	0.0%	7.7%
Overall	54.2%	28.9%	11.8%	3.5%	1.6%

Mortality rate

During the year preceding the survey year, goat mortality rates due to diseases ranged from 0.02 to 0.06 (Table 12). Overall, across regions, the highest mortality is caused by systemic,

respiratory and neurological diseases. The highest mortality rates were reported from Afar, Gambella and Somali regions.

The top killer diseases are shown in Fig. 19. CCPP, PPR, anthrax, black leg, mange, diarrhea, ostrus ovis, coenerosis, and pneumonia are the top killers. Diseases or diseases syndromes locally known as *Qodimus* and *swelling of head* also resulted in high mortalities.

TABLE 12. GOAT MORTALITY RATES DUE TO DISEASES IN DIFFERENT REGIONS AND AGROECOLOGICAL ZONES OF ETHIOPIA

region	Mortality	Agro-ecology	Mortality	Disease category	Mortality
Afar	0.06	Arid lowland	0.03	External	0.01
Amhara	0.04	Submoist/dry lowland	0.02	GIT	0.01
Benshangul	0.02	Submoist midhighland	0.05	Neurological	0.06
Gambela	0.05	Total	0.03	Others	0.00
Oromia	0.03			Respiratory	0.05
SNNP	0.03			Skin	0.02
Somali	0.04			Systemic	0.06
Tigray	0.04			Total	0.03
Total	0.03				

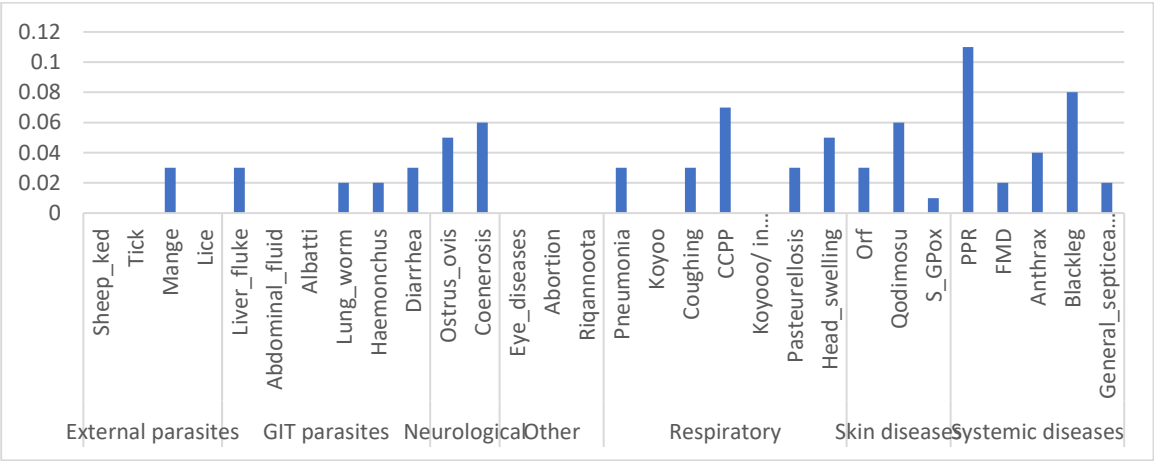


FIGURE 18. AVERAGE GOAT MORTALITY RATE (AS A PROPORTION OF TOTAL GOAT IN A FLOCK) DUE TO DISEASES IN ETHIOPIA

Goat keepers’ responses

Goat keepers’ responses to disease outbreaks are similar to other livestock diseases as shown in Fig. 20.

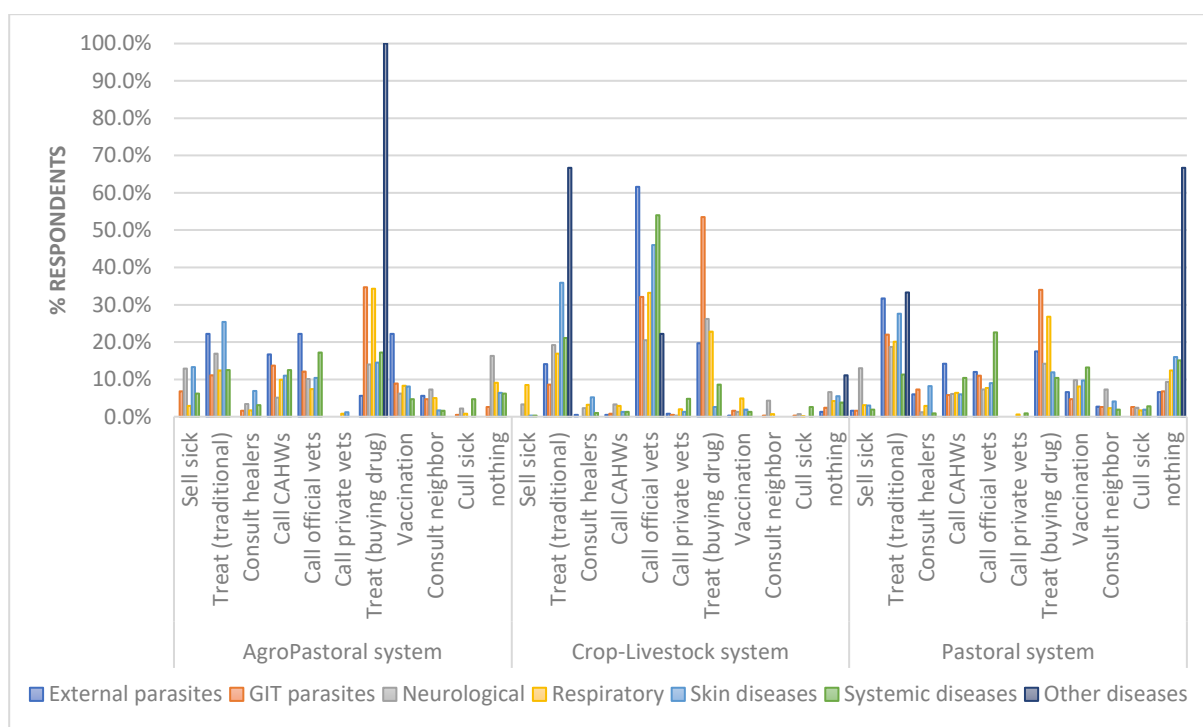


FIGURE 19. RESPONSE OF GOAT KEEPERS (% OF RESPONDENTS OUT OF THOSE REPORTING DISEASES) TO OUTBREAKS OF DISEASES IN THREE LIVESTOCK PRODUCTION SYSTEMS IN ETHIOPIA

Chicken diseases

Diseases identified and response of chicken keepers

Overall, across the six regions, the priority chicken disease identified was new castle disease reported by 67.4% of the respondents. Avian influenza, external parasites, gumboro and internal parasites were identified as the first important diseases by 8.1%, 5.5%, 6.8%, and 8.2% of the respondents, respectively. The remaining 1.4% and 2.6% of the respondents reported other unspecified diseases and no disease, respectively. New castle was the most important diseases in all the regions, except in Gambella where Gumboro was reported as the priority disease (Table 13).

Chicken keepers' responses to disease outbreaks included getting the help of public veterinarians, buy drugs and try to treat sick birds, traditional treatment and culling sick birds (Fig. 21). Surprisingly vaccination was reported by only 5.6% of the respondents.

TABLE 13. PERCENT OF RESPONDENTS REPORTING CHICKEN DISEASES AFFECTING THEIR GOAT FLOCKS IN SIX REGIONS OF ETHIOPIA

	Importance	Avian influenza	external parasites	Gumboro	internal parasites	Newcastle disease	none
Amhara	1st	7.4	8.0	2.4	2.4	71.9	6.5
	2nd	1.7	18.1	5.6	10.7	4.0	55.4

Benishangul	3rd	-	4.8	1.8	.6	-	90.9
	1st	6.5	1.6	27.4	12.9	51.6	-
	2nd	8.7	-	8.7	43.5	39.1	-
Gambela	3rd	-	-	-	-	-	-
	1st	-	-	36.4	31.8	31.8	-
	2nd	28.6	-	-	-	71.4	-
Oromia	3rd	-	-	-	-	-	-
	1st	8.4	4.0	4.9	11.9	68.4	2.0
	2nd	13.6	9.0	19.7	26.5	10.4	20.4
SNNP	3rd	.6	3.7	-	2.5	6.1	87.1
	1st	9.7	6.2	7.0	4.7	69.6	-
	2nd	3.1	39.1	34.4	10.9	9.4	-
Tigray	3rd	-	-	-	-	-	-
	1st	6.5	6.5	15.2	17.4	50.0	-
	2nd	-	66.7	-	33.3	-	-
	3rd	-	-	-	-	-	-

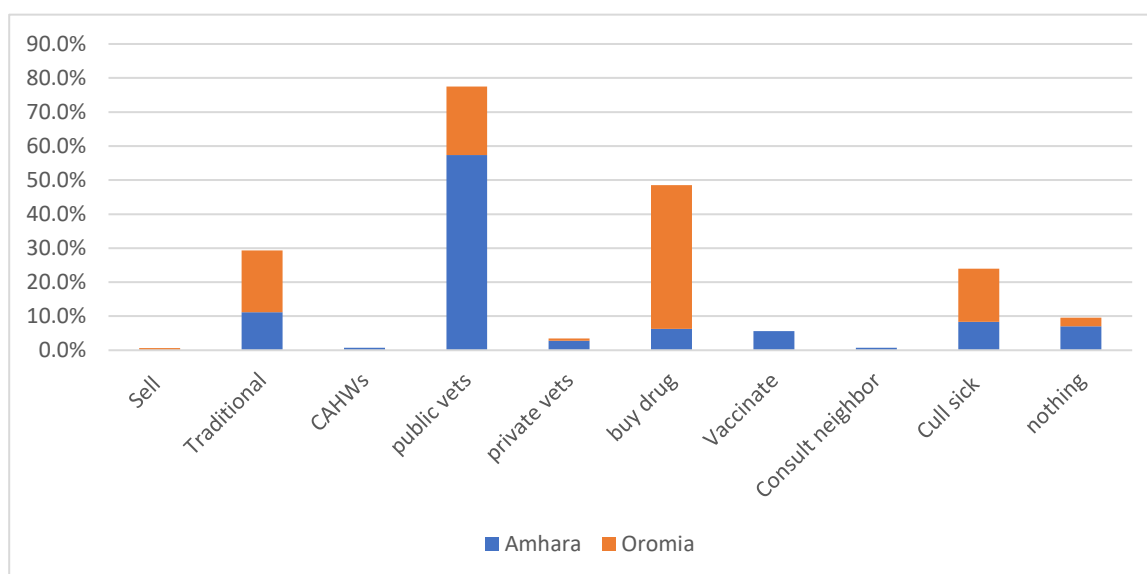


FIGURE 20. RESPONSE OF CHICKEN KEEPERS TO DISEASE OUTBREAKS

Morbidity and mortality

The proportions of chicken affected by the five diseases are presented in Fig.22. The morbidity rate due to NCD could reach 50-99% as reported by 20-30% of the respondents. Chicken mortality was reported to be very high, reaching up to 50% (Fig. 23). New castle disease was reported as the most important killer disease inflicting mortality rates of about 40-50%. Gumboro and Avian influenza were also reported to result in mortality rates of 35%

and 25% in Amhara and Oromia regions, respectively.

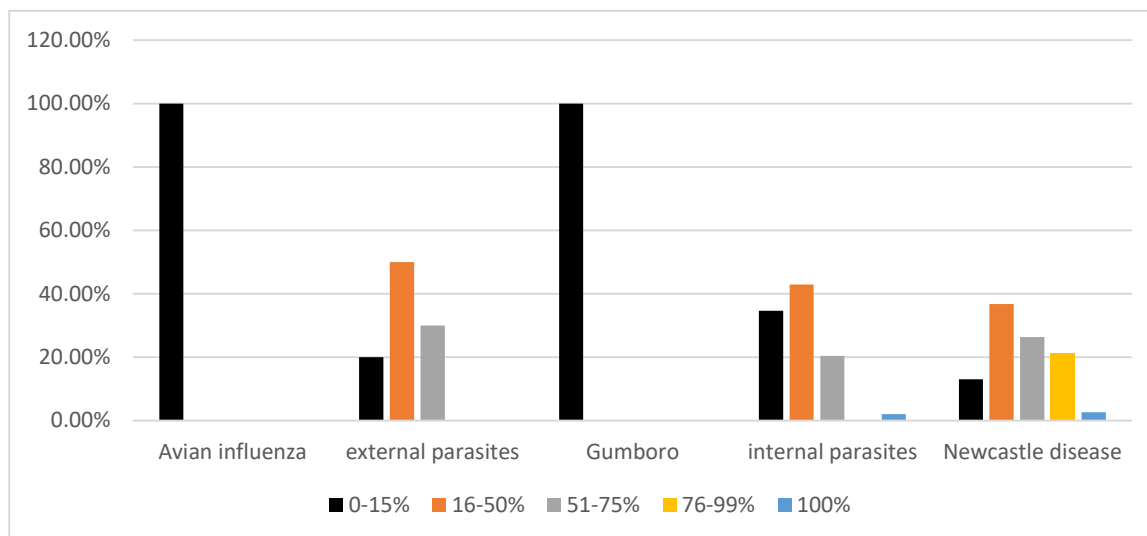


FIGURE 21. AVERAGE PROPORTION (%) OF CHICKENS AFFECTED IN A FLOCK BY DISEASES IN ETHIOPIA

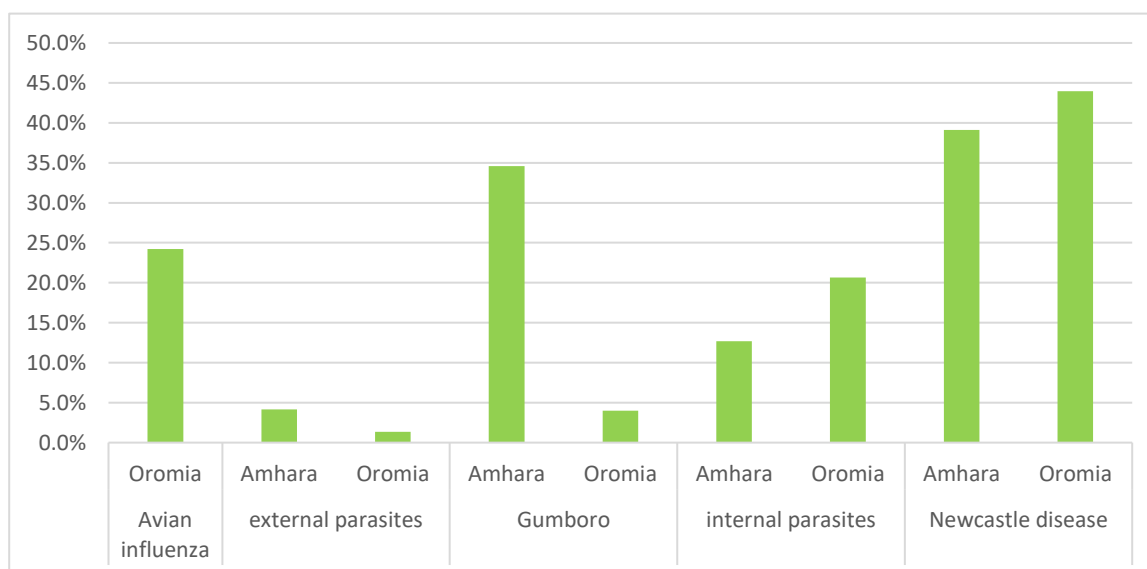


FIGURE 22. AVERAGE MORTALITY (%) OF CHICKENS DUE TO DISEASES IN OROMIA AND AMHARA REGIONS OF ETHIOPIA

Camel diseases

Figs. 24 and 25 show the priority camel diseases and camel keepers' responses to disease outbreaks in Somali, Oromia and Afar. Respiratory disease are the priority camel diseases in all regions surveyed. The second most important diseases are GIT parasites in Afar and external parasites in Somali and Oromia. Traditional camel treatment is the major practice of Afar pastoralists to treat their sick camels.

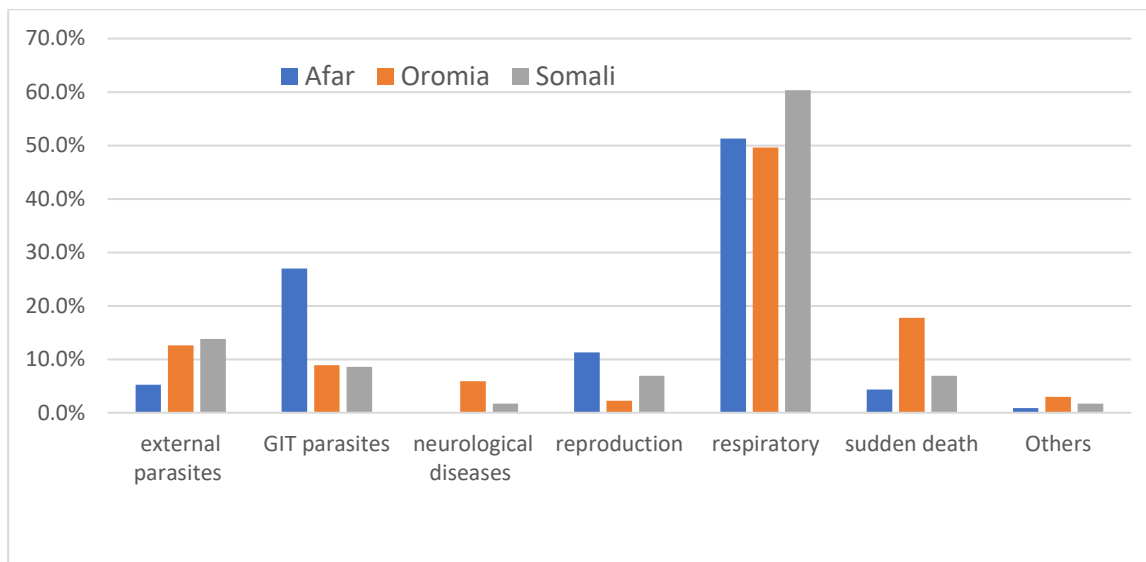


FIGURE 23. PROPORTION (%) OF RESPONDENTS REPORTING THEIR PRIORITY CAMEL DISEASES IN OROMIA, AFAR AND SOMALI REGIONS OF ETHIOPIA

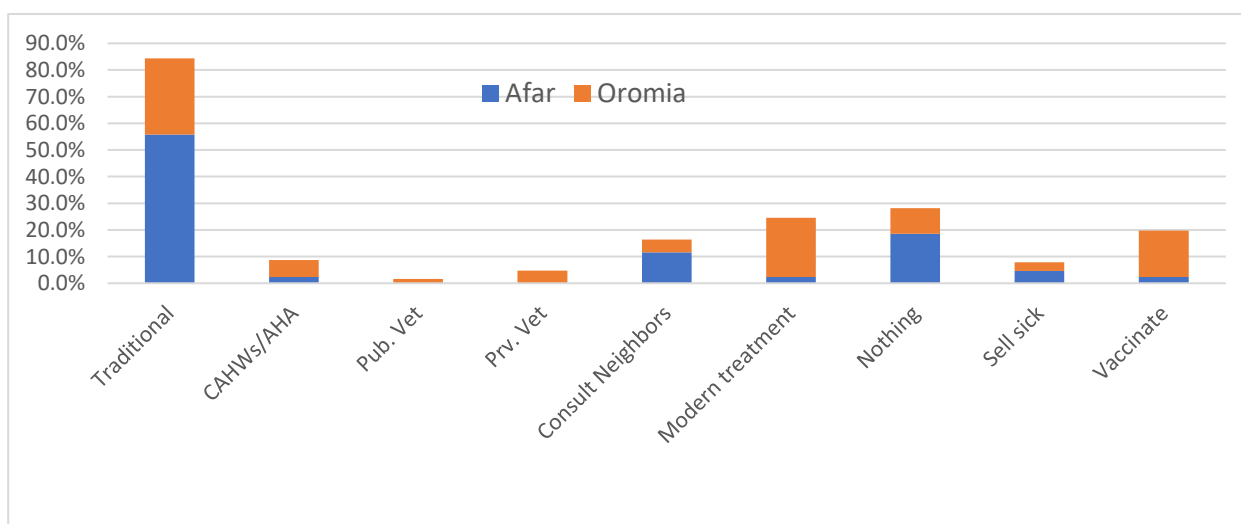


FIGURE 24. PROPORTION (%) OF RESPONDENTS REPORTING THEIR PRIMARY RESPONSE TO CAMEL DISEASE OUTBREAKS IN OROMIA AND AFAR REGIONS OF ETHIOPIA

Health services

Service providers and services

Both the private and public sectors participate in providing animal health services in all the surveyed regions. The services are provided by community animal health workers (CAHW), kebele animal health assistants (AHA) in kebele health posts, livestock extension agents (LEA), local/ traditional healers, private veterinary drug stores, private veterinarians, public veterinarians at woreda level and NGOs (Table 14). Availability and/or access to service providers varies across the eight regions surveyed. Livestock extension agents (which are not directly involved in health services) are fairly highly accessible, particularly in Amhara,

Tigray, Oromia, Benishangul and SNNP regions. The public veterinary service and private drug stores are the second most accessible service providers, especially in Amhara, Oromia and Benishangul. However, the private service providers, including CAHWs, drug stores and private veterinarians are less accessible/available. CAHWs are more available in Afar, Tigray and Benishangul.

Since access and use of paid services are determined by the source of livelihoods of households, the assessment and analysis of the data was disaggregated by livelihood sources of the respondents, namely pastoralism, agro-pastoralism and highland mixed crop-livestock systems (Fig. 26). LEAs and the public veterinary service are more accessible in the mixed crop livestock system. CAHWs, local traditional healers and NGOs are more available in the pastoral/agropastoral systems. Very few pastoral and agropastoral respondents reported access to private veterinarians and to kebele animal health assistants.

TABLE 14. PROPORTION (%) OF RESPONDENTS REPORTING ACCESS TO ANIMAL HEALTH SERVICE PROVIDERS IN EIGHT REGIONS OF ETHIOPIA

	Afar	Amhara	Benshangul	Gambela	Oromia	SNNP	Somali	Tigray	Overall
CAHWs	41.0	14.8	37.8	8.3	24.8	17.5	21.3	52.5	25.1
AHA	-	28.0	-	-	12.3	-	-	-	8.2
LEA	5.8	80.0	57.8	35.0	49.7	45.8	10.2	74.2	43.4
Healer	0.6	13.4	4.4	-	29.8	10.7	1.6	3.3	15.5
Drug store	0.3	43.6	14.4	1.7	45.1	25.1	16.4	11.7	29.6
Private vet	-	17.9	2.2	1.7	17.0	4.3	5.4	6.7	10.3
Public vet	-	63.7	43.3	33.3	47.3	22.1	2.2	15.8	32.3
NGOs	0.2	-	-	-	2.3	2.0	-	-	1.3

CAHWs community animal health workers. AHA/kebele kebel/animal health assistants. LEA extension agent

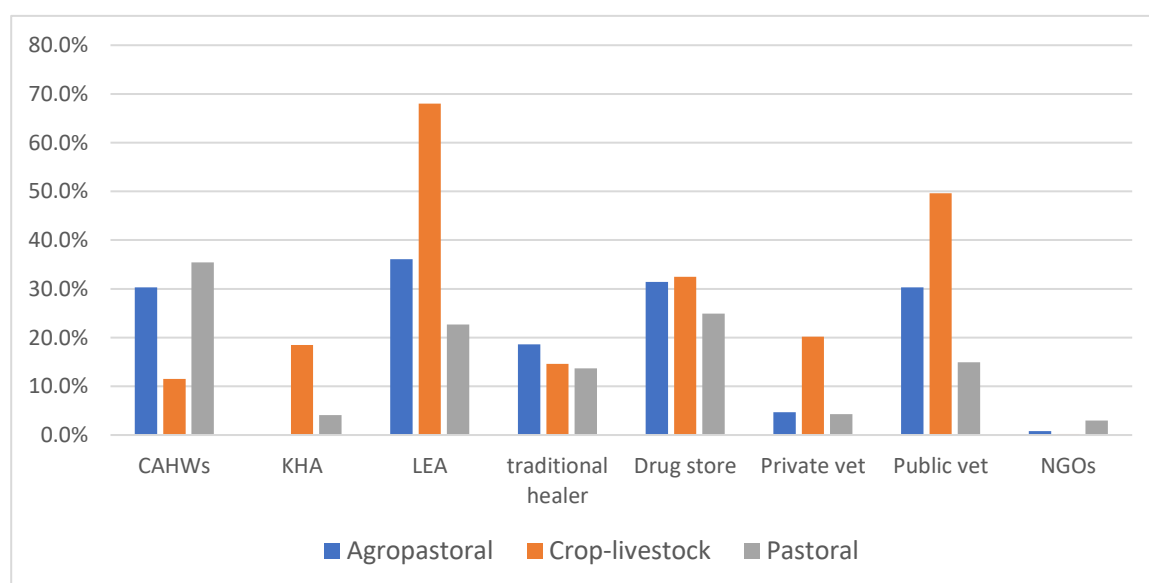


FIGURE 25. PROPORTION (%) OF RESPONDENTS REPORTING ACCESS TO ANIMAL HEALTH SERVICE PROVIDERS IN PASTORAL, AGROPASTORAL AND HIGHLAND MIXED CROP-LIVESTOCK SYSTEMS IN ETHIOPIA

The services provided are listed in Fig. 27. The major services are vaccination, treatment, and deworming. CAHWs are the primary vaccination service providers, with 41% of the respondents citing their services. Despite the high accessibility of the livestock extension officers, their contribution is limited mainly to vaccination services, which is likely limited to awareness creation and organizing the vaccination campaigns. Advice on herd health is virtually absent despite its potential importance in the included production systems, reported by a maximum of 8.8% of the respondents and provided by the extension agents. Also, of concern is the overall low importance of the service providers for trainings and as a source of disease information, which is provided by the LEAs as reported by 8.1 and 9.5% of the respondents. A further concern is that most of the deworming service and a significant part of the modern treatment service are provided by the drug stores.

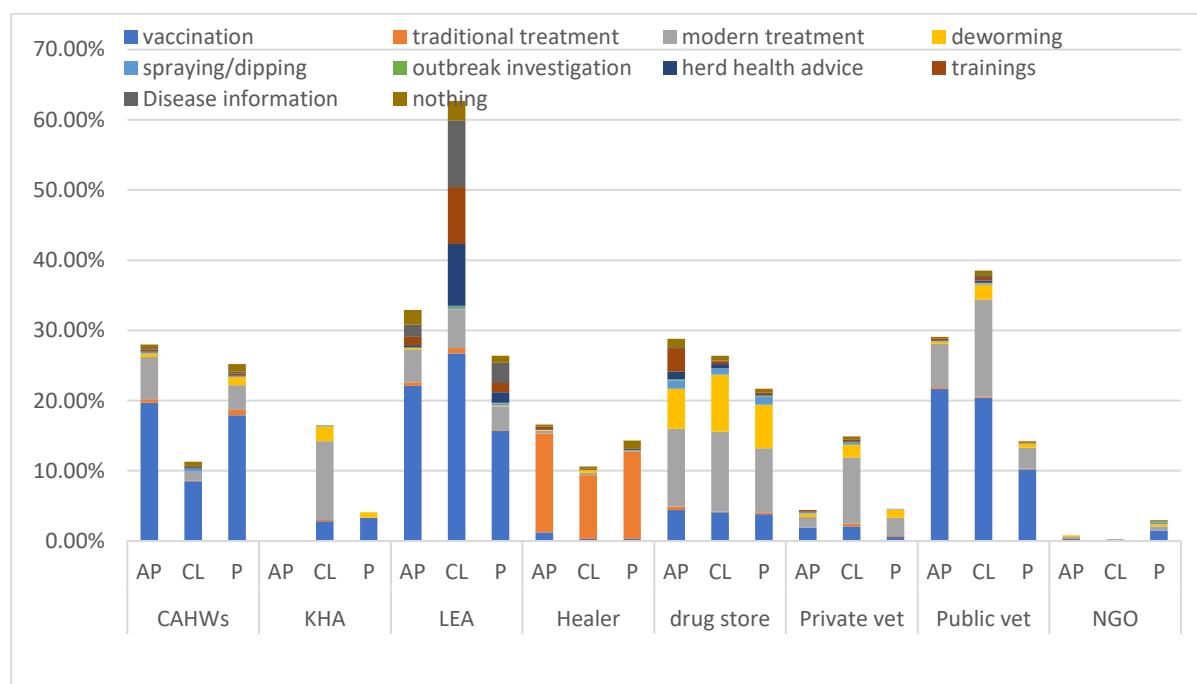


FIGURE 26. HEALTH SERVICES PROVIDED BY DIFFERENT SERVICE PROVIDERS, REPRESENTED AS % OF RESPONDENTS REPORTING ACCESS TO THE SERVICES IN PASTORAL (P) & AGROPASTORAL (AP) AND MIXED CROP-LIVESTOCK SYSTEMS (CL) IN ETHIOPIA

Vaccination services

Availability/accessibility

Availability and accessibility of vaccination services was very high in Amhara, Tigray and Oromia, but very low to low in Afar, Gambella, Benishangul and SNNP regions (Table 15). Cattle and sheep and goat vaccines are more available and accessible than chicken vaccines (Fig. 28). More than 70% of the respondents on the highland mixed crop-livestock

system reported access to vaccines, whereas about 50% in the agropastoral and 40% in the pastoral systems had access to vaccines (Fig. 29).

TABLE 15. AVAILABILITY AND ACCESSIBILITY OF VACCINES IN EIGHT REGIONS OF ETHIOPIA (% OF RESPONDENTS ACCESSING SERVICE) (DATA NOT AVAILABLE FOR SOMALI REGION)

		Afar	Amhara	Benishangul	Gambela	Oromia	SNRP	Tigray
Availability	Always	13.6%	92.5%	55.6%	31.7%	65.6%	50.5%	80.8%
	Sometimes	74.7%	6.6%	11.1%	31.7%	32.6%	46.5%	15.0%
Accessibility	Always	8.3%	85.5%	36.7%	18.3%	63.3%	40.5%	65.0%
	Sometimes	80.0%	13.6%	31.1%	38.3%	34.8%	56.2%	30.0%

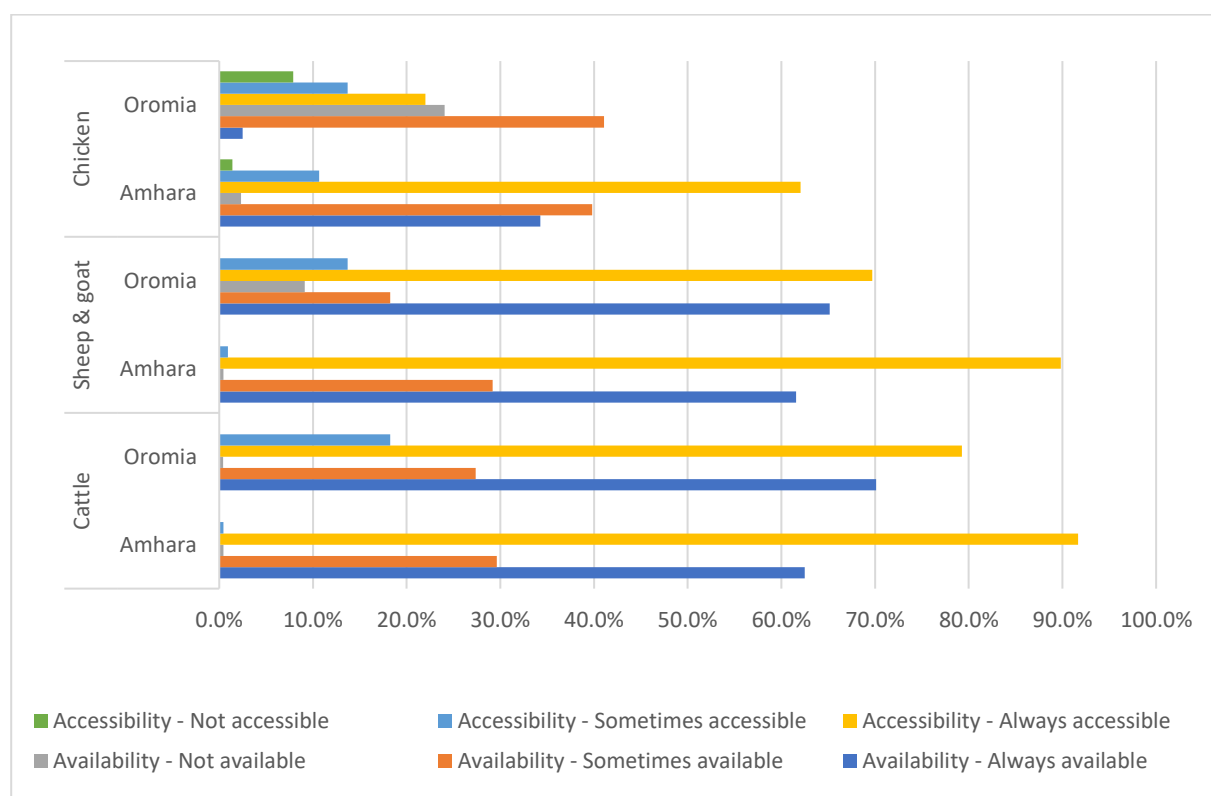


FIGURE 27. RELATIVE AVAILABILITY AND ACCESSIBILITY (% OF RESPONDENTS REPORTING SERVICE) OF CATTLE, SHEEP/GOAT AND CHICKEN VACCINES IN MIXED CROP-LIVESTOCK SYSTEMS IN THE HIGHLANDS OF AMHARA AND OROMIA REGIONS OF ETHIOPIA (DATA NOT AVAILABLE FOR SOMALI REGION)

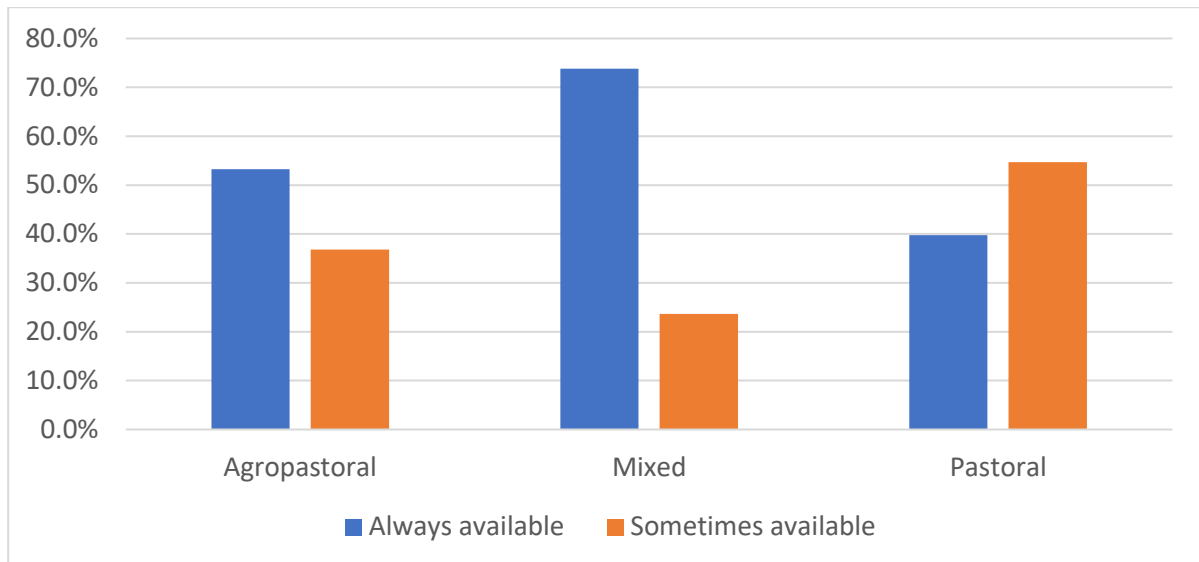


FIGURE 28. AVAILABILITY OF VACCINES IN HIGHLAND MIXED CROP-LIVESTOCK AND LOWLAND PASTORAL/AGROPASTORAL SYSTEMS IN ETHIOPIA (% OF RESPONDENTS)

Vaccination frequency and types

Frequency of vaccination in the year preceding the surveys are presented disaggregated by regions in Fig. 30 and by production systems in Fig. 31. During the reporting period, ranging from 4.3% (Somali region) to 60% (Afar) and from 3.8% (Amhara region) to 57.4% (Afar) of the respondents did not get their cattle and sheep vaccinated, respectively. About 41.4%, 27.3% and 6.4% of the respondents and 29.0%, 40.2% and 1.5% of the respondents got their cattle and sheep vaccinated one, two and three times. Goat vaccination was virtually absent, with 50.5% to 90% of the respondents having had none of their goats vaccinated. Chicken vaccination was also negligible.

Pastoralist and agropastoralists seem to have a better chance for vaccination (Fig. 31). However, most of the respondents had their livestock vaccinated only once, whereas more of the mixed crop-livestock farmers got their livestock vaccinated twice or thrice.

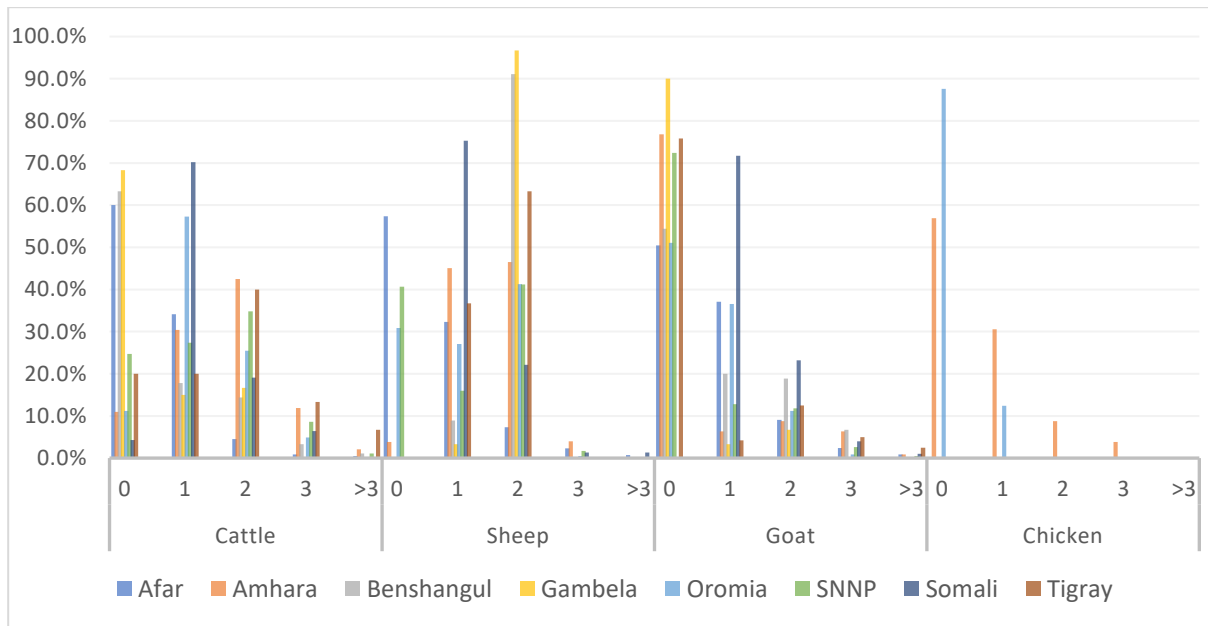


FIGURE 29. FREQUENCY OF VACCINATION OF LIVESTOCK AND POULTRY IN EIGHT REGIONS OF ETHIOPIA (% OF RESPONDENTS)

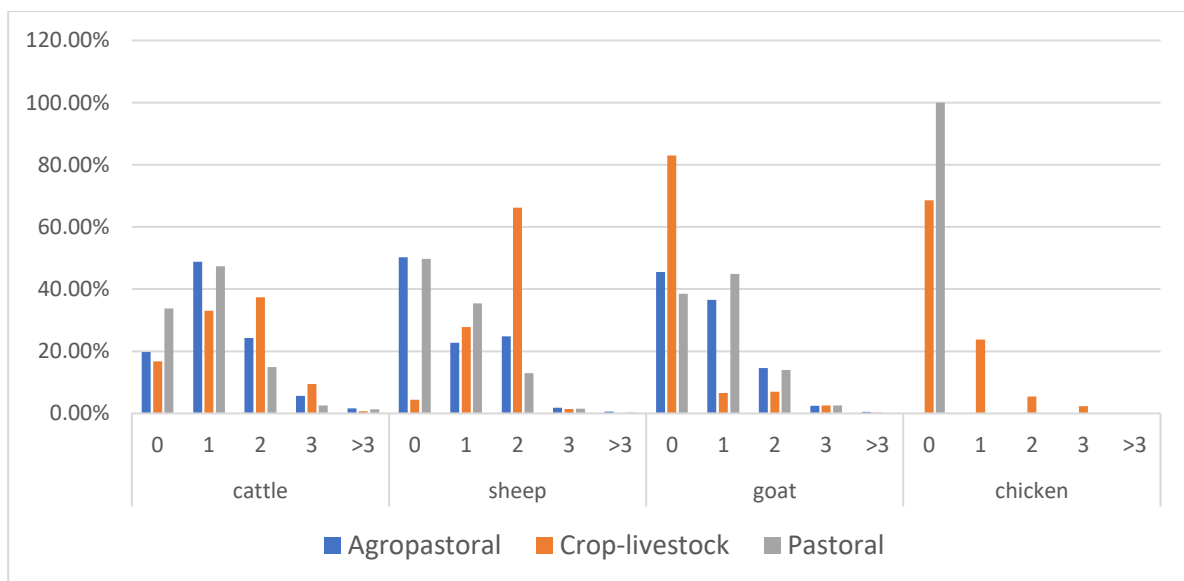


FIGURE 30. FREQUENCY OF VACCINATION OF LIVESTOCK AND POULTRY IN CROP-LIVESTOCK AND PASTORAL/AGROPASTORAL SYSTEMS IN ETHIOPIA (% OF RESPONDENTS)

The pastoralists and agro-pastoralists seem to have a better knowledge of the vaccines their livestock received. The per cent of respondents who did not know the cattle vaccine types was higher for the highland farmers (20.8%) in the mixed crop-livestock system compared to the pastoralists and agropastoralists (5.5% and 7.5%). Vaccines for CBPP, black leg, LSD and anthrax seem to be more available than the other vaccines mentioned in Table 16, assuming the respondents had good knowledge of the vaccine types and memory.

TABLE 16. LIVESTOCK VACCINES USED BY HIGHLAND FARMERS AND LOWLAND PASTORALISTS IN ETHIOPIA (% OF RESPONDENTS)

cattle	FMD	CBPP	LSD	Blackleg	Brucella	Pasteurellosis	Anthrax	Rabies
Pastoral	7.1%	12.4%	8.7%	8.4%	3.5%	6.5%	6.6%	0.9%
Agropastoral	5.6%	11.4%	7.4%	10.4%	3.6%	4.3%	8.5%	0.9%
Crop-livestock	4.6%	10.2%	14.1%	7.1%	4.7%	8.3%	5.3%	0.2%
sheep	FMD	CCPP	PPR	Blackleg	Brucella	Pasteurellosis	Anthrax	Rabies
Pastoral	7.6%	18.7%	7.8%	3.8%	2.2%	7.5%	3.2%	1.1%
Agropastoral	5.4%	9.2%	5.3%	4.1%	3.4%	3.1%	2.2%	0.8%
Crop-livestock	4.8%	9.8%	2.2%	1.6%	6.3%	8.0%	2.3%	1.4%
goat	FMD	CCPP	PPR	Blackleg	Brucella	Pasteurellosis	Anthrax	Rabies
Pastoral	10.2%	21.2%	14.1%	6.1%	4.0%	7.4%	5.9%	1.5%
Agropastoral	9.3%	17.2%	9.5%	6.9%	4.5%	5.6%	3.5%	1.5%
Crop-livestock	0.9%	1.8%	7.5%	0.5%	0.2%	5.2%	2.4%	0.0%

Service use, costs and satisfactions

Pastoralists and agropastoralists more frequently visited LEAs, vet drug stores, traditional healers than the other service providers (Table 17). The highland farmers rely more on the LEA, with about 32 visits per year. While the Pastoralists/agropastoralists rely more on private veterinarians, the highland farmers do more frequent visits to the public veterinarians. Both pastoralists/agropastoralists and farmers spent more money for services/products provided by drug stores, private vets, and AHA. The frequency of visits to service providers in the eight regions surveyed is presented in Fig. 32.

The average scores (out of 10) for overall satisfaction with health services provided by the pastoralists/agropastoralists and farmers were 6.2 and 6.4, respectively. The highest P/AP scores were for healers and private vets and the lowest for public vets and LEAs. Farmers were more satisfied with AHA and NGOs, but least satisfied with healers and drug stores (Table 18). The satisfaction level across the regions is presented in Fig. 34.

TABLE 17. FREQUENCY OF VISITS (NUMBER OF TIMES SERVICE PROVIDER VISITED) AND AMOUNT SPENT BY FARMERS AND PASTORALISTS FOR SERVICES DURING THE SURVEY YEAR IN HIGHLAND MIXED CROP-LIVESTOCK AND LOWLAND PASTORAL/AGROPASTORAL SYSTEMS IN ETHIOPIA

	CAHWs	AHA	LEA	Healer	Drug store	Private vet	Public vet	NGO
<i>Freq. of visit</i>								
Agropastoral	1.9		5.5	2.5	2.8	2.2	1.7	1.3
Crop-Livestock	1.2	4.9	32.1	1.3	2.6	1.5	2.0	0.1
Pastoral	2.1	3.3	2.5	2.3	3.7	3.5	2.4	2.5
<i>Expenses (Birr/visit)</i>								
Agropastoral	46.4		45.9	29.6	260.9	249.7	69.2	8.9
Crop-Livestock	33.6	147.6	2.3	18.9	144.3	105.1	67.5	0.0
Pastoral	66.9	107.7	53.6	31.3	325.3	346.8	83.0	14.2

CAHW: community animal health worker, AHA: animal health assistant, LEA: livestock extension agent, Healer: traditional healers

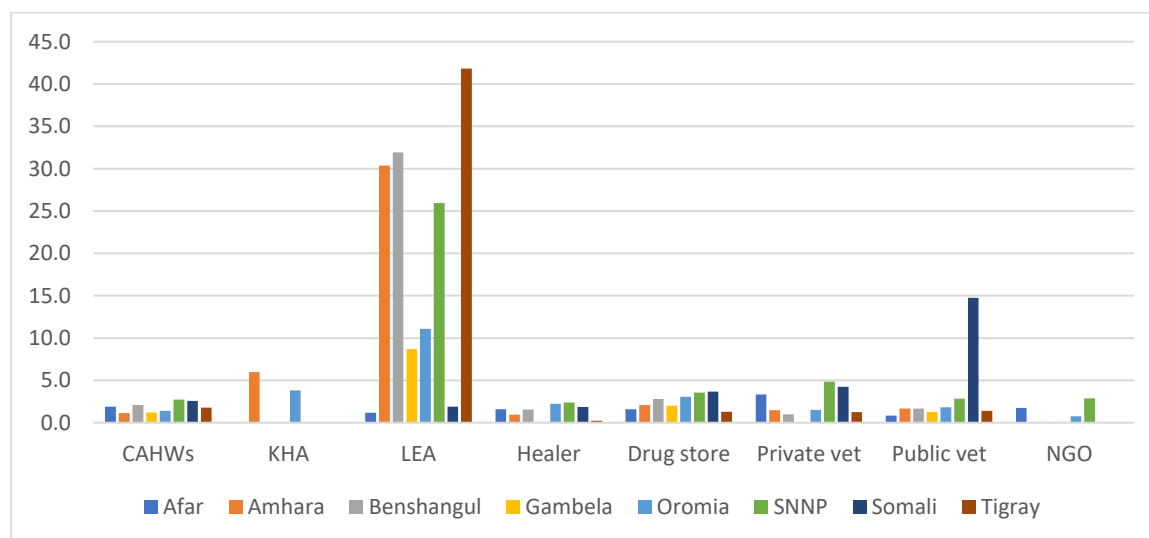


FIGURE 31. FREQUENCY OF USE/VISITS (NUMBER OF TIMES SERVICE PROVIDER VISITED) OF SERVICE PROVIDERS BY LIVESTOCK KEEPERS DURING THE SURVEY YEAR IN EIGHT REGIONS OF ETHIOPIA

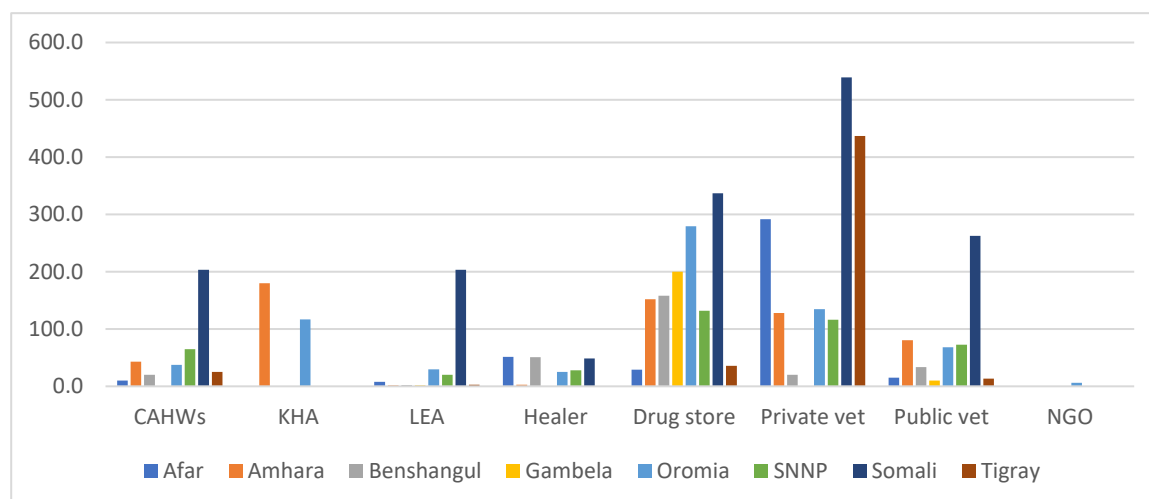


FIGURE 32. AMOUNT SPENT BY FARMERS AND PASTORALISTS FOR SERVICES DURING THE SURVEY YEAR IN HIGHLAND MIXED CROP-LIVESTOCK AND LOWLAND PASTORAL/AGROPASTORAL SYSTEMS IN EIGHT REGIONS OF ETHIOPIA

TABLE 18. SATISFACTION (SCORE OUT OF 10) OF FARMERS AND PASTORALISTS WITH SERVICES PROVIDED DURING THE SURVEY YEAR IN HIGHLAND MIXED CROP-LIVESTOCK AND LOWLAND PASTORAL/AGROPASTORAL SYSTEMS IN ETHIOPIA

Service provider	Production system	Availability	Accessibility	Quality	Timeliness
CAHWs	Pastoral/Agropastoral	5.5	5.5	5.8	5.4
	Crop-livestock	6.6	6.1	6.2	5.9
KHA	Pastoral/Agropastoral	7.3	8.6	7.0	5.9
	Crop-livestock	7.2	6.6	7.0	6.8
LEA	Pastoral/Agropastoral	5.4	5.4	5.8	5.1
	Crop-livestock	6.4	6.1	6.3	5.9

Healer	Pastoral/Agropastoral	6.9	6.8	5.4	6.5
	Crop-livestock	6.4	6.0	4.6	5.4
Drug store	Pastoral/Agropastoral	6.1	5.6	6.4	5.6
	Crop-livestock	6.4	5.8	6.2	6.1
Private vet	Pastoral/Agropastoral	6.0	6.6	6.8	6.6
	Crop-livestock	6.5	5.8	6.3	6.3
Public vet	Pastoral/Agropastoral	5.9	6.3	6.9	5.4
	Crop-livestock	6.0	6.0	6.6	5.9
NGO	Pastoral/Agropastoral	5.7	5.7	7.4	6.0
	Crop-livestock	8.7	7.3	7.0	7.3

Accessibility included affordability.

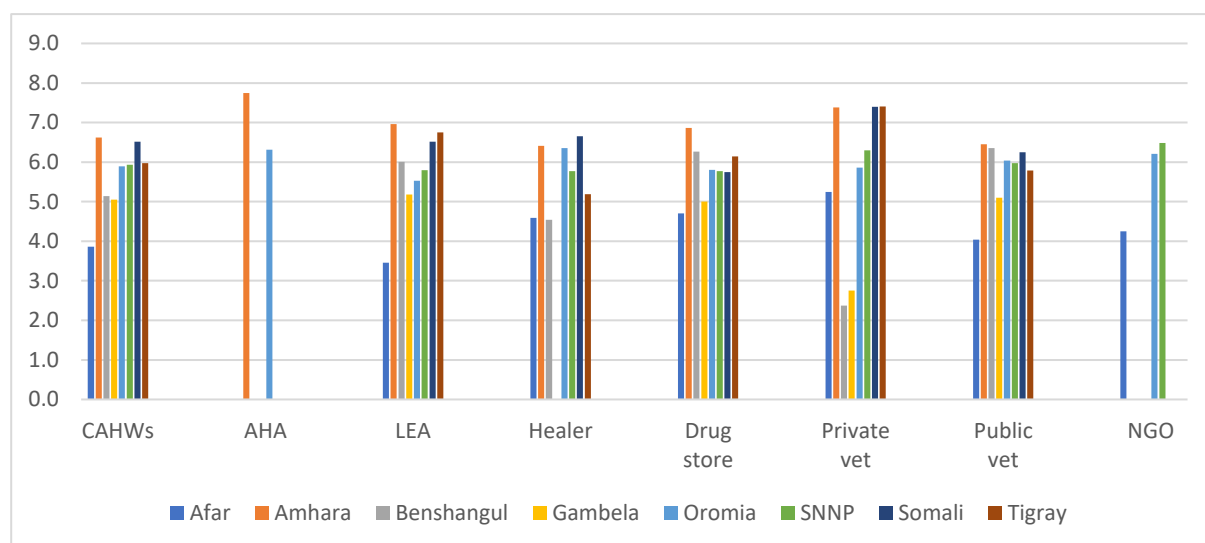


FIGURE 33. SATISFACTION (SCORE OUT OF 10) OF LIVESTOCK KEEPERS IN SERVICES PROVIDED BY DIFFERENT SOURCES DURING THE SURVEY YEAR IN EIGHT REGIONS OF ETHIOPIA

Conclusions and recommendations

Conclusions

- Livestock in Ethiopia are affected by various diseases including respiratory diseases, neurological diseases, skin diseases, gastro-intestinal tract (GIT) parasites, external parasites and systemic diseases
- The major cattle diseases are CBPP, pneumonia, coughing, Pasteurellosis, LSD, liver Fluke, lung worm, diarrhea, Mange mite, tick and lice infestations black leg, FMD, Anthrax and trypanosomiasis.
- The major sheep and goat diseases are Pasteurellosis, CCPP, pneumonia, coughing, coenuruses, tick, lice and sheep ked, Anthrax, FMD and black leg, sheep and goat pox, Orf, liver fluke, lung worm
- Chickens are affected mainly by new castle diseases. Gumboro is also an important disease.

- Respiratory disease and gastro-intestinal tract parasites are the priority camel diseases
- Diseases affect a large proportion of the herds and flocks, reaching up to 75%.
- There is not much variation in the importance of diseases across geographic regions. However, disease vary across agro-ecological zones
- Livestock mortality rates were found to be very high, reaching up to 50.9% in some cases
- Livestock keepers' responses to disease outbreaks vary depending on geographic regions and production systems (source of livelihoods).
- Although some utilize the services available from the different service providers, practices include to buy drugs from market or drug shops to try and treat sick animals by themselves or use traditional medicine
- Surprisingly, while vaccination should be the priority health intervention, the availability and use of the vaccination services is very low, and the satisfaction of livestock keepers with animal health services is intermediate.

Recommendations

- Livestock keepers face a multitude of livestock diseases, threatening their livelihoods, particularly of the pastoralists/agro-pastoralists. It is thus very important to device efficient delivery mechanisms for animal health services in rural Ethiopia. Designing and implementing efficient and sustainable models for a public-private partnership to accelerate delivery of the services is essential
- There are diseases/disease symptoms that need to be investigated. These include reported disease or disease symptom known locally as *Abati*, skin disease locally known as *Qadimus* and others

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