



# A Retrospective Study on Common Animal Diseases from 2018 to 2022 in Gida Ayana District, East Wollega Zone, Western Ethiopia

Amanu Nuguse\*, Fekeda Gemechu

Gida Ayana Agriulture Office, Oromia, Ethiopia

## Email address:

[hundaaroob@gmail.com](mailto:hundaaroob@gmail.com) (Amanu Nuguse)

\*Corresponding author

## To cite this article:

Amanu Nuguse, Fekeda Gemechu. A Retrospective Study on Common Animal Diseases from 2018 to 2022 in Gida Ayana District, East Wollega Zone, Western Ethiopia. *World Journal of Medical Case Reports*. Vol. 4, No. 2, 2023, pp. 26-31. doi: 10.11648/j.wjmcr.20230402.12

**Received:** March 12, 2023; **Accepted:** May 31, 2023; **Published:** June 27, 2023

---

**Abstract:** Ethiopia is endemic to a number of livestock diseases OIE listed diseases and these infectious diseases are a key constraint in livestock production and food security. The study was conducted from October 2022 to February 2023 in Gida Ayana district to assess common animal diseases frequently presented in the vet's clinics for treatment. The present study revealed that, different infectious diseases are the most important animal health problem in the study area with 26% prevalence of clinically sick animals presented for treatment at the clinics as a whole. Study site wise, the number of infectious cases (31.8%) was recorded at Ayana type B clinic followed by 25.2% at Ejere vet's clinic and proportionally, the lowest was recorded at Gute Gudina clinic (21.9%). GIT parasitism is the second leading animal health problem in the area with 24.1% as a general followed by Trypanosomiasis with 19% of total animal presented for treatment in the specified vet's clinics (kebeles) as a whole. Also, Ecto-parasitism is another animal health problem in the district with 13.3% from the whole cases recorded during specified period. Both non infectious diseases and physical injuries are relatively the lower number of cases identified during study period with 8.3% and 9.1% respectively. Generally, the current study indicated that, livestock are affected by infectious diseases, endoparasite and trypanosomiasis at high risk and there is less risk of non-infectious diseases and physical injuries in the area. This shows that, vaccinating animals for those endemic infections and prevention and controlling of tsetse fly is under requirement. Even though, the animal population of the selected site is high, the number of animal and owner using the clinic is less due to absence of proper case recording habits of the experts. Therefore, mass vaccination should be given for endemic diseases in the area as a whole and every case seen and treated in vet's clinic need to be documented.

**Keywords:** Retrospective Study, Animal Diseases, Gida Ayana, Infectious Diseases, GIT

---

## 1. Introduction

Ethiopia is a largely rural country with an agrarian economy. Livestock has economic and social importance both at the house hold and national levels, and has in the past provided significant export earnings [1]. Livestock plays multiple roles in the livelihoods of people in developing communities particularly in the rural areas of Ethiopia; draft power in crop production, food, cash, and transportation, and in pastoral areas as a social prestige [8, 18].

The major constraints in livestock production are health problems which cause the decrease of production, slow rate of regeneration and amplification of the risk of disease transmission [1]. Out of the 15 OIE lists-A diseases known

for their rapid spread and serious socio-economic or public health consequences, eight of them are endemic to Ethiopia namely; Foot and mouth disease, Contagious bovine pleuro pneumonia, PPR, Rift valley fever, Lumpy skin disease, sheep pox, African horse sickness and Newcastle disease [27]. Despite, the development of new vaccines and the application of rigorous Bio-security measures, animal diseases pose a continuing threat to animal health, food safety and security, the national economy and the environment [11, 12, 26]. In addition, animal diseases that are endemic generate a variety of significant impact economically such as mortality, morbidity, productivity and

fertility of herds [9].

In the event of animal diseases outbreak, proper measures have to be put in practice to control on-site pathogen proliferation and to prevent site-to-site transmission. This includes rapid culling of the animals exposed to the pathogens and proper disposal of mortalities and potentially contaminated materials [4]. However, Bio-security, transportation logistics, public perception and environmental concerns limit the use of some of these methods [3]. Thus, knowing the status of major problems that constrain livestock production can help improving productivity and markets access of producers; with the purpose of contributing in poverty reduction at all through market-oriented agricultural development [9].

Disease pathogens are not often host specific and inter-species transmission has led to the notion of an interface [14]. What we observe is that the transmission of disease agents takes place more often at points of common use e.g. water points and at common grazing areas. Also, the possible mechanism being through vectors, wind or contact with forage or water contaminated with urine, faeces, saliva and other bodily fluids [2]. Another common ways of introduction of animal diseases to a new geographical location are through entry of live diseased animals and contaminated animal products [13, 24]. Rinderpest was introduced to Ethiopia in 1887, when Italians imported infected cattle into the country from India [15]. Similarly, SAT-1 FMD virus was introduced to Ethiopia from Sudan along the border with Surma woreda in Bench Maji zone, southern Ethiopia. Even migration of animals and birds, or natural spreading by insect vectors or wind currents, could also spread diseases across geographical borders [7].

Animal diseases seriously limit the potential contribution of the livestock sector [7]. It affects food supplies, trade and commerce, and human health and well-being in every part of the world [5]. Especially, the epidemic diseases which are have the potential for very rapid spread, irrespective of national borders, causing serious socio-economic and possibly public health consequences since they are highly contagious or transmissible. These diseases cause high morbidity and mortality in susceptible animal populations and constitute constant threat to the livelihood of livestock farmers and national economies [17].

Gida Ayana district is highly populated by livestock and the livelihood of the society is based on livestock production directly or indirectly. Even though, livestock is backbone of the society there is no any assessment of livestock production or health problem has been done yet. Based on this, the study aim is to assess the main health constraints and its impacts in the area.

#### *Study Objectives*

##### *General Objective*

To assess common animal diseases in Gida Ayana district.

##### *Specific Objective*

To identify the common animal health problems in selected kebeles.

## **2. Materials and Methods**

### **2.1. Description of the Study Area**

The study was conducted in selected kebeles of Gida Ayana district, East Wollega. Gida Ayana district has 118,633 total populations and the total catchment area of the district is 183063m<sup>2</sup> and its climate condition is 48% wayinadega 2% dega and 50% kola. It is one of the 17 districts in East Wollega zone. The administrative town (Ayana) found at 440km from the capital, Addis Ababa and 110km from Nekemte (zone administrative town). Gida Ayana lies between latitude: 9.85836°, or 9°51'30''North and longitude: 36.63313°36°37'59''East and altitude: 1990.00m/6528.87ft. The climate is warm and temperate in Gida Ayana. In winter, there is much less rainfall than in summer. The average annual temperature is 17.3°C in Gida Ayana. About 1781mm of precipitation falls annually in a year.

About 226,847, 89,894, 64,374, 24,318 and 185,926 cattle, sheep, goats, equine and poultry are there in the district respectively [10].

### **2.2. Selection of the Study Area**

Gida Ayana district is purposively selected since it's my working area. Accordingly, five veterinary clinics in five different kebeles (small administrative unit) were selected. Namely; Ayana type B clinic and others four type D clinics (Ejere, Gaba Jimata, Gute Gudina and Lalise Gudina) were purposively selected for data collection from case book retrospectively for five years (2018-2022).

### **2.3. Sampling Size and Sampling Techniques Study Animals**

The study animals were all livestock that were brought to vets clinics from different parts of the selected kebeles which were selected irrespective of age, sex and species. Accordingly, four different animal species (Bovine, Ovine, Caprine, Poultry and Equine) brought to five veterinary clinics were considered.

### **2.4. Study Design**

The study was conducted from October 2022 to February 2023 in Gida Ayana district on purposively selected vet's clinics retrospectively. From five different vets clinics considered, different number of cases was collected due to animal populations the kebeles and case recording customs of the experts. The data was collected from case book of each clinic and the categorization was as presented in case book; tentative diagnosis and ordered drugs.

### **2.5. Data Storage and Analysis**

The collected data was enter into a Microsoft Excel spread sheet and analyzed with Statistical Package for Social Sciences (SPSS) version 20 statistical software and descriptive statistics was carried out in order to draw a conclusion.

### 3. Result

The results of retrospective study in selected veterinary clinics were presented as follows in the tables. The data was collected from case book of each clinic and the categorization was as presented in case book; tentative

diagnosis and ordered drugs. Accordingly, these cases are categorized as *Infectious disease, Non infectious disease, Injury, Trypanosomiasis, Endoparasitism and Ectoparasitism* infestation. So, based on this, the findings from the cases are briefly presented as the following table for each clinic.

**Table 1.** Common Cases in Ayana Type B Veterinary Clinic.

Diseases	Livestock come to clinic for treatment 11,892 cases encountered					
	Bovine	Ovine	Caprine	Equine	Poultry	Total
Infectious diseases	2,143 (34%)	321 (27%)	100 (21%)	707 (22%)	514 (72%)	3,785
Non-infectious diseases	441 (7%)	131 (11%)	71 (15%)	257 (8%)		900
Injuries	315 (5%)	71 (6%)	53 (11%)	450 (14%)		889
Trypanosomiasis	1,891 (30%)	107 (9%)	33 (7%)	899 (28%)		2,930
Ectoparasitism	630 (10%)	71 (6%)	91 (19%)	224 (7%)	86 (12%)	1,030
Endoparasitism	882 (14%)	488 (41%)	128 (27%)	674 (21%)	114 (16%)	2,358
Total	6,302 cases	1,189 cases	476 cases	3,211 cases	714 cases	11,892

From the above table, it is seen that bovines were highly affected by infectious diseases (34%) followed by trypanosomiasis at Ayana type B veterinary clinic. The less disease which affects bovines was injury (5%) followed by non-infectious diseases in the area. Ovines were highly affected by Endoparasitism, (41%) and less affected by physical injuries and ectoparasitism (5%). Similarly, Caprine

were highly affected by endoparasitism (27%) and less affected by physical injuries (11%) while, Equines were highly affected by trypanosomiasis (28%) followed by infectious diseases. Majority of poultry presented for treatment in this clinic were infected by infectious diseases followed by endoparasitism and ectoparasitism.

**Table 2.** Common Cases in Gaba Jimata Veterinary Clinic.

Disease	Bovine	Ovine	Caprine	Equine	Poultry	Total
Infectious diseases	485 (19%)	319 (20%)	115 (20%)	411 (28%)	169 (88%)	1,499
Non infectious diseases	306 (12%)	176 (11%)	12 (2%)	88 (6%)	23 (12%)	605
Injuries	128 (5%)	127 (8%)	51 (9%)	250 (17%)		556
Trypanosomiasis	230 (9%)	96 (6%)	46 (8%)	206 (14%)		578
Ectoparasitism	536 (21%)	256 (16%)	201 (35%)	161 (11%)		1,154
Endoparasitism	869 (34%)	623 (39%)	150 (26%)	353 (24%)		1,995
Total	2,554 cases	1,597 cases	575 cases	1,469 cases	192 cases	6,386

As stated in the above table, in this area bovines were highly affected by endoparasitism (34%) and less affected by injury (5%). Similarly, Ovines were highly affected by endoparasitism (39%) and less affected by Trypanosomiasis (6%) in this kebele. However, Caprines were highly affected

by ectoparasites (35%) and less affected by Trypanosomiasis (8%). Equines were highly affected by Infectious disease (28%) and less affected by non-infectious disease (6%). Concerning poultry, majority affected by infectious diseases (88%) and the rest were affected by non-infectious diseases.

**Table 3.** Common cases in Lalise Gudina Veterinary Clinic.

Diseases	Bovine	Ovine	Caprine	Equine	Poultry	Total
Infectious disease	344 (19%)	167 (25%)	171 (20%)	214 (18%)	162 (68%)	1,058
Non infectious disease	90 (5%)	107 (16%)	78 (9%)	48 (4%)	17 (7%)	340
Injuries	126 (7%)	33 (5%)	51 (6%)	238 (20%)		448
Trypanosomiasis	561 (31%)	73 (11%)	171 (20%)	333 (28%)		1,138
Ectoparasitism	307 (17%)	60 (9%)	137 (16%)	107 (9%)	28 (12%)	639
Endoparasitism	380 (21%)	226 (34%)	248 (29%)	250 (21%)	31 (13%)	1,135
Total	1,808 cases	666 cases	856 cases	1,190 cases	238 cases	4,758 cases

As shown in the table 3, bovines were highly affected by trypanosomiasis, endoparasitism and infectious diseases in that order and less affected by non infectious diseases (5%) and non infectious diseases (7%). Ovines are highly affected by Endoparasitism (34%) and less affected by injury (5%). Similarly, Caprines were highly affected by endoparasitism

(29%) and less affected by injury (5%). Equines are highly affected by Trypanosomiasis (28%) and Endoparasitism (21%) and less affected by non-infectious disease (4%). Poultry were treated four different diseases in Lalise Gudina vet's clinic. Of this, infectious disease is the dominant poultry disease in the area.

**Table 4.** Common Cases in Gute Gudina Veterinary Clinic.

Diseases	Bovine	Ovine	Caprine	Equine	Poultry	Total
Infectious diseases	365 (18%)	291 (28%)	78 (11%)	243 (17%)	226 (82%)	1,203
Noninfectious diseases	223 (11%)	178 (17%)	72 (10%)	86 (6%)		559
Injuries	142 (7%)	114 (11%)	92 (13%)	256 (18%)		604
Trypanosomiasis	406 (20%)	42 (4%)	86 (12%)	285 (20%)		819
Ectoparasitism	386 (19%)	74 (7%)	214 (30%)	214 (15%)	16 (6%)	904
Endoparasitism	508 (25%)	343 (33%)	172 (24%)	342 (24%)	32 (12%)	1,397
Total	2,030 cases	1,042 cases	714 cases	1,426 cases	274 cases	5,488

The current finding revealed that, bovines were highly affected by endoparasitism (25%) followed by trypanosomiasis (20%) and less affected by injury (7%) in the area. In like, Ovines were highly affected by Endoparasitism (33%) followed by infectious diseases (28%) and less affected by typanosomiasis (4%) at Gute Gudina veterinary clinic. Also, Caprines were highly affected by

Ectoparasites (30%) and Endoparasitism (24%) and less affected by non-infectious disease. Equines were highly affected by Endoparasitism (24%) and trypanosomiasis (20%) and less affected by noninfectious disease (6%) and Ectoparasitism (15%) in this area. In the area, poultry were affected by Infectious disease, Endoparasitism and Ectoparasitism respectively.

**Table 5.** Common cases in Ejere Veterinary Clinic.

Diseases	Bovine	Ovine	Caprine	Equine	Poultry	Total
Infectious diseases	406 (26%)	287 (30%)	121 (20%)	215 (19%)	66 (76%)	1,095
Non infectious diseases	109 (7%)	124 (13%)	67 (11%)	102 (9%)	20 (24%)	319
Injuries	94 (6%)	76 (8%)	85 (14%)	146 (17%)		446
Trypanosomiasis	375 (24)	28 (3%)	91 (15%)	270 (24%)		764
Ectoparasitism	266 (17%)	86 (9%)	104 (17%)	146 (13%)		602
Endoparasitism	313 (20%)	354 (37%)	140 (23%)	205 (18%)		1,012
Total	1,563cases	955cases	607cases	1,129cases	86cases	4,342

The present study shows that, bovines were highly affected by infectious diseases (26%) and less affected by non-infectious diseases (7%). Ovines were highly affected by endoparasitism (37%) and less affected by injury (9%) and noninfectious disease (5%) from the cases at Ejere veterinary clinic. Caprines were highly affected by ectoparasites (23%) followed by infectious diseases (20%) and less affected by non-infectious diseases. Equines were highly affected by and trypanosomiasis (24%) and endoparasitism (18%) and less affected by non infectious diseases (11%).

## 4. Discussion

Ethiopia is endemic to a number of livestock diseases OIE listed diseases and these infectious diseases are a key constraint in livestock production and food security [20]. The present study revealed that, different infectious diseases are the most important animal health problem in the study area with 26% prevalence of clinically sick animals presented for treatment at the clinics as a whole. Study site wise, the number of infectious cases (31.8%) was recorded at Ayana type B clinic followed by 25.2% at Ejere vet's clinic and proportionally, the lowest was recorded at Gute Gudina clinic (21.9%). According to Gida Ayana Type B vet's clinic recording book, in the last five years about 53% of animal treated in the clinic were bovine. In this area, large number of animals keeps under one cowboy and going far to get their ranch and this situation is may be the reason for those milking cow to prone to several infectious diseases and easy for transmission to each other. This finding is almost similar with the study conducted in Southern Tigray zone, Ethiopia

where closest finding was reported [22, 23]. Agro-ecology of kebeles (the smallest administrative unit) is the factor associated with the difference in occurrence of those infectious diseases suddenness of death, frequency of occurrence, rate transmission in the herd and between the herd, poor curability nature of the diseases. In addition, treating animals sick of infectious diseases by the owners is not common in the area relative to the other animal diseases and may be due to awareness of the animal owners and several numbers of infections categorized under this type of disease category. In addition, this may be due to severity of infectious diseases and loss of animals associated with these diseases.

GIT parasitism is the second leading animal health problem in the study area with 24.1% as a general. This finding is different from what was reported from Oromia (Arsi zone), South West Ethiopia where 70.5 of study animals were infected with endoparasitism [21] and lower compared to study conducted in central Ethiopia where 61% of study animals were infected with different GIT parasite in the area [6]. The reason for low number of endoparasitism in this study is that, the animal owner's are treated their animals by themselves through buying anthelmintics from private vet's pharmacy rather consulting veterinarians or brought their animals to vets clinics. Even though, treating of animals infected by of endoparasite at vet's clinics is not well known and small number of cases is recorded on case book, still domestic animals are infected by numerous endoparasite because of poor herd management and lack of regular deworming practices. Proportionally, the highest number

endoparasite was recorded at Gaba Jimata vet's clinic and shoats are highly infected animal species and the lowest number of cases was recorded at Ayana type vet's clinic.

Trypanosomiasis is widely distributed in Western and South Western parts of the country and about 10 to 14 million heads of cattle in Ethiopia are exposed to the risk of trypanosomiasis [19]. Trypanosomiasis another challenging animal disease in the study area with 19% of total animal presented for treatment in the specified vet's clinics (kebeles) as a whole. This finding is higher compared to study conducted in Southern Ethiopia where only 5% of animals were positive to trypanosomiasis [16]. The difference may be due to, in this study, majority of the cases were tentatively diagnosed and the reason for the increment of the cases. The current study revealed that, the highest trypanosomiasis (31%) was recorded Lalise Gudina kebele (vet's clinic) and Bovines were the highly infected species followed by Equine (28%). High numbers of bovine and equine are infected by this blood parasite since climate and agro-ecology of this area is favorable for tsetse fly multiplication and infestation because, large part of the area is categorized under Kolla climate zone and that is why infestation of trypanosomiasis were high in this area. In the contrary, the lowest trypanosomiasis (8.7%) was recorded at Gaba Jimata clinic. This is due to Gaba Jimata and neighboring kebeles are relatively categorized under Woina dega in terms of climate zone. Thus, there is no favorable condition for tsetse flies propagation and infestation. Even the recorded cases may be due to movement of live animal from highly infested area to this area, or may be due to biting fly.

Ectoparasitism is another animal health problem in the woreda with 13.3% from the whole cases recorded during specified period. The present study unveiled that, the highest ectoparasitism recorded at Lalise Gudina vet's clinic (18.1%) followed by Ejere clinic (16.5%). This is similar with the study conducted in East Hararge zone, Ethiopia where overall prevalence's of internal and external parasites were higher relative to other considered major animal health problems [25]. Similar to endoparasite, the owners do not treat their animals at vet's clinics and they treat by themselves with drugs brought from vet's private pharmacies.

Both non infectious diseases and physical injuries are relatively the lower numbers of cases identified during study period with 8.3% and 9.1% respectively. The current study revealed that, the highest non infectious diseases recorded at Gaba Jimata and the lower cases was recorded at Ejere clinic. In similar way, the highest number physical injury cases were registered at Ejere and the lower was registered at Ayana type B clinic.

## 5. Conclusions and Recommendations

The current investigation indicated that, livestock are generally affected by infectious disease endoparasitism and trypanosomiasis at high risk and there is less risk of non-infectious disease and physical injuries in general. The number of cases associated with infectious diseases is high in most of clinics in the study area and this shows vaccinating animals for those endemic infection is under requirement. In addition,

prevention and controlling of tsetse fly didn't get attention by concerning body. Treating poultry in vet's clinics is not well known yet in the area and due to this; the number of poultry treated at vet's clinics are very low. Even though, the animal population of the selected site is high, the number of animal and owner using the clinic is less due to absence of proper case recording habits of the experts. Based on the above conclusions, the following recommendations are sent on;

1. Mass vaccination should be given for endemic diseases in district as a whole.
2. Every case seen and treated in vet's clinic need to be documented.
3. Drugs and vaccines supplying in terms of types and amount need to be covers endemic diseases and all species of animals in the study area.

## List of Abbreviations

AGDP: Agricultural Gross Domestic Product  
 BTB: Bovine Tuberculosis  
 FAO: Food and Agricultural Organization  
 FMD: Foot and Mouth Disease  
 GDP: Growth Domestic Product  
 NGO: Non-governmental Organization  
 TADs: Transboundary Animal Disease  
 OIE: World organization for animal health  
 GIT: Gastro-Intestinal Tract

## Acknowledgements

I would like to express my heart-felt thanks to my staff for their permission of the work and cooperation.

Also, I express my thanks to my close friends who shared me love and experience throughout the up and down challenges of the work.

## References

- [1] Adekunle O. A., Oladele O. I., Olukaiyeja T. D. 2002. Indigenous control methods for pests and diseases of cattle in Northern Nigeria. *Livestock Research for Rural Development*. 14 (2).
- [2] Bengis R. G., Kock R. A. & Fischer, J. 2002. Infectious animal diseases: the wildlife/livestock interface *Review Scientific technique Office international Epizooties*. 21 (1): 53-65.
- [3] Benson, E. R., Malone, G. W., Alphin, R. L., Johnson, K., Staicu, E. 2008. Immunology, health and disease: Application of in-house mortality composting on viral inactivity of Newcastle disease virus. *Poult. Sci.* 87, 627-635. <https://doi.org/10.3382/ps.2007-00308>.
- [4] Bonhotal, J., Waste, C., Hall, R. 2009. Environmental effects of mortality disposal. 3rd International Symposium: Management of Animal Carcasses, Tissue and Related Byproducts. Davis, California.
- [5] CAST, 2005. Global Risks of Infectious Animal Diseases. Council for Agricultural Science and Technology, USA.

- [6] Cheru Telila, Birhanu Abera Diriba Lmma and EyobEticha, 2014. Prevalence of GI Parasitism of Cattle In East Shewa Zone, Oromia Regional State, Central Ethiopia. *Journal of Veterinary Medicine and Animal Health* 6 (2): 54-62. Doi: 10.5897/JVMAH2013.0260.
- [7] FAO, 2004. Transboundary Animal Diseases. Assessment of socioeconomic impacts and institutional responses. Livestock policy discussion paper No 9. Otte MJ, Nugent R, et al. (Eds.), Food and Agriculture Organization. Livestock Information and Policy Branch, AGAL, p. 46.
- [8] Frans S, Aldo S, Siboniso, M. 2010. The Role of Livestock in Developing Communities: Enhancing Multifunctionality. The Technical Centre for Agricultural and Rural Cooperation CTA, Wageningen, Netherlands.
- [9] Geletu US, Musa AA, Waqe, L. 2021. Assessment of Major Animal Health Problems and Their Impact on Beef Cattle Production in Doba District of West Harerghe Zone, Ethiopia. *Veterinary Medicine International*; 2021: 5533398. DOI: 10.1155/2021/5533398. PMID: 34476073; PMCID: PMC8408000.
- [10] Gida Ayana agriculture office, 2021. Statistics of animal population in the district.
- [11] Guan, J. Chan, M., Grenier, C., Brooks, B. W., Spencer, J. L., Kranendonk, C., Copps, J., Clavijo, A., 2010. Degradation of foot-and-mouth disease virus during composting of infected pig carcasses. *Can. J. Vet. Res.* 74, 40–44.
- [12] Gwyther, C. L., Williams, A. P., Golyshin, P. N., Edwards-Jones, G., Jones, D. L. 2011. The environmental and biosecurity characteristics of livestock carcass disposal methods: A review. *Waste Manag.* 31, 767–778. <https://doi.org/10.1016/j.wasman.2010.12.005>.
- [13] Knight-Jones, T. J. D. and Rushton, J. 2013. The economic impacts of foot and mouth disease - what are they, how big are they and where do they occur?, *Preventive veterinary medicine*, Elsevier B. V., 112 (3-4), pp. 161–173.
- [14] Kock, R. A. 2005. What is this infamous “wildlife-livestock interface”? A review of current knowledge on the subject for the African continent.
- [15] MoARD 2009. Ethiopia Freed from the most dangerous Cattle disease. Ministry of Agriculture and Rural Development. Animal and Plant Health Regulatory Directorate. Addis Ababa, Ethiopia.
- [16] Nato Hundessa, Eshetu Esrael, Haben Fesseha and Mesfin Mathewos, 2021. Study on prevalence of trypanosomiasis in cattle of Sodozuriya district, Wolaita zone, Southern Ethiopia. Doi: 10.1155/2021/4472480/org.
- [17] Otte MJ, Nugent R, McLeod A. 2004. Trans-boundary animal diseases: Assessment of socio-economic impacts and institutional responses. Livestock policy discussion paper No. 9. FAO, Rome, Italy.
- [18] Perry, B. and Sones, K. 2007. Poverty Reduction through Animal Health, 315 (January), pp. 333–334.
- [19] Samson Leta, Gezahegn Alemayehu, Zewdu Seyoum and Melkamu Bezie, 2016. Prevalence of bovine trypanosomiasis in Ethiopia a meta-analysis.
- [20] Solomon Gizaw, 2021. Importance of livestock diseases identified using participatory epidemiology in the highlands of Ethiopia.
- [21] Tadalech Kabada, Dimshasha Tolera and Abaje Abera, 2019. Prevalence and associated risk factors of GIT parasites of shoats in Tiyo district, Arsi zone, Oromia, South West Ethiopia.
- [22] Tadesse Birhanu, 2014. Prevalence of the major infectious animal diseases affecting livestock trade industry in Ethiopia. *Journal of Biology, Agriculture and Health care.* 4 (17): 76-83.
- [23] Tedla and Gebresellassie, 2018. Estimating the proportion of clinically diagnosed infectious and non- infectious animal diseases in Ganta Afeshumworeda, Easern Tigray zone, Ethiopia. 11 (29).
- [24] Thomson, G. R. 2003. Foot and mouth disease in Wildlife. *Virus Research.* 91: 145-161.
- [25] Umer, S. G. 2021. Assessment of major animal health problems and their impact on beef cattle production in Doba district of West Harerghe zone, Ethiopia.
- [26] Wilkinson, K., Grant, W. P., Green, L. E., Hunter, S., Jeger, M. J., Lowe, P., Medley, G. F., Mills, P., Phillipson, J., Poppy, G. M., Waage, J., 2011. Infectious diseases of animals and plants: an interdisciplinary approach. *Phil. Trans. R. Soc. B* 366, 1933–1942.
- [27] Wondwosen A. 2003. Influence of animal diseases and sanitary regulations on livestock export trade and cases of export restrictions. Challenges and Opportunities of Livestock Marketing in Ethiopia: Proceedings of the 10th annual conference of the Ethiopian Society of Animal Production (ESAP) held in Addis Ababa, Ethiopia.