

# Major Causes of Organ Condemnation and Its Economic Impact in Cattle slaughtered at Durame Municipal Abattoir, South Eastern Ethiopia

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## Abstract

A cross sectional study was conducted from November 2017 to April 2018 to identify the major causes of organ condemnation in cattle slaughtered at Durame municipal abattoir and to estimate the direct economic loss due to organ condemnation. Out of the total 500 cattle examined by ante mortem examination, in 78 (15.6%) cattle various types of abnormalities were detected include; branding (5.4%), nasal discharge (4.2%), lameness (3.4%), lacrimation (1.4%), and local swelling (1.2%). Postmortem examination revealed that 142 (28.4%) lungs, 77 (15.4%) livers, 30 (6%) hearts and 14 (2.8%) kidneys were condemned due to various causes. Fasciolosis (9.6%) was the main cause of liver condemnation followed by abscessation (2.4%) and cirrhosis (1.6%), respectively. Hydatidosis (12.2%) was the major cause of lung condemnation followed by marbling (7.2%), emphysema (4.4%), and abscessation (2.4%), respectively. Hydatidosis (2.8%) and nephritis (1.8%) were the major causes of heart and kidney condemnation, respectively. Rate of condemnations due to parasitic causes was higher in the lung (12.2%) than in the liver (10.0%). Parasitic diseases particularly fasciolosis and hydatidosis were the major causes of economic loss through condemnation of affected organs. The total annual economic loss incurred due to organs condemnation at the study area was estimated to be 103,300.00 ETB (4804.65 USD). The current result suggests that a thorough investigation that leads to disease control strategy is required to reduce the economic and public health consequences.

**Keywords:** Cattle, Cause of organ condemnation, Economic loss, Ethiopia

## 1. Introduction

The livestock sector globally is highly dynamic, contributes 40% of the global value of agricultural output, and support the livelihoods and food security of almost a billion people (Thornton, 2010). In Ethiopia, livestock production is an integral part of the agricultural system. The livestock sub sector accounts for 40% of the agricultural gross domestic product and 20% of the total GDP without considering other contribution like traction power, fertilizers and mean of transport (Aklilu et al., 2003). Ethiopia is a home for many livestock species and believed to have the largest livestock population in Africa. An estimate indicates that the country is a home for about 54 million cattle, 25.5 million sheep and 24.06 million goats. From the total cattle population 98.95% are local breeds and the remaining are hybrid and exotic breeds. 99.8% of the sheep and nearly all goat population of the country are local breeds (CSA, 2013).

Cattle play significant contribution in Ethiopian economy as source of meat, milk, drought power, income and foreign exchange. However, as other livestock in the country their contribution is below their expected potential due to prevalence of livestock diseases, poor management system and poor genetic performance. Thus, the country is not utilizing this huge potential livestock resource and an improvement in this sector (Desiye and Mersha, 2012).

The significant financial losses incurred in the different abattoirs in Ethiopia results from death of animals, inferior weight gain and condemnation of edible organs and carcass at slaughter during routine meat inspection. This production loss to the livestock industry is estimated at more than 900 million USD annually (Abebe and Yilma, 2012; Ezana, 2008).

Major parasitic diseases such as fasciolosis, hydatid cyst, *Cysticercus bovis* and others causes like abscessation and cirrhosis cause a significant financial loss by lowering the productivity of cattle and condemnation of edible organs (Amene et al., 2012).

Several studies have been conducted through abattoir survey to determine economic loss resulting from organ condemnation in many abattoirs of Ethiopia (Miheret et al., 2013).

The primary aim of the abattoir is to produce healthy meat, wholesome and clean products which are safe for human consumption (Cadmus and Adesokan, 2009). Besides, abattoirs provide information on the epidemiology of diseases on livestock, to know to what extent the public is exposed to certain zoonotic diseases and to estimate financial losses incurred through condemnation of affected organs and carcasses (Jibat et al., 2008).

Ante-mortem inspection of animals in the slaughter house also serves to obtain information that will be

useful in making sound post-mortem inspection (Miheret et al., 2013). As meat is the main source of protein to population, it should be clean and free from diseases of particularly importance to the public health as tuberculosis, hydatidosis and fasciolosis among others (Sirak, 1991).

Postmortem inspection is a screening or sorting process devoted to separate the “normal” from “abnormal” meat. A proper postmortem inspection is important to detect and eliminate abnormalities, including contaminations, thus ensuring that the hygiene of the meat fits the basic requirements for human consumption (Gracey et al., 1999). The decision whether meat fits to appropriate standard for human consumption or not requires utilizing many skills of observation and evaluation. This expertise should be taken into consideration in the results of ante-mortem inspection (MoARD, 2006).

Regarding to the situation of organ condemnation and economic loss in Durame municipal abattoir, information is scant and no study had been conducted to assess the dynamics of the diseases in relation to the efforts made to minimize the causes. Furthermore, there is no single documented work of investigation regarding the major causes and economic losses encountered in study area.

Therefore, the objectives of this study were:

- To identify the major causes of organ condemnation, and
- To assess the economic loss in cattle slaughtered at Durame municipal abattoir

### 3. Materials and Methods

#### 3.1. Study area

The study was conducted from November 2017 to April 2018 in Durame Municipal abattoir, Kembata Tembaro Zone, SNNPR, South eastern Ethiopia. The Durame town is located at 350 km from Addis Ababa at an elevation of 2101 meter above sea level. The town is bordered in the north by Hadiya Zone, in the South by Wolaita Zone, to the West by the Omo River and to the east by Halaba special Woreda. The town has a latitude and longitude of 7° 14' N & 37° 53' E. Rain fall varies from 1497mm with the average annual temperature of 18°C. The area is characterized by two seasons, the wet season from June to September and dry season from October to May. The farming system in the area is mixed type (crop-livestock production). Based on the national census conducted by the CSA of Ethiopia, Kembata Tembaro Zone has a total human population of 683,167 of which 337,852 are men and 345,315 are women. The total cattle population of Kembata Tembaro Zone is 215.55 thousand (CSA, 2007).

#### 3.2. Study population

The study animals were comprised indigenous zebu cattle brought from various localities to Durame municipal abattoir for slaughtering purposes. It is difficult to precisely trace back the exact origin of all animals was slaughtered at Durame municipal abattoir and relate the findings on major causes of organ condemnation and economic loss encountered in the study area. Animals were transported to the abattoir by vehicle and by overland trekking drovers. The animals was selected in systematic sampling method and routinely inspected for pathological condition. Majority of cattle were expected to come from in and around Durame, Shinshicho, Negelle, and Boditi.

#### 3.3. Study design

A cross-sectional study design was employed to identify the major cause of organ condemnation in Durame municipality abattoir and to evaluate the direct financial losses due to organ condemnation. Systematic (three slaughtering days per week) visits were made to Durame municipal abattoir from November 2017 to April 2018. The organs of the cattle in the abattoir during the study period were investigated and the causes for condemnation of the organs were recorded. All animals that had been examined during ante-mortem inspection were all subjected to post-mortem examination. A total of 500 cattle were slaughtered and thoroughly examined by following standardized post-mortem procedure. After evisceration of liver, lungs, kidneys, heart, spleen, Masseter muscles and carcass, a thoroughly examination was made by visual, palpation and systematic incisions for the detection of the presences of cysts, adult parasites and other abnormalities. Pathological lesions were differentiated and judged according to the guidelines of the FAO on meat inspection manual for developing countries (Fufa and Debele, 2013).

#### 3.4. Sample size determination

The total number of cattle for the study was calculated based on the formula given by Thrusfield (2005), with 95% confidence interval and at 5% absolute precision by using systematic sampling method. In this study, 50% prevalence was considered to calculate the sample size using the following formula. For this particular study the sample size determined at 95% confidence level, 5% precision, and 50% expected prevalence is 384.

$$N = \frac{1.96^2 (p) (1-p)}{D^2}$$

Where, n = sample size, P = expected prevalence, D = desired level of precision (5%).

$$\text{Therefore: } n = \frac{1.96^2 (0.5) (1-0.5)}{0.0025} = 384 \text{ samples}$$

Where n = sample size required, 1.96 = the value of z at 95% confidence level, P exp = expected prevalence, d = desired absolute precision. Hence, the required sample size was 384 cattle will be presented for slaughter. Even though, the required sample size was 384, additional 116 samples will be included to increase the precision and a total of 500 animals will be considered in the study.

### 3.5. Study methodology

#### 3.5.1. Active abattoir survey

*Ante-mortem inspection:* A regular visit was made three day per week to Durame municipal abattoirs during the study period from November, 2017 to April, 2018. In each week, three day visit was made for ante mortem inspection and on individual animals for assessment of animals' origins, age and body conditions before the animals were slaughtered. During every visit, each animal was identified based on enumerated code given to the butcher shops before slaughter. Ante mortem inspection was conducted on individual animals while they enter individually and in mass before entering into the lairage. For the ante mortem inspection, records of age, breed, and origin were considered.

*Postmortem examination:* The organs of randomly selected cattle were examined by visual inspection, palpation and incision. Organs of each slaughtered animals infected with hydatid cyst, fasciolosis, cysticercosis and other causes were identified systematically following the standard routine post mortem inspections procedure. The inspected organs were collected for close examination and then were registered. Pathological lesions were differentiated and judged according to guidelines on meat inspection for developing countries and classified in to the following categories of judgments such as approved as fit for human consumption, conditionally approved as fit for human consumption, totally condemned as unfit for human consumption and partially condemned as fit for human consumption (Getachew, 2008).

#### 3.5.2. Direct economic loss assessment:

To assess the economic losses due to fasciolosis, hydatidosis and cysticercosis, only direct economic losses was considered and the calculation based on condemned organs like liver, lungs, heart, and kidney was conducted. To calculate cost of condemned edible organs, butchers and meat inspector in the abattoir were interviewed to establish the price per unit organ and the average organ price was determined and this price index was used to calculate the loss. The analysis carried out based on annual slaughter capacity of the abattoir, market demand, and average market price of each organ in Durame town and the rejection rate of specific organ. Information obtained is subjected to mathematical computation by modifying the formula of (Ogunrinade, 1980).

$$EL = \sum Sr_x \times Coy \times Roz,$$

Where,

EL = Estimated annual financial loss due to organs condemnation

$\sum Sr$  = Annual cattle slaughter of the abattoir

Coy = Average cost of each cattle liver/lung/heart/kidney

Roz = Condemnation rate of cattle liver/lung/heart/kidney

#### 3.5.3. Data analysis:

Abattoir data were collected and recorded on specially designed forms (Annex 1). Data generated from ante mortem and postmortem meat inspection was recorded in micro-soft excel 2007 and statistical analysis was done by using SPSS (statistical packages of social science version 20.00 program). Descriptive statistics was used to determine the level of organs condemnation rates defined as proportion of condemned organs to the total number of organs examined. Results were represented mainly in the form of narrations descriptive tabular summaries. Chi square and ANOVA were run for comparison between breed, age, and sex and body condition.

## 4. Results

### 4.1. Abattoir survey

Out of 500 cattle subjected to ante mortem examination, in 78(15.6%) cattle various types of abnormalities were detected include; branding, nasal discharge, lameness, Lacrimation and local swelling (Table 1).

All animals that had been examined by ante mortem were all slaughtered during postmortem inspection. A total of 500 animals were slaughtered and toughly examined by following standard postmortem inspection procedure. Out of total examined organs, 142(28.4 %) lungs, 77(15.4%) livers, 30(6%) hearts and 14(2.8%) kidneys were condemned due to various causes (Table 2). The condemnation of lungs were results from hydatidosis, marbling, emphysema, congestion and abscess with the condemnation rate 61(12.2 %), 36(7.2%), 22(4.4%), 11(2.2%), and 12(2.4%) respectively. In line with causes of liver condemnation, fasciolosis, abscess, cirrhosis, calcification, and hydatidosis were found to be the major causes of condemnation. From the total number rejected livers, 48(9.6%), 14(2.8%), 8(1.6%), 5(1.0%) and 2(0.4%) were rejected due to fasciolosis,

abscess, cirrhosis, calcification, and hydatidosis respectively. Hydatidosis, pericarditis, and calcification were the major cause of heart rejection. From the total rejected hearts, 14(2.8%), 10(2%), and 6(1.2%) were condemned due to hydatidosis, pericarditis, and calcification respectively. Nephritis and calcification were found to be the major causes of kidney rejection and out of the total number of rejected kidneys, 9(1.8%) and 5(1%) were condemned due to nephritis and calcification respectively.

Parasitic causes like Fasciolosis and hydatidosis were found to be the major parasitic causes for organ condemnation. Lung is the main organ with 61(12.2%), 50(10%), and 14(3%) with liver, and heart respectively (Table-3).

Pathological conditions also play role in organ condemnation. Seems like parasitic cause lung was highly affected by pathological condition with 81(16.2%), 27(5.4%), and 16(3.2%) with lung, liver, and heart respectively (Table-3).

#### 4.2. Assessment of direct economic loss:

The annual slaughter rate of the abattoir was estimated to be 6048 cattle and the average cattle slaughtered in the abattoir were 42 per day. The average price of liver, lung, heart and kidney was 80, 10, 25, and 15 ETB respectively. The direct annual economic loss due to rejection of organ calculated based on average price per organ in Durame town was estimated to be using the formula set by (Ogunrinade, 1980). The annual estimated economic loss was found to be (103,300.00 ETB) per annum (Table 4).

#### 5. Discussion

In the present study, out of 500 examined cattle slaughtered 28.4% lung, 15.4% liver, 6% heart and 2.8% kidney were rejected from the local market based on their parasitic and gross pathological lesions. The rejection rate of lung in this study slightly similar to rate reported by Asmare *et al.* (2012) 25.8% at Bahir Dar, but lower than rate reported by Amene *et al.* (2012) 46.2% at Jimma municipal abattoir. According to the present study, lung was condemned due to hydatid cyst, marbling, emphysema, abscess, and congestion at Durame abattoir. In this finding the rate rejection in lung due to hydatidosis was closer to that reported by Efrem *et al.* (2015) 12.17% from Nekemte and rate reported by Regassa *et al.* (2009) 15.4% from Wolaita Soddo municipal abattoir. Hydatidosis was found to be the main cause of lung condemnation with the rate of 12.2% which is relatively lower than report by Bemrew *et al.* (2015) in which 24.2% rate of rejection was found from cattle slaughtered in northern Ethiopia, reports by Yifat *et al.* (2011) 24.2% from Gondar, by Getaw *et al.* (2010) 46.5% from Adama, and by Regassa *et al.* (2010) 52.7% from Hawassa municipal abattoir.

The emphysema of lung could be due to exposure of cattle to stress factors such as exposure to dust either in the environment or fatigue during long treks in search for pasture (Cadmus and Adesokan, 2009). The lung condemnation due to emphysema in the present finding is 4.4% which is in agreement with previous study by Tadeballi *et al.* (2009) with 4.7% of rejection rate but relatively higher than rate reported by Alembrhan and Haylegebriel (2013) and Yifat *et al.* (2011) from Gondar with the result of 1.61% and 1.5% respectively. The rate of rejection of lung in the current study due to emphysema was lower than rate reported by Amene *et al.* (2012) 6.77% from Jimma and rate reported by Genet *et al.* (2012) 10.5% from Gondar abattoir. The lung congestion is associated with the improper stunning and bleeding methods and it is common in the abattoir (Fufa and Debele, 2013). The rate of rejection of lung due to congestion in the current study with 2.2% is closed or similar rate reported by Fufa *et al.* (2012) from Yirgalem abattoir with the 2% rate of rejection but much lower than rate reported by Fufa and Debele (2013) 10.65% from the Wolaita soddo municipal abattoir and reported by Seboka (2008) 43.75% from Addis Ababa abattoir. The rate of lung rejection due to abscessation in the present study with the rate of 2.4% which was approximately similar, reported by Rahmeto *et al.* (2008) 1.00% out of total lung examined. It is lower than report by Bemrew *et al.* (2015) with rejection rate of 6.0% and reported by Cadamus and Adesokan (2009) with 31.02% rate of rejection in western Nigeria.

The rejection rates of liver in this study (15.4%) is closer to reported by Alembrhan and Haylegebriel, (2013) (17.5%) from Adigrat municipal abattoir, but lower than rate reported by Yifat *et al.* (2011) from Gondar, by Nurit *et al.* (2012) from Kombolcha and by Amene *et al.* (2012) from Jimma municipal abattoirs who reported 31.1%, 66.55% and 64.4%, respectively. The current study revealed that the prevalence of fasciolosis in cattle slaughtered at the abattoir was 9.6%. In line with this finding, the rate of rejection is closer to the rate reported by Alembrhan and Haylegebriel (2013) 9.26% from Adigrat abattoir and the rate that reported by Fufa *et al.* (2010) from Wolaita Soddo Municipal abattoir (14%). These differences can be attributed due to the difference in agro-ecological condition, strategic control of internal parasites in the areas, and variation in animal management systems at different abattoirs. The observed prevalence of fasciolosis in this study abattoir was lower than that reported by Taddelle and Worku (2007) 46.2% from Jimma municipal abattoir. The rate of rejection of liver due to abscessation in the current study was 2.8%, the rate was closer to that reported by Fufa and Debele (2013) 3.1% from Wolaita soddo municipal abattoir, but higher than rate reported by Yifat *et al.* (2011) 1.7% from Gondar Elfora Abattoir. The rate of rejection of liver due to cirrhosis in the present study was

1.6%, the rate was lower than that reported by Yifat *et al.* (2011) 3.4% from Gondar and by Alawa *et al.* (2010) 12.8% from Nigeria.

The present study also showed that the heart was condemned due to hydatidosis, pericarditis and calcification. The rejection rate of hydatidosis, pericarditis and calcification were 2.8%, 1.8% and 1.2% respectively. The rejection rate of hydatidosis and pericarditis in the present study was slightly agreed with report by Bemrew (2015) from Jimma Municipal Abattoir, but higher than that reported by Fufa and Debele (2013) 1.0% from Wolaita sodd. The rejection rate due to pericarditis in this study was 1.8%, which is much lower than rate that reported by Kambarage *et al.* (2000) 36% from Tanzania. The variation in the rate of pericarditis could be result from high occurrence of sharp foreign bodies in the environment of slaughtering animals.

The present study reveals that nephritis and calcification were the major causes of kidney condemnation. The rate of rejection due to nephritis was 1.8%, which is slightly similar to that reported by Fufa *et al.* (2012) 1.2% from Yirgalem municipal abattoir, but lower than that reported by Kambarage *et al.* (2000) 14% from Tanzania.

The total financial loss calculated in this study, due to only offal organs condemnation was 103,300.00 Ethiopian Birr/year, of which 46,448.64 and 7,378.56 Ethiopian Birr/year was due to fasciolosis and hydatidosis, respectively. The total economic loss in this study was lower than that reported by Zewdu *et al.* (2008) 160,032.23 ETB from Ambo municipal abattoir. According to Regassa *et al.* (2009) losses due to hydatidosis was higher than the loss reported in this study. The economic losses in this study due to fasciolosis and hydatidosis was lower than report by Amene *et al.* (2012) from Jimma municipal abattoir who reported 125,842.0 and 27,207.3 Ethiopian Birr, respectively.

## 6. Conclusion and Recommendations

The present study revealed that fasciolosis, hydatidosis, marbling appearance of the lung, emphysema, abscessation, cirrhosis, pericarditis, nephritis and calcification were the major causes of organ condemnation in cattle slaughtered in Durame municipal abattoir resulting in considerable economical loss in livestock production. The differences in the rejection rate of organs with related to different causes may be due to the differences in the prevalence of the disease, variation in animal management systems, agro-ecological condition, and strategic control of internal parasites at different study sites. Hence, this study may valuable to give regular current information on parasitic and pathological lesions. In addition, it helps to estimate economic loss of a country in every year. Among all the causes of organ condemnation, fasciolosis and hydatidosis remain the most important diseases warranting serious attention for prevention and control actions.

Therefore, the following recommendations are forwarded:

- There should be strict or proper routine meat inspection of slaughtering animals so that infected organ condemned accordingly and incinerated.
- Proper disposal of condemned organ in order to break the life cycle of disease conditions.
- Regular deworming of farm animals should be introduced and research in the alternative meat sources should be intensified.
- Further studies should be carried out in cattle slaughtered in different abattoirs of the country.

## 7. References

- Abebe, F and Yilma, J. (2012), "Estimated annual economic loss from organ condemnation, decreased carcass weight and milk yield due to bovine hydatidosis (*Echinococcus granulosus*, Batsch, 1786) in Ethiopia", *Ethiopian Veterinary Journal*, **16**(2), 39-51.
- Aklilu, Y., Irungu, P. and Alemayehu, R. 2003: An Audit of the Livestock Marketing Status in Kenya, Ethiopia and Sudan. In: Issues and Proposed Measures, Vol. II. Community Based Animal Health and Participatory Epidemiology Unit. Nairobi: Pan African Programme for the Control of Epizootics, African Union/Inter African Bureau for Animal Resources.
- Alawa, C. B., Etukudo-Joseph, I. and Alawa, J. N., (2010), "A 6 year survey of pathological condition of slaughtered animals at Zango Abattoir in Zaria, Kaduna state, Nigeria", *Tropical Animal Production*, **43**, 127-131.
- Alembrhan, A. and Haylegebriel, T., (2013), "Major causes of organ condemnation and economic loss in cattle slaughtered at Adigrat municipal abattoir, northern Ethiopia", *Vet. World*, **6**(10), 734-738.
- Amene, F. L., Eskinder and T. Dawit., (2012), "The Cause Rate and Financial Implication of Organ Condemnation of Cattle Slaughtered at Jimma Municipal Abattoir, Southwestern Ethiopia Hawassa University, School of Veterinary Medicine, Hawassa, Ethiopia", *Global Veterinarian*, **9**(4), 396-400.
- Asmare, A., Biniyam, A. and Mersha, Ch., (2012), "Major Causes of Lung and Liver Condemnation and Financial Impact in Cattle Slaughter at Bahir Dar Municipal Abattoir", *African Journal, Basic Applied Science*, **4**(5), 165-171.
- Bemrew, A. Animaw, S. and Wassie, M., (2015), "Contagious Bovine Pleuropneumonia in Ethiopia (Review

- Article)", *Academic Journal of Animal Diseases*, **4**(2), 87-103.
- Cadmus, S. I. B. and H. K. Adesokan, (2009), "Causes and implication of bovine organs/offal condemnations in abattoirs western Nigeria", *Tropical Animal Health and Production*, **41**(7), 1455-1463.
- CSA, 2007. Central statistical Agency of Ethiopia. Agriculture sample survey Report on Livestock and characteristics, Statistical Bulletin, SNNPR, Ethiopia.
- CSA, 2013. Agricultural Sample Survey Report on Livestock and livestock characteristics (Private peasant holdings). Statistical Bulletin 570, Addis Ababa, Ethiopia.
- Desiye, T. and Mersha, C., (2012), "Study on Rumen and Reticulum Foreign Bodies in Cattle Slaughtered at Jimma Municipal Abattoir, South West Ethiopia", *American-Eurasian Journal of Scientific Research*, **7** (4), 160-167.
- Ezana, G., 2008. Major diseases of export oriented livestock in export abattoirs in around Adalben Woreda, DVM thesis, Faculty of veterinary medicine, Haramaya University, Ethiopia.
- F. Abunna, and D. Hordofa, (2013), "Major Causes of Organ Condemnation for Cattle and its Financial Impact at Wolaita Soddo Municipality Abattoir, Southern Ethiopia", *Global Veterinarian* **11** (6), 730-734.
- Fufa, A. Loma, A. Bekele, M. and Alemayehu, R., (2010), "Bovine fasciolosis: coprological, abattoir survey and its economic impact due to liver condemnation at Soddo Municipal abattoir, Southern Ethiopia", *Tropical Animal Health Production*, **42**(2), 289-292.
- Fufa, A., Biniyam, H., Dawit, T., Alemayehu, R. and Bekele, M., 2012. Major causes of organ condemnation and its economic impact in cattle slaughtered at Yirgalem municipal abattoir, Southern Ethiopia, Academic success depends on Research and publication, p. 170-181.
- Genet, M., Tadesse, G., Basaznew, B. and Mersha, C., (2012), "Pathological Conditions Causing Organ and Carcass Condemnation and Their Financial Losses in Cattle Slaughtered in Gondar, Northwest Ethiopia", *African Journal Basic & Applied Science*, **4** (6), 200-208.
- Getachew, E. W., 2008. Major cause of Export oriented livestock in Export Abattoir in/around Ada Liben Woreda, Debrezeit, DVM thesis, Haramaya University, Ethiopia.
- Getaw, A., D. Beyene, D. Ayana, B. Megersa and F. Abunna, (2010), "Hydatidosis: Prevalence and Its Economic Importance in Ruminants Slaughtered at Adama Municipal Abattoir, Ethiopia", *Acta tropica*, **113**(3), 221-225.
- Gracey, J. F., D. S. Collins, and R. J. Huey, 1999. Meat Hygiene, 3rd ed. W.B. Saunders Company Ltd., p. 669-678.
- Jibat, T., G. Ejeta, Y. Asfaw and A. Wudie, (2008), "Causes of abattoir condemnation in apparently health slaughtered sheep and goats at HELMEX abattoir, Debre Zeit, Ethiopia", *Revue Vet. Med.*, **159**(5), 305-311.
- Kambarage, D. M., Kimera, S. I., Kazwala, R. R. and Mafwere, B. M., (2000), "Disease conditions responsible for condemnation of carcass and organs in short horn Zebu Cattle slaughtered in Tanzania", *Preventive Veterinary Medicine*, **22**(2), 249-255.
- L. Efreem, B. Serda, B. Sibhat, and E. Hirpa, (2015), "Causes of organ condemnation, its public health and financial significance in Nekemte municipal abattoir, Wollega, Western Ethiopia", *Journal of Veterinary Medicine and Animal Health*, **7**(6), 205-214.
- Miheret, M., M. Biruk, T. Habtamu, and K. Ashwani, (2013), "Bovine hydatidosis in Eastern Part of Ethiopia", *MEJS*, **5**(1), 107-114.
- MoARD, (2006). Ministry of Agriculture and Rural Development, the Status of Animal Health Services in Ethiopia. Addis Ababa, Ethiopia. Annual report, p. 26.
- Nurit, M., Zerihun, H. and Serkalem, M., (2012), "Major Cause of Liver Condemnation and Associated Financial Loss at Kombolcha Elfora Abattoir, South Wollo, Ethiopia", *Europe Journal Applied Science*, **4** (4), 140-145.
- Ogunrinade, A. and B. I. Ogunrinade., (1980), "Financial importance of Fasciolosis Nigeria", *Tropical Animal Health Production*, **1**, 155-15.
- Rahmeto, A, Fufa, A. Mulugeta, B. Solomon, M. Bekele, M. and Alemayehu, R., 2008. Fasciolosis: Prevalence, financial losses due to liver condemnation and evaluation of a simple sedimentation diagnostic technique in cattle slaughtered at Hawassa Municipal abattoir, southern Ethiopia. Hawassa University, Faculty of Veterinary Medicine.
- Regassa, A., F. Abunna, A. Mulugeta, and B. Megersa, (2009), "Major Metacestodes in cattle slaughtered at Wolaita Soddo municipal abattoir, Southern Ethiopia: Prevalence, Cyst viability, Organ distribution and Socio-economic implications", *Tropical Animal Health Production*, **41**, 1495-1502.
- Regassa, F., A. Molla, and J. Bekele, (2010), "Study on the prevalence of cystic hydatidosis and its economic significance in cattle slaughtered at Hawassa Municipal abattoir, Ethiopia", *Tropical animal Health Production*, **42**, 977-984.
- Seboka, F., 2008. A study on common Lung gross abnormalities at Addis Ababa abattoir, DVM thesis, Faculty of Veterinary Medicine, Jimma University.

- Sirak, A., (1991), "Causes of organ condemnation in Bahir Dar abattoir. Proceeding of the 4th South-West province, Cameroon, Bull. *Animal Health Production. Africa*", **35**(3), 239-242.
- Tadelle, T. and T. Worku, (2007), "The prevalence and economic significance of bovine fasciolosis at Jimma municipal Abattoir, Ethiopia", *The Internet Journal Veterinary Medicine*, **3**, 15.
- Tadepalli, S. Narayanan, S. K., Stewart, G. C., Chengappa, M. M. and Nagaraja, (2009). "Fusiobacterium necrophorum: A ruminal bacterium that invades liver to cause abscesses in cattle", *Anaerobe*, **15**, 36-43.
- Thornton, P. K., 2010. Livestock production: recent trends, future prospects. Royal Soc, 365 (1554), p. 2853-2867.
- Thrusfield, M., 2005. Veterinary Epidemiology. 2nd ed. UK: *Black Well Science*. p 180.
- Yifat, D. Gedefaw, D. and Desie, S. H. 2011. Major Causes of Organ Condemnation and Financial Significance of Cattle Slaughtered at Gondar Elfora Abattoir, Northern Ethiopia.
- Zewdu, E., Teshome, Y. and Makaoya, A., (2008), "Bovine hydatidosis in Ambo municipal abattoir, West Shoa", *Ethiopia Veterinary Journal*, **11**(1), 1-14.

**Table 1. Abnormalities encountered during ante mortem examination at Durame abattoir**

Abnormalities	Number of infected animals	Percentage (%)
Branding	27	5.4
Nasal discharge	21	4.2
Lameness	17	3.4
Lacrimation	7	1.4
Local swelling	6	1.2
Total	78	15.6

**Table 2. Causes, percentage of organ condemnation and economic losses analysis**

Condemned organs	Causes	Total rate of rejection	Partial of condemnation	Total condemnation	Loss(ETB)
Lung	Hydatidosis	61(12.20)	0(0.0)	61(12.20)	7,378.56
	Marbling	36(7.20)	0(0.0)	36(7.20)	43,54.56
	Emphysema	22(4.40)	0(0.0)	22(4.40)	2,661.12
	Congestion	11(2.20)	6(1.20)	5(1.00)	1,330.56
	Abscess	12(2.40)	3(0.60)	9(1.80)	1,451.52
	Total	142(28.40)			17,176.32
Liver	Fasciolosis	48(9.60)	8(1.60)	40(8.00)	46,448.64
	Abscess	14(2.80)	2(0.40)	12(2.40)	13,547.52
	Cirrhosis	8(1.60)	0(0.0)	8(1.60)	7,741.44
	Calcification	5(1.00)	4(0.80)	1(0.20)	4,838.40
	Hydatidosis	2(0.40)	0(0.00)	2(0.40)	1,935.36
	Total	74(14.80)			71,608.32
Heart	Hydatidosis	14(2.80)	0(0.00)	14(2.80)	4,233.60
	Pericarditis	10(2.00)	1(0.20)	9(1.80)	3,024.00
	Calcification	6(1.20)	2(0.40)	4(0.80)	1,814.40
	Total	30(6.00)			9,072.00
kidney	Nephritis	9(1.80)	0(0.00)	9(1.80)	1,632.96
	Calcification	5(1.00)	2(0.40)	3(0.60)	907.20
	Total	14(2.80)			2,540.16

**Table 3. Summary for the liver, lung, and heart condemnation due to parasitic diseases and pathological conditions**

Cause	Rate of condemnation (%)		
	Liver	Lung	Heart
Organ			
Parasitic	50(10%)	61(12.20)	14(2.8)
Pathological	27(5.40)	81(16.20)	16(3.2)
Total	75(15.40)	142(28.40)	30(6.00)

**Table 4. Estimated economic losses encountered due to organ condemnation**

Organ	Financial loss due to Organ condemnation (%)			
	Liver	Lung	heart	Kidney
Number of organs condemned totally	61(12.2)	133(26.6)	27(5.4)	12(2.4)
Total cost of organs total condemned (ETB)	59,028.48	16,087.68	8,164.8	2,177.28
Number of organs condemned partially	16(3.2)	9(1.8)	3(0.6)	2(0.4)
Total cost of organs partial condemnation (ETB)	15,482.88	1,088.64	907.2	362.88
Total loss =	74511.36	17176.32	9072.0	2540.16