

## Survey on Luna Export Slaughter House in Eastern Showa administrative zone of Oromia, Ethiopia

Asmamaw Aki Jano

Assosa Regional veterinary Diagnostic, Surveillance, Monitoring and Study Laboratory, P.O.Box: 326, Assosa, Ethiopia. Email: [asmamawaki@gmail.com](mailto:asmamawaki@gmail.com), Telephone; +251 922232353

**Abstract:** survey was conducted in Luna export abattoir from March to April 2014 to study the company current conditions in requirement of importing countries. Factors such as age, weight, agro ecology, illegal trade and health conditions are the basic things that limit the supply and demand of abattoir in terms of quantity and quality. The standard sanitary and good hygienic measures has to be practiced in the abattoir so as to meet the importing countries requirements. The potential hazard introduced in the plant must be controlled or minimized by applying necessary risk reduction measures at each processing steps, starting from animal unloading to loading activities. In the 2009-2014 year, the LESH exported meat to importing countries were 21, 926.24 tones and the plant performance was supposed to be 66.45% and also during this year the income gained was 9474. 32\$ US and this was assumed to be 59.73% achievement. In 2009-2013, Veterinary inspection teams of Luna export abattoirs have performed ante mortem inspections over 18,482,492 animals and a total of 18, 479,072 animals were fit for slaughter. A total of about 3420 animals were found to be unfit for slaughter. Besides this, total of 342,612 different organs and/or body parts were reported to be found affected with different diseases and abnormalities which made them unfit for export markets. The organ which were found to be affected with disease and abnormalities were mostly liver and lung and they accounted for 80.93% and 16.6% of the total rejections. A total 0.71% carcasses were also condemned. Veterinary inspectors were doing ante mortem and post mortem inspection in the slaughter house to screen the abnormal from healthy animals and products so as to fit for human consumption. The gross pathological lesions/ abnormal conditions such as pleuritis, pneumonia, bruising, cysticercus, emaciation, abscess, hydatidosis and Distoma were mostly observed in different organs such as carcass, head, liver, lung, heart, kidney and tongue and due to those abnormal conditions a lot of meat are condemned in the processing plant. So that economic losses may be faced when huge part of the carcass was condemned in plant. Besides this, export animal testing for different notifiable animal disease such as RVF, TB, FMD and brucellosis before slaughter is mandatory so as to keep the public health from zoonotic disease. Therefore, applying HACCP and SPS system in abattoir will be strategic for importing countries so as to attract different importing customers.

[Asmamaw Aki Jano. **Survey on Luna Export Slaughter House in Eastern Showa administrative zone of Oromia, Ethiopia.** *Rep Opin* 2018;10(3):60-70]. ISSN 1553-9873 (print); ISSN 2375-7205 (online). <http://www.sciencepub.net/report>. 7. doi:[10.7537/marsroj100318.07](https://doi.org/10.7537/marsroj100318.07).

**Key words:** Ante mortem, import, Food safety, Luna export abattoir, HACCP, meat products, veterinary inspectors, post mortem

### 1. Introduction

Ethiopia has about 33 million sheep and 30 million goats (CSA, 2009). Small ruminants are important livestock resources in Ethiopia, providing 35% (148, 850 tones) of meat consumption ( 2.7 kg per capital per year ), and 14 % of milk consumption ( Asfaw, 1998). The contribution of livestock to the productivity and sustainability of small holders farming system is severely compromised by ill health and disease. Diseases reduces incomes directly by causing considerable livestock losses indirectly by necessitating health restriction on exports. Similarly, 37,904 tone of meat and meat products was exported from Ethiopia during the last five years. The average annual growth was 36%. The volume of meat export reached record levels and UAE and KSA took the highest proportion as 50 % and 40% of the total export volume, respectively ( MOA, 2010).

Ethiopia have more than seven export abattoirs in the country. These includes Luna, Helmex, ELFORA Debre zeit, ELFORA metehara, Mojo modern, Organic and Aberegelle export abattoirs ( MOA, 2010). The main meat products of the firms are goat and mutton carcass, offal including ( liver, heart, kidney, tongue and brain). To the market chains those products are being exported to countries of kingdom of Saudi Arabia (KSA) including Dubai, Qatar, Oman, Vietnam, Yemen, Turk, Egypt, Congo and Brazzaville. The firm gets small ruminant especially male goats and sheep for slaughter purpose from different agro ecological areas of the countries by traders, middle man, and livestock producers/pastoralists from Borena, Awash-metahara, Bati, Wollo, Babile, Dawro, Somali, Jimma, Afar, Gini, Kosso, Jido, and Ambo areas of the country. In the slaughter house veterinary inspectors perform ante mortem and post mortem inspection and decides

expertise judgments for animals, meat and meat products which are being exported based on the importing countries sanitary requirements ( MOA, 2010).

Mostly, gross pathological lesions observed in the abattoir were pleuritis, pneumonia, hydatidosis, cysticercus, inflammations, abscess, bruising and emaciation etc. Those abnormal condition are observed in organs of liver, lung, kidney, heart, carcass ( partial and whole), tongue etc. usually, carcass are partial condemned due to emaciation, bruising, contamination, abscess and quality problems as the meat inspectors report indicated. Currently, Luna export slaughter house was practicing ISO 22000:2005- specific requirement for food safety management system where an organization in the food chain needs to demonstrate its ability to identify and control food safety hazards in order to ensure that food is safe at the time of human consumption and also the HACCP plan document so as to certify in the near future ( MOA, 2010).

The Director of veterinary science, meat inspectors are closely giving training evaluating and auditing the abattoirs as they should be competitive enough in the market. While exporting meat and meat products, the zoo sanitary requirements of importing countries includes 1/ healthy animal slaughtered at officially approved abattoir under the direct supervision of veterinary inspectors 2/ animal undergone ante- mortem inspection within 12hrs before slaughter under direct supervision of veterinarian 3/ animals that were borne and reared in pastoral areas of the country 4/ animals that were not exposed to notifiable diseases to the OIE 5/ were prepared, handled, stored and transported with the required hygiene and sanitation 6/ were supervised through all stages of production, storage and transportation by veterinarian 7/ were derived from animals that have never been fed with feed of animal origin and subjected to treatment with growth hormones 8/ meat processed in conformity with HACCP system. Therefore, Luna meat product exporting slaughter house should have to meet the importing countries standard sanitary and hygiene requirement. The food safety management and HACCP principles, which were on process has to be implemented to identify and control food safety hazards so as to attract the world market and increase country income, and also they have to provide high quality and quantity livestock products especially, the lowland sheep and goats which have well developed fat coverage than the high land breeds. Similarly, factors such age, live weight, carcass weight and health conditions which are limiting the trade should be improved by close discussion, awareness creation and continues training so as to fill the knowledge and/

or awareness gap among the importing countries, livestock producers and meat products exporting abattoir and then, export the high quantity and quality products in meeting the requirement and country economy of this sector tremendously increased as well. The survey mainly focused on the data available in the Luna export abattoir which are key indicators for the importing countries requirements, and show the current status of the presenting abattoir in the country ( MOA, 2010).

Therefore, the descriptive survey was undertaken at Luna export abattoir in modjo with the following **objectives**;

- To assess the back ground history of abattoirs and processing activities, in the meat processing plant.
- To give a detailed descriptive on where the firm gets their raw materials.
- To identify the countries they export their products and outline their sanitary requirements in the firm.
- To describe the food safety procedures the firm has implemented to ensure safety and quality of the products they produce.

## **2. Methodology and Data sources**

### **2.1 Data sources**

Published and unpublished previous and ongoing study documents; interview, Ethiopia meat and dairy industry institute, Ethiopia MOA, AAU, FVM, Luna export abattoir, resources persons and rapid assessments have been used as sources of information for this study. Relevant detailed study documents and in some cases summaries have been attached in support of the action plan for detailed reference.

### **2.2 Study site and animals**

The survey was conducted in Luna export slaughter house, at Modjo, Ethiopia. modjo town is the center of Lume Districts in eastern Showa administrative zones of Oromia Regional State. It is located 73kms southeast of Addis Ababa at an altitude of 1777 meters above sea level. And also the town is geo graphically located at 8<sup>o</sup>44'N and 38<sup>o</sup>58' E. The abattoir is privately owned. It experiences a bimodal pattern of rainfall with the main rainy season extending from June to September and a short rainy season that extends from March to May with an average annual rainy fall of 800 mm. The average maximum and minimum temperatures are 28<sup>o</sup>c and 18<sup>o</sup>c respectively (ILRI, 2005).

Luna export slaughter house is owned by the Luna PLC and it was established 11 years ago in march of 2002 G.C located in Modjo town of Ethiopia. This abattoir was reviewed on march 13, 2007. During the initial visit the plant was not killing any sheep and goats or beef cattle. The abattoir was reviewed a second time on Thursday march 15, 2007 when they

were processing sheep and goats. It contains 50,000 sq. m of area. For chilling room it takes 400m<sup>2</sup> storage areas. The abattoir has dressing capacity of 2600 sheep and goats or 200 cattle a day.

### 2.3 Study Design and Questionnaire survey

The descriptive study was conducted in Luna export abattoir to gather and analyze the previous reports/ data in the Luna meat processing plant. Structured questionnaire survey and participatory approaches were used in the abattoirs to collect the required data. In addition to this, the meat inspection daily, monthly and annually reports documents which are available in abattoir are collected and systematically arranged and analysed in different forms ( annex 1).

### 2.4. Data Analysis

All data collected from ante mortem and post mortem meat inspection were recorded, handled, and entered in to a MS excel spreadsheet and checked for accuracy, analysed systematically and set in different tables. Descriptive statistics was used to determine the level of organs and carcass condemnation rates defined as proportion of condemned organs and carcass to the total number of organs and carcasses examined ( Newcombe (1998) and Wilson (1927).

## 3. Results

### 3.1 Major activities performed in the Export Slaughter House/ result

#### 3.1.1 The processing activities

Table 1. processing activities of the Luna export abattoir		
Input	Process	Output
Live animals from the market loaded in live animals transportation vehicles delivered to the facility	Animal unloading	Animals in the facility un loaded from the vehicles
Animal in the facility	Animal weighing & screening (fail & pass)	Animals fit for slaughter health and other criteria wise, animal rejected to be deported out of the facility immediately
Animals fit for slaughter health and other criteria wise	Animal weighing and screening -weight fail, non urgent and livestock unit	-Weighed animals for the purpose of weight criteria and financial transactions -Animals healthy but over and under weight for current slaughter use to be holded in livestock unit for other inspection
Animals fulfilling the weight and other slaughter criteria	Holding pen	Animals in holding pen
Animals from holding pen	Weighing	Weighed animals ready to be used for slaughter
Weighed animals ready for lairage water	Lairage	Animals in lairage being given water ready to inspected for slaughter
Animals in lairage being given water ready to be inspected for slaughter	Antemortem inspection ( pass/fail)	-Inspected animals for slaughter for operation -rejected animals deported out of facility for not passing antemortem inspection by regulatory body.
Animals inspected and allowed for slaughter	Slaughtering	Animals cut on their neck
Animals cut on their neck	Hoisting and bleeding	Hoisted animals cut on neck
Hoisted animals cut on neck	Head cutting and removal	Head of animal head cut animals body
Head of animals	Brain removal	Brain removed head of animals
Brain removed head of animals	Tongue removal	Tongue and brain removed head animals Tongue and brain separated from other part of head
Tongue and brain separated from other part of head	Offal washing and processing	Washed dressed and inspected brain tongue (offal)
Washed dressed and inspected brain and tongue (offals)	Offal organic acid spraying	Acid sprayed clean offal
Acid sprayed clean offal	Offal primary packing	Acid sprayed clean offal
Acid sprayed clean offal	Offal primary packing	Primary packed clean and ready offal
Primary packed clean and ready offal	Offal freezing	Offal under freezing condition
Offal under freezing condition	Secondary packing	Secondary packed offal under cool condition
Head cut animal body	Flanking rear leg	Animals open at rear leg and broken one of the rear leg
Animals open at rear and broken one of the rear leg	Hoisting and other leg flanking	Carcass hoisted on hook with two rear legs broken
Carcass hoisted on hook with two	Skin dissection	Animals body with dissected skin

rear legs broken		
Animals body with dissected skin	Skinning	Animals body skin removed from most part with hide on
Animals body skin removed from most part with hide on	Hide removed	<ul style="list-style-type: none"> <li>• De hidid carcass</li> <li>• Hide and testicle</li> </ul>
Hide and testicle	Hide collection and loading	<ul style="list-style-type: none"> <li>• Loaded hide and testicle</li> </ul>
De hidid carcass	Rectal detachment and abdominal dissection	<ul style="list-style-type: none"> <li>• Rectum ringed and stomach opened carcass</li> </ul>
Rectum ringed stomach opened carcass	Evisceration green offal removal	<ul style="list-style-type: none"> <li>• Green offal removal carcass</li> <li>• Green offal</li> </ul>
Green offal	Green offal processing	<ul style="list-style-type: none"> <li>• Processed green offal</li> </ul>
Processed green offal	Green offal packing	<ul style="list-style-type: none"> <li>• Packed green offal</li> </ul>
Packed green offal	Green offal loading	<ul style="list-style-type: none"> <li>• Loaded green offal</li> </ul>
Green offal removed carcass	Evisceration lung, heart and liver, removal	<ul style="list-style-type: none"> <li>• Lung, heart and liver removed carcass</li> <li>• Unprocessed red offal</li> </ul>
Red offal lung and heart, liver	Lung, liver and heart inspection and trimming	<ul style="list-style-type: none"> <li>• Inspected and fit for use offal, rejected condemned offal</li> </ul>
Inspected and fit for use offal	Offal washing and processing	<ul style="list-style-type: none"> <li>• Washed and processed red offal</li> </ul>
Washed and processed red offal	Offal organic acid spraying	<ul style="list-style-type: none"> <li>• Organic acid sprayed and read be packed offa</li> </ul>
Organic acid sprayed and ready to be packed offal	Offal primary packing	<ul style="list-style-type: none"> <li>• Offal packed with primary packed like poly bags</li> </ul>
Offal packed with primary packed like poly bags	Offal freezing	<ul style="list-style-type: none"> <li>• Offal under freezing condition</li> </ul>
Offal under freezing condition	Secondary packing	<ul style="list-style-type: none"> <li>• Secondary packed and labeled offal</li> </ul>
Lung, heart and liver removed carcass	Trim zero tolerance and post mortal inspection Detaining and condemnation	Carcass with no visible contamination from milk, viscera and iniesta and pathogenically inspected for capability to be sold in the market or detained for further inspection and removal
Inspected and fit for use carcass	Kidney and penis removal	Kidney and penis removed ready for use carcass Kidney and penis
	Kidney collection and penis sepration	Collected kidney ready for process penis removed from the system, kidney and penis removed removed carcass
Kidney and penis removed ready for use carcass, treated pressure water	Carcass pressure washing	Washed carcass
Washed carcass	Carcass dressing	Dressed carcass
Dressed carcass	Carcass weighing	Processed
Processed and weighed carcass	Dripping	Carcass which processing water I removed
Carcass w/c processing water removed Organic acid of 3% strength	Carcass organic acid spraying	Carcass sprayed with 3% organic acid all over the meat surface
Carcass sprayed with 3% organic acid all over the meat surface	Carcass chilling	Chilled carcass which is sprayed with organic acid
Chilled carcass Sterilized stock net	Carcass packing	Stock net wrapped and tagged carcass
Stock net wraped and tagged carcass Poly bagged and carton packed (2 dry packed offal)	Weighing	Processed, packed and weigh carcass and offal products
Processed, packed and weighed carcass and offal products in the packing room	Loading	Product loaded to refrigerator truck

Sources: Luna export slaughter house- operating procedures-004

### 3.1.2 Sanitary requirement in the abattoir Sanitation standard operating procedures (SSOP) covers the following

- Written SSOPs that describe what slaughter house personnel do on slaughter days,
- Pre- operational procedures that cover the sanitation of food contact surfaces of facilities, equipment and utensils,
- SSOP frequency for each procedures.
- Records completed on slaughter days in accordance with the SSOP as a means of monitoring the SSOP and carrying out necessary correctives action.
- Pre operational cleaning and sanitizing (general equipment, cleaning of floors, walls and ceilings/ overhead infrastructures.
- Cleaning and sanitizing of premises.
- Personnel cleanliness and facilities, sanitizing equipment.
- Sanitary operation for slaughter operation, carcass dressing, post dressing sanitary operation, hygienic transportation meat.

#### Sanitary for slaughter operation

There is a substantial risk of seen and unseen contamination of meat during slaughter so that good manufacturing practice and good hygienic practice will minimize these risks. Rooms/ floors, walls and drainages/ equipments and utensils for slaughtering should be used as clean during the operation to avoid cross contamination.

- All animals brought to slaughter room should be slaughtered with out delay.
- Bleeding should be as complete as possible and the carcass to facilitate skinning may be used.
- Removal of hide, skin, head or pelt should be done hygienically ie it should not have contact with the carcass.

#### Hygienic Transportation of meat

- Particular care should be taken during transportation to prevent the growth of microorganisms.
- Meat should be transported.
- In a mean of transported that clean and in good repair before loading on if necessary was disinfected.
- Carcass sides, or quarters as a hanging load under hygienic arrangements.
- Edible offal's should be wrapped n carton and placed in racks.
- In a vehicle or container that prevents entry of pests and other source of contamination.
- In a way that prevents un acceptable rises in temperature ie in a track having thermo kings.

Sources: LESH-OP-001-004 sanitation and operating procedures document, LESH- OF-016-128 ( document).

### 4.5.3 The Food safety management and Hazard analysis in the meat processing plant

#### 4.5.3.1 Food safety in the meat processing plant

- The main activity f Luna export slaughter house in production areas is production of safe and quality carcass and offal from slaughtering of healthy sheep and goats mainly for export purpose.
- Inspection and decision of any quality parameter of raw material, on process material and finished products is the responsibility of quality control section.
- Overall infrastructure and equipment planning and activity of preventive and on time effective and efficient maintenance in the production of carcass and offal is the responsibility of the technic section.
- The overall controlling of the cleaning, hygienic and sanitation in the production of carcass and offal which has a great impact for safer production and keeping the environment clean is the main responsibility of this process.

#### 4.5.3.2 Hazard Analysis in the meat processing plant

Hazard analysis and critical control points ( HACCP) is a systematic preventive approach to food safety from biological, chemical and physical hazards in production processes that can cause the finished product to be unsafe, and designs measurements to reduce these risks to a safe level. It is prevention of hazards rather than finished product inspection. The HACCP system can be used at all stages of a food chain, from food production and preparation processes including packaging, distribution, etc. In each processing steps conduct hazard analysis, identify critical control points, establish critical limits for each critical control point, establish critical control point monitoring requirements, establish corrective actions, establish procedures for ensuring the HACCP system is working as intended and establish record keeping procedures.

HACCP system practiced in export abattoir, especially modjo modern, organic and Helmex were already accredited for this success, where as the Luna export slaughter house was not certified but practicing the HACCP Plan document including ( product description, process flow chart, hazard analysis and HACCP control chart so as to certify in the near future.

In the slaughter house, physical, chemical and biological hazard agents should be controlled at each steps of the meat processing activities. The potential hazard introduced in the plant must be controlled or

minimized by applying necessary risk reduction measures at each processing steps, starting from animal un loading ie live stock from the farm is brought in to the plant with plant vehicles and deployed at the receiving location of the plant to loading ie the carcass and the organs will be loaded in to the transport vehicle which is in a chilled condition in the following meat processing points-

- Animal un loading and animal screening.
- Weighing and holding pen/ lairage.
- Ante mortal inspection, slaughtering.
- Hoisting and bleeding, head removal.
- Tongue and brain removal and collection.
- Tongue and brain packing and deep freezing.
- Tongue and brain secondary packaging.
- Tongue and brain weighing, flanking and one leg opening.
  - Hoisting and other leg flanking, skin dissection / skinning and hide removal.
  - Rectal detachment and stomach opening, green offal evisceration.
  - Green offal processing and red offal evisceration.
  - Red offal inspection, red offal processing and organic acid spraying.
  - Red offal preparation and packing, red offal deep freezing.
  - Red offal secondary packaging, red offal weighing.
  - Post mortal inspection and trim zero tolerance, penis and kidney removal.
  - Carcass final wash, carcass dressing and carcass weighing.
  - Carcass dripping, carcass organic acid spraying.
  - Carcass chilling, carcass weighing and carcass packing.
  - Loading.

Sources: LESH-CRD=016 HACCP plan and LESH-OP-0001 Food safety manual.

#### **4.5.4 The role of veterinary department in ensuring the firm complies with the importing countries requirements**

- **Competent authorizes**  
Competent authorizes are the departments of veterinary services. They play an important role in development and implementation of SPS measures, production of disease free and safe livestock and livestock products and certification of livestock and livestock products import and exports.
- **Sanitary and phyto sanitary measures**  
Are applied for imported products and exporting countries must meet the SPS requirements described by importing countries to be able to export their products to those countries. Import permits are issued

by importing countries when they are satisfied that the exporting country has met the SPS requirements prescribed for particular livestock and livestock products.

Sanitary measures include all relevant laws, decrees, regulations, requirements and procedures including, inter alia, end products criteria; processes and production methods; testing, inspection certification and approval procedures; provisions on relevant statistical methods, sampling procedures and methods of risk assessment; and labeling requirements directly related to food safety.

- **Bio security managements**

These includes determination of the level of implementation off disease control and eradications strategies. Eg regular de worming, spraying and vaccination of animals disease monitoring and surveillance, quarantine, vaccination and testing of livestock. Assess herd disease monitoring and control programs, implementation of bio security measures and good animal husbandary practice.

- **Inspection services in the slaughter house**

Ante mortem inspection services

Ante- mortem inspection is a screening process to remove obviously diseased animals from the food supply prior to slaughter and to identify animals that requires a more extensive post mortem examination.

Veterinary inspectors:-

- Are authorized to examine and inspect livestock prior to slaughter.
- She/ he should make sure that animals are denied access to feed 12 hrs before slaughter.
- They are obliged to accept for slaughter only those animals which are capable of producing products that are acceptable for use as human food.
- Veterinary inspectors should have the required training knowledge, kills and ability to conduct ante- mortem inspection procedures.

Post- mortem inspectors services.

- Meat inspection is part of the wider process of screening animals and meat for fitness for human consumption.

- Mostly organs such as head, tongue, viscera, offals and carcass were inspected for different pathological lesions.

- The observed organs may be passed, partially condemned and/ or rejected for different pathological lesions. Usually the organs are condemned due to emaciation/ low quality, pathological lesions such as pneumonia, distoma, abscess, fasciolosis, cysticercus, inflammations, brusing, hydatidosis etc.

- Similarly, sanitary measures of inspection has been kept.

- The processed and packed carcass and offals for export have been chilled for 24 hrs at 0-4 0c and

relative humidity of 90-95 % and PH: 5-8. And then transported to airport maintaining cold chain.

- In general, meat inspection covers the inspection of the carcasses and parts of meat used for human consumption. It takes place after ante- mortem inspection, and after the animals has been slaughtered. It covers the whole slaughter process that begins at stunning and ends at the step where the carcass is placed in the cooler.

- The decision as to whether meat fit for human consumption nor not will utilize many skills of observation and evaluation, and should take into consideration the results of ante- mortem inspection, as well as any available information on the disease history of the herd or region of origin of the animals.

#### **Laboratory test for export livestock and products**

- National animal health diagnostic and investigation center veterinary officers have been collecting samples from export slaughter house and

quarantine and test for different notifiable disease according to the importing countries requirements.

- Even though we share common scenario disease impact, the importing countries have different sanitary requirements all of the required live animal exported to their country should be free of FMD, brucellosis, BTB, RVF, and for export of carcass their require test for RVF slaughter.

- Export testing services were conducted for animals slaughter in the export abattoirs ( Luna, ELFORA, Mojo Modern, Hashim, Organic abattoirs) located in East Shewa zone. In year 2012/13 the volume of representative export testing samples from these abattoirs was 11410 ( originating from sheep and goats) and the samples were tested Rift valley Fever (FVF),

- FRM this, in the Luna export abattoir from shoats, 3144 samples were taken and tested for RVF and it was supposed to be negative ( no RVF). Table2.

**Table 2: summary report of export testing result ( 465 batches of samples out of 668 records)**

Region	Locations	species	disease	Sample size	Tested type	result
Oromia	Luna	shoats	RVF	3144	IGM-ELISA	0
Oromia	ELFORA	shoats	RVF	2056	IGM-ELISA	0
Oromia	Hashim	shoats	RVF	1057	IGM-ELISA	0
Oromia	Mojo	shoats	RVF	2997	IGM-ELISA	0
Oromia	Organic	shoats	RVF	2052	IGM-ELISA	0
Oromia	EastShowa	shoats	RVF	104	IGM-ELISA	0
Total				11,410		

Sources: NHADIC 2012/2013 report

#### **4.5.5 Export procedures the firm follows to get their products the market destinations**

- The animals for slaughter originated from different pastoral areas such as Borena, Awash-Metehara, Bati, wollo, Babile, Jimma, Somali and Gini, and they are provided by livestock producers, traders, and middle man.

- In the indigenous place, veterinary inspectors were done per purchased inspection and brought apparently healthy animals to the slaughtering house.

- Usually the importing countries required lowland shoats which have fat coverage than the highland shoats.

- Similarly, age, live weight, carcass weight and health factors brought problems for export countries to supply many products as much as possible.

- The purchased un loading animals are transported to the slaughter house and stay in holding pens for 12-24 hrs and inspected for different health conditions by inspectors. Ant mortem, post mortem and export product testing examination are monitored by veterinary inspectors in the processing plant.

- Processed, packed and weighed carcass and offal products and keeping the standard sanitary and hygienic conditions, chilled for 24hrs at 2-40c, RH, 90-95 % and PH 5.8, cold chain maintaining transport to air port.

- And then, the zoo sanitary requirement full fillment certificate was given at abattoir.

- Those important requirements were undersigned by official veterinarian as above described, so that.

- The certified meat and meat products destined for export is checked by the assigned inspectors during exist at bole international air port.

- Currently livestock product market destination country was kingdom of Saudi Arabia ( KSA), United Arab emirates including Dubai, Qatar, Jidda ( Oman, Vietnam, Barin and Riyad ) Yemen Turk, Egypt, Congo and Brazzaville.

- The inspectors and airport officials alike concur that the newly established cold room facilities at the air port has brought major benefit in ensuring meat safety and quality to the required standard.

- The meat transport trucks from Luna export slaughter houses, was carrying fresh chilled carcass

stay in the cargo terminal. The trucks temperature control devices and the carcass was checked. The temperature ranges from 2-4 0c.

#### 4.5.6 Meat inspection data from Luna export slaughter house

In the ( 2009-2014) year, the LESH exported meat to importing countries were 21,926.24 tones and the 6 years plan performance was supposed to be 66.45% and also during this year the income gained was 9474.32 \$US and this was assumed to be 59.73% achievement (table3).

**Table 3: LESH (2009-2014E.C ) exported meat and income achievement**

Year	Amount by tones ( volume)			Income by millions USD		
	Plan	achieved	Achieved.%	Plan	achieved	Achieved.%
2009	4500	2404.5	53.43	9987	6,092	60.9
2010	5300	3,225	60.84	1811	1,105	61.01
2011	6300	4260.4	67.6	65.07	16.4	25.2
2012	5440	4420.5	81.3	33.1	20.19	61.0
2013	7200	4285.9	59.5	36	20.75	57.6
2014(9 moth)	5230	3329.94	63.66	3930.00	2219.98	56.49
Total	33970	21926.24	66.45	15862.2	9474.32	59.73

Sources: LESH, Monthly meat inspection report

#### Ante- mortem inspection

In 2009-2013, Veterinary inspection teams of Luna export abattoir have performed ante mortem inspectors over 18,482,492 animals and a total of 18,479,072 animals were fit for slaughter ( table 4 ). A

total of about 3420 animals were found to be unfit for slaughter. As indicated below, most of causes of rejection of animals was due to emaciation, diarrhea, and pneumonia.

**Table 4: Total number of animals inspected, passed and rejection in export abattoir ( 2009-2013)**

no	Species	Total inspected	passed	Rejected	Rejection rate	Cause of rejection
1	Bovine	4085	4085	0	0%	emaciation
2	Ovine	442417	441729	688	0%	diarrhea
3	Caprine	18035990	18033258	2732	0%	pneumonia
Total		18,482,492	18,479,072	3420		

Sources: Ethiopia animal health year book, 2009-2013

#### Post- mortem inspection

A total of 342,612 different organs and/ or body parts were reported to be found affected with different diseases and abnormalities which made them unfits for export markets (table-3). The organs which were found affected with disease and abnormalities were mostly liver and lung and they accounted for 80.93%

and 16.6% of the total rejections. A total of 2445 (0.71%) carcasses were also condemned. Most of causes of organs rejection reported at abattoir at gross pathological examination were pneumonia, hydatidosis, cysticercus, abscess, bruising, Distoma and emaciation etc.

**Table 5: number of carcass inspected, passed and rejected in export abattoir (2009-2013)**

no	Spp	Total inspected	passed	Rejected				Cause of rejections of organs
				carcass	Liver	lung	heart	
1	Bovine	4085	4085	35	1840	1375	532	Abscess,bruising, emaciated
2	Ovine	422969	422969	165	108340	23732	2757	Pleuritis, hydatid, c.ovis
3	Caprine	1771474	1771474	2245	167092	31742		Pneumonia, hydatid, cyst, abscess, cirrhosis, distomainflammations, bruising
Total		2,198,528	2,198,528	2445	277272	56849	6046	
				342,612				

Sources; LESH, monthly meat inspection report



#### 4.5.7 Major constraints the firm face in meeting the prescribed conditions

- Importing countries requirement of livestock products in terms of quality and quantity restrict the export abattoir not to mitigate the need of the receiving countries ie importing countries require high quality and quantity products and lowland shoats, which have high fat coverage, but pastoralists/ lowland livestock owners sale their animals illegally to the neighboring countries in high price so that the required shoats become few in the market to some extent.

- Factors such as age health conditions, live weight, carcass weight and geographical location of the animals limit receiving countries requirements, for example age of shoats  $\geq 8$  months ( young male breed), health factors- free of all notifiable animals disease such as RVF free, lowland breed which have high fat coverage/ well developed than high land breed, weight ( live weight 14-25 kg) and 6-8 kg carcass weight was required with importing countries. However, our countries animals age group coming to the market was old which cannot fit with the need, this is the challenge for many export abattoirs to offer as much possible products.

- Cross- border illegal market price which have bought animals with high price as compared to the legal market which purchase with low price, comparably this brings the livestock especially lowland breed as they illegally exported to the neighbouring countries.

- Shortage of animals supply especially during rainy season and when farm activity takes place.

- The most common mode of livestock transport in Ethiopia is by trekking ( on hoofs) which exposes the livestock to 14% body weight. In addition to trekking, land transport of animals is often undertaken using non-livestock and non-sanitized transport vehicles. As a result, livestock are handled in a manner that encourages injury and maximizes stress and disease transmission throughout the journey. This reduces the sanitary standard and quality of meat of slaughter animals.

- Although the export abattoirs have trained man power in good hygienic practice (GHP) and HACCP principles, these Luna export abattoir have not fully developed quality control programs un like modjo modern, organic and helmix export abattoirs.

- The Luna export abattoir do not follow strict code of conduct regarding animals handling and this is seriously affecting the quality of meat.

- Another factor that has contributed to supply shortage is believed to be the concentration of all abattoirs to limited areas for purchase of shoats.

- These are Nagelle market of Guji zone, Yabello of Borena, Ginir of Bale, Meso and Babile of east Hararge, Filtu and Dolo of Somali, komobolcha of south wollo and Gedamaytu of Afar region. It is indeed necessary for the abattoirs to strengthen their procurement strategy and penetrate other supply shades.

#### 4. Conclusion

Sanitary and phyto sanitary (SPS) measures have become an important determine of the development of the Ethiopia livestock sector. The impact of SPS regulations imposed by importing countries has had a significant effect on the livestock producers, traders, processors and consumers of meat. The importing countries requirements such as sheep and goats age  $\geq 8$  month, live weight between 14-25 kg, carcass weight 6-8kg, RVF free animals, Lowland breeds which have fat coverage well developed, were problems for the export abattoirs to provide the required products to the world market, besides this, the required animals are mostly exported illegally to the neighbouring countries in the lowland/ pastoral areas and then producers gain high price from illegal market than the legal market price. Factors such age, sex, weight, agro ecological breeds/ fat coverage/ and health factors are the basic things that limit the meat product. The limiting factors should be solved by continues capacity building awareness creation among the producers, importing countries and slaughters houses so to motivate the legal market and increase the countries economy as well. The standard sanitary and hygiene requirements of the importing countries regulations and guidelines have to be practiced to export the meat and meat products better. Hazard analysis and critical control points (HACCP) is a systematic preventive approach to food safety from biological, chemical, and physical hazards in production processes that can cause the finished product to be unsafe, and designs measurements to reduce these risks to safe level. It is prevention of hazard rather than finished products inspection. The HACCP system can be used at all stages of a food chain, from food production and preparation processes including packaging distribution, etc. The HACCP system and food safety principles should be implemented in the slaughter house at acceptable level but in most abattoirs the HACCP system was not fully implemented but there was plan document which is on process. However, currently Modjo modern, Organic and Helmix export abattoirs are the that certify for HACCP system. Besides this the Luna export has been practising system in order to obtain ISO 22000; 2005 and certify for HACCP in the near future. In general, the export abattoirs have to improve the weakness

observed and do for better competency in the world market.

### Recommendation

- Awareness creation for receiving countries, illegal traders, importers, whole salers, distributors, retailers, traders and attract the world market.
- Age and weight factors that restrict the amount of the produces provision, should be improved by close discussion, awareness with importing countries as the receive with out ignoring the old breed which have good body conditions and also similarity weight factors as well.
- Application of Hazard Analysis and critical control point ( HACCP) system is becoming a standard procedures globally to ensure food safety and quality. There is growing evidence that or trading partners, sooner or later, will adopt HACCP as major requirement. Therefore, it is quite imperative to start implementing the system in export slaughter houses.
- Health factors especially notifiable animals disease should be checked by standard laboratory tests and then, strict control and preventive measures should be taken in the countries and similarity meat inspection, standard sanitary requirements, good hygienic practices, in the meat processing plant should be applied and disease free product certificate should be given and attract different importing countries.
- Import restrictions imposed by importing countries based on stringent sanitary and phyto sanitary requirements, insufficient and inconsistent supply of price competitive export quality meat and livestock, should be imported better than now, so as to attract the receiving countries.
- Encourage abattoir workers and owners to the implementation of good hygiene practice /GHP/.
- Train regularly abattoir workers about hygiene and hygienic handling of carcasses and meat contact surfaces.
- Further studies should be carried out in small ruminants that are going to be slaughtered in different abattoirs of the country and introduce preventive measures to reduce un necessary financial losses encountered in the industry.

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3/22/2018