

**MAJOR LIVESTOCK HEALTH PROBLEMS IN MARKET ORIENTED LIVESTOCK
DEVELOPMENT IN MEISO WOREDA WESTERN HAREREGHE ETHIOPIA.**

By

Getahun Asebe

**A thesis submitted to the Faculty of Veterinary Medicine, Addis Ababa University in the
partial fulfillment of the requirement for the attainment of the Degree, Doctor of
Veterinary Medicine (DVM)**

**July, 2007
Dbere Zeit, Ethiopia**





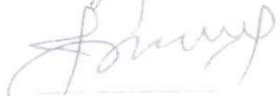
MAJOR LIVESTOCK HEALTH PROBLEMS IN MARKET ORIENTED
LIVESTOCK DEVELOPMENT IN MEISO WOREDA, WESTERN HARERGHE,
ETHIOPIA.

By
Getahun Asebe

Approved by Board of External examiners

Signature

| | |
|--------------------------|---|
| Dr. A.K. Basu | Indian Expatriate staff, FVM, AAU |
| Dr. Andrew Trawford | The Donkey sanctuary, IDPT, United Kingdom |
| Dr. Gebrehiwot Taddesse. | Faculty of veterinary Medicine Mekelle University, Mekelle |
| Dr. Melesse Nadew | National Veterinary institute Debre Zeit |
| Dr. Tsegaw Fente | Faculty of veterinary Medicine. Gondar University, Gondar |

Advisors

Ato Gebeyehu Goshu (BSc, MSc Assistant professor)
Chairperson of Department of Animal Production
Faculty of Veterinary Medicine
Addis Ababa University

Dr Yilkal Asfawu (DVM, MSc, Assistant Professor)
Faculty of Veterinary Medicine
Addis Ababa University



| TABLE OF CONTENTS | PAGES |
|---|--------------|
| TABLE OF CONTENTS..... | I |
| LIST OF TABLES..... | II |
| LIST OF FIGURES | II |
| LIST OF ABBREVIATIONS..... | III |
| ACKNOWLEDGEMENTS..... | IV |
| ABSTRACT..... | V |
| 1. INTRODUCTION | 1 |
| 2. MATERIALS AND METHODS | 3 |
| 2.1 study area | 3 |
| 2.2 Sample size | 4 |
| 2.3. Study protocol..... | 5 |
| 3. RESULTS | 5 |
| 3.1. General Characteristics of the Households..... | 5 |
| 3.2. Livestock production | 7 |
| 3.3. Animal Health..... | 10 |
| 4. DISCUSSION..... | 17 |
| 5. Conclusion and recommendations | 24 |
| 6. REFERENCES | 25 |
| 7. ANNEXES..... | 28 |

LIST OF TABLES**PAGES**

| | |
|---|----|
| Table 1: Demographic feature of the respondents in the studied area..... | 5 |
| Table 2: Land use pattern of the respondents in the studied area | 6 |
| Table 3: Livestock herding of the households in the studied area..... | 7 |
| Table 4: Livestock utility in the study area by % | 8 |
| Table 5: Feeding practice response by the respondents (%)...... | 9 |
| Table 6: Distribution (%) of major cattle health problems | 11 |
| Table 7: Distribution (%) of major camel health problems | 11 |
| Table 8: Distribution (%) of major small ruminant health problems | 11 |
| Table 9: Distribution (%) of major equine health problems..... | 12 |
| Table10: Major clinical findings (November 2006 up to March 2007) | 14 |
| Table 11: Cattle diseases mentioned by key respondents..... | 15 |
| Table 12: Health problems of small ruminant, camel and equines mentioned by key respondents..... | 16 |

LIST OF FIGURES**PAGES**

| | |
|--|----|
| Figure 1 Critical water shortage months..... | 9 |
| Figure 2 Main livestock selling months:..... | 10 |

list of Abbreviations

| | |
|----------------|--|
| AAU | Addis Ababa University |
| CAHWs | Community Animal Health Workers |
| C ⁰ | Degree Celicious |
| CFC | Common Fund for Commodities |
| COMESA | Common Market for Eastern and Southern Africa |
| CSA | Central Statistics Authority |
| FAO | Food and Agriculture Organization |
| FMD | Foot and Mouth Disease |
| FVM | Faculty of Veterinary Medicine |
| GIT | Gastro Intestinal Tract |
| ILCA | International Livestock Center for Africa |
| ILRI | International Livestock Research Institute |
| IPMS | Improving Productivity and Market Success |
| Km | Kilometer |
| LSD | Lumpy Skin Disease |
| MEDaC | Ministry of Economic Development and Cooperation |
| mm | Millimeter |
| MoARD | Ministry of Agriculture and Rural Development |
| OoPRDMW | Office of Pastoralist and Rural Development Meiso Woreda |
| OIE | Office International des Epizootics |
| Orf | Open reading Frames |
| NCD | Newcastle disease |
| NGOs | Non- Governmental Organizations |
| PAs | Peasant Associations |

ACKNOWLEDGMENTS

First and for most, blessed be my heavenly father, God, who helped, lead and strengthen me to finish this thesis successfully.

I would like to express my heart felt thanks, to my advisor Ato Gebeyehu Goshu, Addis Ababa University Faculty of Veterinary Medicine (AAU FVM), for his valuable suggestion and comments. I pass my utmost gratitude to him for commenting and shaping my research proposal and thesis .Dr Yilkal Asefaw; my co-advisor at (AAU FVM) takes my thanks and gratitude for his comment on the proposed title of the research at the start of the job and providing materials.

I am highly grateful to ILRI-IPMS project for their financial and material support from the beginning to the end to accomplish this paper.

I am highly indebted to Dr. Azage Tegegne, International Livestock Research Institute (research scientist in the IPMS Project ILRI Addis Ababa), who has initiated the research topic, facilitated the process before I start the research. I am very happy when I express my heartfelt thanks and sincere appreciation to Ato Zewdu Ayele (ILRI- IPMS Ethiopia, Research Development Officer) my supervisor and Ato Dadi Gelashe (Research Development Assistant), Meiso pilot learning woreda who guided me during the study period.

May God bless and reward my lovely family members, for their encouragement, financial support and overall assistance through my stay in the university.

My thanks go to my best friends Temesgen Mulugeta (Lecturer at Mekele University) and Gizachewu Bayileyegni (AAU FVM externship student) for their unforgettable help.

My thanks also extended to my class friends and student at the FVM

ABSTRACT

A survey was carried out to study major livestock health constraints in four peasant association of Meiso Woreda, Eastern Ethiopia, from November, 2006 to April, 2007. A questionnaire survey was carried out with the main objectives of assessing major health problems and characterization of the production system of livestock. The study carried out on 80 households to collect livestock health problems in market oriented livestock development, livestock production system and associated information by giving emphasis on livestock health. All livestock owned by households were study animals. Four PAs were selected from a total of 49 PAs purposively. Households (N=80) were randomly selected and interviewed from the four PAs 20 from each. Group discussion and observational studies were also conducted. 10-12 key respondents were selected for each PAs by the respective DAs and discussed for one hour. Clinical observation also made from November, 2006 to March, 2007. The production system was found to be mixed type with main livestock of cattle and goats. Most of the respondents were found to be non-educated. Health problems were mentioned and ranked by the respondents. The percentages of diseases were calculated based on the respondent frequency. Major livestock health problems in cattle are anthrax, blackleg, Pasteurellosis, FMD, enteritis, predators, tick and others; in camel pneumonia, skin disease, GIT parasite, enteritis and others; in small ruminants enteritis, Orf, circling disease, pasteurellosis, predators and others; in equines respiratory diseases, colic, GIT parasites, local swelling and others. The poultry respondents (n=45) mentioned and ranked NCD (*Fengil*), others were lice, mites, and fleas.

Key words:-Meiso, Eastern Ethiopia, Livestock, Major health problems, Market.

1. INTRODUCTION

Livestock production constitutes one of the principal means of achieving improved living standards in many regions of the developing world .In Sub-Saharan African countries; livestock plays a crucial role both in national economies and the livelihood of rural communities. It provides drought power, high value food, clothing, transport and serve as a source of cash and manure for energy and soil fertility (ILCA, 1980).

Ethiopia basically constitutes an agrarian society; the socio-economic activities of about 85% of the population are based on farming and animal husbandry (Solomon, 1994). Available data indicate that livestock products represented 40% of agricultural out put in Ethiopia (ILRI and FAO, 2005).

Livestock plays a critical role for the majority of the Ethiopian population. Domestic animals are mainly used as drought animals, source of milk, meat, hide and skin and as pack animals. Apart from this they also serve as a means of the risk aversion and accumulation of wealth among the rural community (Yohannes, 2002). Livestock contribute 12-15% of the export earnings; the sub-sector is the second major source of foreign currency through export of live animals, hides and skins. Among the export of livestock products skins and hides have the largest share of exports followed by live animals (MEDaC1998; FAO, 1999).

The estimated small and large ruminant populations in Ethiopia are 18.07million sheep; 14.86million goats, 38.75 million cattle, 5.76million equines, 31million poultry, 4.55 million beehives and 0.6 million camels (CSA, 2005).

Livestock productivity is affected by the ecological conditions that are changing and leading to more fertile ground for disease, affecting especially pastoral systems where there is a close physical association between people, livestock and wild animals. Viral and other pathogens benefit hugely from the dynamic state created by animal migration, and the increasing pressure on scarce resources from all human and animal populations with more frequent contact improves the opportunity for disease transmission. (McPherson, 1995). Livestock diseases are the causes of

economic losses to the farming community in general and pastoralists in particular in Ethiopia. The loss amounts to hundreds of millions of birr annually (Coppock, 1994).

Recently an integrated rural development project is launched by the International Livestock Research Institute (ILRI) and the Ministry of Agriculture and Rural Development (MoARD) in Meiso woreda with a project title “Improving productivity and market success” (IPMS) of Ethiopian farmers, aims at contributing to a reduction in poverty of the rural poor through market oriented agricultural development. In the woreda both mixed farming system and pastoral farming system practiced. Among the livestock types, cattle and goats are the most dominant livestock types in the mixed farming system and Sorghum, maize, sesame, haricot bean, *teff*, flax, and chickpea are growing in this farming system. In the pastoral farming system there are no marketable crop commodities because the main livelihood of these pastoralists depends on livestock production. Cattle and goats are the major marketable livestock commodities in this farming system (OoPRDMW, 2006/7). Therefore the objectives of this study were:-

- I. To assess major livestock health problems in market oriented livestock development in Meiso Woreda; and
- II. To characterize livestock production system

2. MATERIALS AND METHODS

2.1 Study Area

The study was conducted at Meiso woreda which is found 292 kms East of Addis Ababa. It is one of the woredas in Oromiya where pastoralist farming system is practiced. The woreda is found northwest of Somali and south and southwest of Afar regions. According to the recent woreda population report, the total human population of the woreda is 154,100. The rural human population is around 137,582 out of this 76107 are males and 61475 are females. The urban human population is around 16518; out of this 8604 are males, and 2914 are females (OoPRD, 2006/2007). Geographically, the woreda is located between 40°9'30.1' W and 40°56'44' E; and 9°19'52'N and 8°48'12' N. Altitudinally, the woreda ranges from 1107 to 3106 meter above sea level (m asl), but most of the woreda is found at about 1700 m asl. Agro ecologically, the woreda is classified as lowland (*Kolla*) with a total area is 196026km². The total grazing land of the woreda is 20,264 hectare. The mean annual temperature is around 21°C; while average annual rainfall is between 790 mm. 90% of the soil is clay and the rest 10% sandy soil. The area receives a bimodal rainfall where the small rainy seasons are between March and April while the main rainy season is between July and September (under normal conditions). During the small rains, farmers plant long seasoned sorghum, which lasts about 8 months (April to November). There are totally 49 peasant associations in the woreda. During the main rains, all crops, including maize, *teff* and sesame are planted. The livestock population of the woreda is 11,0462 cattle, 24516 sheep, 40993 goats, 20 horses, 8100 donkeys, 2 mules, 19430 camels, 17320 poultry, beehives 623 traditional and 15 modern.(Source: Meiso Woreda Office of Pastoralists and Rural Development (OoPRDMW, 2006/7).

2.2 Sample Size

80 households were interviewed by the questionnaire and all livestock owned by the respondents of all ages and sex included in the study.

2.3. Study Protocol

Sampling procedure

A purposive selection method has been done to select the study Peasant Associations (PAs) based on accessibility, security and those identified by OoPRDMW. Based on the above criteria 4 PAs selected namely as Deneba Hunde Missoma, Oda Bela, Harnero Deeyma and Bililo. From each PAs 20 households randomly selected, totally 80 households included in the study (Annex III). All livestock owned by the households were considered as study animals.

Data collection

A detailed structured questionnaire format (Annex I) was designed to generate information related to livestock production system , traditional livestock health keeping, livestock health problem, measures taken by the owners against livestock health problems and veterinary service of the area, and other important information. It was designed in such a way that farmers easily provide information that are recent and carried out to recall. One visit interview carried out to collect the above-mentioned information from the beginning of November 2006 to January 2007.

Group discussion

10-12 key respondents were selected by the respective Development Agent (DA) in each of the 4PAs and informal group discussion was held for one hour to generate relevant information about livestock health problems. The group discussion was based on a prepared checklist (Annex II)

Observation study

Observational study was made during the questionnaire survey and cases presented to the pastoralist office in Meiso woreda veterinary clinic from November 2006 to March 2007 consecutively. All of the cases were subjected to physical examination, taking physiological parameters (rectal temperature, pulse rate, heart rate, and respiration rate and rumen motility

Data Management and Data Analysis

The data that has been collected is entered into Microsoft office excel programme version 11.0.5612.10 and analysed for, proportion, descriptive statistics, percentages, sum, average rank, and average percentage. The result then demonstrated by graphs, and tables. In the disease part, different households listed one disease in five different places then the average of the five taken to calculate the percentage.

3. RESULTS

3.1 General Characteristics of the Households

Characteristics and labor utilization

Table 1 shows the demographic feature of the 80 respondents who were involved in the interview. As it indicated in the table 92.5% of the respondents are male, 7.5% are female. The maximum and minimum age of the respondents is 90 and 22 respectively while average age is 39.5 in males and 33.3 in females. The educational level of the respondents was found 64.9% as illiterate, 10.8 % religious, 23 % 1-6 grades, 1.3 % more than grade 6 in males where as 83.3 % illiterate in females. The total numbers of family in the 80 households were 545. Out of this 55.2% were under 15 years and the rest 44.8% were above than 15 years old.

Table 1 Demographic feature of the respondents in the study area

| Category | Average age in years | Age | | Education level in % | | | |
|--------------|-------------------------|-----|-----|----------------------|-----------|------------|----------|
| | | Max | Min | Non | Religious | 1-6 grades | >Grade 6 |
| Male (N=74) | 39.5 | 90 | 22 | 64.9 | 10.8 | 23 | 1.3 |
| Female (N=6) | 33.3 | 25 | 37 | 83.3 | - | 16.7 | - |

Max= maximum; min= minimum

Out of the 80 respondents, 12.5% devoted both in farm and off farm employment and the rest 87.5% were engaged only in farm activities. 72.5% respondents replied that females involve in decision making of selling small ruminants, budget management of the house, milk selling, egg selling, and gifting animals for others, selling crops specially sorghum. About 8.7% of the respondents use hired labor for harvesting and 91.3% do not use hired labor.

Private land use pattern

Out of the 80 respondents 100% replied that they have their own cropland. Less than one hectare (Ha) 12.5%, between 1 and 2 hector inclusively 85%, between 2 exclusively and 3 inclusively 1.3 % between 3 exclusively and 4 inclusively 1.3 % 11.3 % do have owned fallow land and 31.3% do have owned grazing land as indicated in Table 2

Table 2 Land use pattern of the respondents in the study area

| Land type | % | Holding size (Ha) in % | | | | Average |
|--------------------|----|------------------------|---------|---------|---------|---------|
| | | <1 ha | 1≤x≤2ha | 2<x≤3ha | 2<x≤3ha | |
| Crop land owned | 80 | 12.5 | 85 | 1.3 | 1.3 | 1.40 |
| Fallow land rented | 2 | 1.3 | 1.3 | - | - | 0.75 |
| Grazing land owned | 25 | 17.5 | 11.3 | 2.5 | - | 0.96 |
| Others | 1 | 1.3 | - | - | - | - |

X= The range of grazing land

Out of the 80 respondents 73 do have communal grazing land while 8.7% do not have communal grazing land. The trend of using communal grazing land starts to increase from June to September and then declines. This means during main rainy seasons most of the land will be covered by crops and low availability of grazing land in particular two of the studied kebeles Odabella, and Deneba Hundhe Missoma.

3.2 Livestock Production

Livestock holdings

Table 3 shows the households herd structure in the four PAs of the 80 respondents. The highest population in the 4 PAs is cattle (528) and followed by goats (444).

Table 3 Livestock herding of the households in the studied PAs

| | Peasant associations | | | | | | | |
|-------------|----------------------|------------|-----|------------|----|------------|----|------------|
| | BI | | DHM | | OB | | HD | |
| | N | Total | N | Total | N | Total | N | Total |
| Cattle | 20 | 79 | 20 | 123 | 20 | 143 | 20 | 183 |
| calf | 17 | 31 | 11 | 19 | 17 | 35 | 21 | 60 |
| cow | 19 | 29 | 19 | 40 | 20 | 53 | 20 | 63 |
| Heifer | 1 | 1 | 15 | 31 | 9 | 15 | 8 | 12 |
| Mature male | 12 | 18 | 20 | 33 | 16 | 40 | 19 | 48 |
| Camel | 5 | 10 | 6 | 13 | 25 | 56 | 9 | 14 |
| Calf | 1 | 3 | 2 | 3 | 8 | 19 | 2 | 4 |
| Heifer | 2 | 2 | 1 | 3 | 3 | 5 | 2 | 3 |
| Cow | 1 | 1 | 2 | 4 | 7 | 16 | 3 | 7 |
| Mature male | 1 | 3 | 1 | 3 | 7 | 16 | 2 | 2 |
| Goats | 19 | 101 | 20 | 143 | 19 | 73 | 19 | 127 |
| Kids | 11 | 28 | 16 | 49 | 13 | 31 | 15 | 42 |
| Yearling | 5 | 18 | 15 | 39 | 1 | 1 | 12 | 39 |
| Doe | 15 | 42 | 14 | 37 | 10 | 27 | 14 | 31 |
| Mature male | 5 | 13 | 14 | 18 | 6 | 14 | 9 | 15 |
| Donkey | 12 | 12 | 20 | 21 | 13 | 24 | 10 | 2 |
| Young | 1 | 1 | 10 | 11 | 2 | 2 | 1 | 2 |
| Adult | 11 | 11 | 10 | 10 | 13 | 22 | 9 | 2 |
| sheep | 2 | 9 | - | - | 3 | 4 | 5 | 7 |
| Young | 2 | 4 | - | - | 1 | 1 | 5 | 11 |
| Adult | 2 | 5 | - | - | 2 | 3 | 5 | 8 |
| Poultry | 9 | 59 | 13 | 66 | 9 | 69 | 14 | 55 |
| Beehives | 1 | 2 | 2 | 3 | 5 | 8 | 4 | 4 |

N=number of respondents, **BI**= Bililo **DHM**=Deneba Hundhe Missoma, **OB**=Oda Bella, **HD**=Harmero Deeymaa, Total= here means the number of livestock species in the PA that correspond with rows. The bolded numbers indicate the total per PA.

Livestock functions

Respondents replied the uses of keeping livestock in the area as fro milk, meat, market (source of income), draft power, loading, transport, eggs and other functions as it indicted in Table 4 by different proportions.

Table 4 livestock utility in the study area by %

| Species/ Functions | Bovine (N=80) | Caprine (N=77) | Ovine (N=10) | Camel (N=45) | Equine (N=55) | Poultry (N=45) | Bee (N=12) |
|-----------------------|------------------|-------------------|-----------------|-----------------|------------------|-------------------|---------------|
| Milk | 100 | 87.0 | - | 55.5 | - | - | - |
| Meat | 97.5 | 90.9 | 80 | 26.7 | - | 80 | - |
| Market | 85 | 90.9 | 90 | 17.8 | - | 86.7 | - |
| Draft | 68.8 | - | - | - | - | - | - |
| Skin | 17.5 | 15.6 | 30 | - | - | - | - |
| Loading | - | - | - | 31.1 | 52.7 | - | - |
| Transport | - | - | - | 28.9 | 30.9 | - | - |
| Renting | - | - | - | - | 18.2 | - | - |
| Eggs | - | - | - | - | - | 100 | - |
| Honey | - | - | - | - | - | - | 83.3 |
| Wax | - | - | - | - | - | - | 33.3 |

N= number of respondents

Feed types

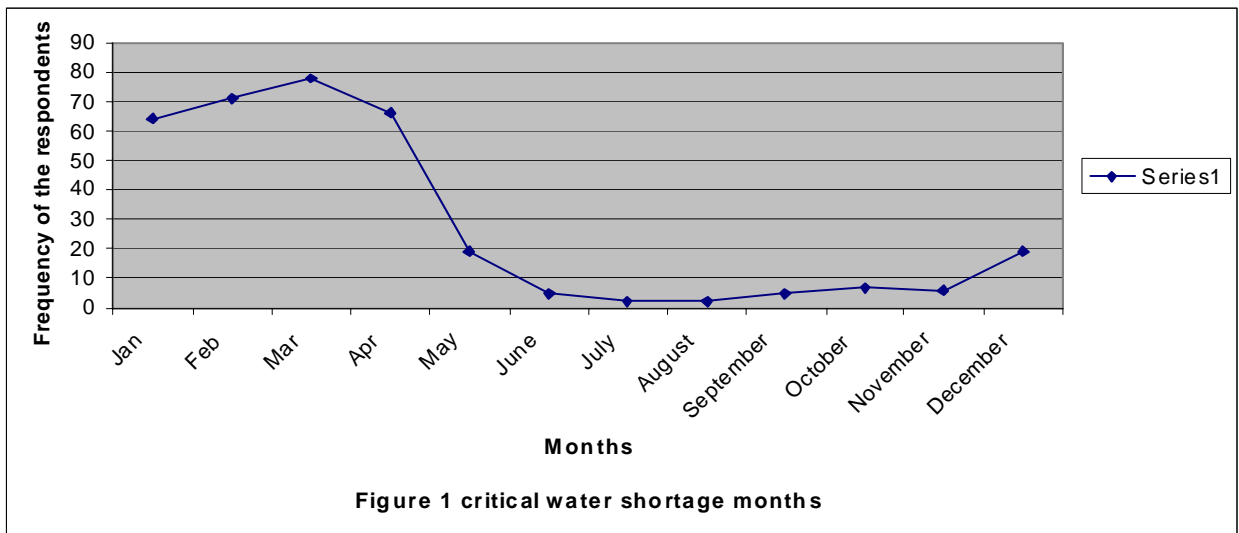
The proportion of feeding practice varies with season in the 4 PAs with respect to the dry season, short rainy seasons and long rainy seasons from mid October to February, March to April and July to September respectively. During dry season sorghum stalk, cultivated pastures, and stover, are the main feed types and in the long and short rainy seasons the feed types almost are similar except that the proportion of the stover declines (Table 5). In addition to the above there are other feed types that livestock feed during the dry season according to the farmers that rose in the formal group discussion. These feed types are cactus “*Tini*”, Acacia spp “*Firii garbi*”, and papaya leaf “*Bala paappayaa*”. Regarding salt supplements, 77 Of the 80 respondents use salt.

The key respondents mentioned different feed type according to their availability and shortage months. Sorghum spp (*qara misinga*), natural pasture (Chita), cactus (tini), and Acacia spp (*firii garbii*). Feed and water availability months are July-October and July to September where as shortage months January-May and October-April respectively. The Key respondents also mentioned about the use of natural mineral/salt supplement from mineral soil locally called “*Haya*”. The salt supplement months are May to August due to there is enough water during these periods. The main sources of salt were from mineral soil, watering point and plant in decreasing of the respondents’ frequency (75%, 15%, and 6.3% respectively).

Table 5: - Feeding practice response by the respondents (%)

| Land type | Availability | | |
|---------------------------|--------------|--------------------|-------------------|
| | Dry | Short rainy season | Long rainy season |
| Natural pasture (N=80) | 3.8 | 30 | 98. |
| Cultivated pasture (N=79) | 95 | 35 | 3.8 |
| Cereal straw (N=6) | 7.5 | 2.5 | - |
| Stover(N=80) | 97.5 | 47.5 | 17.5 |
| Minerals (N=71) | 12.5 | 35 | 98.8 |

Main watering source of the area is pond and river with proportion of 75, and 17 respectively. The main critical water shortage seasons are shown in the Figure 1.



Housing, breeding, record keeping and marketing

Out of the 80 respondents, housing system for the night accommodation of livestock in the study area is responded by the livestock owners as, 73.75% of them said species separately, 13.75% both species mixed and separately, 12.5% species mixed. 55% of the respondents said separate from home and the 45% said communal with home. All of the respondents use natural type of breeding .Out of the 80 respondents 98.8% use uncontrolled natural breeding system while 11.2% controlled and natural. Out of the 80 households 60% of them keep recording and 15% do not use recording to know the performance of their animals. 48.7% respondents knew performance their

livestock by recalling, the 53.7% by measuring, 1.25% by weighing, and 3.7% by others means. Out the respondents interviewed 63.7% sold livestock last year. The main selling reasons were 45% for household purpose 11.3% for replacement 3.7% due to good market price, 3.7% drought 10% for others like input, repayment, fear of outbreak, and old age. The main selling months of livestock were, during holydays, September and July, and January as shown in the Figure 2

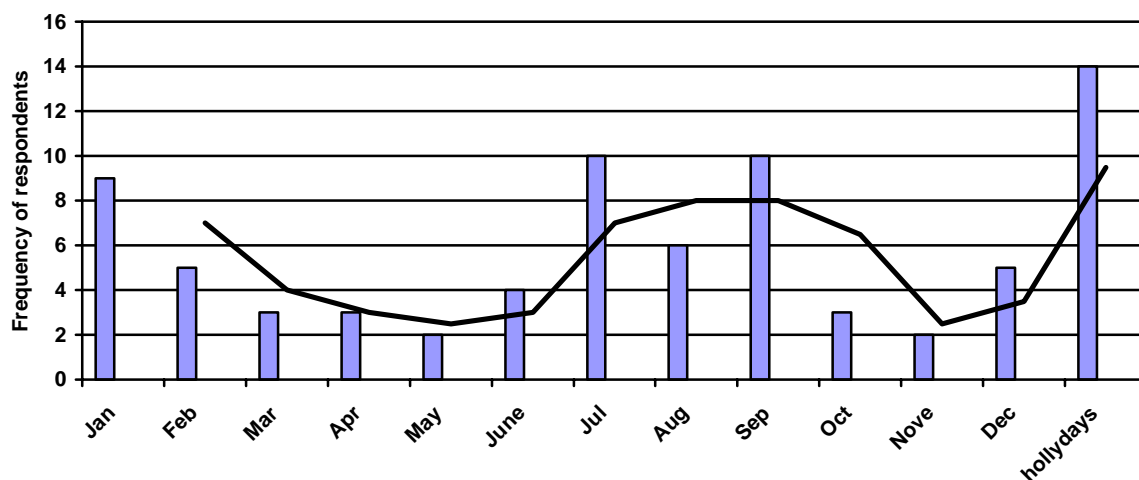


Figure 2. Main livestock selling months

3.3. Animal Health

Major Health Problems

Livestock owners' responded different health problems in the listed PAs. Among non-infectious health problems in the study area that are mentioned by the respondents are bloat (digestion problem), lameness (*Okolo*), and predators. Infectious health problems that are common in the study area responded by the livestock owners during the questionnaire survey and group discussion, are anthrax (*Abasenga*), pasterollosis (*Gororsa*), blackleg (*Abagorba*), contagious ecthyma/orf (*Hancharoo*), foot and mouth disease (*Masa*), LSD (Kormammu), NCD (*Fengil*), Endoparasite ,enteritis (*Bira*),Mastitis (*Jigo*), Abortion, septicemia, local swelling

(*Masha*), respiratory problems (*Dhukuba Quffa*), Ectoparasites like ticks (*Silme*), lice (*Engira*), fleas (*Tefki*) and skin disease (*Chito*) (Tables 6 to 12).

Table 6. Distribution (%) of major cattle health problems

| Vernacular name | Common name | Species affected | | | |
|-----------------|---------------|--------------------|----------------------|-------------------|--------------------------|
| | | Calf (%) (N=80) | Heifer (%) (N=67) | Cow (%) (N=77) | Adult male (%) (N=78) |
| Abasenga | Anthrax | 24.7 | 17.9 | 17.1 | 18.8 |
| Bira | Enteritis | 18.4 | 17.8 | 15.4 | 17.2 |
| Abagorba | Black leg | 14.1 | 15.3 | 11.6 | 15.1 |
| Masa | FMD | 12.9 | 13.1 | 11.3 | 14.3 |
| Kormammu | LSD | 12.5 | 9.0 | 3 | 4.4 |
| Gororsa | pasterollosis | 9.8 | 9.0 | 8.8 | 8.3 |
| Engiree | Lice | 7.6 | 7.5 | - | 2.9 |
| Jigo | Mastits | - | - | 11.8 | - |
| Furfursa | Bloat | - | - | 4.1 | 4.4 |
| NA | Abortion | - | - | 6.3 | - |
| NA | Septicemia | - | - | - | 5.5 |

NA=not available

Table 7. Distribution (%) of major camel health problems

| Vernacular name | Common name | Species affected | |
|-----------------|--------------|------------------|--------------------|
| | | Calf (N=22) | Adult camel (N=45) |
| Quufa | Pneumonia | 24.4 | 25 |
| Chito | Skin disease | 20.9 | 22.7 |
| NA | GIT parasite | 19.8 | 20 |
| safika | Enteritis | 18.6 | 14.2 |
| Slime | tick | 4.7 | 3.1 |
| Okolo | lameness | 3.5 | 10 |
| | Others | 8.1 | 5 |

NA= not available

Table 8. Distribution (%) major small ruminant health problems

| Vernacular name | Common name | Species affected | | | |
|-----------------|---------------------|------------------|-------------------|--------------------|--------------------|
| | | Kid goat N=67 | Lamb sheep N=8 | Adult goat N=77 | Adult sheep N=4 |
| Albaati | Enteritis | 21.9 | 25.8 | 18.3 | 12 |
| Hancharoo | Orf/ | 17.8 | 25.8 | 19.9 | 12.4 |
| Osa | Circling diseases | 17.8 | 3 | 21.5 | 18.6 |
| Engira | Lice | 9.1 | 8.6 | 5.8 | 18.6 |
| Chito | Skin diseases | 8.8 | 8.6 | 5.5 | 6.6 |
| Gororsa | Pasteurellosis | 7.3 | 8.6 | 11.3 | 17.6 |
| NA | predator | 4 | 2 | 3.5 | 10.4 |
| Okolo | lameness | 1 | - | 3.2 | - |
| Quufa | Respiratory problem | 5.9 | 12.9 | 1.9 | 3.8 |
| | Others | 6.4 | 4.7 | 7.8 | - |

NA=not available

Table 9. Distribution (%) of major equine health problems

| Vernacular name | Common name | Species affected | |
|-----------------|----------------------|------------------|--------------|
| | | Young (N=4) | Adult (N=55) |
| Quufa | Respiratory diseases | 34.8 | 24.3 |
| Dhukuba figa | Colic | 31.9 | 34 |
| NA | Local swelling | 11.6 | 10.6 |
| Masha/Niokolo | Lameness | 8.7 | 8.7 |
| Chito | Skin disease | 7.2 | 8. |
| NA | predator | 2 | 3.9 |
| | Other | 3.8 | 10.5 |

NA=not available

There were respondents for poultry diseases in the four PAs NCD (*Fengil*) was mentioned by 54% of the respondents and other like lice, mange mites, fleas and local mouth and foot lesions consist the rest proportion.

Disposing of animal after birth/fluids/abotrus

The usual disposing methods in the study area replied as 43.7% by throwing, 51.2% by hanging, 26.2% do not involve in it, 10% dog, hyena or burring. Regarding the frequency of abortion, 35% of the respondents said they have encountered abortion in their herd with 39.3% in cattle, and 60.7% in goats while the rest did not encounter. The respondents mentioned the months of abortion with highest frequency in November, September, July and August respectively.

Way of consuming livestock products in the study area

Livestock products such as milk, meat and eggs consumed in the study area as, raw milk, boiled/cooked, raw and boiled in a proportion of 51.2%, 25% boiled 22.5% raw and boiled for milk while meat 98.7% said in cooked form and 1 in other form 3%. 85% the households consume eggs in boiled form and the rest 7.55 raw and 7.5% both in raw and cooked form.

Culling criteria in the herd by the farmers

The culling criteria were 25% disease, 25% poor production 27% old age, and reproductive diseases/infertility 20%.

Veterinary service delivery in the area

The households responded for the measures taken in their area when animal health problem arises as 96.25% traditional treatment, 27.5% modern treatment, 16% slaughtering, and other 2.5%. Traditional treatment in the 4PAs is used for treating different health problems like 80.5% for infectious, 63.7% for parasitic case, 33.7% for non-infectious, 17.5% for surgical and 1.2% others. 27.5% of the respondents do have access to modern veterinary service while 47.5% do not have access to that. About health service donor 70% said owner medication and 22% animal health assistant and the rest is done by animal health technician. Households from the 4 PAs responded about their problems they face when they trying to treat or vaccinate their animals as 96.2% lack of modern service/clinics, 90% transport (distance), and 88.7% lack of drugs and vaccines. Treatment and vaccination cost judgment in the 4 PAs was responded as 62.5% not available, 30% expensive for treatment and 45% cheap, 40% moderate for vaccination. The total numbers of livestock lost during last year in the four PAs of the respondents were 348. Out of these 46 were poultry, 35 adult cattle, 102 adult goats, 25 young goats, 9 young camels, 3 adult camels. 53.7 % of the households responded that they reported disease outbreaks and 46.2% did not report disease outbreak. 86.0% said the government responded while 14% said government did not respond for their report. The government responded by treatment, vaccination and other mainly as 10.8%, 83.8% and 5.4% respectively. In the last 5 years 5% of the respondents have taken training regarding livestock health care delivery while 95% have not taken any health care delivery. 47.5% said NGOs are found in the area and 52.5% said there are no NGOs areas. 57.6% of the respondents said the NGOs engagement in the 4 PAs is for food and water provision, 10.5% in animal health, 7.9% in animal production, 23.5% in other activities. In the area there is no animal health extension service according to the key respondents.

Observational result

Cases that were encountered at the Meiso veterinary clinic during the study period are shown in Table 9. All of the cases were subjected to physical examination, taking physiological parameters (rectal temperature, pulse rate, heart rate, and respiration rate and rumen motility). The following observational study result is based on clinical sign and case history and diagnosed tentatively. In bovine skin diseases and local infection takes the highest frequency, in goats' respiratory problem and circling takes the highest frequency followed by enteritis and abortion.

Table 10. Major clinical findings (November 2 up to March 2007)

| Disease category | Bovine | Caprine | Ovine | Camel | Equine | Total |
|--|--------|---------|-------|-------|--------|-------|
| Ectoparasites | 5 | 2 | 2 | 6 | 2 | 17 |
| Aspiration pneumonia | 3 | 2 | 1 | 1 | 2 | 9 |
| Respiratory problem | 7 | 6 | 6 | 4 | 3 | 26 |
| Mixed infection | 2 | 2 | 2 | 3 | 1 | 10 |
| Blood less castration | 2 | 1 | 2 | - | - | 5 |
| Paraphimosis | 2 | 1 | - | - | - | 3 |
| Abortion | 2 | 4 | 3 | 1 | - | 10 |
| Enteritis | 5 | 4 | 2 | 1 | - | 12 |
| Orf | - | 3 | 1 | - | - | 4 |
| Local infection | 6 | 2 | 2 | 3 | 3 | 16 |
| Circling disease | | 6 | 2 | - | - | 8 |
| Mastitis | 5 | 2 | 1 | 1 | - | 9 |
| Excessive hoof growth | 1 | - | 1 | - | - | 2 |
| Lameness | - | - | - | 3 | 4 | 7 |
| Digestive system disorder/colic for equine | 3 | 2 | 1 | 1 | 6 | 13 |
| Skin disease | 8 | 1 | 2 | 4 | 3 | 18 |
| Malnutrition | 3 | 1 | 3 | 4 | 3 | 14 |
| Total | 46 | 35 | 28 | 16 | 23 | 148 |

Group discussion

During group discussion major livestock health problems ranked by the key respondents as shown in Table 11 and 12 below. The key respondents ranked diseases, mentioned season/months of occurrence, and clinical signs, species affected. Water shortage, animal health, feed shortage and drought are the most important problems identified by the key respondents. Giving water after one day interval, traditional treatment, moving livestock to other areas where enough feed is available are the measures taken up on this problems by farmers. Livestock health as shown in Tables 11 enteritis, blackleg, anthrax, Pasteurellosis and others were mentioned by the key respondents with their degree of importance as shown by their rank.

Table 11. Cattle diseases mentioned by key respondents.

| Species affected | Vernacular name | Common name | Season | Clinical sign | Rank |
|------------------|----------------------|----------------|---------------------|---|------|
| | Bira | Enteritis | December - February | Bloody diarrhea, emaciation the animal smell even from a distance | 1 |
| | Abagorba/Horsistu | Blackleg | January-April | Lameness, paralysis, burned type of flesh when slaughtered | 2 |
| | Abasenga | Anthrax | At any time | Blood through anus and every other orifices | 6 |
| | Jigo | Mastitis | Any time | The opening of the teat canal will be closed | 7 |
| | Bute/Kormmamu/Digisa | LSD | My to September | Skin of the animals become swell. The disease is highly contagious in nature, | 5 |
| | Masa | FMD | At any time | Lacerating of the Foot and Mouth. | 3 |
| | Gororsa | Pasteurellosis | At any time | Unable to breath and nasal discharge and lag behind the herd | 4 |

Table 12. Health problems of small ruminant, camel and equines mentioned by key respondents.

| Species affected | Vernacular name | Common name | Season | Clinical sign | Rank |
|------------------|----------------------|---------------------------|---|---|------|
| | <i>Albasa/Tinesa</i> | <i>Diarrhea/Enteritis</i> | <i>Any time</i> | <i>Diarrhea, restlessness, and crying</i> | 2 |
| | Hirqit | FMD | At any time | Drying of the body, wound on mouth and hoof emaciation | 3 |
| | Chittoo | Skin disease | At any time | Hair loss, and irritating rubbing their body to stone and wood | 6 |
| | Hancharo | Orf | Mostly in rainy season but can occur any time | Lesion on the skin and lips | 4 |
| | Osa | Circling disease | Dry season | Crying, circling and abnormal behavior blindness, tooth grinding, and convulsion | 1 |
| | Gororsa | Pasteurellosis | Any time | Salivation and nasal discharge weakness | 5 |
| | Quufa gala | Respiratory problem | Dry season mostly but also occur at any time | coughing | 1 |
| | Chittoo | Skin disease | Mostly October to March but can occur at any time | Lesion and wound in all the body parts, do not increase in body weight and hair loss | 2 |
| | Safika /Melka | Enteritis | Dry season | Collapsing of the intestine found after post mortem, the milk become sour | 3 |
| | Dhukuba figa | Colic | Not seasonal | The donkey become restlessness and circle on one place then die immediately but still normal in appearance. | 1 |
| | Ni Okolo/Masha | lameness | Dry season | Unable to move properly | |
| | Quufa | Respiratory problem | Dry season | Coughing | |

4. DISCUSSION

General characteristics of the households, and livestock production.

Educational levels of the households show that most of the respondents are non- educated in secular form. Out of this females takes the highest percent 83.3 and the males 64.9 (Table 1). Educating the people leads the market in a better way. It is better and more profitable to educate females since they take part in the selling of small ruminants, milk, eggs and poultry. In the study area both crop and livestock production system is practiced (Tables 2 and 3). All of the respondents at least have their own cropland and livestock of one species (Tables 2 and 3). Important livestock species in the area includes cattle, goats, camels, donkeys, sheep, poultry and apiculture (Table 3). As it indicated in Table 3 cattle and goats takes the highest number and important means of livelihood of the households. The functions of livestock in the area are high value food (milk, meat, egg, and honey), hides and skin, transport and source of cash income (Table 4). The respondents sell their livestock for different purposes as it shown in the result part. The selling months also indicated in Figure 2 that correspond to the occurrence of many livestock health problems (Tables 11 and 12); this also has great importance in affecting the market orientations. In the study area farmers used different types of feeding and watering schemes based on the seasons and also use supplement from mineral soil. They also mentioned water shortage months (Figure 1). During water shortage months health problems arises such as pasteurellosis and cause great damage up on the livestock. Frequently occurring problems that are identified by the farmers include water shortage (Figure 1), absence of veterinary health service, feed shortage and drought. In the study area it can be said that there is no animal health extension service. Traditionally livestock owners use different ways in disposing of animal after birth/fluids/ abortions, and almost all methods are risky and unsafe regarding health. 70% of households use traditional medication when animal health problem arises. Households of the study area do have an experience of using communal grazing practice which is very important point with respect to disease transmission. In the area both communal and separate type of housing system is practiced with species separated and mixed. Households are practicing breeding, marketing and recording relating to livestock that is not supported by modern approach. Consuming of raw milk is practiced highly in the area and these expose consumers for health problem.

Animal health

Questionnaire survey, group discussion and observational studies were conducted with the aim of assessing the over all situation of livestock health problems in market oriented livestock development

Cattle health problems

Among the mentioned diseases of cattle *anthrax* is one of the important diseases in the study area as respondents put this disease in rank one with different proportion and average value as shown in the (Tables 6). The disease in the area is mainly due to there is a marked climatic and/or ecologic change occurring in the study area. Up on group discussion the occurrence this is variable and occurs both in the rainy season and drought season. This disease is classified as one of the soil born disease in the fear of economic loss as indicated in (Seifert, 1996). Other impacts such as effects on human health and community stability tend to be more visible and last longer in developing countries, particularly at the village level where animals are husbanded primarily for the benefit of the immediate family, and often in impoverished circumstances (Preslar, 1999).

Enteritis is another important disease mentioned by the respondents both in the survey and group discussion. Enteric disease is a major cause of economic loss in cattle herds it has great importance both in adult and calf as shown in tables 6. Enteric diseases in cattle occur in newborn calves as well as in adults (NAH, 2007).

The major cattle *ectoparasites* in this study area are ticks, lice, and mange mites. Key respondents these parasites cause bites cause irritations, preventing the cattle from grazing, and can also lead to secondary infections and infestations. As responded by the owners, these parasites also cause weakening the animals and even kill younger ones this is also agreed with (NAH, 2007).

Mastitis is important disease of cows in the study area and cause severe economic. In terms of economic loss mastitis is one of the most important disease in the diary sector (Blood & Radostits, 1989). Estimates show that on the average a quarter affected with mastitis results in a 30% reduction in productivity and an affected cow is estimated to loss 15% of its production

(Blood & Radostits, 1989).

Among the bacterial diseases ranked by the livestock owners (Table 6) *blackleg* is important disease in the area. It is also reported in the northern part of Ethiopia (Tigray) with a prevalence rate of 20% (Legesse, 1996). The season of occurrence of this disease in this area is from January to April, which is dry season that agree with (Seifert, 1996). The disease occurs in the study area starting from the July to November according to the key respondents in the group discussion.

Another important cattle disease in the area is *Food and Mouth Disease* (FMD). A study of an outbreak of FMD in Ethiopia indicated that the disease affects cattle, sheep and goats and the disease cause mortality in calves (6%) and 64% of the farmers reported FMD as a harmful disease. Of these farmers, the majority reported losses in milk production and loss in draught power production of approximately twenty days (Mersie *et al.*, 1992). It is not only because affects the health of the animals but also because of international restrictions on animal trade which causes economic losses to the affected countries (Seifert, 1996). In the study area the disease occurs at the onset of long rainy season from May to June as it is indicated in (Seifert, 1996). The prevalence of this notifiable disease is high in Ethiopia and important. Since 45% of the households use communal grazing land it will be easily transmitted from one herd to another.

Respondents also ranked *pasteurellosis* as an important disease in the study area. This disease is common to cattle, sheep, and goats. Respondents give different rank during the survey and in the group discussion. In group discussion and observational study it showed the importance of the disease. Pasteurellosis in cattle usually occurs as pneumonia (Frank, 1989). Morbidity rates of around 10% are typical in outbreaks of bovine pneumonic pasteurellosis (BPP) (Dalglish, 1990). The disease has great economical loss due to death of animals and vaccination cost. In the study area most of the markets and watering places are far from the villages and the animals will be easily affected by the disease. Bovine pneumonic pasteurellosis is seen principally in recently weaned, newly housed, single-suckled beef cattle especially around the time of the autumn calf sales (Andrews, *et al.*, 1981; Dalglish, 1990).

Out of the reproductive diseases abortion was one of the ailments of cows in the area. This is not seasonal but can occur in the area at any time according to the key respondents. It is a multifactor causative disease, as in group discussion respondents said it can be caused by Pasteurellosis and

enteritis. Taking into consider the breeding type of the area as 98.8% use uncontrolled natural breeding type it is very important. The trend of consuming raw milk in the area also directly relate with zoonotic diseases.

LSD mentioned as important disease in the area by the key respondents and survey. Key respondents said that it causes rough skin appearance the animals easily affected by biting flies and abortion. *LSD*, an OIE list A disease, causes major production losses, and is a constraint on trade (Davies, 1991). Major economic importance due to loss of production, severe emaciation, lowered milk production, abortion, secondary mastitis, loss of fertility, extensive damage to hides loss of draft from lameness are (Davies, 1991). A study conducted on major health problems of cattle and camel in the field and abattoir around Dire Dawa, *LSD* was the most frequently occurring infectious disease in the area. The occurrence of this disease was reported in Dire Dawa, Moyale area of the country with incidence rate of 6.6% (Damte, 2003).

Camel health problems

In the study area pneumonia is one of the most important diseases mentioned by the respondents. On camels (they call it locally *Quufa*) (Tables 7 and 12) that affect the respiratory tract of camels. The most predisposing factors listed for this disease complex in (Schwartz and Dilo, 1992) climatic changes, poor management practice, low level of herd health status and bad nutrition. On informal group discussion key respondents said the disease can occur at any time. The disease complex has impact on overall productivity due to the long recovery period, abortion can also occur during mid-pregnancy (Schwartz and Dioli, 1992).

The second important diseases that affect camels in this study area is skin disease (locally called it *Chito*) (Table 12). This condition can be caused by, Dermatophylosis, ticks and mange mites (Schwartz and Dioli, 1992). According to the key respondents the period of occurrence is not specific. Affected animals will not increase in their body condition even they eat feed adequately (Table 12). There are also other health problems mentioned by the key respondents and the survey time

Small ruminant health problems

Circling disease an important and ranked as first health problem in market oriented development of small ruminants. In the clinical observation it is also new emerging disease sign that owners frequently encountering and bring to the clinic. The causes of this could be as many numerous diseases as (Seifert, 1996) stated like enterotoxaemia and associated toxin and triggered by mistakes in feed management, and influence of weather. The disease sign may also due to listeriosis (bacterial disease), poisonous plants. The case fatality rate of this health problem is 100% (Radostits *et al.*, 1994). It is also responded by the key respondents it is a killer disease and if it occurs in the heard those affected by it will not recover rather their fate is death (Tables 8, 10 and 12). The mentioned clinical signs by the key respondents were nervous disorders, excitation, blindness, tooth grinding, and convulsion, animals walk in circle. Temperature may raise or be reduced to sub-febrile, the mucosa being grey violet has observed both in the clinic and field. The incidence as a clinical case may reach as high as 20-30%. In an outbreak the disease initially affects 1-4 day old kids and lambs (Gardiner, 1990).

A study on diseases occurring in small ruminants in the four PAs revealed the preponderance of enteritis as major health problems affecting the flocks. Occur at any time with Clinical sign of diarrhea (locally called *Albaatii*) (Tables 10 and 12). During the study period it was observed that this health problem occur frequently at the Meiso Veterinary clinic. This health problem reduces the milk production, weight gain and acute death in severely affected patients (Fitzhugh *et al.*, 1987).

Another important disease of small ruminants in the study area is *pasteurellosis*. In the study area there is high water shortage as it shown in (Figure 1) and also feed shortage months as indicated in the group discussion. Key respondents mentioned also they travel long journey for selling their livestock (goat), and during this time there is high chance of being affected by this disease. Most of the time March to November (rainy season. The key respondents also said it occurs when feed shortage comes. It is an important disease in most part of world and affect all ages of sheep and goats (Radostits *et al.*, 1994). This aggravated by the long distance they travel in search of water, feed and market place. This disease is induced by stress and cause small ruminants' death (Seifert, 1996).

In the study area *Orf* (Contagious Ecthyma) is listed as an important disease ranked and mentioned in the group discussions and survey by the livestock owners. Key respondents said it is a disease that leads goats and sheep to unthriftiness by prohibiting feed intake (Table 8, 10, and 12). It has some economical importance and it has been reported that when an outbreak occurs in goats and sheep it will have morbidity rates ranging from 70 to 80% and case fatality rate from 5 to 15% (Housawi, 1991). Since 91.25% of the livestock owners use communal grazing land, which is mentioned in the result part respondents, the chance of diseases transmission will be high. They also use pond as a source of watering for their livestock it has great importance in the favor of this diseases transmission (users of pond and river with proportion of 75%, 17% respectively). Spread of the disease in a flock is very rapid and occurs by contact with either affected animals or inanimate objects (Allworth *et al.*, 1987). This disease results in economical loss either by carcass condemnation or /and direct loss of animals (Robinson and Balassu, 1981). The disease is reported in the northern part of Ethiopia with an incidence rate 3% (Weldemeskel and Ashenafi, 2003)

Ectoparasites are among the small ruminants health problems mentioned by the livestock owners' as important. In the study area price of livestock judgment is simply by animal's size and appearance, due to this the impact of ectoparasite in the area is high in decreasing the price of the livestock. Among the ectoparasite that affect small ruminant in the area are mange mites and lice. These parasites down grade the quality of hides and skin as well as the productivity and body weight. Demmisse *et al.*, (2003) reported mange mites affect sheep from the Amhara region of Ethiopia. By another study in the same regional state the economic loss due to skin problems due to external parasite cause 35% of sheep skin and 56% of goat skin rejections (Bayou, 1998).

Equine health problems

The first listed equine health problem is *respiratory disease complex* the respondents listed. The respondents who have equines responded that this disease complex affects both sexes, and decreased working capacity, frequent coughing during working time and high speed exercise with poor performance. Incidence of this disease complex is reported as 3 to 8% (Rose and Hodgson, 2000). A retrospective study in four woredas of central Ethiopia showed 57% in male

and 43% in female donkeys showed the respiratory problem (Alemnesh, 2004).

Colic (abdominal pain) is one of the mentioned and frequently occurring health problem in the area according to the respondents both in the group discussion and questionnaire survey (Table 9, 10 and 12). All owners of equines listed this disease sign as first. Key respondents characterize the health problem by restlessness, circling at one place and look to the back and immediately die. Causes of this disease sign are numerous in numbers (Rose and Hodgson, 2000) listed as impaction, spasmodic colic, intussusceptions, volvulus torsion, strangulation, tympany, colitis; verminous cases are amongst the commonest.

Local swelling and *lameness* are health problems in the study area according to the respondents' rank in-group discussion and questionnaire survey (Tables 9, 10 and 12). These locomotary health problems in the area may be due to equines forced to carry water for long distance and then easily exposed. Since equines in the area are the means of pack animals specially for carrying water lameness has great impact on the day to day activity. Other health problems mentioned are skin diseases, GIT, neurological problems and predators

Poultry disease

Among the important diseases of poultry mentioned by the respondents of 45 domestic fowl owners 54% of them said Newcastle (locally called *Fengil*) is an important disease that affects the marketing fowls. This is an acute disease of domestic poultry as the key respondents mentioned. It is a worldwide problem that presents primarily as a respiratory disease, but depression, nervous manifestations, or diarrhea may be the predominant clinical form. Mortality is variable. Occurrence of a virulent form of the disease is reportable and may result in trade restrictions (Merck Veterinary Manual, 1998). There were also other health problems that are mentioned by the respondents.

5. CONCLUSION AND RECOMMENDATIONS

The study revealed that mixed farming system is practiced for the livelihood of the households in the area. Most important livestock in the area includes cattle, small ruminants, goats, camels, equines and poultry. These animals are the most important parts of the agricultural community in the study area by providing food, source of income, transportation draft power, hides and skins. Even though species diversification and functions of these livestock are high in the area there are health problems that obstacle the utilization their products, marketability and direct use of livestock. Among the health problems that impede the performance animals, utilization of products and hinder the marketability are; anthrax, blackleg, FMD, LSD, external parasites, NCD, Orf, respiratory problems, skin diseases, circling disease, local swelling, colic, digestive problem, enteritis, predators, abortion, and other cases. The impact of the health problems in market is in either by; decreasing performance, decreasing productivity, death of livestock, and decrease quality of the products or by trade banning. Based on the above findings and gaps found on the study on general health problems that impede the marketing of livestock, the following points are recommended.

- 1 Basic knowledge of animals' health and nutrition need to be introduced to the livestock owners.
- 2 Since pastoral areas characterized by being remote, inaccessible and unpredictable security situations for the professionals to reach herders and provide the service on a regular basis and required degree the pastoral office and rural development of the woreda should graduate the pastoral common into legally recognized cooperatives and Community Animal Health Workers (CAHWs)
- 3 Animal health service and market places should be as near as possible in such a way that all can access it at an average of equal distance and adequate in number to provide the service.
- 4 Based on the above data, detail epidemiology survey is recommended to the most important diseases known by the livestock owners in the area that have market influence.
- 5 The study result may help in developing, strategic disease control scheme to prevent and fight animal health problems in the woreda
- 6 It is good and high paramount importance to build regional integration and harmonization of primary animal health services in particularly of cross boarder areas of the woreda.

6. REFERENCES

- Alemnesh, W. (2004): Investigation to the occurrence of strangles among donkeys in the four woredas of central Ethiopia. DVM thesis, Faculty of Veterinary Medicine, Addis Ababa University, Debre Zeit, Ethiopia. pp 24-26.
- Allworth M.B., Hughes K.L. and Studdert, M. J. (1987): Contagious pustular dermatitis (orf) of sheep affecting the ear following ear tagging. *Aust. Vet. J.* **64**(1): 61-65
- Andrews, A. H., Cook, G. L., Pritchard, D. G., Morzaria, S. P., and Gilmour, N. J. L. (1981): Observations on a respiratory disease outbreak in weaned suckled calves. *Scotland UK. Vet. Rec.* **108**:139-142.
- Bayou, K. (1998): Control of sheep and goatskin diseases. In: B.C. Ian and B. Bayou, Editors, *Proceedings of control of sheep and goat skin diseases for improved quality of hides and skin.* 13–14 February 1998, FAO, Addis Ababa, Ethiopia.
- Bennett, R., and J. IJpelaar. (2005): Updated estimates of the costs associated with thirty four endemic livestock diseases in Great Britain: A Note. *J. Agri. Econ.* **56**:135–44.
- Bicknell, E. J., Reggiardo, C., Noon, T. H., Bradley, G.A. and Lozano-Alarcon, F. (1994): Abortion Diseases of Range Cattle. University of Arizona College of Agriculture, Department of Veterinary Science, Veterinary Diagnostic Laboratory pp. 1-2.
- Blood, D. C. and Radostits, O. M. (1989): Veterinary Medicine. In a Text book of the diseases of cattle, sheep, pigs, goats, and horses. 7th edition. Baillier Tindall. London. Pp. 643–657.
- Coppock, D.L., (1994): Climate primary production and carrying capacity of the Borena plateau of southern Ethiopia. Synthesis of Pastoral Research Development and Change. International Livestock Center for Africa (ILCA), Addis Ababa, Ethiopia .p. 23.
- CSA (2007): Central statistics Authority of Ethiopia. Agricultural Sample Survey. Report on Livestock and Livestock Characteristics. Volume II, Addis Ababa Ethiopia.
- Dammtte, D. (2003): Major health problems of cattle and camel in the field and Abattoir, Around Dire Dawa, DVM thesis, Faculty of Veterinary Medicine, Addis Ababa University, Deber Zeit Ethiopia.
- Demmisse, A., Siraw, B., Teferi, Tsertse, T., Mammo, G., Mekonen, D., and Shimelse, S. (2000): Mange a diseases of growing threat for the production of small ruminants in Amhara National State. In the opportunities and challenges of enhancing goat production in East

- Africa. Conference on the opportunities and challenges of enhancing goat production in east Africa, Awassa, Ethiopia, 10-12 November 2000, pp. 80-91.
- Davies FG. (1991): Lumpy skin disease of cattle: A growing problem in Africa and the Near East. *Wrlld. Anim. Rev.* 1991; Italy (Rome), pp.37-42.
- Dalgleish, R. (1990): Bovine pneumonic pasteurellosis. The University of Reading Department of Agriculture and Economics United Kingdom. *In Practice* **12**:223-226.
- Delgado C. L., Rosegrant, M., Steinfeld, H., Ehui, S. and Courbois, C. (1999): Livestock 2020: the next food revolution. In 2020 Vision. Brief 61. International Food Policy Research Institute June, 1999 Washington D.C.USA. Discussion paper 28
- Fitzhagh, H .A. Omin, J. F, Semenye, M, ed., Sidahmed, A. E. (1987): Ingestion of goats with crop production and other livestock production systems: Mixed farming in the tropics. Proceedings of the fourth international conference on goat. 8-12 March, Brasilia, Brazil.
- Frank, G. H. (1989): Pasteurellosis of cattle. *Pasteurella and Pasteurellosis*. In C. Adlam and J. M. Rutter (eds.), Academic Press, London, Pp. 197-222.
- Housawi, F. M., Elzein, E. M., Amin, M. M. and Afaleq, A.I, (1991): Contagious pustular dermatitis (orf) infection in sheep and goats in Saudi Arabia. *J. Vet. Rec.* **128**: 550-551.
- ILCA. (1980): Economic Trends; Livestock Production Prospects for Tropical Africa in the Year 2000. ILCA Bulletin No. 10. ILCA, Addis Ababa, Ethiopia.
- ILRI and FAO; (2005): International Livestock Research Institute/Food and Agricultural Organizations. Pre-slaughter defects of hides/skins and intervention options in East Africa: Harnessing the leather industry to benefit the poor. Technical paper No 47. 18-20 April, 2005, Addis Ababa, Ethiopia.
- Leggese, G. (1996): Livestock health situation in central Tigray. Rural Exploratory Studies Proceeding of a workshop, in the Central zone of Tigray. Oyhus, A. O and Gebru, G. (Ed).Agricultural University of Norwegian (AUN).pp 83-100.
- McPherson, C.N.L. (1995). The effect of transhumance on the epidemiology of animal diseases. *Prev. Vet. Med.* **25(2)**: 213–224.

- MEDaC (Ministry of Economic Development and Cooperation): (1998). Survey of livestock and fisheries development. Addis Ababa, Ethiopia. p. 65.
- Merck Veterinary Manual (1998): The Merck Veterinary Manual. 8th edition USA, pp.1941.
- Mersie A., Tafesse B., Getahun F. & Tekelu W. (1992). Losses from foot-and-mouth disease in a mixed farming area of Eastern Ethiopia. *Trop. Anim. Hlth. Prod.* **24** (3): 144.
- NHA (Novartis Animal Health) (2007): Novartis Animal Health Inc., Switzerland pp. 2.
- Preslar, D.B., (1999): Lessening the Impact of Animal Disease on Developing Country Agriculture, Action Report 1999, Novello Press, and London.
- Radostits, O.M., Blood D.C. and Gay, C.C. (1994): Veterinary Medicine: In a Text book of the Diseases of cattle, sheep, pigs, goats, and horses. 8th edition. Baillier Tindall. London. pp. 1293-1297.
- Robinson, A. J. & Balassu, T. C. (1981). Contagious pustular dermatitis (orf). *NZ. Vet. Bulle.* **51**: 771-782.
- Rose, F. R. and Hodgson, R. D. (2000): Manual of equine practice, second edition, Pp. 187-292.
- Schwartz, H., and M. Dioli, (1992): The One-Humped Camel in Eastern Africa. A Pictorial Guide to Diseases, Health Care and Management of One-Humped Camel in Eastern Africa. Verlag.pp.199-208.
- Seifert, H.S.H (1996): Contagious bovine pleuropneumonia. Tropical Animal Health, 2nd edition, Klulver academic publishers group, Dordrecht, The Netherlands, pp. 418-431.
- Solomon, B (1994): Privatization of animal health service. Proceedings of the 18th annual conference of Ethiopian Veterinary Association (EVA). Addis Ababa, Ethiopia
- Woldemeskel, M. and Ashenafi, H (2003): Study on skin diseases in sheep from northern Ethiopia. *Dtsch Tiererts Wochen School.* Jan, 2003.Vol. 1No. 110. pp. 20-2.
- Yohannes, A. (2002): Background information on Contagious Bovine Pleuropneumonia in Ethiopia AU- IBAR, PACE, Nairobi, Kenya.

7. ANNEXES

ANNEX I

Questionnaire

I. Animal Production

| | | | | |
|------------------------------------|------------|---------------------------------------|---------------------|---------------------|
| 1. Code [/ / /] | | 1.1. Date of interview [/ /] | | |
| 2. Kebele [/] | | 2.1. Peasant Association (PA) [/ /] | | |
| 3. Name of village [] | | | | |
| 4. Name of the farmer [] | | | | |
| 5. Owner's sex | | 6.1. Male [] | 6.2. Female [] | 6.3. Age [] |
| 6. Owner's education level | 6.1.No [] | 6.2. Religious [] | 6.3. 1-6 Grades [] | 6.4.> 6 Grade [] |
| 7. Number of family members | | 7.1. ≤ 15 years [] | | 7.2. > 15 years [] |
| 8. Private land use pattern | | Own (ha) | | Rented (ha) |
| 8.1. Cropland | | | | |
| 8.2. Fallow land | | | | |
| 8.3. Grazing land | | | | |
| 8.4. Other | | | | |

9. Livestock inventory (number)

| | Calves | | | Cow | | | | |
|-------------|----------|---------------|-------------|-------|---------|--------------|-----------|--|
| | Male | Female | | Dry | Lact. | | | |
| 9.1. Cattle | | | | | | | | |
| 9.2. Camel | | | | | | | | |
| | Kid/lamb | | | | | | | |
| | Male | Female | | | | | | |
| 9.3. Goat | | | | | | | | |
| 9.4. Sheep | | | | | | | | |
| Species | Young | Mature female | Mature male | Total | Species | | | |
| 9.5. Donkey | | | | | | 9.7. Poultry | 9.8. Bees | |
| 9.6. Horse | | | | | | | | |

10. Livestock products and function

| Cattle | Goat | Sheep | Camel | Equine. | Poultry | Bees |
|--------|------|-------|-------|---------|---------|------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

11. Feeding practice.

| Type feeds | Rank |
|--|------|
| 11.1. Natural pasture | |
| 11.2. Cultivated pasture | |
| 11.3. Cereal straws ('teff', barley, wheat...) | |
| 11.4. Stover (sorghum and maize) | |
| 11.5. Salt and minerals | |
| 11.6. | |

12. Communal grazing land

| | | |
|--|---------|--------|
| 12.1. Is there communal grazing land? | Yes [] | No [] |
| 12.2. Distance from the village (km)? | | |
| 12.3. In which season is most important? | | |

13. Availability and seasonality of feeds

| Type feeds | Dry season | Short rainy season | Long rainy season |
|--|------------|--------------------|-------------------|
| 13.1. Natural pasture | [] | [] | [] |
| 13.2. Cultivated pasture | [] | [] | [] |
| 13.3. Cereal straws ('teff', barley, wheat...) | [] | [] | [] |
| 13.4. Stover (sorghum and maize) | [] | [] | [] |
| 13.5. Salt and minerals | [] | [] | [] |
| 13.6. | [] | [] | [] |

12. Traditional salt supplements

| | | | |
|--|---------------------|------------|------------------|
| 14.1. Do farmers traditionally supplement salt? | Yes [] | No [] | |
| 14.2. Natural source of salt | Watering points [] | Plants [] | Mineral soil [] |
| 14.3. Which salt source is most available? | Watering points [] | Plants [] | Mineral soil [] |
| 14.4. Time of the year for supplementation | [] | | |
| 14.5. List deficiencies observed (based on farmers perception) in order of importance. | | | |

15. Watering

| | | | | |
|---|-----------|------------|----------|----------|
| 15.1. Watering source | River [] | Stream [] | Pond [] | well [] |
| 15.2. Critical season of water shortage | | | | |
| 15.3. Other strategy adopted: | | | | |
| | | | | |

16. Housing

| | | |
|--------------------------|---------------|-------------------|
| 16.1. Separate from home | Species mixed | Species separated |
| 16.2. Communal | Species mixed | Species separated |

17. Breeding

| | | |
|--------------------|---------|----|
| 17.1. Controlled | Natural | AI |
| 17.2. Uncontrolled | Natural | AI |

18. Recording

| | | |
|--|-----|----|
| 18.1. Do you know the performance of your animals? | Yes | No |
| 18.2. If yes, how? | | |

19. Labour utilization

| | | |
|---|-----|----|
| 19.1. Do you use hired labour? | Yes | No |
| 19.2. If yes, for what activities? | | |
| 19.3. Do you do other income farm activities (off-farm employment)? | Yes | No |
| 19.4. If yes list the activities usually performed | | |
| 19.5. Do females involve in decision-making? | Yes | No |
| 19.6. If yes, list those activities requiring her decision | | |

20. Marketing

| | | |
|--|-----|----|
| 20.1. Did you sell livestock during the last year? | Yes | No |
| 20.2. What are the main reasons of selling livestock | | |
| | | |
| 20.3. The main season of selling livestock | | |

II. Animal Health

21. What are your culling criteria?
 Disease old age reproductive disease/infertility poor production other
22. How do you dispose the after birth/fluids/abortus/cadaver?

23. Have you encountered abortions in the last 2 years?
 Yes No
24. If your answer to question 23 is yes;
 Which species Which term which month/season
25. How do you consume animal products?

| Way/product | milk | meat | eggs |
|---------------|------|------|------|
| raw | | | |
| Cooked/boiled | | | |
| other | | | |

26. List (and rank) five important health problems of livestock that are affecting market.

(i) Cattle

| Calf (<1year) | heifer | cow | Adult male cattle |
|---------------|--------|-----|-------------------|
| 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 |

(ii) Sheep

(a) Age and season

| Young (1- 12 months) | Adult (> 12 months) |
|----------------------|---------------------|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |

(iii) Goats

| Young(1- 12 months) | Adult(> 12 months) |
|---------------------|--------------------|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |

(iv) Equine (horses, mules, donkeys)

| Foal (1 year) | adult |
|---------------|-------|
| 1 | 1 |
| 2 | 2 |
| 3 | 3 |
| 4 | 4 |
| 5 | 5 |

(v) Camel

| Calf (1 year) | Adult female | adult male |
|---------------|--------------|------------|
| 1 | 1 | 1 |
| 2 | 2 | 2 |
| 3 | 3 | 3 |
| 4 | 4 | 4 |
| 5 | 5 | 5 |

(vi) Poultry

| |
|--|
| |
|--|

27. What measures are taken to tackle the above problems?

Slaughter [] Modern treatment [] Traditional treatment [] Other []

27. If you use traditional treatment, for which diseases?

Infectious [] Parasitic [] non infectious [] surgical [] other []

29. What measures are taken to prevent the disease?

Slaughter [] Vaccination [] Quarantine Other []

30. Is there access to modern veterinary service?

Yes [] No []

31. Who performs the treatment?

Veterinarian [] animal health assistant [] animal health technician [] owner [] other []

32. What problems do you face when treating or vaccinating livestock in your area (rank them)?

Lack of modern services/clinics [] lack of drugs and vaccines [] transport/distance [] other []

33. How do you judge the cost of modern treatment/vaccination?

| | treatment | vaccination |
|-----------|-----------|-------------|
| expensive | | |
| moderate | | |
| cheap | | |

34. What is the number of animals you lost by the above health problems last year?

| Species | Calves | Heifer | Adult male | Adult female |
|-------------|---------------------|--------|--------------------|--------------|
| 9.1. Cattle | | | | |
| 9.2. Camel | | | | |
| Species | Young (1-12 months) | | Adult (>12 months) | |
| 9.3. Goat | | | | |
| 9.4. Sheep | | | | |
| Species | | | | |
| 9.5. Donkey | | | | Poultry |
| 9.6. Horse | | | | |

35. Do you report any diseases/outbreak to the government body?

Yes [] No []

36. If your answer to question 35 is yes, did the government body respond?

Yes [] No []

37. If the government body responded, what measures were taken by the government?

Treatment [] Vaccination [] Other []

38. Has any training been provided to you in animal health care delivery in the last five years?

Yes [] No []

39. If your answer to question 38 is yes, what was the nature of the training?

40. Are there any community based animal health workers/NGOs in your area of operation?

Yes [] No []

41. If your answer to question 40 is yes, what is their area of engagement?

Animal health [] Animal production [] Feed and water provision [] Animal management []
other []

42. What suggestion do you give for improvement of animal health care activities in your area?

ANNEX II

Checklist for Group Discussion

Group discussion was held with Key respondents (10-12 known individuals identified by the Development Agent (DA) for about 1 hr)

- Major feed types in the area and when feed/water is a problem
- Use of natural (plants or water source) mineral supplements: when, where, major symptoms of the deficiency
- Known problems identified by farmers and measures
- Major disease/site of the area and occurrence across seasons
- Priority of major livestock problems and anticipated solutions
- About extension service
- Presence of NGO in the area and their involvement in livestock development

Annex III

Randomly selected households from the 4 PAs

| No | Kebele | Village | Owner Name | Sex | Age |
|----|-----------------|-----------------|-----------------------|-----|-----|
| 1 | Haremero Deeyma | Ademe | Aliyi Amed Abdulle | M | 36 |
| 2 | Haremero Deeyma | Ademe | Amed Abdulle | M | 90 |
| 3 | Haremero Deeyma | Abdulle | Mussa Mohamed Abdulle | M | 34 |
| 4 | Haremero Deeyma | Deeyma | Salii Haji Gutoo | M | 65 |
| 5 | Haremero Deeyma | Tuluqi | Digo Uso Alii | M | 30 |
| 6 | Haremero Deeyma | Haremero deymaa | Amad Amin | M | 30 |
| 7 | Haremero Deeyma | Birkaa | Amdin Shek M/d | M | 27 |
| 8 | Haremero deeyma | Deeyma | Usman Amin Wedey | M | 45 |
| 9 | Haremero Deeyma | Kubey | Mohamed Yoya | M | 33 |
| 10 | Haremero Deeyma | Ademe | Adem Mohamed Uso | M | 40 |
| 11 | Haremero Deeyma | Abdulle | sara Aliyi | F | 35 |
| 12 | Haremero Deeyma | Birka | Ahimed Hajii | M | 41 |
| 13 | Haromero Deeyma | Abdulle | Sanii Umer Hajii | M | 35 |
| 14 | Haremero Deeyma | Abdulle | Zeynab Ahemed Umer | F | 35 |
| 15 | Haremero Deeyma | Deeyma | Amad Umer | M | 38 |
| 16 | Heremero Deeyma | Ademe | Amed Adam | M | 28 |
| 17 | Haremero Deeyma | Deeyma | Abdulle Uso Adem | M | 40 |
| 18 | Haremero Deeyma | Deeyma | Abraham Ademe Abdulle | M | 40 |
| 19 | Haremero Deeyma | Deeyma | Mohamed Yusuf | M | 28 |
| 20 | Haremero Deeyma | Deeyma | Usman Ahimed Aliyii | M | 35 |
| 21 | odabella | Meta | Abdi Ahmed | M | 39 |
| 22 | Oda bella | Meta | Keddoo Dadhi | M | 43 |
| 23 | Oda bella | Meta | Ali Mohamed Wedey | M | 35 |
| 24 | Oda bella | Meta | Mohamed Ibiro Ahmede | M | 25 |
| 25 | Oda bella | Meta | Aliheider Abdo Dadhi | M | 40 |
| 26 | Oda bella | Deeka Deeku | Adam Yuya | M | 38 |
| 27 | Oda bella | Sheka | Mohamed Hassen | M | 27 |
| 28 | Oda bella | Korse | Mehamed adem elemoo | M | 45 |
| 29 | Oda bella | Adem Bedasoo | Abdella Bila Nini | M | 22 |
| 30 | Oda bella | Deeka Deeku | Ture Ushee Gereba | M | 47 |
| 31 | Oda bella | Bone | Mehammed Abdella Alii | M | 49 |
| 32 | Oda bella | Sheka | Adem Abreshe Hamid | M | 40 |
| 33 | Oda bella | Bone | Alii Ahmed Usman | M | 44 |
| 34 | Oda bella | Meta | Abdella Alii Roba | M | 36 |
| 35 | Oda bella | Meta | Ahmed M/d Weden | M | 56 |
| 36 | Oda bella | Meta | Adem Mehamede Boru | M | 29 |
| 37 | Oda bella | Sheka | Sufiyan Abdella | M | 39 |
| 38 | Oda bella | Deeka Deeku | sultan Sheka | M | 56 |
| 39 | Oda bella | Sheka | Adem Ali Tuke | M | 40 |
| 40 | Oda bella | Dheeka Deeku | Jemal Umer Wedey | M | 28 |
| 41 | DHM | Hachere | Challe Ademe | M | 38 |
| 42 | DHM | Kore | Akiya M/d | F | 34 |
| 43 | DHM | Kubbii | Umer Uttoo | M | 50 |

| | | | | | |
|----|--------|----------------------|-------------------------|---|----|
| 44 | DHM | Kimita | Adem Seiddoo | M | 49 |
| 45 | DHM | Haro Hara | Ahmend Adem | M | 40 |
| 46 | DHM | Kubbii | Jemal Umer | M | 42 |
| 47 | DHM | Haro Hara | Yasin Adem | M | 45 |
| 48 | DHM | Haro Hara | Umer Adem Demo | M | 34 |
| 49 | DHM | Kimita | Amin Abraham | M | 48 |
| 50 | DHM | Haro Hara | Yusufe Amin | M | 47 |
| 51 | DHM | Haro Hara | Mehammed Hassen Ameya | M | 45 |
| 52 | DHM | Haro Hara | Talle Ummer Amed | M | 52 |
| 53 | DHM | Haro Hara | Musa Ahmed Belo | M | 44 |
| 54 | DHM | Kimita | M/d Abdella | M | 45 |
| 55 | DHM | Muke Sera | Ali Amin | M | 38 |
| 56 | DHM | Haro Hara | Chala Mune Weyiyo | M | 38 |
| 57 | DHM | Muke Sera | Amiin Sheriif | M | 40 |
| 58 | DHM | Muka Sera | Abdella Ameddo | M | 43 |
| 59 | DHM | Kimita | Abdella M/d | M | 35 |
| 60 | DHM | Hassen Boru | M/d Ussman | M | 45 |
| 61 | Bililo | Bililo yelayignawu | Yusuf Ibro | M | 39 |
| 62 | Bililo | Bililo yelayignawu | Hassen Umer | M | 34 |
| 63 | Bililo | Bililo yetachignawu | Asha Amed Tiysa | F | 25 |
| 64 | Bililo | Bililo yetachignawu | Mehamed Adem Dadi | M | 42 |
| 65 | Bililo | Bililo yetachignawu | Mehamed Mussa Seid | M | 30 |
| 66 | Bililo | Bililo yetachignawu | Ziyad Seido Mira | M | 35 |
| 67 | Bililo | Bililoo yetachignawu | Amed Umer Sheka | M | 37 |
| 68 | Bililo | Bililo yetachignawu | Mahamed Sani Osman | M | 38 |
| 69 | Bililo | Bililo yetachignawu | Husen Abdela Yusuf | M | 31 |
| 70 | Bililo | Bililo yelayignawu | Waqo Alii Unkii | M | 45 |
| 71 | Bililo | Bililo yetachignawu | Mussa Beshi Ali | M | 55 |
| 72 | Bililo | Bililo yelayignawu | Abdurahiman Ture Oda | M | 30 |
| 73 | Bililo | Bililo yelayignawu | Hussen Hassen Ali | M | 22 |
| 74 | Bililo | Bililo yetachignawu | Hashim Sani Kezira | M | 36 |
| 75 | Bililo | Bililo yetachignawu | Adem Amed Umer | M | 50 |
| 76 | Bililo | Bililo yelayignawu | Sufiyan Yuya Umer | M | 28 |
| 77 | Bililo | BililoYelagniwau | Mohamed Ebrahim Yuya | M | 23 |
| 78 | Bililo | Bililo yetachignawu | Desse Mohamed Abdurehim | F | 28 |
| 79 | Bililo | Bililo yetachignawu | Hussen Adem Ote | M | 52 |
| 80 | Bililo | Bililo yetachignawu | Nefisa Adem Gile | F | 37 |

Keys:-DHM= Deneba Hundhe Missoma