

**ADDIS ABABA UNIVERSITY
COLLAGE OF VETERINARY MEDICINE AND AGRICULTURE**

**ASSESEMENT OF VETERINARY SERVICES: A CASE STUDY IN ADA'A
DISTRICT OF OROMIA REGION, ETHIOPIA**

BY

KIDANE GIRMAY ZERU

**JUNE, 2012
DEBRE ZEIT, ETHIOPIA**

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**A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in
Partial Fulfillment of the Requirements for the Degree of Master of Science in
Tropical Animal Production and Health**

BY

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TABLE OF CONTENT

	PAGES
TABLE OF CONTENT	I
ACKNOWLEDGEMENTS	III
LIST OF TABLES	VI
LIST OF FIGURE.....	VII
LIST OF ANNEXES	IX
ABSTRACT.....	X
1. INTRODUCTION	1
2. LITERATURE REVIEW	4
2.1. Veterinary services in Ethiopia.....	4
2.2. Veterinary service delivery system in Ethiopia	4
2.2.1. Federal veterinary service in Ethiopia	5
2.2.2. Regional veterinary service in Ethiopia.....	6
2.2.3. District veterinary service in Ethiopia	6
2.2.4. Animal health personnel and infrastructure in Ethiopia	7
2.2.5. Private veterinary service in Ethiopia	7
2.6. Traditional veterinary practice in Ethiopia	11
2.7. Livestock disease status and control in Ethiopia	12
2.8. Livestock disease reporting system in Ethiopia.....	14
2.9. Veterinary service in meat and live animal export	15
2.10. Vaccine production and quality control.....	17
2.11. Legal framework (proclamations and institutional arrangement).....	18
3. MATERIALS AND METHODS.....	21
3.1. General description of study area	21
3.2. Study population	22
3.3. Study design.....	22

3.3.1. Sampling procedure and sample size determination.....	22
3.3.2. Methods of data collection.....	23
3.4. Data analysis	24
4. RESULTS	25
4.1. Characteristics of household heads.....	25
4.1.1. Demographic characteristics.....	25
4.1.2. Means of livelihood	25
4.1.3. Education level of household heads.....	26
4.2. Livestock keeping constraints.....	27
4.3. Veterinary service providers.....	28
4.3.1. Actors and their roles in veterinary service delivery	29
4.4. Constraints of veterinary services.....	37
4.5. Evaluation of veterinary service providers by clients.....	39
4.5.1. Public veterinary services	39
4.5.2. Private veterinary services	42
4.5.3. Third sector (Ada'a Cooperative, SPANA and Donkey Sanctuary).....	43
4.6. Legal framework (proclamations and institutional arrangement).....	45
5. DISCUSSION.....	47
6. CONCLUSIONS AND RECOMMENDATIONS	54
7. REFERENCES	56
8. ANNEXES	65
9. DECLARATION	82

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ABBREVIATIONS

AAU	Addis Ababa University
ACDI/VOCA	Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance
ADLI	Agriculture Development Led Industrialization
AHA	Animal Health Assistants
AHS	African Horse Sickness
AHTs	Animal health Technicians
AI	Artificial Insemination
APHRD	Animal and Plant Health Regulatory Directorate
AU-PANVAC	Africa Union Pan African Veterinary Vaccine Centre
CAHWs	Community-based Animal Health Workers
CBPP	Contagious Bovine Pleuro-Pneumonia
CCPP	Contagious Caprine Pleuro-Pneumonia
CSA	Central Statistics Authority
DACA	Drug Administration and Control Authority
DAs	Development Agents
DFZs	Disease Free Zones
DREA	Department of Rural Economy and Agriculture
DVM	Doctor of Veterinary Medicine
DVO	District Veterinary Office
EVA	Ethiopia Veterinarians Association
FAO	Food and Agricultural Organization
FGD	Focus Group Discussion
FMD	Foot and Mouth Disease
GDP	Gross Domestic Product
GFDRE	Government of the Federal Democratic Republic of Ethiopia

GO	Government Organization
Helimex	Hashim Ethiopia Livestock and Meat Export
HH	Household
IBAR	Inter-African Bureau for Animal Resources
IBD	Infectious Bursal Disease
IMF	International Monetary Fund
IPST	Institutional and Policy Support Team
Km	Kilo meter
LDHA	Livestock Health Development Agency
LLP	Livestock and Livestock Products
LSD	Lumpy Skin Disease
MoARD	Ministry of Agriculture and Rural Development
MoH	Ministry of Health
NAHDIC	National Animal Health Diagnostic and Investigation Center
NBE	National Bank of Ethiopia
NCD	New Castle Disease
NEPAD	New Partnership for Africa's Development
NGO	Non Governmental Organization
NMSA	National Meteorology Service Agency
NTTICC	National Tsetse and Trypanosomosis Investigation and Control Center
NVI	National Veterinary Institute
OAU	Organization of Africa Union
OIE	Office International des Epizooties
PA	Peasant Association
PLC	Private Limited Company
PPR	Pesti des Petits Ruminants
RVF	Rift Valley Fever
SE ²	Standard Error square
SPANAS	Society for the Protection Animals Abroad

SPS–LMM	Sanitary phyto sanitary
SPSS	Statistical Procedure for Social Science
SVM	School of Veterinary Medicine of Addis Ababa University
UK	United Kingdom
UN	United Nation
USAID	Unite States Agency for International Development
USDS	US Department of State
VS	Veterinary Service
WoARD	Woreda (District) Office of Agriculture and Rural Development
χ^2	Chi-Square
%	percentage

LIST OF TABLES

PAGES

Table 1: Infrastructure in veterinary service	7
Table 2: Livestock services and appropriate sectoral delivery mechanism	10
Table 3: Trends of the organizational setup of the veterinary services of Ethiopian	18
Table 4: Means of livelihoods for farmers in the study area	26
Table 5: Respondent characteristics.....	27
Table 6: livestock keeping Constraints	28
Table 7: Human resource and clinics of public veterinary service in the district.....	30
Table 8: Actors of clinical veterinary services providers	32
Table 9: Activities of the public vet clinics	33
Table 10: Actors of veterinary drug services providers.....	34
Table 11: Private veterinary clinic and drug shops in Ada'a district.....	35
Table 12: Actors of vaccination veterinary services providers.....	36
Table 13: Constraints in the provision of veterinary services.....	38
Table 14: Evaluation of public veterinary service by clients.....	40
Table 15: Evaluation of private veterinary service by clients.....	42
Table 16: Evaluation of third actor veterinary service by clients	44

LIST OF FIGURE

PAGE

Figure 1: Map of the study area	21
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LIST OF ANNEXES

	PAGES
Annex 1: HH Survey interview schedule.....	65
Annex 2: Checklist guide for FGD and key informant interviews	69
Annex 3: Checklist for veterinary clinics and field veterinarians.....	70
Annex 4: Checklist for private veterinary service providers	71
Annex 5: English equivalent name for common livestock diseases in the study area.....	73
Annex 6: Private veterinary pharmacy in rural area (Godino)	74
Annex 7: Public veterinary clinics.....	75
Annex 8: Roots of veterinary drug in the district	77
Annex 9: Focus Group Discussion photo	78
Annex 10: Drug prices at different level.....	79

ABSTRACT

This study was conducted to identify: the actors, their roles, competences and main constraints of veterinary service delivery system in Ada'a district of the Oromia regional state, Ethiopia. The kebele administrations were selected representing urban, peri-urban and rural areas of the district based on the presence and absence of veterinary clinics and drug shops. Questionnaire, focus group discussions, key informant interviews and desk review were conducted to gather important primary and secondary data. For the questionnaire survey 100 household heads from the rural, peri-urban and urban were selected purposively. This assessment revealed that the district obtains veterinary services mainly from three sectors: public, private and third sectors. The public serves 62%, 56% and 45% of clinical treatment, vaccination and drug sales respectively. "Open-air clinic" (SVM) 38% clinical cases and 37% drugs sales. Private 40%, 5% and 43% of clinical treatments, Vaccination and veterinary drug sales respectively. Veterinary pharmacies cover 82% of drug sales and 44% of clinical cases. Part time veterinarians 11% of clinical cases, 2% vaccination and 9% of drug sales. From the respondents 53% were illegal drug user. Ada'a dairy cooperative provides 12.5%, 7.5% and 10% of clinical cases, vaccination, and drug sale respectively mainly to its members. Donkey sanctuary provides 16.675 and 6.67% of clinical cases in the peri-urban and rural respectively. SPANA provides clinical cases of 7.5 and 7.5% vaccination in the urban. Inadequate budget, logistic problems, shortage of manpower and working days were found to be the main causes for the very weakness of government veterinary services, and black-market drug dealers were found to be challengers of private practitioner. But significant population of dairy cattle and poultry farms with good access to market, there appears to be opportunities to profitability support the private veterinary sector in the study area.

Keywords: *Ada'a district, Drug, Private, Public, Vaccine, Veterinary service*

1. INTRODUCTION

Agriculture is the basis of Ethiopia's economy and is the most important economic sector in terms of generation of foreign currency. The sector is the primary source of livelihood for more than 85 % of Ethiopian rural households who practice subsistence crop and livestock production. The Ethiopian economy is heavily dependent on agriculture sector. The livestock sub-sector contributes an estimated 12% the total and over 45% to the agricultural GDPs (NBE, 2008), over 90% of the foreign exchange earnings and about 85-90% of the employment opportunities in the country (USDS, 2010; MoARD, 2006). The current Ethiopian agricultural policy, which advocates Agricultural Development Led Industrialization (ADLI), has led the Ministry of Agriculture to spearhead the intensification of activities in support of agricultural development. One concern is the overall improvement and development of the livestock sector (MoARD, 2007).

Livestock are being recognized as essential assets for livelihoods; as key to moving out of poverty; as a way into lucrative markets; as a source of foreign exchange; as well as important cultural resources, social safety nets and means of saving (Scoones and Wollmer, 2006). Animals provide highly nutritious foods, and provide draught power, transport, manure, and hides and skins (IPST, 2004). Ethiopia has a total of 51.8, 63.3, 2.5, 8.1, 42.1 and 4.6 million heads of cattle, shoat, camels, equine, poultry and bee colonies respectively (CSA, 2009). Livestock production systems in Ethiopia are generally subsistence oriented and productivity is very low (Belachew and Jemberu, 2003).

Ethiopia possesses the most important livestock resource of all African countries. Nevertheless, the production is very low: the important resource remains in practical life unexploited due to diseases, poor nutrition, poor husbandry and marketing problems. Despite the efforts of the Veterinary Services, emergent diseases are present in the

country: Foot-and Mouth disease, Peste des petits ruminants, Sheep- and goat pox, Newcastle disease and African horse sickness (Mayen, 2003a).

In most African countries the animal health service has declined due to a number of reasons associated with stagnant economies with increased responsibilities of the states; inadequate and unpredictable access to foreign exchange; recession of global economy; influence of the structural adjustment programs supported by World Bank and IMF and the presence of different production systems within a single economy in a country. In recognition of the shortcomings of conventional veterinary service delivery system, many development agents including NGOs and UN organizations started using primary animal healthcare approaches. However, there are challenges to be addressed during the implementation of primary animal healthcare services related to poor organization of regulatory bodies, lack of clear demarcation between public and private goods services, poor management of the transfer of services from the government to the private sector, delivery of animal health services in low input areas and provision of adequate services of acceptable standard (MoARD, 2010).

To ameliorate the development constraints and realize the benefits from the huge but untapped livestock resource, efforts have been made in various aspects to develop the livestock sector. These efforts include the provision of input and services such as animal health, breed improvement, feed resources development, research, extension services and development, finance and marketing (Azage *et al.*, 2006). The benefits derived from livestock are far below the existing potential. While a number of factors are attributable to the problem, livestock diseases remain as the most important constraints to the development of the sub sector. This is because livestock diseases are distributed across all agro-ecological zones of the country. To curb the problem, Animal and Plant Health Regulatory Directorate (APHRD), National Animal Health Diagnostic and Investigation Center (NAHDIC), National Veterinary Institute (NVI), regional animal health services, regional veterinary laboratories and National Tsetse and Trypanosomosis Investigation

and Control Center (NTTICC) are carrying out livestock disease surveillance, prevention, control and eradication activities (MoARD, 2010c).

Today the development and growth of many countries depends on the performance of their agricultural policies and economies. This relates directly to the quality of their veterinary services (VS). Important roles for VS include veterinary public health and regional and international market access for animals and animal products. To meet these opportunities and challenges, VS need to operate on scientifically based principles and be technically competent, independent and immune from political pressures (OIE, 2010).

Therefore, revitalization of veterinary services is required to increase the efficiency and effectiveness of animal healthcare delivery and, consequently, livestock productivity; safeguard public health; and contribute to national development. Thus, this study was conducted with the following general and specific objectives:

General objective of this study was to assess the veterinary services delivery system in Ada'a district, Ethiopia.

The specific objectives of the study were to:

- Identification of actors, their roles and competences in the veterinary service delivery system in the study area and
- Identify the main constraints of veterinary service delivery system.

2. LITERATURE REVIEW

2.1. Veterinary services in Ethiopia

The main objectives of the veterinary services are to ensure animal health and welfare; protect human health and ensure the provision of healthy hygienic animal products (NEPAD, 2005). According to World Bank (2002), livestock services can be grouped into two major functional categories: health and production services. Health services include curative and preventive services and the provision of pharmaceuticals. Curative services include the provision of clinical care, while preventive services consist of vaccination, vector control, and disease control measures such as quarantines and movement restrictions. On the other hand, production services include research and extension relating to improved livestock husbandry and the provision of input supplies such as seeds, feeds and Artificial Insemination (AI). Production services try to improve livestock productivity by such means as genetic upgrading of livestock through artificial insemination, the improved formulation of feeds, the use of improved forages and changes in management practices.

Livestock departments and their allied veterinary services were established in the early part of the twentieth century across Africa. In the early days, veterinary services in particular were focused on the control of major diseases. With colonial authorities wishing to establish trade links between Europe and Africa, the need to avoid serious disease outbreaks in Europe was of major concern (Waller, 2004).

2.2. Veterinary service delivery system in Ethiopia

In Ethiopia, people have used traditional methods to treat both human and livestock diseases for generations. Plants comprise the largest component of the diverse therapeutic elements of traditional livestock health care practices. Herbal medicine is the branch of

traditional practices that is most amenable to scientific investigation. More than 30% of modern drugs are derived from plants (McCorkle, 1995).

Traditional healers, “Wegeshas”, used to treat both human and animal patients through drenching of herbal drugs, incising and cauterising of abscesses and wounds using sharp objects and hot metals, mending fractures and rehabilitating dislocations. Such practices still exist in some parts of the country. Modern veterinary services started relatively recently in Ethiopia. A French Veterinary Mission began providing veterinary services in 1908. During its occupation of Eritrea, and later other parts of the country from 1936-41, the Italian army was treating equines used in its cavalry unit. Moreover, it established a laboratory around Kechene Medhanealem, in Addis Ababa, where some vaccines were produced (Admassu, 2003).

Delivery of quality and affordable veterinary services is one of an effective means of enhancing livestock productivity. However, access to these vital services is inadequate as public resources are insufficient to serve the entire country. Lack of personnel, shortage of inputs (drugs, vaccines and equipment), poor mobility and one size-fits-all model animal health service delivery system lets the nation to be within a limited coverage of 40-45% (Admassu, 2010).

Organizational set up of the veterinary services in Ethiopia mainly consist of federal and regional entities, where the federal veterinary services is governed under the jurisdiction of the MoARD and the regional components are run under regional agricultural bureaus of the respective regional states (NEPAD, 2005).

2.2.1. Federal veterinary service in Ethiopia

The mandate of the veterinary services include: preparing the country’s veterinary policy, strategy, proclamation, regulations and directives or guidelines; preventing, controlling and eradicating animal and zoonotic diseases; collect, compile, analyze and disseminate

animal health information for concerned national and international organizations. Conducting diagnostic, surveillance and control activities on animal diseases; inspecting and certification of export and import animals, animal products and byproducts with respect to animal health and safety of the products for human consumption; inspecting and licensing/certifying plants or industries that prepare and process meat and related food products of animal origin; approving and inspecting the efficacy of veterinary vaccines, biological and reagents; controlling the handling and use of veterinary drugs (medicaments) in collaboration (jointly) with the Drug Administration and Control Authority (DACA); issuing professional permit to veterinary personnel and supervising their conduct and activities; ensuring animal welfare practices; and representing the country on international veterinary organizations (MoARD, 2006; Gebreegziabher, 2009; NEPAD, 2005).

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2.2.2. Regional veterinary service in Ethiopia

The duties of the regional Veterinary services consists of provision of preventive and clinical services; annual vaccinations, meat inspection, collection of data, infrastructure development, training of AHT and CAHWs, conduct diagnostic activities, procurement of drugs, biological and other veterinary products; and licensing private practices (Gebreegziabher, 2009; NEPAD, 2005).

2.2.3. District veterinary service in Ethiopia

The main activities of district veterinary services includes: provision of vaccination and treatment services to prevent and control diseases; conduct meat inspection at municipal slaughterhouse and collection and reporting of animal disease occurrence and meat inspection data (Zewdie, 2004).

2.2.4. Animal health personnel and infrastructure in Ethiopia

The animal health service delivery in Ethiopia covers only 30% of the country's population. This low service coverage is attributed to lack of personnel, shortage of drugs and equipment, poor mobility, and highland oriented animal health service delivery. With regard to veterinary personnel in the public sector, there are 661 veterinarians, 8709 animal health assistants, animal health technicians, and others (meat inspectors, laboratory technicians and Para professionals). In the country, the number of private veterinary services providers that involved fully in the import, wholesaling and retailing of vet drugs and equipments was estimated to be over 787 in the country. In 2010, there were 41 firms involved in drug importation, 636 in vet drug retail, 110 in veterinary clinic (including drug dispensation) (MoARD, 2010c).

Table 1: Infrastructure in veterinary service

Infrastructure	Number
Regional Diagnostic laboratories	13
Referral Diagnostic laboratory (NAHDIC)	1
Vaccine production center	1
Veterinary clinics	745
Animal health posts	2740
Quarantine Stations	6
Animal products quality control laboratory	1
Domestic abattoirs (Municipal)	90
Export abattoirs	10

Source: MoARD, 2010c.

2.2.5. Private veterinary service in Ethiopia

Historically, veterinary services have been the domain of the public sector and in many developing countries they remain so. Furthermore, past veterinary services were involved almost exclusively in the prevention of highly infectious diseases, which have strong

public good characteristics or externalities associated with their utilization. Due to the inefficiency of public animal health service delivery in those countries, more recently an increasing number of functions are carried out in cooperation with, or transferred to, private operators (Umali and Cornelis, 1994).

Veterinary privatization

Currently, participation of the private sector in the delivery of veterinary services is occurring at an increasing rate. However, most of the participants are geared towards operating drugs shops and importation of veterinary pharmaceuticals, while clinical or diagnostic services are very minimal and are operative in and around Addis Ababa where there are commercial livestock farms (Admassu, 2003).

The need for privatization

Privatization of some veterinary services has received a strong impetus in the developing world over the last decade. Several factors contributed to this trend:

- i. Fiscal constraints and poor management of resources have led to a decline in the operational efficiency of public sector services,
- ii. The development of new technologies has shifted the focus from mostly herd-level prevention, which is more compatible with public intervention, to the treatment of individual animals, which is more suitable for private handling.
- iii. Traditional livestock farming is shifting toward more commercialized operations. At the same time, there is an increasing awareness by traditional livestock herders of the benefits of modern veterinary medicine.
- iv. Increasing supply of veterinarians and shrinking public market: [proliferation of veterinary faculties resulted in an increasing supply of veterinarians. Private practice is further enhanced by the opening of opportunities to sell related products such as drugs, feeds, and farm tools.

These factors contribute to the large numbers of veterinarians seeking to establish private practice (Umali and Cornelis, 1994). On the other hand, demand for veterinary services has increased strongly over the last decades, whereas public sector supply in many countries stagnated or deteriorated. At the same time a group of young graduates, all keen to establish themselves privately, has become available in many developing countries. Together these factors are generating a significant force for privatization (Umali and Cornelis, 1994).

In assessing whether these services can be privatized, it is necessary to obtain a clear understanding of the nature of the service (Umali, Feder, and de Haan 1992). Veterinary services can be classified into four categories (table 2):

Private good: A good or service wherein the person who paid for the good or service exclusively benefits from it and no one else is able to avail of the good or service at the same time (for example, treatment of an animal's broken leg).

Private good with externalities: A private good or service whose production or consumption has spillover effects on other individuals, although the other individuals are not charged for the spillover benefits or compensated for the negative spillover effects (for example, vaccination provides spillover disease protection to animals owned by others).

Private good with moral hazard problems: A private good or service whose quality is not transparent or cannot be easily assessed (for example, vaccine quality cannot be easily evaluated).

Public good: A good or service wherein the consumption of the good or service by one individual does not reduce its availability to others and the person who paid for the

service cannot exclude others from "free riding" or using the service as well (for example, food hygiene and inspection).

Table 2: Livestock services and appropriate sectoral delivery mechanism

Livestock service	Type of economic good		Sectoral delivery	
	Public	Private	Public	Private
Curative				
Diagnosis		X*		YY
Treatment		X**		YY
Preventive				
Vaccination		X*	Y	YY
Vaccine production		X*		YY
Vector control				YY
Tick control		X*		YY
Tsetse fly control	X		Y	
Veterinary surveillance	X		YY	
Diagnosis support		X*	Y	YY
Quarantine			YY	
Drug quality control			YY	
Veterinary research	X	X	YY	YY
Human health protection				
Food/hygiene inspection			YY	YY
Provision of vet supplies				
Production		X		YY
Distribution		X		YY

Note: *, private good with consumption externalities; **, private good with consumption externalities only for infectious diseases; X, good classified as public or private; YY, economically justified; Y, economically justified under special circumstances.

Source: Umali *et al.*, 1992.

Using the same principles, FAO (Smith, 2001), suggested the following responsibility of public and private sector for delivery of livestock services.

- i. Public sector: ensuring the health of the national herd including disease surveillance, compliance monitoring, quarantine, quality control of remedies and vaccines, planning for emergencies and reporting to international bodies and neighboring countries; oversight of food safety, import and export inspection and certification according to international standards; regulation, monitoring and support of other partners in the animal health care system; accreditation of

personnel; creation of an enabling environment for the private sector; and general formulation of livestock development policy.

- ii. Private sector: clinical diagnosis and treatment; production and distribution of remedies and vaccines; artificial insemination; management of herd health and production programmes; marketing livestock and products
- iii. Shared responsibility: disease diagnosis and reporting; compulsory testing; accreditation; tick and tsetse fly control; food hygiene and inspection; continuing education and training; diagnostic support; animal welfare; notifiable disease control; disease emergency response; zoonosis control; research; and advice and extension.

2.6. Traditional veterinary practice in Ethiopia

Traditional veterinary service is believed to have been in practice in Ethiopia long ago however, it is difficult to indicate the exact date of its beginning (Admassu, 2010). Before the introduction of conventional veterinary practice into Ethiopia, the highland peasants and the lowland pastoralists alike used to have their animals treated by traditional healers such as *awalaji* (midwife), *wogesha* (bone-setter), *debtera* (religious man), *kallitcha* and *tenkwai* (fortune teller) (Mesfin *et al.*, 1995). The conservative methods of treatment of animals in the traditional way constituted using herbal medicines, which are acquired from different parts of plants. The physical form of the traditional medicines could be fresh or pounded and dried, administered separately or as a cocktail. In addition, different minerals and fats of animal and plant origin are used as traditional medicines (Mesfin, 1999).

The methods of application are different, such as topical application on surface wounds and making incisions into the skin and burying the medicine under the skin or muscle. Another method of traditional treatment includes different surgical techniques and

branding. These techniques assist in the healing processes of bone fractures and chronic ailments particularly swellings on the skin. Today, traditional medicine continues to be practiced in remote areas of the country where conventional animal health care has not reached (Mesfin, 1999). This has been found to be the case even in Central Ethiopia where modern veterinary services had been introduced many years ago (Wirtu *et al.*, 1997).

Pharmacotherapy is one of the most important means of controlling livestock diseases, but it is possible only if livestock owners can afford to cover the cost of treatments. Cost of treatment is therefore an important determinant of the usefulness of veterinary drugs. In Ethiopia, conventional veterinary services have been playing a paramount role in the control and prophylaxis of livestock diseases in the last three decades. However, they cannot yet deliver complete coverage in preventive and curative health care practices because of inadequate labor, logistical problems, an erratic supply of drugs, and the high cost of drugs and equipment. Consequently, the majority of those raising stock in rural areas are far from the site of veterinary stations, and those who have access to veterinary services may not be able to afford to pay for them. Additionally, reduced funding for animal disease control is an issue in Ethiopia and is likely to influence the incidence of some serious livestock diseases (Sori *et al.*, 1999).

2.7. Livestock disease status and control in Ethiopia

An updated assessment of the present animal disease status of a country is an important and necessary procedure (OIE, 2010). There are diseases reported to be endemic in Ethiopia. These are: Contagious Bovine Pleuropneumonia (CBPP), Lumpy Skin Disease (LSD), Foot and Mouth Disease (FMD), Newcastle Disease (NCD), Peste des Petis Rumanitis (PPR), sheep and goat pox, African Horse Sickness (AHS), Anthrax, Black leg, Pasteurellosis, Contagious Caprine Pleuropneumonia (CCPP), Trypanosomosis, Rabies, Tuberculosis, Tick and tick borne diseases. The occurrence of Rift Valley Fever (RVF) in Ethiopia has not officially been reported. Other diseases occurring in the

country include: haemorrhagic septicaemia, brucellosis and internal and external parasitosis. These diseases cause huge mortality and morbidity. Arthropods and arthropod-borne diseases significantly affect the qualities of hides and skins, which is the source of major foreign currency earning for the country. Prevalent diseases invariably affect the survival and productivity of exotic animals. The presence of these diseases makes it difficult for the country to access international livestock markets. An estimated 1.5–2.5 billion birr is annually lost from animal (NEPAD, 2005; Daudi, 2009).

Cattle owners in Ethiopia have long been aware of serious diseases such as *desta* (rinderpest), *aftegir* (foot and mouth disease), *abasenga* (anthrax), *abagorba* (blackleg), *gendi* (trypanosomosis) and diseases caused by internal and external parasites, and of the zoonotic nature of diseases such as anthrax and rabies. Before the introduction of modern veterinary practice, traditional healers were usually the only people approached to attend to these livestock diseases. The various traditional practices included prevention of diseases, recognition of toxic plants, surgical intervention and crude vaccination methods (Mesfin and Obsa 1994).

However, nowadays when Blackleg, anthrax, PPR, LSD, sheep and goat pox and, bovine and ovine pastuerollosis outbreaks occurs they are controlled by mass vaccination of the risky population following the reports their occurrences. CCPP outbreaks are controlled by mass administration of oxy tetracycline (antibiotics) injections for risky population (Bayissa and Bereda, 2009). Annual vaccination and treatment are entirely carried out by regional and district veterinary services.

In response to the animal health service delivery gap, GO, NGOs and development organizations introduced different models of community based animal health service delivery system as an interim measure to save livestock keepers from eventual loss of their asset and vulnerability. The system supports provision of basic animal health care by community animal health workers. CAHWs can provide services at much lower cost

than comparable services delivered by professional veterinarians, because they live locally, do not require transport, often use cheaper local treatments and have lower income expectations. CAHWs are usually part-time workers who also make a living from rearing livestock (Admassu, 2010).

Community-based Animal Health Workers (CAHWs) are community members who have received basic and non-formal training in animal health care and who prevent and treat animal diseases within their community (Abebe, 2003). Most CAHWs' work focuses on simple treatable diseases such as internal and external parasites and infections which respond to antibiotics and trypanocides (Scoones and Wolmert, 2006).

2.8. Livestock disease reporting system in Ethiopia

Two types of reports are done by veterinary offices. Routine activities reports contain specific cases, curative service of veterinary clinics and health posts and mass vaccinations information whereas outbreak reports comprise information of outbreaks occurred. Veterinary offices have been reporting routine activities of veterinary clinics/posts through hierarchal chains from local to district to province/region and finally to national office. The reports are submitted to their respective high level veterinary offices on monthly, quarterly and annual basis. Formats developed by DVOs (District Veterinary Offices), for routine activities reports are, in general, prepared in such a way to collect type of species, age and number of animal treated; type of diseases diagnosed; and type of drug used for treating. Species and number of animals vaccinated and type vaccine used data could be included to these reports format if vaccinations are done (Bayissa and Bereda, 2009).

The Federal Veterinary Service collects the data and stores them, and report to the Office International des Epizooties (OIE). A standard format is used for this purpose. These Passive Surveillance reports should be sent every month to the Federal Veterinary Services, but staff shortage and logistic problems (shortage of cars, no Internet

connection), and a very rudimentary or non-existent communication between the Regional and the Federal entities result in a reporting rate between 5% and 37% (depending on the region) instead of the required 80% per year. The OIE requires at least 10 times a year reports coming from the regions. The Epidemiology Unit of the Federal Veterinary Services introduce the gathered data into a computer database, from where the information is forwarded to the OIE and also to the OAU/ IBAR, FAO and neighboring countries (Mayen, 2003b).

2.9. Veterinary service in meat and live animal export

The current international standards governing trade in livestock commodities insist that animal products be derived from areas which are free from certain animal diseases. The underlying principle of the standards is that if an area is free from disease, it cannot export disease to another area or country. For Africa and other developing regions, the implication of the standards is that these regions need to eradicate numerous animal diseases before they can engage in international trade. Unfortunately, such eradication is technically infeasible and hugely expensive, and therefore, millions of livestock producers remain isolated from lucrative international markets (MoARD, 2010b).

The OIE Terrestrial Animal Health Code specifies the guidelines for safe animal and animal product trade. These guidelines specify that LLP must originate from countries or specified geographical areas (zones) of a country that are free from major animal diseases, capable of causing economic losses or human diseases. Like other developing countries, constrained by these international regulations Ethiopia is considering the establishment of disease free zone (DFZs) in Borena, Ogaden and Afar areas in order to maximize profits from the huge livestock resource in these parts of the country. The document highlights accounts on livestock resource potential, profiles of each of these areas, descriptions of project components and expected outputs along with the various phases of the implementation process. In addition, it also provides details on organization and management needs, monitoring and evaluation mechanisms and capacity (manpower,

facility) requirements for the implementation of the project. Currently, there is no disease free zone officially communicated to the OIE (NEPAD, 2005).

There are some nine privately-owned export abattoirs in Ethiopia (Aklilu, 2008). As of early 2011, there are seven functional export abattoirs involved in exporting small ruminant chilled meat (Sebsibe, 2011). ELFORA Agro-Industries P.L.C, Modjo Modern Export Abattoir P.L.C, Luna Export Slaughter House P.L.C., Hashim Ethiopia Livestock and Meat Export (Helimex P.L.C.), Organic Export Abattoir, Abergelle International Livestock Development P.L.C, and Ashraf Export Abattoir PLC.

The Government of the Federal Democratic Republic of Ethiopia (GFDRE) recognizes livestock as one of the country's key economic resources. The government's policy aims to increase in-country value addition by encouraging meat exports over live animal exports. The establishment of USAID funded Ethiopia Sanitary and Phyto-sanitary Standards and Livestock & Meat Marketing Program (SPS-LMM) in 2005 and Ethiopia Meat & Dairy Technology Institute in January 2008, are the major measures taken to support private sector to immediately increase sales and profitability and provide them with tools for long –term success (SPS-LMM, 2010). The main goal of the SPS-LMM program is to increase exports of meat and livestock to benefit Ethiopian livestock producers and exporters and to promote national economic development (MoARD, 2010b).

The main objective of quarantine and inspection service is to prevent the entrance of exotic diseases into the country and to inspect exported and imported animals, animal products & by products (Aklilu, 2008). These livestock exports have suffered from repeated trade bans due to importing countries' concerns over trans-boundary diseases. In order to overcome these challenges the exporter must obtain a health certificate from a quarantine service station, following a minimum of 30 days of quarantine during which the exporter is responsible for all feed and watering expenses (Mulugeta *et al.*, 2007).

There are about 12 public quarantine stations and check posts in Metema, Mille, Dire Dawa, Jijiga, Addis Ababa, Adama, Moyale, Dolo Odo, Ferfer, Geladin, Gashamo and Dewele (MoARD, 2010c). There are veterinarians, senior inspectors and junior inspectors assigned at each of these posts. At the veterinary inspection post of Bole Airport (which is the main port of exit for animal products via air shipment), two veterinarians and four senior inspectors are assigned to inspection in order to control the movement of animal products. Each animal must undergo quarantine procedures before export in an APHRD approved animal quarantine station for a minimum period of 30 days (Manzella and Vapnek, 2007). Ethiopian certification is neither required nor seen by the final recipient, as all animals are re-certified as Djibouti origin (ACDI/VOCA, 2008).

2.10. Vaccine production and quality control

The National Veterinary Institute (NVI)

The National Veterinary Institute which is located in Debre Zeit, 47 Km from Addis Ababa, was established in 1963 with the help of the French Government. It produces and supplies most of the vaccines needed in the country as well as occasional surplus for export and it is managed as a government enterprise (MoARD, 2006).

Pan African Veterinary Vaccine Centre (AU-PANVAC)

It is located in Debre Zeit within the premises of the National Veterinary Institute. Since 2006 PANVAC is reorganized and is now operating as a specialized agency under the Department of Rural Economy and Agriculture (DREA) within the Commission of the African Union. PANVAC's principal objective is operating as a leading regional authority in veterinary vaccine quality control testing in Africa and in the standardization of veterinary vaccines in the region (MoARD, 2006).

2.11. Legal framework (proclamations and institutional arrangement)

Agricultural service in Ethiopia has been influenced by the different political systems and prevailing government policies and strategies. In the imperial era, agricultural extension and other support services were targeted for larger commercial farmers while marginalizing the smallholder farmers, and therefore limited coverage. During the Derg regime, the system has a relatively wider coverage and attention, but the focus was on cooperative/collective farmers and large-scale commercial state farms, still at the expense of smallholder farmers. After 1991, ADLI provided policy guide to focus on increasing productivity of the smallholder agriculture in general has been expanded (Ahmed *et al.*, 2004 and Habtemariam, 2005).

Available information depicts that over the last 60 years, the veterinary services has experienced ups and downs in its structural setups and mandates. From an autonomous setup during the imperial regime, its power diminished to the status of division/team for over 67% of its period till 2004 (Hurrisa, 2004).

Table 3: Trends of the organizational setup of the veterinary services of Ethiopian

year	Organization set up	Duration
1943-63	Imperial Health Service (autonomous)	20
1963-72	Animal Health Department	9
1973-75	Animal Health Division	2
1975-79	Animal Health Service (Under Livestock and Fishery Development Authority)	4
1980-85	Animal Health Team	5
1985-94	Animal Health Department	9
1994-2004	Animal Health Team	10

Source: Hurrisa, 2004.

The Animal Disease Control Proclamation No. 267/2002 regulates the prevention and control of animal diseases. The proclamation tasks the Ministry of Agriculture and Rural Development with import controls on animals and animal products as well as animal

movement restrictions. Import requirements are set forth, including import permits and inspections. The ministry is obliged to establish an emergency preparedness and epidemic surveillance system to contain the spread of animal diseases and prevent the introduction of exotic diseases into the country. The Ministry is authorized to declare animal quarantine in areas infected by animal diseases of economic relevance and to order zoo sanitary measures. With regard to exports, the ministry is responsible for international veterinary certification and the establishment of disease-free areas. The proclamation also sets out export conditions and procedures that exporters shall follow.

A set of regulatory instruments are in place for meat production and inspections. The Meat Inspection Proclamation No. 274/1970 confers a mandate on the ministry to control and regulate the production, processing and handling of livestock products. The Meat Inspection Amendment Proclamation No. 81/1976 mandates the ministry to issue regulations and establish criteria for livestock production for human consumption, including classification of products and inspection of processing facilities. The Meat Inspection Regulations No. 428/1972 lay down the requirements for setting up abattoirs and commercial establishments dealing with slaughtering, preparation and processing of livestock products for export from or import into Ethiopia.

The investment proclamation No 280/2002 and 373/2003 and investment regulation (84/2003) gives a room for investment climate and stipulates incentive for private sector development. Commercial registration and business proclamation (67/1997) prohibit engaging in any commercial activity unless registered in a commercial registry and requires to present certification of professional qualification and statement related to the commercial activities. In this regard, list of commercial code were prepared for registration livestock related services such as veterinary service, dairy farm, milk and dairy processing, animal feed, forage and AI services, in retail, whole sell, industry and import and export trades and consultancy service are clearly outlined.

The Drug Administration and Control Authority (DACA) was established as a semi-autonomous regulatory agency through Proclamation No. 176/1999 with the objective of ensuring safety, efficiency and quality of drugs and regulating their production, distribution and use. DACA has the power to set standards and ensure their observance, to control the quality of raw materials and packaging and to monitor drugs and set standards for traditional medicine practitioners and users. Along with these functions, inspectors are empowered to search any premises, conduct inspections, seize documents and take samples of materials. DACA performs import and distribution controls through a system of registration and import permits

3.1. General description of study area

Map of the Balkan Peninsula showing the distribution of 28 bird species. The map is divided into numbered regions (1-28). A legend on the left lists the species names in two columns. A legend on the right explains the symbols: a box for 'Pobudni (bird)', a line for 'Pobudni (bird)', a line for 'Pobudni (bird)', a line for 'Pobudni (bird)', a line for 'Pobudni (bird)', and a line for 'Pobudni (bird)'. An inset map in the bottom left shows the location of the study area within the Balkan Peninsula.

Source: IPMS, 2010.

21

3.2. Study population

The study was conducted with livestock owners, veterinarians, public veterinary clinics, NGOs, private veterinary pharmacy owners, veterinary drug importers and distributors and district and federal officers.

3.3. Study design

3.3.1. Sampling procedure and sample size determination

The district was first stratified in to urban, peri-urban and rural areas based on their proximity to Debre Zeit town. Three kebeles were selected from the three subsystem of the district. They were purposely selected based on the presence, absence and distance from the veterinary clinics, accessibility of drug stores (veterinary pharmacy) in the kebele. From each kebele 6-12 household heads selected, on average 8 household heads were selected for a single group discussion and a minimum of three groups from a kebele were organized and allowed to discuss for an average of two hours. For the questionnaire survey 40, 30 and 30 respondents were selected from the urban, peri-urban and rural respectively.

Sample size for the questionnaire survey was determined according to Arsham (2007) sample size determination formula: - standard error considering confidence interval at 5% and confidence level of 95%, the total sample computed was 100 households.

$$N = 0.25/SE^2$$

Where N= Sample size

SE²= Standard Error square

With the assumption of 5% standard error a total of 100 households were selected.

3.3.2. Methods of data collection

Questionnaire survey

A detailed and organized questionnaire format (Annex 1) was designed in an attempt to generate baseline information related to veterinary service delivery, livestock production with particular emphasis on major livestock health problems; livestock diseases considered as important by farmers; lost animals due to disease and measures taken by farmers against these diseases. The questionnaire was framed in such a way that farmer could give information that is recent and easy to recall and it was filled directly by interviewing purposively selected farmers and veterinary users.

Focus group discussion

The focus groups were formed by selecting communities of the targeted population. Focus group discussions were conducted at each selected PA. Group discussion was repeated until no new idea comes out. Therefore, the total number of 9 focus group discussions was held during the study period. Each focus group discussion on average composed of 8 discussants (Annex 2).

Key informant interviews

Interviews were conducted using checklist involving people participating in veterinary drug, dairy, fattening, mixed farms, and the government officers at the woreda, regional and federal levels which took 30 minutes to one hour. (Annex 2).

Secondary data collection

Results of previous studies, guidelines, manuals, policies and regulations and literatures were reviewed to assess current veterinary service, drug administration and licensing body, surveillance and reporting systems across the country and especially of the districts of Oromia region. The secondary data collected pertaining to the investigated issues was also collected. Routine activities and outbreak reporting formats developed at different veterinary offices were also thoroughly assessed.

3.4. Data analysis

After collecting the data the Microsoft Excel spread sheet program was used for storage of the collected data then subjected to analyses using SPSS (Version 17). Quantitative data collected from the selected area of veterinary service receivers was analyzed using descriptive statistic. Qualitative assessment was employed for data collected through focused group discussion, interviews of veterinary service providers and government policy document narrative analysis.

4. RESULTS

4.1. Characteristics of household heads

4.1.1. Demographic characteristics

From the selected respondents in the study area 86% were males and the rest were female respondents. The number of female respondents, who are either household heads or owners of the livestock, is more in urban subsystem where they comprised 22.5% of the urban respondents than the peri-urban and rural sub system where females comprised 13.33 and 3.33% of the respondents respectively (Table 5).

4.1.2. Means of livelihood

Livestock are an important source of food, draught power and more importantly as cash income. In the study area horses used for cart and donkeys for transportation play an important role for a HH to engage in petty trade thus to build better livelihood. Accordingly the livestock products such as butter, milk, shoats and poultry selling are an important income source to livestock owners.

The major source of livelihood in the rural and peri-urban is mixed crop livestock production. On the other hand, the major source of livelihood for the urban are dairy farming (52.5%), monthly salary (27.5%) and petty trading (17.5%) (Table 4).

Table 4: Means of livelihoods for farmers in the study area

Means of Livelihood	Sub System						Total			
	Urban		Peri-urban		Rural				χ^2	P value
	N	%	N	%	N	%	N	%		
Mixed farming	1	2.50	28	93.33	29	96.67	58	58	96.489	0.000**
Crop rearing	00	00	2	6.67	1	3.33	3	3		
Dairy Farming	21	52.50	00	00		00	21	21		
Monthly salary	11	27.50	00	00		00	11	11		
Petty trade	7	17.50	0			00	7	7		

**highly significance difference (P<0.05)

4.1.3. Education level of household heads

The educational status of the HH head is a key as it is influencing ability to access and use and make informal decision in veterinary service, such as vaccination and treating diseased animal in the veterinary clinic rather than using traditional healers. The highest illiteracy rate 86.67% was reported in the rural PAs followed by peri-urban 66.67% and urban 37.5%.

In the peri-urban 10%, 3.33% and 23.33% of the respondents have learned through elementary, high school and informal education respectively. In the urban area most 45% of the respondents were literate, 20% who attended elementary school, followed by 25 % who attended high school and above and 17.5% of the respondent can read and write from informal education. The rural area showed that 3.33% and 10% of the respondents were from elementary school and informal education respectively. The urban shows with better educated people than the peri-urban and the rural PAs, this is due to the fact that the urban people are able to access education easily.

Table 5: Respondent characteristics

Variable	Sub System						Total	
	Urban		Peri-urban		Rural		N	%
	N	%	N	%	N	%		
Sex								
Male	31	77.5	26	86.67	29	96.67	86	86.00
Female	9	22.5	4	13.33	1	3.33	14	14.00
Education level								
Illiterate	15	37.50	20	66.67	26	86.67	61	61.00
Read and write	7	17.50	7	23.33	3	10	17	17.00
Elementary	8	20.00	3	10.00	1	3.33	12	12.00
HS & above	10	25.00	0	00	00	00	10	10.00
Marital Status								
Married	35	86.50	26	86.67	28	93.33	89	89.00
Divorced	2	5.00	3	10.00	1	3.33	6	6.00
Widowed	3	7.50	1	3.33	1	3.33	5	5.00

4.2. Livestock keeping constraints

Livestock disease, feed shortage and grazing land were the major livestock keeping constraints identified by the sampled household respondents in the district. Sampled HHs in the rural sub system put animal disease as their most important constraint followed by livestock grazing land challenge and feed shortage with the proportion of 50%, 43.33% and 6.67%, respectively (Table 6). In the peri-urban sub system similar to that of the rural, livestock disease, grazing land and feed shortage were accordingly ranked with 66.67%, 23.33% and 10% respectively.

Table 6: Livestock keeping Constraints

Livestock Constraints	Sub System						Total	
	Urban		Peri-urban		Rural		N	%
	N	%	N	%	N	%		
Livestock diseases	4	10.00	20	66.67	15	50.00	39	39.00
Feed Shortage	36	90.00	3	10.00	2	6.67	41	41.00
Grazing land	0	00	7	23.33	13	43.33	20	20.00
Total	40	100	30	100	30	100	100	100

Shortage of feed has been considered as the most important challenge to all livestock owners in the urban area (Debre Zeit town). 90% of the sampled households of the urban has ranked feed shortage as first constraint in their livestock keeping. They have explained that the price of feed at that time was highly rating and was expensive. The second important constraint is livestock disease, which was reported by 10% of the urban sampled households (Table 6).

4.3. Veterinary service providers

All informants, in questionnaire survey and group discussions agree that public veterinary service, private veterinarians, traditional healers are the main source of veterinary service in the district. Public vet service, illegal drug dealers and traditional healers were the main source of veterinary service providers in the rural and peri-urban areas of the district. Public and private veterinary services were the main actors in the urban. In addition to these Ada'a cooperative, Donkey sanctuary and SPANA are also playing their role in the veterinary service delivery in the district (Table 8, 10 and 12).

4.3.1. Actors and their roles in veterinary service delivery

Based on these findings veterinary service providers in the study area were classified in to three sectors as public, private and third sector. Based on the classification each service provision and activities are explained here.

A. Public veterinary clinic

Ada'a district Agricultural and Rural Development Office is situated in Debre Zeit town administration which is surrounded by 27 PAs of the district. The veterinary service main body has not given any transport vehicle. This problem has hindered the continuous surveillance and response to emergency calls in time in the district (personal observation).

The veterinary clinic in the rural area (Godino) has only single class in which all veterinary services, veterinary drugs and equipments are placed (Annex 7B). At the same time the class is used as animal feed seed store. There is no electricity and fixed phone. One Animal Health Assistant (AHA) is assigned to provide the veterinary service including the surrounding PAs. The peri-urban (Ude) has a single class (Annex 7A) veterinary clinic which is used as store for veterinary medicine drug and veterinary equipment and office for the assigned Animal Health Assistant who is expected to cover five peasant associations. There is wood made crush for vaccination and treatment of patient animals. The clinic is without electricity and fixed phone. The urban (Debre Zeit town) has public veterinary clinic with four premises which are allocated for laboratory; store for drug and other veterinary equipments; office and toilet. These premises are equipped with electricity, fixed phone, deep freezer and other laboratory equipment facilities. Veterinary drug and equipment were supplied by WoARD for all clinics in the district. (Annex 9).

Table 7: Human resource and clinics of public veterinary service in the district

	Educational level						Total		Clinic
	DVM		AHA		AHT				
	M	F	M	F	M	F	M	F	
Sex									7
Employed	1	1	4	4	1	-	6	5	
Gap			6				6		3

There were two veterinarians (DVM), eight animal health assistants (AHA) and one technician working in the veterinary service delivery system in the district. On an interview with one of the officer in the veterinary service of the district remarked that the coverage of veterinary service currently provided and the number of PAs were not proportional so six animal health assistant are more needed. The structure for veterinary service in the district showed one veterinary clinic with one animal health assistant for three peasant association. Since the district owns 27 peasant associations it needs additional three clinics and three animal health assistants for the rural and peri-urban subsystem of the district. In the urban veterinary clinic two DVM and three AHA and in the Bishoftu municipal abattoirs one AHA and AHT are required. Totally 6 AHA are required by the district to fulfill the required veterinary service in the district, but due to budget and other reasons by the WoARD still not employed (Table 7).

The budget allocated by the WoARD for the veterinary service sector for the year 2011-2012 was of two types: 40,000 birr as revolving fund for veterinary section is expected to cover drug and vaccines and the operational budget 11,000 birr as operational budget for operational costs. The revolving budget is used to buy drugs through regional office and vaccine directly from National Veterinary Institute. After selling of the drug and vaccine the money is returned to the district account. The operational budget is also used for some material like soap, fuel, stationary and other non permanent materials.

Activities of the public veterinary clinics

During the study, the public veterinary service sector (WoARD) plays a central role in animal health and veterinary drug distribution services especially in the rural and peri-urban of the district (personal observation). The (WoARD) animal health team also provide service such as disease prevention and control (clinical service); disease surveillance and information; quarantine and inspection in the municipal abattoirs of Debre Zeit town; control of illegal veterinary drug trade; supervise the operation of private veterinary service providers (veterinary pharmacies) in the district; and evaluate the standard, professional competence and project proposal of new entrants in to the sector. Provision of veterinary service is the major and the day to day activity and encompasses treatment and vaccination; laboratory diagnosis and sample collection for regional laboratory. In addition to clinical service at the clinic, they are also involved in mobile clinical service on call basis and vaccination campaigns when disease outbreak is reported from farmers. This study revealed that the public (WoARD) veterinary clinic involvement for the rural, peri-urban and urban parts of the district selected for the study of veterinary service in the provision of clinical treatment (62%), vaccination (56%) and drug sales (45%). The School of Veterinary Medicine (SVM) is another public veterinary service provider through the “Open-air clinic” in its campus accounting for the provision 28% of the clinical service, 27% of the drugs sales (Table 8, 10, and 12).

Prevention and control

The main objective of the public veterinarian was on the control and prevention of different diseases through vaccination and treatment. During the study period from October 2011 – April 2012 the public vet clinics have been in many activities in the district. In this period the veterinarians have given service to 79,987 doses of vaccination and treatments of 240,011 patient animals. Miscellaneous activities and meat inspection was experienced in the municipal abattoir of the town (Table 8).

Table 8: Actors of clinical veterinary services providers

Types of clinical Veterinary Services providers	Sub System						Total		χ^2	P value
	Urban		Peri-urban		Rural		N	%		
	N	%	N	%	N	%				
Clinical	40	100	30	100	30	100	100	100		
WoARD Vet clinic	2	5.00	30	100	30	100	62	62.00	91.935	0.000**
WoARD personnel on call	14	35.00	9	30	15	50	38	38.00	2.801	0.246
Private vet Pharmacy	12	30	15	50	17	56.67	44	44.00	5.574	0.62
Private Vets on Call basis	19	47.50	16	53.33	5	16.67	40	40.00	9.965	0.007*
Part time vet personnel	11	36.67	00	00	00	00	11	11.00	18.539	0.000**
SVM (AAU)	3	7.50	22	73.33	13	10	38	38.00	32.053	0.000**
Open air clinic	00	00	17	56.67	11	36.67	28	28.00		
Donkey sanctuary	00	00	5	16.67	2	6.67	7	7.00		
SPANNA	3	7.50	00	00	00	00	3	3.00		
Ada'a cooperative	5	12.50	00	00	00	00	5	5.00	7.895	0.019*
Traditional treatments	00	00	25	83.33	30	100	55			

**highly significance difference (P<0.05)

Bishoftu municipal abattoir is administered by the town municipality and supervised by WoARD veterinarian. It is a moderate-sized abattoir established to provide slaughter and inspection services to local butcher shops in the town. On average, 25 bovines are slaughtered daily. The overall abattoir sanitary environment is below the requirements of good hygiene practices in slaughterhouses. One technician meat inspectors deliver services in the abattoir.

Table 9: Activities of the public vet clinics

No	Activities	Species					Total
1	Vaccination	Cattle	Shoats	Equines	Poultry	Canine/Feline	
	Anthrax	3950	195	1220			5365
	Blackleg	23052					23052
	Pasteurellosis	19640	4540				24180
	FMD*		-	-			
	AHS			950			950
	Newcastle				470		470
	Rabies					1147	1147
	LSD	9765					9765
	Sheep pox		14228				14228
	PPR		830				830
	Total	56407	19793	2170	470	1147	79987
2	Treatments	9916	5012	1176	86458		102562
	External parasite	17288	10677	1251	31808	30	61054
	Internal Parasite	16711	11193	5008	42878	605	76395
	Total	43915	26882	7435	161144	635	240011
3	Miscellaneous						
	Mastitis	399	64				463
	Castration	2102	1219	416			3737
	Wounds	249	296	356	2		903
	Hoof trimming	63	66				129
	Dehorning	38	16				54
	Obstetrics	157	129	27			313
4	Abattoir	6572					6572

*FMD vaccine not given till April, 2011/2012

Table 10: Actors of veterinary drug services providers

Source of Veterinary drug Services	Sub System						Total			
	Urban		Peri-urban		Rural				χ^2	P value
	N	%	N	%	N	%	N	%		
Veterinary Drug										
WOARD Vet clinic	2	6.67	21	70	22	73	45	45.00	43.165	0.000**
WOARD personnel on call	13	32.50	9	30	15	50	37	37.00	3.153	0.207
Private vet Pharmacy	24	60.00	28	93.33	30	100	82	82.00	22.313	0.000**
Ada'a cooperative	4	10.00	00	00	00	00	4	4.00	6.250	0.044*
Private Vet on Call basis	20	50.00	18	60.00	5	16.67	43	43.00	12.825	0.002*
Part time vet personnel	9	22.50	00	00	00	00	9	9.00	14.835	0.001*
SVM (AAU)	3	7.50	21	70.00	13	43.33	37	37.00	35.078	0.000**
Open air clinic	00	00	16	53.33	11	36.67	27	27.00		
Donkey sanctuary	00	00	5	16.67	2	6.67	7	7.00		
SPANNA	3	7.50	00	00	00	00	3	3.00		
Open Market	00	00	23	76.67	30	100	53	53.00	78.456	0.000*

**highly significance difference (P<0.05)

Reporting system

The WoARD Veterinary Service coordinator collect monthly report from the animal health assistants and veterinarians in the urban, peri-urban and rural clinics and animal health posts of the public vet workers and private vet service providers in all sub systems and are reported to the zonal (East Shoa zone) veterinary service and to Animal and Plant Health Regulatory Directorate (APHRD) at the federal MoARD through the zone. The reporting format which is used to report to zonal veterinary service department is written in Oromic language and a standard format (OIE) is used for reporting to APHRD. During the study the record file showed the number of reports sent to the zone and federal office was 100%.

B. Private sector

Private organizations and individuals providing veterinary services in the district include veterinary drugs shops, mobile clinics with fulltime and part time. These private service providers operate more intensively in Debre Zeit town with few drug retailers in the peri-urban and rural areas. Private sectors play a vital role in the veterinary service delivery especially in Debre Zeit town. Private veterinarian serve on call basis for clinical treatments covers (40%), vaccination service (5%) and drug sale while treating patient animals (43%). There are six privately owned and licensed veterinary pharmacies and one veterinary clinic in the study area, four of them are in the urban area (Debre Zeit town), while the other two rural drug shops are located in the rural peasant association of Godino and Dire while the veterinary clinic is at Hidi. These veterinary pharmacies cover drug sale service of 82% and clinical veterinary service 44% in the district. Part time veterinary service providers mainly act in the urban area (Debre Zeit). The source of these part time veterinarians were: The National Veterinary Institute (NVI); School of Veterinary Medicine (SVM) and other privately owned farms in and around Debre Zeit. The main sources of drug for private practitioner are the importers and distributors in Addis Ababa

Table 11: Private veterinary clinic and drug shops in Ada'a district

No	Private vet practitioners	Location kebele	licensed	qualification
1	Private Veterinary clinic	Hidi	yes	DVM
2	Rural drug shop	Dire	»	10 ⁺³
3	Rural drug shop	Godino	»	10 ⁺³
4	Dynamic Drug shop	02	»	DVM
5	TAD Drug shop	13	»	DVM
6	Tilahun Qopesa Drug shop	01	»	12 + 6 month
7	Ybeyn Drug shop	13	»	DVM

Part-time veterinary professionals serve 11% of clinical cases, 2% vaccination and 9% of drug sales during treatment. The illegal drug dealers in the open market mainly sell their

drug to the rural and peri-urban parts of the district which account for 53% of the respondents. This is significantly different ($p<0.05$) with that of the urban. This difference is due to shortage of drug in the public veterinary clinic in the rural area and the cost of drug is cheaper than in the private pharmacy. The other reason is the urban people were better aware of the use and disadvantages of illegal drug (Table 8, 10 and 12).

C. Third sector (Ada'a cooperative, SPANA and Donkey Sanctuary)

On an informant interview with one of an employee of Ada'a dairy cooperative insisted that, Ada'a cooperative was established in 1996, as a result of milk market, feed shortage and veterinary service problems for dairy cows in the town (Debre Zeit). The cooperative was established to solve these problems collectively and for reducing dependence on the government or private service providers. Ada'a cooperative serves its members in the animal health services. Ada'a cooperative has employed its own veterinarian who is full time worker for routine and emergency services. Respondents of the urban sub system showed that Ada'a dairy cooperative veterinary service gives door to door service for members mostly on call basis, clinical veterinary services of 12.5%, vaccination 7.5% and drug sale 10% of the urban veterinary service users (Table 8, 10 and 12).

Table 12: Actors of vaccination veterinary services providers

Type and Source of Veterinary Services	Sub System						Total		χ^2	P value
	Urban		Peri-urban		Rural		N	%		
	N	%	N	%	N	%				
Vaccination	40	100.00	30	100	26	86.67	96	96.00	96.000	0.000**
WoARD Vet clinic	00	00	30	100.00	26	86.67	56	56.00		
WoARD personnel on call	26	65.00	0.0	00	00	00	26	26.00		
Ada'a cooperative	3	7.50	00	00	00	00	3	3.00		
Private Vet on Call basis	5	12.50	00	00	00	00	5	5.00		
Part time vet personnel	2	5.00	00	00	00	00	2	2.00		
SVM (AAU) SPANA	3	7.500	00	00	00	00	3	3.00		
No source (self)	1	2.50	00	00	00	00	1	1.00		

**highly significance difference ($P<0.05$)

An informant interview revealed that the donkey Sanctuary is a UK based charity which was launched as a project on donkey health and welfare in Ethiopia in collaboration with the School of Veterinary Medicine of Addis Ababa University in 1986. This organization works mainly on donkey and mule in the district. Clinical services of 16.67 and 6.67% for the peri-urban and rural areas respectively. SPANA is also UK based charity working on horses. It provides clinical cases of 7.5% and 7.5% vaccination in the urban. In addition, provision of harnessing materials and training to farmers and other stakeholders without any service charge.

4.4. Constraints of veterinary services

In all sub system of the districts and especially in the rural area black-market drug dealers were found to be challengers of private practitioner (informal interviews). The black-market dealers sell low quality drugs with low price. For instant, 150mg albendazole is sold at one birr and cheating that 150mg can be given for cattle, which is really under dose. Sometimes they sell expired drugs at low price. The availability of these contraband veterinary drugs accompanied by custom of farmers themselves treating their own sick animals is resulted in drug misuses, drug abuse and losses of animals. Deaths of eight animals after spraying of expired acaricide at the Ude and Godino PAs explained in the group discussions.

Table 13: Constraints in the provision of veterinary services

	Sub System						Total			
Constraints	Urban		Peri-urban		Rural				χ^2	P value
	N	%	N	%	N	%	N	%		
Vaccine	40	100.00	30	100.00	30	100.00	100	100	34.379	0.000*
Unawareness	00	00	4	13.33	3	10.0	7	7.00		
Lack of Service Provider	9	22.50	15	50	00	00	24	24.00		
Lack of Vaccine	31	77.50	8	26.67	18	60.00	57	57.00		
Expensive (Vaccine)	00	00	3	10.00	9	30	12	12.00		
Distance from clinic							100		21.419	0.002*
2 -4km	40	100	11	36.67	13	43.33	54	54.00	30	
>5 km	00	00	19	63.33	17	56.67	36	36.00	00	
Drug Shortage	30	75	20	66.67	28	93.33	78	78.00	16.154	0.000*
Shortage of Vaccine at clinic	30	75	25	83.33	26	86.67	81	81.00	5.185	0.075
Weekend closed clinic	2	5	23	76.67	26	86.67	51	51.00	46.425	0.000*
Shortage Man Power clinic	17	42.5	16	53.33	23	76.67	56	56.00	12.299	0.002*

**highly significance difference (P<0.05)

Clients complained that the service provided by the public veterinary service was not enough in terms of availability of drug and presence of veterinarians in clinic especially in the weekend days. In such conditions and in emergency cases they were obliged calling private veterinarians for rescue of their animals. The other constraints in vet service which were pointed out were the shortage of veterinary drug in the clinic (78%) and due to this they were forced to visit the private pharmacy repeatedly. One of the most emphasized constraints by the participants of the group discussion was shortage of vaccine in the veterinary clinic (81%) (Table 13). Vaccination is given after the disease outbreak and death of animals. Even after that farmers are asked to collect money by representative and buy the required vaccine and animals are vaccinated by the veterinarians. Interview with veterinarians in the clinic regarding this vaccine complain by clients and they assured that viral vaccines were not in store of WoARD veterinary clinic in the town where electricity and refrigerator is available. As example of FMD vaccine is bought when money is collected from farmers after disease outbreak is reported (Table 9).

4.5. Evaluation of veterinary service providers by clients

4.5.1. Public veterinary services

Participants were asked to show their priorities according to timeliness, effectiveness and costliness compared to the other actors participating in the provision of veterinary service. Accordingly, participants put the public veterinary service (WoARD and SVM) as their first choice for its effectiveness and costliness compared to the private veterinary service in their area. In addition they have high trust in the drug used by public veterinary service providers. Clients blame the public veterinary service providers for timeliness and rank them behind the private veterinary service providers. The reason of clients for this was when public veterinarians are called on the case of emergency they don't show any willingness of helping clients rather they create a lot of reasons like time, transport and drug constraints (Table 14).

Table 14: Evaluation of public veterinary service by clients

Service provider	Sub system	Excellent (%)	Very good (%)	Good (%)	Poor (%)	Very poor (%)	*Score	Rank
Timeliness								
Public vet	Urban (N=2)	0.00	0.00	100.00	0.00	0.00	300	
Clinic	Peri-urban (N=30)	0.00	0.00	26.67	56.67	16.67	210.02	
(N=62)	Rural (N=30)	0.00	0.00	36.67	63.33	0.00	236.67	
	Total (N=62)	0.00	0.00	33.87	58.07	8.07	225.82	8
Public vet	Urban (N=2)	0.00	0.00	100.00	0.00	0.00	300	
(DVM)	Peri-urban (N=13)	0.00	0.00	53.85	38.46	7.69	246.16	
clinic	Rural (N=6)	0.00	50.00	50.00	0.00	0.00	350	
(N=21)	Total (N=21)	0.00	14.29	57.14	23.81	4.76	280.96	6
Public vet	Urban (N=5)	0.00	80.00	20.00	0.00	0.00	380	
Personnel	Peri-urban (N=30)	0.00	0.00	33.33	50.00	16.67	216.66	
(N=65)	Rural (N=30)	0.00	3.33	50.00	43.33	3.33	253.31	
	Total (N=65)	0.00	7.69	40.00	43.08	9.23	246.15	7
Effectiveness								
Public vet	Urban (N=2)	50.00	50.00	0.00	0.00	0.00	450	
Clinic	Peri-urban (N=30)	0.00	66.67	33.33	0.00	0.00	366.67	
(N=62)	Rural (N=30)	80.00	20.00	0.00	0.00	0.00	480	
	Total (N=62)	40.32	43.55	16.13	0.00	0.00	424.19	3
Public vet	Urban (N=2)	100.00	0.00	0.00	0.00	0.00	500	
(DVM)	Peri-urban (N=13)	69.23	30.77	0.00	0.00	0.00	469.23	
clinic	Rural (N=6)	50.00	50.00	0.00	0.00	0.00	450	
(N=21)	Total (N=21)	66.67	33.33	0.00	0.00	0.00	446.67	2
Public vet	Urban (N=5)	40.00	60.00	0.00	0.00	0.00	440	
Personnel	Peri-urban (N=30)	46.67	36.67	16.67	0.00	0.00	430.04	
(N=65)	Rural (N=30)	23.33	60.00	16.67	0.00	0.00	406.66	
	Total (N=63)	35.39	49.23	15.39	0.00	0.00	420.04	4

Table 14: continues.....

Service provider	Sub system	Excellent (%)	Very good (%)	Good (%)	Poor (%)	Very poor (%)	*Score	Rank
Costliness								
Public vet	Urban (N=2)	0.00	100.00	0.00	0.00	0.00	400.00	
Clinic	Peri-urban (N=30)	0.00	76.67	23.33	0.00	0.00	376.67	
(N=62)	Rural (N=30)	0.00	46.67	53.33	0.00	0.00	346.67	
	Total (N=62)	0.00	62.90	37.10	0.00	0.00	362.9	4
Public vet	Urban (N=2)	0.00	100.00	0.00	0.00	0.00	400.00	
(DVM) clinic	Peri-urban (N=13)	0.00	53.85	46.15	0.00	0.00	353.85	
(N= 21)	Rural (N=6)	33.33	50.00	16.67	0.00	0.00	416.66	
	Total (N=21)	9.52	57.14	33.33	0.00	0.00	376.15	3
Public vet	Urban (N=5)	0.00	80.00	20.00	0.00	0.00	380.00	
Personnel	Peri-urban (N=30)	10.00	63.33	26.67	0.00	0.00	383.33	
(N= 65)	Rural (N=30)	43.33	36.67	20.00	0.00	0.00	423.33	
	Total (N=65)	24.62	52.31	23.08	0.00	0.00	401.58	1

*Score is calculated by assigning 5 for excellent, 4 for very good, 3 for good, 2 for poor and 1 for very poor. Then multiply % of observation by the score, and finally adding the total observation

The “open air clinic” which belongs to the school of veterinary medicine of Addis Ababa University gives service in its campus. It gives service only to those who brings their animals to the clinic through its students and staff members. On the evaluation of this clinic, clients were interested in the effectiveness and timeliness. They admire the veterinarians or students in taking different activities of diagnosis such as use of diagnostic equipments and techniques like taking sample (faecal, blood, etc) and advice given in prevention and control of the disease. Even the cost of service and drug was appreciated to be cheap compared to that of private veterinary service in the district.

4.5.2. Private veterinary services

In the assessment of veterinary service respondents evaluating the private veterinary service participants appreciated the private veterinary service for their best timeliness.

Table 15: Evaluation of private veterinary service by clients

Service provider	Sub system	Excellent (%)	Very good (%)	Good (%)	Poor (%)	Very poor (%)	*Score	Rank
Timeliness								
Private vet	Urban (N=23)	39.13	60.87	0.00	0.00	0.00	439.13	1
Pharmacy	Peri-urban (N=28)	75.00	25.00	0.00	0.00	0.00	475.00	
(N=81)	Rural (N=30)	100.00	0.00	0.00	0.00	0.00	500.00	
	Total (N=81)	72.73	27.27	0.00	0.00	0.00	472.73	
Private vet	Urban (N=19)	63.16	36.84	0.00	0.00	0.00	463.16	2
Personnel	Peri-urban (N=18)	66.67	33.33	0.00	0.00	0.00	466.67	
(N=42)	Rural (N=5)	60.00	40.00	0.00	0.00	0.00	460.00	
	Total (N=42)	64.29	35.71	0.00	0.00	0.00	464.29	
Part time	Urban (N=10)	0.00	50.00	50.00	0.00	0.00	350	4
Vet (N=10)	Total (N=10)	0.00	50.00	50.00	0.00	0.00	350	
Effectiveness								
Private vet	Urban (N=23)	0.00	8.70	86.96	4.35	0.00	304.38	7
Pharmacy	Peri-urban (N=28)	0.00	0.00	64.29	35.71	0.00	264.29	
(N=81)	Rural (N=30)	0.00	36.67	53.33	10.00	0.00	326.67	
	Total (N=81)	0.00	16.05	66.67	17.28	0.00	298.77	
Private vet	Urban (N=19)	15.79	47.37	36.84	0.00	0.00	378.95	6
Personnel	Peri-urban (N=18)	0.00	0.00	66.67	33.33	0.00	266.67	
(N=42)	Rural (N=5)	0.00	0.00	40.00	60.00	0.00	240	
	Total (N=42)	7.14	21.43	50.00	21.43	0.00	314.28	
Part time	Urban (N=10)	30.00	60.00	10.00	0.00	0.00	420.00	4
Vet (N=10)	Total (N=10)	30.00	60.00	10.00	0.00	0.00	420.00	

Table 15: continues.....

Service provider	Sub system	Excellent (%)	Very good (%)	Good (%)	Poor (%)	Very poor (%)	*Score	Rank
Costliness								
Private vet	Urban (N=23)	0.00	0.00	17.39	43.48	39.13	179.26	
Pharmacy	Peri-urban (N= 28)	0.00	0.00	17.86	67.86	14.29	203.59	
(N=81)	Rural (N= 30)	0.00	0.00	0.00	30.00	70.00	130	
	Total (N=81)	0.00	0.00	11.11	46.91	41.98	169.13	8
Private vet	Urban (N=19)	0.00	0.00	42.11	57.89	0.00	242.11	
Personnel	Peri-urban (N=18)	0.00	0.00	44.44	50.00	5.56	238.88	
(N=42)	Rural (N=5)	0.00	0.00	0.00	100.00	0.00	200	
	Total (N=42)	0.00	0.00	38.10	59.52	2.38	235.72	7
Part time	Urban (N=10)	10.00	60.00	30.00	0.00	0.00	380	
Vet (N=10)	Total (N=10)	10.00	60.00	30.00	0.00	0.00	380	2

*Score is calculated by assigning 5 for excellent, 4 for very good, 3 for good, 2 for poor and 1 for very poor. Then multiply % of observation by the score, and finally adding the total observations

Most of the time when private veterinary service providers are called their response is fast and immediate but the cost of service is very expensive. Even though, they were appreciated for timeliness but claimed of effectiveness. It was not as good as the public veterinary service effectiveness. This was related with the misuse of drug, expired drug and under dose. Users choose private veterinary service providers for their timeliness, availability and provision services at home or farm level (Table 15).

4.5.3. Third sector (Ada'a Cooperative, SPANA and Donkey Sanctuary)

The assessment of veterinary service providers in the study area showed that ada'a dairy cooperative was one of the veterinary service provider through its veterinarian employed for its members. Users evaluated this organization regarding of timeliness, effectiveness and costliness compared to the public and private veterinary service providers in the district. Accordingly, members choose ada'a cooperative second, next to the public

veterinary service in terms of costliness but it was ranked behind the private veterinary service providers in terms of timeliness. The Ada'a dairy cooperative members prefer the service provided by the cooperative for its service provision at home or farm level (Table 16).

Table 16: Evaluation of third actor veterinary service by clients

Service provider	Sub system	Excellent (%)	Very good (%)	Good (%)	Poor (%)	Very poor (%)	*Score	Rank
Timeliness								
Ada'a coop	Urban (N=4)	0.00	25.00	75.00	0.00	0.00	325	
	Total (N= 4)	0.00	25.00	75.00	0.00	0.00	325	5
SVM (AAU) (N=39)	Urban (N=3)	66.67	33.33	0.00	0.00	0.00	466.67	
	Peri-urban (N=22)	27.27	72.27	0.00	0.00	0.00	425.43	
	Rural (N= 14)	85.71	14.29	0.00	0.00	0.00	485.71	
	Total (N=39)	51.28	48.72	0.00	0.00	0.00	451.28	3
Effectiveness								
Ada'a cooperative	Urban (N=4)	0.00	75.00	25.00	0.00	0.00	375	
	Total (N=4)	0.00	75.00	25.00	0.00	0.00	375	5
SVM (AAU) (N=39)	Urban (N=3)	100.00	0.00	0.00	0.00	0.00	500	
	Peri-urban (N= 22)	54.55	45.45	0.00	0.00	0.00	454.55	
	Rural (N= 14)	85.71	14.29	0.00	0.00	0.00	442.84	
	Total (N=39)	69.23	30.77	0.00	0.00	0.00	469.23	1
Costliness								
Ada'a coop N=4	Urban (N=4)	0.00	25.00	75.00	0.00	0.00	325.00	
	Total (N=4)	0.00	25.00	75.00	0.00	0.00	325.00	6
SVM (AAU) (N=39)	Urban (N=3)	0.00	66.67	33.33	0.00	0.00	366.67	
	Peri-urban (N= 22)	0.00	54.55	45.46	0.00	0.00	354.55	
	Rural (N= 14)	0.00	0.00	85.71	14.29	0.00	285.71	
	Total (N=39)	0.00	35.90	58.97	5.13	0.00	330.77	5

*Score is calculated by assigning 5 for excellent, 4 for very good, 3 for good, 2 for poor and 1 for very poor. Then multiply % of observation by the score, and finally adding the total observation

Currently there are two charity veterinary service providers working on donkey, mule and horse health and welfare in the district. These charity organizations were highly pointed out by the participants for the service they are being provided by donkey sanctuary (working for donkey and mule) and SPANA (working for horses) in their society. In the evaluating of these projects effectiveness and timeliness were used since they are serving at free of charge. Clients remarked highest effectiveness, but time of visiting to rural and peri-urban is not as much as it was before two to three years. Response from an interview with an officer in the donkey sanctuary shows that at this time more emphasis is given on capacity building such as training of farmers and public and private veterinarians.

4.6. Legal framework (proclamations and institutional arrangement)

The Oromia national regional state has established an agency in accordance with article 7 (2) of the proclamation No 132/2007 the following regulation was issued. The title of the agency was “Oromia Animal Resource Development, Health Protection and Market Agency” established by the regulation No 111/2008. the agency has been established with objectives: to engage in the development and reservation of animals and fish resources so as to alleviate poverty and achieve efficient result through sustainable development; to provide efficient animals and fish health service based on the standards of the international health institute and control and prevent diseases of animals and make animals and their products acceptable in the international market; and by increasing the products and productivity of animals and fish resource to contribute a higher role in poverty reduction effort and by producing a competitive product to play a higher role in improving the living standard of the country as well as the region. Under the article 6 (12) indicate the power and duties concerning this matter which were previously given to the Oromia agriculture and rural development bureau shall be transferred to the agency by this regulation. Structure of the agency it has branch offices at the region, zones and weredas level. It has developmental employees at kebele level as well as centers and laboratories. It works cooperatively with the cities administered by mayors. After two

years of implementation this agency it was revised and the marketing part split out and it was named as Oromia animal resource development and health agency.

Public (WoARD) veterinary service is the main veterinary service provider in Ada'a district in cost recovery scheme. Moreover, non public veterinary service providers such as private and NGOs are also involved in the urban, peri-urban and rural parts of the district. The government has given right for private veterinary service through Proclamation No. 267/2002. This proclamation allows veterinary professionals and investors to establish private veterinary clinics, import wholesaling and retailing of veterinary drugs and equipments upon the fulfillment of the necessary requirements like a certificate of competence from the concerned district and zone, regional or Ministry of Agriculture and Rural Development offices.

5. DISCUSSION

The major source of livelihood in the rural and peri-urban is mixed crop livestock production 95%. Which is consistent with the general situation of Ethiopia where above 80% of the population is engaged in mixed farming system. On the other hand, the major source of livelihood for the urban is dairy farming 52.5%, followed by monthly salary 27.5% and small petty 17.5%. The major income obtained in this study is lower than observation made in the same area, 100% dairy farming and monthly salary 42.9% and Girma (2008). With illiteracy rate was 86.67, 66.67 and 37.5% in the rural, peri-urban and urban respectively. Most of the urban 25% respondents joined high school and higher institutions, followed by 20% who attended elementary school and 17.5% who are able to read and write through informal learning. 23.33% of the peri-urban respondents are able to read write through informal learning and 10% who joined the elementary school. While in the rural 10% are able to read write through informal learning and 3.33% who joined the elementary school. This result is similar to Girma (2008) with 30% elementary school and 36.1% high school and higher institutions in the urban. In peri-urban, read and write 27.1% and 43.8% elementary school which is slightly higher, this difference is due to the targeted group of the researcher.

The major livestock keeping constraints in the rural and peri-urban sub systems identified by the sampled household respondents and group discussion, the presence of different kinds of diseases 50% and 66.67%, and scarcity of grazing land 43.33 and 23.33% respectively while Shortage of feed 90% was their first constraint for the urban respondents which is different from the other sub systems. The same result reported by Dagnachew (2004) who stated that livestock disease and scarcity of grazing land are bottleneck challenges for the development of livestock.

The study revealed that there are different actors in the district, public veterinary service; private veterinarians; non governmental organizations and traditional healers were the main providers of veterinary service in the district. Similar to the study made in the border of Ethiopia and Kenya by Bayissa and Bereda (2009) they stated that the main actors in veterinary service are government, private, traditional healers and CAHWs.

The public veterinary service is the main veterinary service provider in the peri-urban and rural of the district. In the other hand, the urban receives veterinary service mainly from private veterinary service providers in the town. This difference is that the private veterinary service providers are not attracted by the profit of the rural area. As the service provided by the government is highly subsidized. So this does not attract the private sector to invest veterinary clinics in the rural area because the first choice of rural area is the public veterinary service. According to the public (WoARD) veterinary clinic service provider involvements in the rural, peri-urban and urban in the provision of clinical treatment (62%), vaccination (56%), and drug sales (45%). Study dairy services delivery in Debre Zeit milkshed of Ada'a district by Girma (2008), showed that vaccination 67.57%, drug sale 10% and clinical treatment 3.3%, the vaccination is consistent with this study but drug sale and clinical treatment is lower. This difference is due to the dairy producer in the urban uses the private veterinary service for clinical treatment and drug service.

The total of 240,011 cases of treatment and 79,987 doses of vaccination were the main activities in the district during the study period. The school of veterinary medicine (AAU) provides clinical service of 28% and 27% of drug sale services at the "Open-air clinic" which is mostly chosen by the peri-urban farmers. This goes with Girma (2004), 7.69% of clinical service and 9.29% of the drug sales and Abebe (2004), indicated that Open-air clinic is very popular among the livestock owning community.

The basic infrastructures required by veterinary service like transportation, electricity, and communication are very poor in the rural and peri-urban area. This agrees with Charles and Alistair (2002) but does not fulfill the recommendation of OIE (2010), Article 3.2.6. Which indicates the Veterinary Services should be able to demonstrate that they have reliable access to effective communications systems, sufficient reliable transport facilities, and suitable premises for efficient performance of their functions for animal health surveillance and control programmes.

The veterinary services provided by WoARD were very much limited in view of existing need veterinary service across the study area. Inadequate budget, logistic problems, lack of basic veterinary equipments, shortage of trained manpower and low capacity of veterinary section were found to be main causes for the weakness of conventional veterinary services. The budget allocated (40,000 birr revolving fund and 11,000 birr operational budget) for veterinary section is expected to cover drug, vaccines and operational costs year round. However, veterinary officers indicated that it is very common to finish of the allocated budget before third quarter of the fiscal years. Very small operational budgets together with logistic problems limit veterinary staffs' service to livestock owners. For evidence of logistic problems, no motorbike was found in the District. Thus, veterinarians are relying on artificial insemination technician logistic supports (motorbike) which were observed during the study. In addition, all veterinary clinics were suffering with lack of basic laboratory equipments and kits to diagnose specific cases visiting clinics. This weakness leads diagnosis of specific cases to depend up on inspections of exhibited clinical signs.

Reporting system of the district to the zone and federal office which goes through the zone and regional offices, concerning disease out break during the study was 100%. The OIE requires for the control of diseases at least 10 reports (80%) per year coming from the regions. This result is more than the minimum report requirement by the OIE. This result is higher than 5-37% reported in the surveillance system in Ethiopia and its

different actors by Mayen (2003b). The reporting system of the study area fulfils the OIE recommendation, due to the establishment of the agency and increased awareness of veterinarians towards the importance of reporting for the development of livestock.

These private service providers operate more intensively in Debre Zeit town with few drug retailers in the peri-urban and rural areas. Five privately owned and licensed veterinary pharmacies in the study area which cover drug sale service of 82% and clinical veterinary service 44% in the district. Part time veterinary services providers mainly act in the urban with 11% clinical, 9% drug sale and 2% vaccine in the district. The result was similar to 35.16% of clinical and 5% of drug sales in Ada'a district by Girma (2008). The part time veterinarians providing veterinary service in their area were appreciated so that livestock producers can have access to veterinary medicine easily. This finding agrees with Rüsch and Kihm (2003) in their research of, the federal system of veterinary services in Switzerland, they stated that, the part-time system makes possible to have a dense network of veterinary service throughout Switzerland, so that most Swiss citizens have access to veterinary service in their local area.

The illegal drug dealer in the open market mainly sells their drug 100% to the rural and 76.67% peri-urban parts of the district with low price where farmers can not find drug from legal drug shop or public veterinary clinics. These reasons agree with Bayissa and Bereda (2009) research result in the assessment of veterinary service delivery, livestock disease reporting, surveillance systems and prevention and control measures across Ethiopia/Kenya border.

As discussed above, one of the livelihoods for the urban sub system of the district is dairy farming, for this reason there is a dairy cooperative which provides 7.5% vaccination, 12.5% treatment and 10% drug sales for prevention and control of different diseases mainly for its members in the urban. Similar to result were reported by Girma (2008) about 22.9% and 65.7% of the urban dairy producers were served by the cooperative

veterinarian for clinical and vaccination services, respectively. An informal interview with the officers for the need of the establishment of the veterinary service by the cooperative was due to the poor service delivery and shortage of manpower in the public veterinary services, thus to overcome these problems they organized mobile veterinary service.

This study revealed that the donkey Sanctuary and SPANA charity projects work on donkey, mule and horses in and around Debre Zeit. The same result was reported by Abebe (2004). As huge numbers of these animals are in and around the district they are found to be very important in their service provision. In the group discussion, participants emphasized that these charities have to continue their service especially in the rural. In the field observation, public veterinary clinics in the rural areas are not good participants in treating equines.

Shortage of veterinary drug and public veterinary clinic being closed during weekends and public holidays, black-market drug dealers, low quality drug and clinic distance are the main constraints forwarded by the interviewed and group discussion participants. There is high significance ($p < 0.05$) difference between the urban, peri-urban and rural subsystem in the proximity towards the clinic. Due to the absence of veterinary clinic in the peri-urban livestock owners are forced to take their patient animal to Debre Zeit. The finding opposes with Marabelli (2003) who noted that the role of veterinary medicine is to help rural communities to remain on their land, protecting the health of their animals and the safety of the animal products that are so essential to the income of the farmers.

Based on timeliness, effectiveness and costliness participants ranked their priorities of veterinary service providers. The public veterinary service was chosen as first choice for effectiveness and costliness compared to private veterinary service. The reason is the cost of veterinary service and cost of drug asked at public veterinary clinic is subsidized by the government. Drugs used at public veterinary services are better in quality and are not

out of date (not expired). Time is the main problem in the public veterinary services; veterinary clinics are not opened or closed on time. The findings agree with the study made by Girma (2008) in Ada'a district veterinary service providers were ranked by clients, public veterinary service were first for their effectiveness and costliness and fourth in timeliness. Public veterinarians are not forced to give service at farm level in case of emergency and other conditions. Clients especially in the rural and peri-urban strongly disagree with this condition.

The private services providers were appreciated by veterinary service receivers for their timeliness. When the private service providers are called on emergency cases their response is fast and immediate to the farm level. Since these work for their benefits they are active for response to the farm or house level. But the cost of service was very expensive and low effectiveness which ranks them at the last. This was related with the misuse of drug, expired drug and under dosing for increased income. This is similar to the finding of Girma (2008) who remarked that private veterinary service providers ranked first for timeliness but last in the effectiveness and cost of services.

Ada'a cooperative ranked second next to the public vet service in terms of costliness but it was ranked behind the private veterinary service providers in terms of timeliness. The cooperative has fair price to protect and control diseases and attract more members. Its members prefer it for its service provision at home or farm level. This agrees with Tefera (2008) who stated that members of Ada'a cooperative complain on the timeliness of the service.

The Government of the Federal Democratic Republic of Ethiopia seems to recognize the importance and contribution of livestock to the national economy particularly to wards poverty reduction at farm household levels and foreign exchange earnings. To exploit the sub sector and raise its contribution to the highest level, the improvement of the animal health service is given attention. Towards the attainment of availing healthy and quality

products to the market, efforts of the government includes: restructuring of the federal veterinary services promoting its previous organizational structure from animal health team to animal and plant health regulatory directorate (APHRD) since 2007; transfer of NAHDIC to MoA; increased number of quarantines stations; border inspection posts; the feasibility study for establishing disease free zone in the country and the establishment of veterinary medicine schools to alleviate the shortage of professionals in the field are some of the important steps done by the government for strengthening the country's animal health services..

The establishment of the agency by the Oromia regional state is an encouraging step to the development of livestock through veterinary services in the region as well as to the country. Due to the establishment of the agency there are some important steps moved, the animal health posts are being transferred to clinics, field observation. An interview with an officer revealed that after the establishment of this agency the communication between veterinarians at the kebele, wereda, zone and region became easy and simple for reporting and other major decisions with easy professional language.

Currently, the new proclamation No. 728/2011 on the Veterinary Drug and Feed Administration and Control is a step improved by the government. The transfer of the administration and control of veterinary drugs and biological products from the Ministry of Health to the Ministry of Agriculture in order to ensure and regulate the distribution and use of veterinary drugs and biological products at grass root levels is also another historical achievement for the country's animal health services, but the associated regulations, directives and guidelines are not yet in place to fully enforce the proclamation.

6. CONCLUSSIONS AND RECOMMENDATIONS

In Ada'a district especially in the urban, there is good access to veterinary service from the main three actors: public, private and third sector (NGOs and Ada'a dairy cooperative) veterinary services. These actors are competent of effectiveness, timeliness and costliness in veterinary services. Shortage of veterinary drugs, vaccine, logistics, working hours in the public veterinary clinics and black market-drug are the main constraints of veterinary service in the district. The district has a relatively significant population of dairy cattle and poultry farms with good access to market, there appears to be opportunities to profitability support the private veterinary sector and the government should create the required conditions.

Based on the above conclusion the following recommendations are forwarded:-

- ✓ Public veterinary clinics need to be equipped well with veterinary equipments, manpower and necessary operational budget and logistic facilities has to be provided so as to improve definitive diagnosis and timely veterinary services provision.
- ✓ Appropriate and mandated government bodies have to control illegal veterinary drug traders and evaluate the quality of veterinary services by private practitioners.
- ✓ Organized activities should be done by the government, NGOs and other stakeholders to create community awareness on the risks of black-marketed drugs and practices of veterinary drug by untrained persons.
- ✓ Public veterinary clinics working hours should be increased with appropriate incentive and the supply of veterinary drugs has to be increased to improve rational use of veterinary drug and reduce people looking for black-marketed drugs.

- ✓ The government has to minimize subsidizing the veterinary services and drugs to promote the participation of private practitioners in the sector and encourage veterinary practitioners to involve in provision of mobile services instead of retailing veterinary drug.
- ✓ The government should focus on the rural areas where veterinary service is dominated by traditional healers and illegal drug traders.
- ✓ Provision of scheduled vaccination service should be considered instead of mass vaccination after outbreaks of infectious diseases.
- ✓ Livestock health sector institutionalization should be encouraged and disseminated to national regional states of the country.

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8. ANNEXES

Annex 1: HH Survey interview schedule

General Information: Name of the PA _____

Name of the village _____ Date of interview _____

Interviewee name _____ Interviewer name _____

A. Household characteristics

HH head characteristics

Sex 1. Male 2. Female Age _____ Marital status 1. Married 3. Divorced 2. Single
4. Widowed Education level* _____

Household Demography

Age group	No	Education level*	Currently going to school yes/no	Health status healthy/sick
Male > 50 years old				
Female >50 years old				
Adult female (17 – 50 yrs old)				
Adult male (17 – 50 years old)				
Young male (14 – 16)				
Young female (14 - 16)				
Children < 14 years				

* Education level: 0 = cannot read and write, 1 = Able to read and write, but no formal Schooling, 2 = Primary school, 3 = Secondary school, 4= Beyond

II. Access to veterinary services

1. Has any training been provided to you in animal health care delivery, prevention and control of different diseases? 1. Yes 2. No

2. If yes, who gave you the training? 1. WoARD 2. Private 3. NGOs 4. Specify _____

3. Is there any vet clinic in your area? 1. Yes 2. No

4. If yes to Q 3 who give the vet service? 1. Public 2. Private 3. NGO 4. All

5. Do you use veterinary clinic? 1. Yes 2. No
6. If yes to Q5 which organization service providers do you prefer? 1. Public 2. Private
3. NGO 4. All
7. Why you prefer the service provider in Q6? 1. Easily accessible (good qual of service)
2. Give service at farm level 3. Cheap price 4. Free of charge 5. Specify
8. Who performs the treatment? 1. Veterinarian (DVM) 2. Animal health assistant
3. Animal health technician
9. If no to Q5 what is the reason? 1. Unawareness 2. Inaccessibility to road
3. Lack of service giving organization 4. Lack of veterinarian
5. Lack of medicine 6. Other _____
10. What is the distance of the vet clinic from your area? ____ km or time it takes ____
11. What kinds of veterinary services do you get? 1. Diagnosis and treatment of diseased
animals 2. Vaccination 3. Deworming of internal parasites 4. Spraying acaricides,
5. Castration, 6. Specify _____
12. Where do they provide you the veterinary service? 1. Clinic, 2. Farm, 3. Field,
4. Specify _____
13. Do you vaccinate your animals? 1. Yes 2. No
14. If your answer to Q13 is yes for which disease do you vaccinate your animals?
1 _____ 2 _____ 3 _____ 4 _____ 5 _____
15. If your answer to Q13 is no explain what is the reason of not vaccinating of your
animals? _____
16. What problems do you face when treating or vaccinating livestock in your area?

17. Which number is greater when you compare animals dead due to diseases and other
reasons? 1. Disease 2. Feed shortage 3. Accident etc
18. Do you practice culling? 1. Yes 2. No
19. If yes to Q18 what are your culling criteria?
1. Disease 2. Old age 3. Infertility 4. Poor production 5. Other

20. List (and rank) important diseases in your area

	cattle	Sheep	Goats	equine	Bee colony	Poultry
1						
2						

21. Source of vet services used to tackle different kinds of diseases

Name of health service	Service provider	
Clinical vet service		1. Traditional preventive measures
		2. WOARD Vet Clinic
Vaccination service		3. WOARD vet personnel on call basis.
		4. WOARD veterinarian (DVM)
Veterinary drug		5. Private vet clinic
		6. Private vet pharmacy
		7. Private veterinarian on call basis
		8. Part time vet personnel
		9. Ada'a coop. veterinarian
		10. SVM (AAU)
		11. No source

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

1. Infectious 2. Non infectious 3. Parasitic

23. When one or more of your animals is/are sick and unable to walk/track them to clinic what measure do you take?

1. Inform the government clinic service providers
2. Inform the private service providers

24. If your answer is '1' why? _____

25. If your answer is '2' why? _____

26. How do you call for emergency? 1. On foot 2. Mobile phone 3. Not at all

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

1. Yes 2. No

28. If your answer to question above is yes, did the government body respond?

1. Yes 2. No

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

1. Treatment 2. Vaccination 3. Both 4. Other

30. If there is a more than one health service giving organization in your area, how do you evaluate them?

Service provider	Evaluation*		
	Timeliness	Effectiveness	Costliness
1. WoARD Vet Clinic personnel			
2. WoARD veterinarian (DVM)			
3. Ada'a coop. veterinarian			
4. Private vet personnel			
5. Private vet clinic			
6. SVM (AAU)			
7. WoARD Vet Clinic			
8. Private vet pharmacy			
9. Part time vet personnel			
10. Other (Specify)			

* 1. Excellent 2. Very good 3. Good 4. Poor 5. Very poor

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

III. Drug storage and quality

1. Do you have drug store (pharmacy) in your area? 1. Yes 2. No

2. If yes, do you find the drug you want /access (drug of choice)? 1. Yes 2. No

3. How /who prescribes the drug? 1. Veterinarians 2. Drug dealers 3. Yourself

4. Do you know drug durability (e.g. expire date)? 1. Yes 2. No

5. Have you faced any death of your animals after treatment? 1. Yes 2. No

6. If yes, what do you think is the reason for the death of your animal? 1. Expired drug

2. Abuse of drug 3. low efficacy of drug 4. Specify _____

7. Have you ever purchased drug from an open market? 1. Yes 2. No
8. Is the price of the drug affordable at open market? 1. Yes 2. No
9. Is the price of the drug affordable at pharmacy? 1. Yes 2. No
10. What are the possible solutions of those constraints? _____

Annex 2: Checklist guide for FGD and key informant interviews

1. Code (No) _____ Date _____
2. Kebele _____ PAs _____
4. N° of the discussants _____
5. Discussants sex Male _____ Female _____
- A. Veterinary services
6. Say something about the use/importance of livestock?
8. What are the constraints of livestock production in your area?
9. List (and rank) important diseases.

	cattle	sheep	goats	equine	camel	Poultry
1						

10. Is there any vet clinic in your area?
11. Do you use veterinary clinic? Why?
12. Do you use traditional medicine or drug? Why?
13. What kind of veterinary services do you get?
14. Who give the vet service? Public Private NGO
15. When and why was established?
16. Do you know veterinarians working in your area?
17. Do you think it is important?
18. How frequent do you visit the clinic?
19. What problems do you face when treating or vaccinating livestock in your area rank them?

20. Which number is greater when you compare animals dead due to diseases and other reasons?
21. Has any training been provided to you in animal health care delivery in the last five years? What was the nature of the training?
22. Are there any community based animal health workers/NGOs in your area?
23. What are the constraints of veterinary service?
24. What are the possible solutions of constraints to improve the service in future?

Annex 3: Checklist for veterinary clinics and field veterinarians

A. Livestock disease information flow

1. Importance of reporting?
2. From whom do they get information?
3. Livestock disease reporting system
 - Outbreak reporting system
 - To whom do they report outbreaks of disease?
 - For which diseases outbreaks do you report? Why?
 - How do you report?
 - Routine activities reporting
 - How frequent?
 - What are the problems that hinder your reporting?
 - What are their possible solutions?
 - When does the government body respond?

*Rate the response (poor (1) to excellent (5))

- What measures were taken by the government?

Monthly Reports sent (based on the OIE format)

No	Year	WoARD	Zone	Federal	Total	Remark
1						
2						

B. Livestock disease surveillance

1. How does surveillance carry out?
2. Who are involved in disease surveillance? What are their roles?
3. What are constraints/challenges for disease surveillance?
4. What are possible solutions to improve the disease surveillance?

C. Livestock disease prevention and control measures

1. How do prevent and control livestock diseases?
2. For which diseases you do vaccinate animals? When?
3. What are constraints/challenges for prevention and control measures taken?
4. What are their possible solutions to improve prevention and control of livestock diseases?

Annex 4: Checklist for private veterinary service providers

Part 1: General information

1. Contact address of the service provider (Kebele) -----
2. Education of the service provider (Diploma, Technician, DVM)
3. Type of service s/he provides and for how long s/he has been providing -----
4. What motivated you to start the business?
5. Have you had prior experience in veterinary service business?
6. License and regulatory requirements
 - 6.1 Do you need license/certification to provide the service?
 - 6.2 What are the requirements that one should fulfill to provide the service formally?
 - 6.3 What is your view about the requirements and ability of the providers to meet it?
 - 6.4 What are the regulations currently enforced to ensure service quality and safety?
7. What were the main constraints/challenges that you faced during starting up? _____
7. Currently, who are your service users (clients)? Please list them in order of importance, under the following categories: "
 - a. Urban / peri-urban/ rural
 - b. Wealth category (poor/middle/better)
8. What supports are you currently getting from WoARD? _____

9. How do you assess the technical back stopping you are being provided with by WoARD? Rate on scale from 1 (poor) to 5 (excellent) in terms of
10. With whom and for what purpose would you like to establish new linkages to help strengthen your business (service provision)?
11. Opportunities and constraints to stay in the business and/or expand the business.
- 11.1 Most important things that you consider as opportunities encouraging you to expand your service?
- 11.2 Most important things that you consider as constraints or challenges discouraging you to expand your service?
12. How has been the demand for your service in the last 12 months?
Rate on scale from 1(very low) to 5 (very highly) -----
14. Service charge
- 14.1 Who set service charge rates and how they are set? -----
- 14.2 How comparable are your charge rates (low/ the same/ higher) with the rates charged by another private/public provider of similar service (if there is any)? -----
15. Please provide actual charge rates for different animal health services.

Part 2. Veterinary drug sources, use, and handling

1. Veterinary drugs sources:

Import from abroad	Distributors	Pharmacy(other pharmacy	Drug dealers	All

*Rate on scale 1(rarely) to 5(always)

2. Veterinary drugs handling practice, store, refrigerator, sterilizer etc
3. Have you observed any change such as decrease/increase in diseases or external and internal parasites?

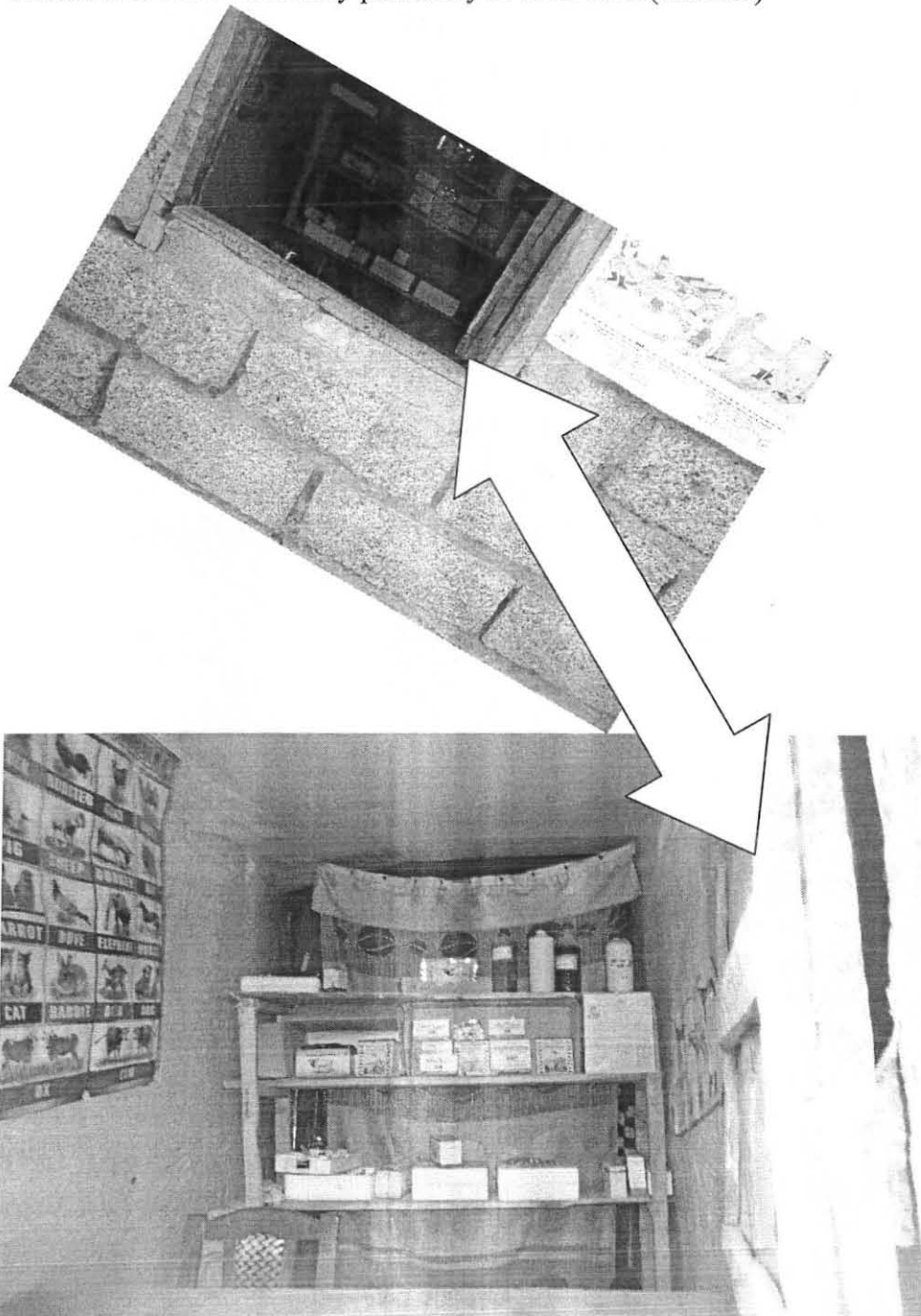
2. Privat clinic and Pharmacy

no	Private Pharmacy	Location kebele	licensed	qualification
1				
2				
	Private Clinic			
1				

Annex 5: English equivalent name for common livestock diseases in the study area

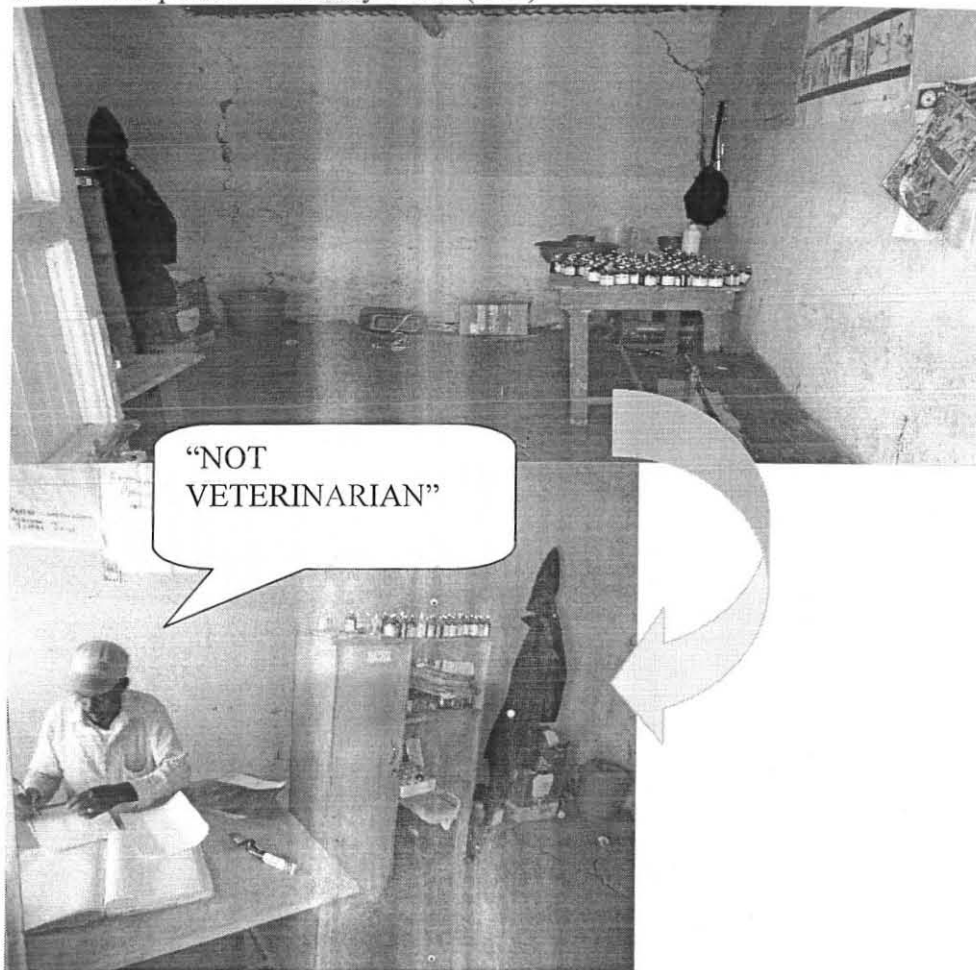
No	Scientific Disease names	Local name	Remarks
1	ANTHRAX	<i>Abba sanga</i>	oromic
2	BLACKLEG	<i>Abba gorba</i>	oromic
3	FMD	<i>Qabanaa/qabanechaa</i>	oromic
4	LSD	<i>Dhkubaa gogaa</i>	oromic
5	BOVINE PASTEURELLOSIS	<i>gororsa</i>	oromic
6	OVINE PASTEURELLOSIS	<i>Kale darbaisaa</i>	oromic
7	Sheep ked	<i>cini</i>	oromic
8	WOUND	<i>madaa</i>	oromic
9	SHEEP POX	<i>Maaryee holaa,</i>	oromic
10	TICK INFESTATION	<i>silmi</i>	oromic
11	FOOT ROT	<i>okkolechisaa</i>	oromic
12	NEWCASTLE DISEASE	<i>fangle</i>	oromic
13	STRAGLES	<i>furo</i>	oromic
14	LYMPHANGITIS	<i>biche</i>	oromic
15	Rabies	<i>Wane sare</i>	oromic
16	Internal parasite	<i>dodoho</i>	oromic
17	Coughing	<i>kufasisa</i>	oromic
18	Mastitis	<i>Dhukkuba muchaa</i>	oromic
19	Bloat	<i>bokooksaa</i>	oromic
20	Diarrhea	<i>Garaa kaasaa</i>	oromic
21	Abortion	<i>Gattachiisaa</i>	oromic

Annex 6: Private veterinary pharmacy in rural area (Godino)



Annex 7: Public veterinary clinics

A. Current public veterinary clinic (Ude)

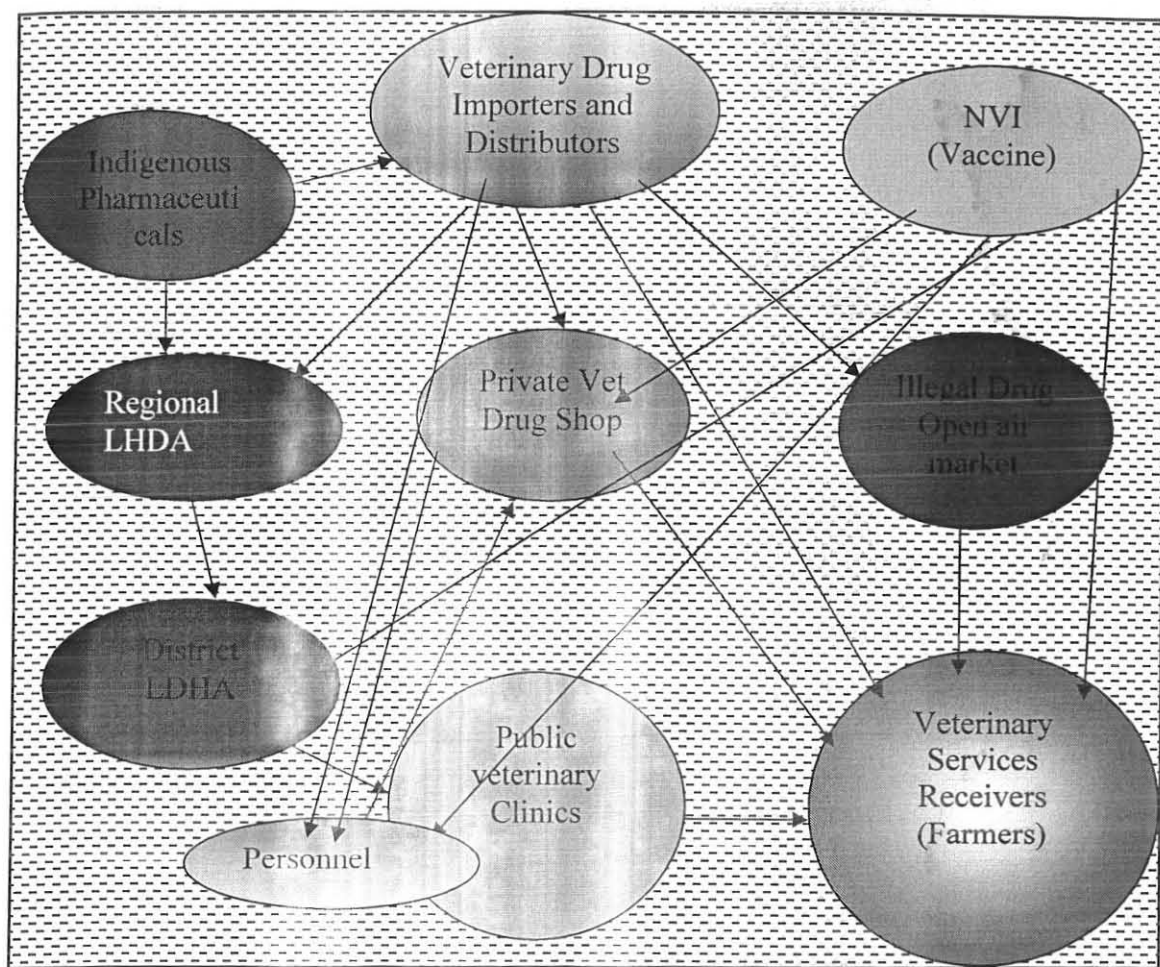


Under construction public veterinary clinic (Ude)

B. Public veterinary clinic (Godino)



Annex 8: Roots of veterinary drug in the district



Annex 10: Drug prices at different level

A. Prices of drugs by importers and distributors

Drugs	Unit	Selling price		Remark
		Birr	cents	
Penestrect 100 ml	Bottle (100ml)	65	00	
Oxytetracycline 20%	Bottle (100ml)	25	00	
Oxytetracycline 10%	Bottle (100ml)	21	00	
Multivitamin	Bottle (100ml)	45	00	
Ivermectine	Bottle (50ml)	20	00	
Albendazol 2500mg	Tablet	1.45	00	
Albendazol 300mg	Tablet	00	40	
Tetralozan 3400mg	Tablet	3	50	
Tetralozan 900mg	Tablet	1	20	
Fenbendazol	sachet	11	00	
Intramammary infusion	syringe	18	00	
Diminazine aceturate	sachet	4	00	
Calcium borogluconate	Bottle (500 ml)	800	00	
Procaine pencilline F	vial	6	00	
TTC Ointment	tube	2	00	
Oxy TTC powder	sachet	55	00	
Idigestion powder	sachet	40	00	
Alcohol	litter	70	00	
Savlon	litter	65	00	
Iodine	litter	110		
Acaricides				
Diazinone 60%	litter	190	00	
Steladone 300EC	litter	370	00	

* Market governs the price rate

B. Average drug and service prices by private practitioners in the district

Drugs	Unit	Selling price		Remark
		Birr	cents	
Penistrepts 100 ml	Vial (ml)	80	00	
Oxytetracycline 20%	Vial (ml)	40	00	
Oxytetracycline 10%	Vial (ml)	32	00	
Oxy TTC powder	sachet	70	00	
TTC Ointment	tube	7	00	
Procaine pencilline F	Vial	10	00	
Intramammary infusion	syringe	23	00	
Diminazine aceturate	sachet	13	00	
Albendazol 2500mg	Tablet	2	50	
Albendazol 300mg	Tablet	1	50	
Tetraozan 3400mg	Tablet	5	00	
Tetraozan 900mg	Tablet	3	00	
Fenbendazol	sachet	15	00	
Ivermectine	Vial (ml)	27	00	
Calcium borogluconate	500 ml	1050	00	
Multivitamin	Vial (ml)	60	00	
Idigestion powder	sachet	65	00	
Acaricides				
Diazinone 60%	litter	270	00	
Steladone 300EC	litter	435	00	
Alcohol	litter	105	00	
Savlon	litter			
Iodine	litter	130	00	
Castration	Bulls	10	00	
	Shoats	15	00	
	Equines	20	00	

**Market governs the price rate*

C. Prices of drugs in public veterinary clinic

Drugs	Unit	Selling price		Remark
		Birr	cents	
Penestrept 100 ml	Bottle (ml)	67	00	
Oxytetracycline 20%	Bottle (ml)	30	00	
Oxytetracycline 10%	Bottle (ml)	23	00	
Ivermectine	Bottle (ml)	20		
Albendazol 2500mg	Tablet	1.65		
Albendazol 300mg	Tablet	00	45	
Fenbendazol	sachet	12	00	
Diminazine aceturate	sachet	5	50	
Acaricides				
Diazinone 60%	litter	180	00	
Steladone 300EC	litter			

9. DECLARATION

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any University and that all sources of material used for the thesis have been duly acknowledged.

Name: Kidane Girmay: _____

Date of submission: June 2012.

This thesis has been submitted for examination with our approval as University advisors:

Dr. Ashenafi Mengistu: _____

Dr. Tariku Jibat: _____