A Review on Opportunities and Challenges for Livestock Production in Gonji Kolela District, Addis Alem, Ethiopia

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Abstract: Livestock contributes immensely to rural livelihoods through numerous channels including income, food, employment, transport, draft power, manure, savings and insurance, social status among others. The major objectives of this paper are to review major problems facing livestock rearing in Gonji Kolela district and highlight the prevalent animal diseases in the district. Suitable agro-ecology of the District for livestock production, the presence of Washera sheep breed which are highly demanded in neighboring districts as well as in different research centers, presence of huge crop residues in the district for livestock feed and the readily available market for red meat are opportunities for livestock production in the Gonji Kolela District. Challenges facing livestock production in the district include diseases, feed shortage, inadequate information on how to improve animal breeding and Lack of support services. Anthrax, Blackleg and Ovine Pasteurellosis are categorized as the major bacterial diseases in the district and Lumpy Skin Disease, Sheep and Goat pox, New Castle Disease, Rabies, African Horse sickness and Infectious Bursal Disease are viral diseases present. *Paramphystomiasis, Ascariasis, Strongylosis, Coccidiosis, Trichuriasis* and infection with *Moniezia* are the endo-parasites. In the case of ectoparasites in sheep and goats, fleas were found frequently followed by lice. Different Measures have been taken to prevent and control the diseases, like vaccination and strategic deworming. In the district, only governmental budget is used for veterinary services, which is not enough to give full service. Non-governmental organizations should support veterinary services in the district.
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1. INTRODUCTION

The diversified agro-ecological and climatic setting that Ethiopia is endowed with has offered a potential agricultural development opportunities which will definitely be able to bring about sound and sustainable economic growth and development among the livestock rearing communities. Properly planned and managed with available livestock and plant resources, in conjunction with an appropriate policy environment, this potential could put the country on the right track to food self-sufficiency. The country's total land area is estimated at 111.5 million hectares. Out of the total land area, 66% is suitable for agriculture including livestock production (Tesfaye *et al*., 2008).

The economy of Ethiopia is based on agricultural sector which contributes 40-50% of the Gross Domestic Product (GDP), over 90% of the foreign exchange earnings and about 85-90% of the employment opportunities in the country (USDS, 2010). Crop and livestock integrated production systems contribute the majority of agricultural output in the country. The livestock sub-sector alone contributes 12% the country's GDP and over 45% of the agricultural GDPs (MoA, 2010). Over 85%and 90% of the farm and pastoral incomes respectively, are generated by or from livestock (LDMP, 2003). Livestock contribute considerably to Ethiopians' livelihoods andthe national economy in general. These contributions are in the forms of food and nutrition, draft power, farmyard manure, income-security, and foreign currency (CSA, 2017).

Despite, the scale of livestock industries in Ethiopia, endemic diseases threatens its performance and potential, posing a risk to the nation's agricultural development. Export of live animals and livestock products/by products face challenges due to stringent animal health requirements in the international markets; this is as a result of prevalence of Trans-boundary livestock diseases. The impact of animal diseases can be direct loss of livestock due to animal mortality, and more indirect effects of morbidity such as slow growth, low fertility rates and low productivity (resulting in reduction of milk yield and draught power). Some of the diseases are zoonotic and so have considerable impact on human health (Bekele *et al*., 2018).

Ethiopia is known for its high livestock population, being the first in Africa (CSA, 2004). Despite the large number of livestock in Ethiopia the sector is characterized by low productivity and, hence, income

derived from this sector could not impart significant role in the development of the country's economy (Mukasa-Mugerwa, 1998). The low productivity is due to the low genetic potential of indigenous cattle, poor nutrition and reproduction, inadequate management and high disease incidence. In tropical areas livestock health problems are high due to environmental factors such as high temperature and humidity, topography structure of sloppy area exposed to floods which can easily aid the spread of soil borne diseases, stress factors and drought are common in these areas as a result feed availability is limited and low vegetation coverage; the other major reason is poor animal health services (Assegid, 2000; Gebremedin, 2007).

Inadequate feed supply, high prevalence of animal diseases, poor animal genetic resources and poor marketing are the main bottlenecks for the development of the livestock sub-sector in Ethiopia. Nevertheless, animal diseases remain as one of the most important constraints to livestock development since they are distributed across all agro-ecological zones of the country as well as the region including Gonji Kolela district. Therefore, the major objectives of this paper are to review major problems facing livestock rearing in Gonji Kolela district and highlight the prevalent animal diseases in the district.

2. LIVESTOCK POPULATION IN ETHIOPIA

Ethiopia has the largest livestock population in Africa and is a repository of considerable animal genetic diversity. The country is home of 183 million livestock including 56.7 million cattle, 58.4 million sheep and goats, 11.0 million equines and 56.9 million poultry (CSA, 2017). Despite the large number of livestock in Ethiopia the sector is characterized by low productivity. One of the causes of low productivity is livestock diseases including trans-boundary animal diseases. Trans-boundary animal diseases (TADs) have been described as those diseases that are of significant economic, trade and food security importance for a considerable number of countries; which can easily spread globally and reach epidemic proportions; and where control and prevention requires cooperation between several countries. These diseases are highly contagious and have the potential for rapid spread, irrespective of national borders, causing serious socio- economic consequences in the world. Trans-boundary animal diseases pose a serious risk to animal production, increase production costs in terms of management/control and jeopardize international trade (Otte *et al*., 2004).

In Ethiopia, the aggregate annual economic losses from such animal diseases through direct mortality and reduce productive and reproductive performance were estimated at US$ 150 million, equivalent to three billion Ethiopian Birr per year (Berhanu, 2002). The overwhelming majority of morbidity and mortality is caused by a finite set of common and predictably occurring disease problems that are conditioned by local geography, climate, and animal management systems (Befikadu and Endale, 2017).

3. LIVESTOCK POPULATION IN AMHARA REGION

The Amhara Regional State is located in the north central and north-western parts of Ethiopia, approximately between 9° 21' and 14° 0' N latitude and 36° 20' to 40° 20' E longitude. The Region is about 170,152 km^2 of land with altitudes ranging from 600 to 4,620 meters above sea level. It is divided into administrative zones, which are further subdivided into districts. Lowlands, extensive plateaus, numerous mountains, river valleys and gorges all are topographic characteristics found in the Region. The lowlands are mainly found in the eastern and north western areas, bordering the Afar Regional State and Sudan, whereas the highlands are largely located in the northern and eastern parts of the region. Agro-ecologically, this region is constituted by 48% woinadega (1500-2300 masl), 28% kolla (below 1500 masl) and 24% dega (2300- 3000 masl). The average annual rainfall ranges between 598 mm and 1692 mm, and the mean annual temperature varies from 12.4°C in the kollaecology to 27.8°C in the degaregion (Tesfaye *et al*., 2008).

The region is only second to Oromiya in its livestock resources and covers 30% of the total livestock population of the country. Cattle are the most abundant livestock type in the area. The average total livestock ownership per household is three animals per household. The households in the woredas receiving adequate rainfall own a significantly larger number of cows and oxen than those living in moisture-deficit areas. The productivity of the livestock industry in the region is low because of poor nutrition and health care and lack of appropriate genetic improvement (BFED, 2004).

Currently, about 66.5% (18.6% pasture land, 36.6% shrubs and bushes and 11.3% aftermath) and 33.3% of the livestock feed requirements are met from grazing and crop residues, respectively. Improved fodder crops contribute 0.2% only. The animals in the region are about 31% deficient in their dry matter requirements for maintenance. This will have huge implications for animal production, reproduction, growth, disease-resistance and survival. Especially during the months March-May the area experiences a serious shortage of animal feed due to drought. There is, therefore, a need for augmenting animal feed

resources through an improved utilization of crop residues, agro-industrial byproducts and improved fodder production. Less than 10% of the households in the region practice production of improved fodder, this could be attributed to scarcity of land, shortage of certified seeds and lack of awareness on the existence of high quality fodder (Tesfaye *et al*., 2008).

3.1. Major animal diseases in Amhara Region

According to the Amhara National Regional State Animal Resource Development Promotion Agency (2017), some of the diseases found in the Region include viral, bacterial and parasitic diseases:

- Viral diseases: Foot and Mouth Disease, Lumpy Skin Disease, Peste des Petits Ruminants, Sheep and Goat Pox, Maedi-Visna, African Horse Sickness, New Castle Disease, Infectious Bursal Disease and Fowl Pox.
- Bacterial diseases: Anthrax, Blackleg, Brucellosis, Mastitis, Dermatophilosis, Pasteurellosis, Contagious Bovine Pleuropneumonia, Actinobacillosis, Actinomycosis, Infectious Kerato-conjuctivitis/Pink eye/, Bacillary Haemoglobinuria, Salmonellosis, Footrot, etc.
- Parasitic diseases: Fasciolosis, Lung worm infection, Coccidiosis, Mange, Lice infestation, Sheep ked infestation, etc. are some of the diseases indicated.

4. LIVE STOCK POPULATION IN GONJI KOLELA DISTRICT

4.1. Description of Gonji Kolela District

Gonji Kolela district is one of the 105 districts of Amhara National Regional State of Ethiopia. It is found in West Gojjam zone of the region. Geographically the district is located 11˚05ˈto 11˚20'N (Latitude), 37˚ 20' to 37˚53'E (Longitude) and within the altitudinal range of 1400-4300 meter above sea level. This district is bordered by four districts, namely Yilmana Densa in the North, Dega Damot in the South, Quarit in the west and Bibugn in the East. Gonji Kolela district falls into three climatic zones known as "Dega", "Woinadega" and"Kolla". The mean annual temperature level of the district ranges from 20℃ - 30℃. It receives a mean annual rain fall of 1700 mm-2000 mm (Horecha, 2005).

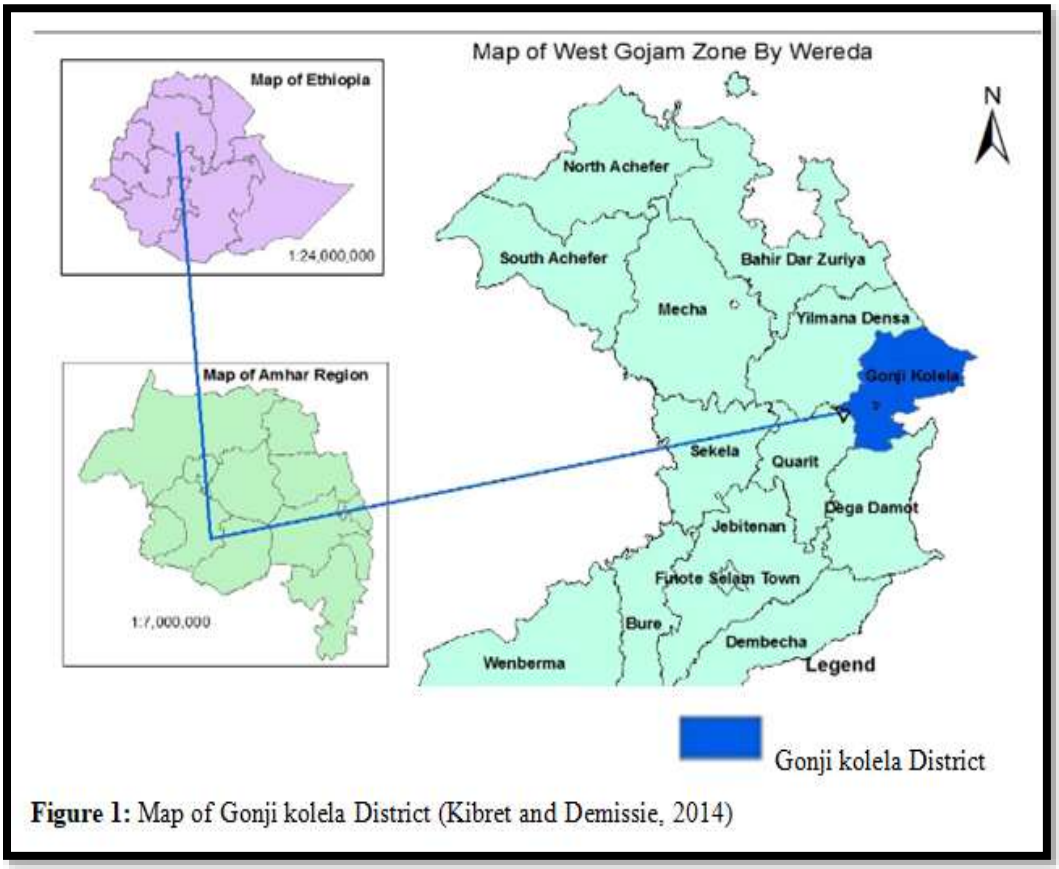

Figure 1: Map of Gonji kolela District (Kibret and Demissie, 2014)

According to Gonji Kolela district Livestock and Fisheries Resource Development Nominal Office basic documentation (2019), the livestock population in the district are about 61549 cattle, 86198 sheep and goats, 14946 equines and 79090 poultry.

4.2. Opportunities for Livestock Production in Gonji Kolela District

- The agro-ecology of the district is suitable for livestock production
- The presence of Washera sheep breed which are highly demanded in neighboring districts as well as in different research centers
- Attentions given by the government to the livestock sector
- Presence of huge crop residues in the district for livestock feed
- High demand of animals and animal products by the local market

4.3. Challenges for livestock Production in Gonji Kolela District

4.3.1. Diseases

Even though the livestock sub sector contributes to the national economy, its development is constrained by various challenges. The most important constraints to livestock productions are widespread endemic diseases including viral, bacterial, and parasitic diseases (Tadesse, 2014). Tick and tick borne diseases, Foot and Mouth Diseases (FMD), Contagious Bovine pleuropneumonia (CBPP), Brucellosis, Lumpy Skin Diseases (LSD), Peste des Petits Ruminants (PPR), Sheep and Goat Pox contribute to the great financial losses by the farmers and livestock traders. These diseases have a high mortality and morbidity rates; the diseases impact negatively on the international livestock market opportunities and about 1.5-2.5 billion birr is annually lost from Trans-boundary animal diseases (Zewdie, 2004).
In addition to tentative diagnosis from clinical signs, a questionnaire survey and focus group discussion were frequently performed in selected kebeles. Based on these active surveillance Anthrax and Black quarter were categorized as the major bacterial diseases of cattle and sheep; Anthrax is the major disease of equines in the district. Ovine Pasteurellosis is also a major problem in the district. Based on our survey the major viral diseases in the district were lumpy skin disease, sheep and goat pox and New castle disease in poultry. However, Rabies, African Horse sickness and Infectious Bursal disease were also reported in the study area.
Regarding Parasitic diseases,*Paraphystomiasis, Ascariasis, Strongylosis, Coccidiosis, Trichuriasis* and infection with *Monezia* were the endo-parasites identified from selected kebeles. But other additional parasites like *Haemonchosis* and *Fasciollosis* were also frequently found causing mainly loss of body condition, emaciation and weakness in draught power of animals and were observed as common health problem of livestock (Bahirdar Animal health Diagnostic and Investigation Laboratory, 2019). Based on the survey conducted by Bahirdar Animal health Diagnostic and Investigation Laboratory, the ectoparasites identified were fleas followed by lice and sheep keds. Ticks were also reported as a major ectoparasite in the district.

Measures that have been taken to prevent and control the diseases:

- Vaccination- vaccines have been given based on the vaccination calendar as much as possible before the occurrence of the diseases outbreak. In the district, vaccination is performed annually for Anthrax, Black quarter, Ovine Pasteurellosis, Rabies, Sheep and Goat pox, Lumpy skin disease, and African Horse sickness. The vaccines for New Castle disease and Infectious Bursal Disease have been given as necessary in order to prevent and control the diseases. The vaccines are produced by the National Veterinary Institute (NVI) which is the sole supplier of veterinary vaccines in Ethiopia. The availability of the vaccines presents a favorable opportunity for controlling and preventing these diseases in the country. In the Amhara region, districts procure the vaccines from NVI based on their demand. Almost all districts`Livestock and Fisheries Resource Development Nominal Offices in the region have a minimum revolving fund (RF) of 1,000,000.00 Ethiopian Birr specifically allocated for the purchase of veterinary drugs and vaccines; Gonji Kolela district Livestock and Fisheries Resource Development Nominal Office has a RF of above 1,000,000.00 Ethiopian Birr. Therefore, this is one of the best opportunities to control and prevent the diseases in the district.
- Deworming- is the giving of an anthelmintic drug to animals to rid them of helminthes parasites, such as roundworm, flukes and tapeworm. Purge dewormers for use in livestock can be formulated as a feed supplement that, a paste or gel that is deposited at the back of the animal's mouth, a drench given orally, an injectable, or as a pour-on.
- Strategic deworming- requires deworming when most of the parasites are in the animals body and not in the environment. Seasonality of helminthes infections in Ethiopia (Tembley *et al*., 1997) is considered

advantageous as diseases caused by helminthes parasites can prevented and controlled economically. On the other hand, the life cycle of the parasites can be interrupted. Strategic deworming is done twice a year, at the end of dry season and at the end of rainy season in the District for endo-parasites and strategic spraying of sheep and goats to control and prevent ectoparasites as the area mostly receives rain once per year (from June to August).

Table1: Vaccines, Antibiotics and Antiparasites that have been used in the District for control and prevention the diseases

Vaccines	Antibiotics	Antiparasitics
✓ Anthrax Vaccine ✓ Rabies Vaccine ✓ Black leg Vaccine ✓ Ovine pasturellosis Vaccine ✓ AHS Vaccine ✓ LSD Vaccine ✓ S and G pox Vaccine ✓ NCD Vaccine ✓ IBD Vaccine	✓ Penstrep ✓ Oxytetracycline 10% ✓ Oxytetracycline 20% ✓ Sulphonamides ✓ Oxytetracycline powder 20% ✓ Ash oxy 20% ✓ Procaine penicillin	✓ Albendazole 2500 mg ✓ Albendazole 300 mg ✓ Tetraclozan 3400 mg ✓ Tetraclozan 900 mg ✓ Tetramisole 600 mg ✓ Amprolium ✓ Ivermecin 1% ✓ Amiteraz12.5%

Key:% = percent, AHS = African Horse Sickness, LSD = Lumpy Skin Disease, S and G = Sheep and Goat, NCD = Newcastle Disease, IBD = Infectious Bursal Disease

4.3.2. Inadequate nutrition/feed shortage

The Availability, quality and quantity of feeds vary among varies production systems. Cattle largely depend on rangeland grazing or crop residues which have poor nutritive value. Feed is not uniformly supplied, and the quality is also poor. Seasonal fluctuation in the availability and quality of feed has been a common phenomenon, inflecting serious changes in livestock production. The feed shortages and nutrient deficiencies are more acute in dry seasons (Getachew *et al*., 2005). The dry season feed shortage and low quality feeds are serious problem in the district. The farming system in the district is mixed farming and there is inadequate land for cultivation of pastures and fodder, most farmers feed their animals on crop residues which have poor nutritive value.

4.3.3. Inadequate information on how to improve animal genetics

Animal breeds of the tropics including Ethiopia generally have a limited genetic potential for production and remain low producers (500 to 1500 kg per lactation) even when the best possible husbandry management conditions are available to these type of livestock. In a general way, the genetic improvement of local breeds for meat production has essentially been obtained by crossing with beef breeds from temperate regions.However, the tropical African indigenous breeds have special adaptive traits, like disease resistance, heat tolerance, shortage of feed and ability to utilize poor quality feed. The livestock genetic resources of the Country have involved largely as a result of natural selection influenced by environmental factors that made the stock better conditioned to withstand feed and water shortages, diseases challenges and harsh climates. The problems are common in Ethiopia. Nevertheless, the capacity for the high level of production has remained low (Tewdros and Mebrate, 2019).

In the district, even though there is improvement of breeds, this area needs further awareness creation on which type of animal is best for crossing, how to feed and other management systems as well as the health care of the animals. Inadequate market infrastructure, virtual absence of market information system, absence of market oriented livestock production system, inadequate knowledge of international trade, low level of quarantine facilities and procedures etc. are observable gabs in the area.

4.3.4. Lack of support services

Veterinary services are one of the major areas where most organizations have not given attention to this sector and Veterinary professionals have roles in Governmental as well as Non-governmental organizations. They are involved in developing guidelines, norms, and standards, provides key component of efforts supporting sustainable production of food from animal origins and to the success of farm operations. A vast number of veterinarians working for

intergovernmental and nongovernmental organizations are also active in addressing on the same selected diseases and improving information systems, field investigation methods, laboratory networks and quality controls, risk and threat analysis and mitigation, provisions of vaccines and treatments, and rapid responses to emergencies and humanitarian crises. When zoonotic diseases strike in any given geographical location, veterinary professionals are the first source of informed opinion on veterinary issues for governments, the media, civil society organizations and charities, action and consumer groups, and the public. Generally Veterinary services fall into four main categories:

- ✓ Clinical services (treatment of diseased animals and control and prevention of diseases)
- ✓ Preventive services (avoiding the outbreak of diseases)
- ✓ Provision of drugs, vaccines and Equipment
- ✓ Human health protection (Public Health).

To give veterinary services effectively, resources from different organizations including governmental and nongovernmental organizations must be accessible. However, in the Gonji Kolela district there is no supportive nongovernmental organization for veterinary services and veterinary services is only supported by governmental budget which is not always enough to roll out all the required services. Some of the main problems in the district that needs support are:

- ➢ Transportation: in order to transport drugs, vaccines, veterinary medical instruments and others from their source to the district and kebeles.
- ➢ Presence of under quality clinics in most of the kebeles due to absence of budget to renew
- ➢ Limitation of veterinary medical infrastructure in most of the kebeles

5. CONCLUSION

Despite Ethiopia being the home of the largest livestock population in Africa, income derived from the livestock sector cannot impact significantly on the country's economy. The livestock sector of Gonji Kolela district does not also have major significant economic role as the sector is characterized by high disease incidence, poor nutrition, inadequate management and low genetic potential of indigenous livestock breeds. Climate change is creating new ecological platform for the entry and establishment of diseases from one geographical region to another. Several new trans-boundary diseases emerge, and old diseases reemerge, exhibiting increased chances for unexpected spread to new regions including our district. Different bacterial, viral and parasitic diseases are present in the district and different Measures have been taken to prevent and control the diseases like treating diseased animals**,** vaccination and prophylactic treatment. However, there is limitation of drugs, medical instruments and transportation facilities due to absence of supportive organization. Therefore, the following points are forwarded as recommendation:

- ✓ Extra drugs should be supplied in the district, especially for cestode parasites
- ✓ Medical instruments should be accessible in the region
- ✓ Case handling should be supported with laboratory service
- ✓ Non-governmental organizations should support veterinary services in the district

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