Websites:
http://www.sciencepub.net/nature
http://www.sciencepub.net

Emails:
naturesciencej@gmail.com
editor@sciencepub.net

Nature and Science

MARSLAND PRESS
Multidisciplinary Academic Journal Publisher

REVIEW ON THE IMPACT OF ANIMAL DISEASES ON FOOD SECURITY AND PUBLIC HEALTH: ETHIOPIAN PERSPECTIVE

Awol Assen, Ayalew negash, Alemu Zewdu, Tsegaw Fentie

Faculty of Veterinary Medicine, College of Medical and Health science, University of Gondar, P.o.box. 196, Gondar, Ethiopia.
awolhassen25@gmail.com,drayalewdvm@gmail.com

ABSTRACT: Majority of the world population are dependent directly or indirectly on livestock for their livelihood. Livestock sector plays a significant role in the economic development of many countries. Livestock contributes to the producers through food supply, family nutrition, incomes, employment, soil fertility, livelihoods, transport and sustainable agricultural production. In Ethiopia with a high livestock population, the sector has prominent support for the country's economy. The country is not in a position to utilize the livestock resource to its potential. Prevalence of animal diseases along with other constraints is heavily affected the asset of the livestock producer and welfare of the people. Animal diseases also pose socio-economic and health problems for humans. Economic and socio-economic threats from livestock diseases are explained in terms of losses in production, productivity and profitability caused by disease agents and the cost of their treatment; disruptions to local markets, international trade and rural economies arising from disease outbreaks and the control measures aimed at containing their spread, such as culling, quarantine sand travel bans; and livelihood threats to the poor. Zoonotic diseases and food-borne illnesses are human-health threats associated with animals. Therefore to boost the economic contribution of livestock for the country and to minimize the burden of animal diseases on the economy of producers and their welfare, improved animal health and food safety systems need to be developed and strengthened through collaborative efforts of all stakeholders.

[Awol Assen, Ayalew negash, Alemu Zewdu, Tsegaw Fentie. **Review on the impact of Animal Diseases on Food Security and Public Health: Ethiopian perspective.** *Nat Sci* 2024,22(1):14-23].ISSN1545-0740(print);ISSN2375-7167(online).http://www.sciencepub.net/nature 03. doi:10.7537/marsnsj220124.03.

Key words: Animal diseases, Health problem, Socio-economic problem

Nature and Science

Websites:
http://www.sciencepub.net/nature
http://www.sciencepub.net

Emails:
naturesciencej@gmail.com
editor@sciencepub.net

MARSLAND PRESS
Multidisciplinary Academic Journal Publisher

1. INTRODUCTION

The livestock population of Ethiopia is believed to be one of the largest in the world and the largest in Africa totaling up to 134.33 million animals. Livestock sector has been contributing considerable portion to Ethiopia's economy, and still promising to rally round the economic development of the country. It contributes about 43.5% of the GDP and 61% of total export (NABC, 2010).The contribution of livestock sector in the Ethiopian economy context can generally be categorized in terms of food production, supplier of inputs and services for crop production, raw material for industry, cash income and export earning, saving and investment and generator of employment (Fitaweke and Bhnke, 2002).

Although Ethiopia owns a significantly large livestock population, the sector has remained underdeveloped and its potential has not been efficiently and effectively used. Several constraints are responsible for low economic contribution of the sector in Ethiopia. Specific constraints prone to the efficient development of the sector include lack of proper statistics or inadequate knowledge of the livestock resource, under and malnutrition of the existing livestock, prevalence of animal diseases, poor market development and low genetic potential of indigenous animals for specific product. Less attention given to develop known local breeds of animals in the utilization of adaptive characteristics should also be considered important drawback. The constraints that hinder livestock development can be environmental, technical, infrastructure, institutional and policy (Azage *et al.*, 2006).

Among the constraints prevalence of animal diseases is the main constraint to hinder the contribution of the livestock sector to Ethiopia economy. The consequences of animal diseases in domesticated birds and livestock can be complex and generally go well beyond the immediate effects on affected producers. These diseases have numerous impacts, including: productivity losses for the livestock sector (e.g. production losses, cost of treatment, market disturbances),loss of income from activities using animal resources (in such sectors as agriculture; energy; transportation; tourism),loss of well-being of human beings (morbidity and even mortality rates; food safety and quality), prevention or control costs (production costs; public expenditure),suboptimal use of production potential (animal species, genetics, livestock practices) (James *et al.*, 2005).

In order to overcome such constraints and to allow the livestock sector to play its potential role on alleviating poor farmers from poverty, we should manage livestock disease and improve social welfare. Managing livestock disease and improving social welfare requires action on several fronts. Dealing with transboundary diseases requires regional cooperation or "cluster approaches" that take into consideration the rapid spread and evolution of these diseases. Mechanisms for reducing risks from livestock diseases include: Re-locating intensive livestock production facilities away from urban population centers, strengthening animal-health and food safety systems, including information and early warning, engaging all stakeholders, including poor people, in decision-making on animal-health programmers, developing animal-health strategies tailored to specific local circumstances and improving collaboration between national and international animal-health and food-safety authorities (FAO, 2009).

Therefore, the objectives of this seminar paper are:

- To highlight the role of animal diseases on food insecurity
- To review impact of animal diseases on human welfare

2. THE ROLE OF ETHIOPIAN LIVESTOCK TO THE LIVELIHOOD OF PRODUCERS AND NATIONAL ECONOMY

The majority of the world's estimated 1.3 billion poor people live in developing countries where they depend directly or indirectly on livestock for their livelihoods. Globally, livestock contributes about 40 percent to the agricultural gross domestic product (GDP) and constitutes about 30 percent of the agricultural GDP in the developing world. These estimates highlight the important contribution of livestock to sustainable agricultural development.The livestock population of Ethiopia is believed to be one of the largest in the world and the largest in Africa totalling up to 134.33 million animals. Livestock sector has been contributing considerable portion to Ethiopia's economy, and still promising to rally round the economic development of the country. It contributes about 43.5% of the GDP and 61% of total export(NABC, 2010).Livestock have multiple uses aside from income generation, including cash storage for those beyond the reach of the banking system, draught and pack services, milk and meat for household consumption, and manure for fuel and fertilizer. In addition to these non-market values, a thriving informal export trade in live animals further emphasizes the significance, albeit unrecognized by official statistics, of livestock and particularly cattle in the Ethiopian economy. This importance is pronounced in pastoral regions, and women's crucial role is widely acknowledged: both directly in primary production, and indirectly through the contribution of livestock to

household assets and food security (Aleme and Lemma. 2015)

2.1 Contribution to poverty reduction

Major outputs of livestock as food are production of meat, milk, eggs, fish, honey, etc. From the 45 food items identified as important for human consumption in the world, milk ranks second to rice while beef is fourth, egg ninth, poultry meat twentieth and mutton and goat meat twenty-first. Hence, given the importance attributed and the comparatively high contribution in terms of readily available protein source increased livestock production may add to food security and should be the focus of attention. Many poor smallholders will have direct access to food of livestock origin. Increased production will keep livestock products down and allow low-income groups to have access to such food (Zinash, 2011).

Almost all the Ethiopian rural population are dependent on agriculture where most of the 85-87% directly involve with livestock for the production of food of animal origin, and the provision of services and inputs in crop production. Livestock plays an important role in the generation of employment in meat production, processing and marketing, hides and skins processing, leather industry, milk collection, processing and marketing and many but small sized industries in livestock and livestock products such as cattle fattening and marketing, live animal trade. About 21.6 million agro pastoralists/pastoralists in Ethiopia depend on livestock as a major economic activity and for their livelihoods. The livestock sectors in these countries also support and sustain enterprises and interest groups which are linked and associated with the livestock value chains such as the livestock traders, transporters, slaughter facilities/processors, feed manufacturers, government (veterinary/animal husbandry departments), local authorities, veterinary drug suppliers, etc. who also generate employment opportunities. Livestock, therefore, is a major source of sustainable employment for the majority of people and supports rural development initiatives along the value chain (Aleme and Lemma. 2015).

2.2 Contribution to crop production

As supplier of inputs and services for crop production livestock provide draught power, serve in weed control, involve in nutrient recycling, and supply manure for enhancing crop production. Livestock play an important role in this respect. If services and inputs can be accounted in financial terms in production of crop their value would have been by far higher than what in these days' people advocate for utilization of fertilizers, machinery and human power. About 80% of Ethiopian farmers use animal traction to plough their fields. Both the mean area cultivated by a farm household and their yields per hectare are positively correlated with cattle ownership and ploughing, in comparison to hand cultivation. Despite these contributions to agricultural output, no attempt is currently made by Ministry of Finance and Economic Development (MoFED) to impute the monetary value of animal traction for Ethiopian agriculture. Based on the average cost of renting ploughing services, the value of the animal draught power input into arable production is about a quarter (26.4%) of the value of annual crop production. Nearly a third (31%) of the total gross value of livestock output is represented by the value of animal draught power as an input into crop cultivation, an estimated 21.500 billion Ethiopian Birr (EB) in 2008-09 (Abassa, 2010).

2.3 Contribution to the national economy

Livestock are important source of income for smallholder farmers' and pastoralist population. They provide direct cash income through sales of animals or animal products for purchase of food, input and other needs. Nationwide export of livestock and livestock products assist in earning foreign exchange and import substitution. Cash can be generated from sales of livestock products regularly (milk, egg) or sporadically (live animal, meat) or from services (draught, transport). Livestock are important source of income for smallholder farmers' and pastoralist population. Combined with hides, skins and leather exports (which are sourced primarily from highland animals) live animal and meat exports probably constitute about a fifth of all of Ethiopia's exports. Approximately half of these livestock sector exports are not recorded and not recognized by the National Bank of Ethiopia because they are produced by the cross border trade in live animals, which the government deems to be illegal and does not recognize (CSA, 1996).

Some studies by Gryseels (1988) and the International Livestock Research Institute (ILRI, 1995) show that livestock alone accounts for 37-87 percent of the total cash income of agro pastoralists/pastoralists in Ethiopia. (FAO, 2006) indicate that livestock in Ethiopia, especially in arid/semi-arid areas, livestock provides almost 100 percent of household income (90.0 percent from cattle; 5.3 percent from milk, butter and hides/skins; 1.2 percent from small ruminants, 0.9 percent from camels and their products and 1.7 percent from other sources, whereas in come from crops is practically zero (Aleme and Lemma. 2015).

In satisfying the requirement of human needs accordingly in terms of quality food of animal origin and supply of raw material for the manufacture of goods needed in the day to day activity, animal products play an important role as suppliers of inputs to processing and manufacturing industry. Whole fresh milk is used as raw material for the production of high

quality milk and milk products with long duration of shelf life products such as UHT milk, butter, gee, cheese and other products. Meat, in the same token, is processed to improve its handling capacity for proper utilization and in the equity supply of the product to the different locations. Other products such as honey, wax, skin and hides, wool, etc. are used for the production of different materials of human benefit other than food items (Sansoucy *et al.*, 1995).

3. CHALLENGES OF LIVESTOCK SECTOR DEVELOPMENT

Generally, constraints mitigating successful animal production development revolve around the absence of clear livestock sector development policy and strategy. Specific constraints prone to the efficient development of the sector include lack of proper statistics or inadequate knowledge of the livestock resource, under and mal nutrition of the existing livestock, prevalence of animal diseases, poor market development and low genetic potential of indigenous animals for specific product. Less attention given to develop known local breeds of animals in the utilization of adaptive characteristics should also be considered important draw back. Negligence of the government the role of the private sector in development of the sub sector, absence of users participation in the designing and planning of livestock development projects and inability of the previous livestock sector development projects to be sustained after their completion (either by government fund or community participation). The constraints that hinder livestock development can be broadly categorized into environmental, technical, infrastructure, institutional and policy. The major technical constraints are under nutrition and malnutrition, high prevalence of diseases, poor genetic resource management and poor market infrastructure (Aleme and Lemma. 2015)

4. ECONOMIC AND HUMAN-HEALTH THREATS RELATED TO LIVESTOCK DISEASES

Animal diseases pose two basic types of problem for humans: socio-economic and health. Economic and socio-economic threats from livestock diseases come in three broad categories: (i) losses in production, productivity and profitability caused by disease agents and the cost of their treatment; (ii) disruptions to local markets, international trade and rural economies arising from disease outbreaks and the control measures aimed at containing their spread, such as culling, quarantine sand travel bans; and (iii) livelihood threats to the poor. Livelihood threats arise from the first two categories of threat. Human-health threats from livestock come in two basic forms: (i) zoonotic diseases, and (ii) food-borne illnesses (FAO, 2009).

The consequences of animal diseases in domesticated birds and livestock can be complex and generally go well beyond the immediate effects on affected producers. These diseases have numerous impacts, including: productivity losses for the livestock sector (e.g. production losses, cost of treatment, market disturbances),loss of income from activities using animal resources (in such sectors as agriculture; energy; transportation; tourism),loss of well-being of human beings (morbidity and even mortality rates; food safety and quality), prevention or control costs (production costs; public expenditure),suboptimal use of production potential (animal species, genetics, livestock practices) (James *et al*., 2005).

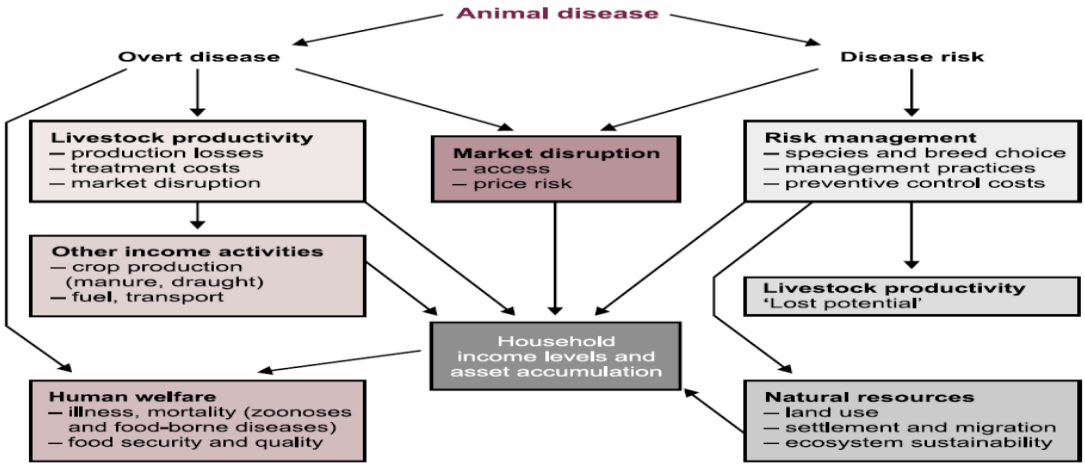

Figure 1: Impact of Animal Diseases on Food Security and Public Health

4.1 Economic impact of animal diseases

From the point of view of producers, livestock diseases are essentially an economic problem. Diseases reduce production and productivity, disrupt trade and local and regional economies and exacerbate poverty. At the biological level, pathogens compete for the productive potential of animals and reduce the share that can be captured for human ends. Veterinary services are often not available or affordable, so the routine costs of controlling and treating disease in traditional systems are low, but the continual drain on production and productivity caused by endemic infectious and parasitic diseases reduces the ability of smallholders to lift themselves out of poverty (FAO, 2009)

4.1.1 Loss of production, productivity and profitability

The animal health situation usually reflects a country's level of economic development. In developed and emerging countries, animal diseases are being controlled ever more effectively. By contrast, in low-income countries, where the death of a single animal can have dramatic consequences for a vulnerable family, the economic and social impact of animal diseases is particularly severe (OIE, 2014).

Despite the large number of livestock in Ethiopia the sector is characterized by low Productivity and, hence, income derived from this sector of agriculture could not impart significant role in the development of the country's economy. The low productivity is attributed to the low genetic potential of indigenous cattle, poor nutrition and reproductive performance, inadequate management, high disease incidence and parasite burden. Among these diseases have numerous influences on productivity and fertility of herds i.e. losses due to mortality and morbidity, loss of weight, slow down growth, poor fertility performance and decrease physical power. It is particular problem when it infects draught animals during the ploughing season, limiting their ability to work. This reduces farmers' incomes from renting out draught animals and causes a reduction in the area of land that can be planted to staple food crops (Gebremedhin, 2007)

4.1.2 Reduction or elimination of market opportunities

The livestock sector plays a significant role in the economic development of many countries.

The loss of access to regional and international markets tends to have much more important economic implications than local production losses alone. The extent of the economic damage is contingent upon the volume of exports from the affected area. Naturally, the impact can be severe for those areas that had an important and established export market before the outbreak (Asfaw *et al*., 2011).

Although one of the most devastating diseases of livestock in the country i.e., rinderpest has been eradicated and many other endemic diseases are put under considerable control, there are still some serious trans-boundary animal diseases (TADs), such as CBPP, CCPP, FMD, LSD, AHS, PPR and ND which are limiting the productivity and international trade of livestock and their products. Particular area of concern is the foreign trade opportunities that are getting broader for Ethiopian livestock and livestock products in the Middle East and the African sub-region, provided that risk from TADs is eliminated or is under adequate level of control or protection to pose no threat to trading partners (APHRD, 2012).

Animal diseases that cause high mortality in animals and spread rapidly nationally and internationally into disease-free areas can exact particularly high economic costs. These so-called transboundary and emerging diseases can be vectored by birds, rodents and insects and carried by live animals and animal products or on the clothes, shoes and vehicle tire of people moving through an affected area. The emergences of new diseases that are not understood or for which control technology is not available are of particular concern. Because of their dramatic effects on animal mortality and their high economic costs, they tend to attract the greatest attention from public animal-health programmers and national and international regulations (FAO, 2009).

The discovery of a notifiable disease in a country that exports livestock or livestock products can create severe market shocks. Control measures typically include market and trade bans, restrictions on the movement of livestock and culling of affected herds or flocks. Consumers may also shun products of the livestock species involved if the disease is perceived to have possible human-health implications. Sharp falls in consumption can affect producers and traders far outside the area where the outbreak occurs (Ayele, 2003).

In a livelihoods analytical framework, bans imposed on livestock markets are usually categorized as a "shock." This is a sudden, unpredictable and relatively large-scale event, the duration of which is unknown at the onset. In the Horn of Africa, livestock market bans are usually imposed by importing countries due to concerns about livestock diseases and, specifically, are a response to the presence (real or suspected) of epizootic or transboundary animal diseases in exporting countries. The extent to which different pastoral wealth groups are affected by domestic and market bans depends on a host of factors, which include: the volume of transactions; the purpose and mode of production; export tradition; types of animals exported; the

availability of alternative domestic and/or cross-border markets and capacity to adapt to these markets; and the duration of the bans (Endale, 2010).

The eradication of certain major diseases to facilitate access to "high value" export markets can provide considerable benefits. Uruguay is a good example of a country that gained access to a lucrative market after eradicating foot and mouth disease. Beef exports increased in volume by more than 100 percent and in value by 52 percent after the OIE declared Uruguay to be officially foot and mouth disease-free without vaccination in 1996. Access to the U.S. market (where prices are double those of the domestic market) provides Uruguay with additional revenue to the tune of US$20 million each year (FAO, 2009).

4.1.3 Impact on livelihoods

Livestock supports the livelihoods of 800 million to 1 billion of the world's poor and landless (Thornton *et al*. 2000).Livestock in Ethiopia provide subsistence and employment for more than 10,000,000 people and are source of meat, milk and fiber for the residents of some two dozen major towns and cities within or adjacent to the low land. The livestock are estimated to contribute to the livelihood of 60-70% (Alemayehu, 2004).

They are not only an important income-generating asset but also an indicator of wealth status and a source of food and nutrition security as well as insurance against future shocks and stresses (Randolph *et al*., 2007). However, livestock owned by the poor is particularly vulnerable to diseases because of poor people's lack of resources to cope with, and often knowledge regarding, disease prevention and mitigation. Livestock diseases can therefore potentially have significant impacts on the various livelihood outcomes of the poor (Ekin *et al.,* 2011). Animal disease affects all livestock-owning households by threatening their assets and making their income less secure. For many families in the poorest quintile, livestock disease is particularly damaging because it threatens the very asset that they use for dealing with other crises. It also affects people who are employed by livestock owners, small-scale traders of livestock and poor consumers. A survey by the Food and Agriculture Organization of the United Nations (FAO) on avian flu revealed that in the most seriously affected regions of Indonesia, 20 percent of permanent workers at industrial or commercial farms lost their jobs (ILRI, 1995).

.For these reasons, reducing the incidence of livestock diseases can help alleviate poverty. However, as noted above, livestock keepers have different objectives and face different risks and incentives. Policy makers need to consider these differences in formulating responses, even as health objectives remain foremost. It must be recognized that poorly planned and executed measures may seriously harm poor livestock owners and fail to achieve animal health objectives (FAO, 2009).

4.2 Human health threats

Many animal related problems, which negatively affect human health and economy, exist in all countries of the world including zoonoses, food borne diseases and pollution of the environment from animal sources. Most of the agents associated with the current world wide increase in cases of food borne diseases such as Salmonellosis, *E. coli*,Campylobacteriosis and Listeriosis are concerns especially in the developingworld. In addition zoonoses like Rabies, Brucellosis, Bovine Tuberculosis, Cysticercosis, Hydatidosis, Taeniasis, Toxoplasmosis are yet uncontrolled diseases which need the attention of veterinary public health services (Sissay, 2012). According to estimates of the World Health Organization in low income countries, trypanosomosis kills 75,000 people annually, rabies kills 55,000, cysticercosis 50,000 and trematodosis10,000 (to name but a few of the zoonoses in existence). Every year, 2.2 million people in LDCs, most of them young children, die from diarrheal diseases, chiefly of zoonotic origin, caused by Campylobacter or Salmonella (WHO, 2010).

4.2.1 Zoonotic diseases and pandemic threats

The link among humans, animal populations and the surrounding environment is very close in many developing countries, where animals provide transportation, draught power, fuel, clothing and sources of protein (that is, meat, eggs, and milk). In the absence of proper care, this linkage can lead to a serious risk to public health with huge economic consequences (WHO, 2010).

Zoonoses are defined as those diseases and infections naturally transmitted between people and vertebrate animals (WHO, 2005). Zoonoses constitute a diverse group of viral, bacterial, rickettsial, fungal, parasitic, and prion disease with a variety of animal reservoirs, including wild life, livestock, pet animals, and birds. The transmission may occur through direct contact with the animal, through vectors (such as fleas or ticks), or through food or water contamination. Globally, zoonoses are said to account for 60% of all infectious disease pathogens and 75% of all emerging pathogens (In both developing and developed countries, a number of new zoonoses have emerged. This might be the result of either newly discovered pathogens or agents that are already known, usually appearing in animal species in which the disease had not previously been detected . Many diseases that affect humans which are new, emerging and re-emerging, were caused by pathogens that originated from animals. Moreover, a number of zoonotic

diseases, including rabies, brucellosis, bovine tuberculosis and echinococcosis continue to affect humans and animals in many countries, particularly developing nations (WHO, 2004).

Over the last twenty to thirty years we have been observing the emergence or re emergence of several bacterial zoonoses. In most cases these disease are the one that humans have contracted either when ingesting contaminated foods or by exposing themselves to wild bacterial reservoirs or vectors (Alula, 2012). In recent years, several major human epidemics have occurred on a world-wide scale. Notable examples include SARS, avian influenza and swine flu, each of which have spread over a number of continents and caused widespread morbidity and mortality. Similar occurrences have been observed in animal populations, for example foot-and-mouth-disease in the United Kingdom, avian influenza in the Netherlands and bluetongue disease in Europe. In each of these examples, the pathogens were considered "exotic" prior to their introduction and spread (kebede *et al*., 2012).

Zoonotic diseases cause mortality and morbidity in people, while also imposing significant economic losses in the livestock sector. Their burden tends to fall most heavily on poor societies. They have both direct and indirect effects on livestock health and producion. Indirect effects occur as a result of the risk of human disease, the economic impact on livestock producers through barriers to trade, the costs associated with control programmes, the increased cost of marketing produce to ensure it is safe for human consumption, and the loss of markets because of decreased consumer confidence (McDermott and Arimi, 2002).

Toxoplasmosis, leishmaniasis and hydatidosis are the most neglected, an important public health problem and of economic importance, affecting largely the poorest of the poor, mainly in developing countries. Toxoplasmosis is a problematic zoonosis, particularly in vulnerable groups such as pregnant women and immune deficient patients. Toxoplasmosis is the most common disease complication, next to tuberculosis, among HIV sero-positive admissions and deaths in Ethiopia. Visceral leishmaniasis focus in Ethiopia has the highest known HIV co-infection. Ethiopia has been noted for a high prevalence of hydatid disease since 1970s during which it was reported that the disease occurs in all parts of the country. Likewise, studies conducted recently in abattoirs of various locations have indicated that hydatidosis is widespread in Ethiopia with great economic and public health significance. The MoH estimates the annual burden of VL to be between 4,500 and 5,000 cases. Therefore, it is highly imperative public health education to build up public awareness about the sources of infection, control and prevention method for overcoming neglected tropical diseases (Dawit and Shishay, 2014).

The majority of zoonooses are, however, not prioritized by health systems at national and international level and labeled 'neglected' or 'endemic'. NTDs are significant public health problems in Ethiopia. From the analysis reported here, Ethiopia stands out for having the largest number of NTD cases following Nigeria and the Democratic Republic of Congo. Ethiopia is estimated to have the highest burden of trachoma, podoconiosis and cutanous leishmaniasis in sub-Saharan Africa (SSA), the second highest burden in terms of ascariasis, leprosy and visceral leishmaniasis, and the third highest burden of hookworm. Infections such as schistosomiasis, trichuriasis, lymphatic filariasis and rabies are also common. A third of Ethiopians are infected with ascariasis, one quarter is infected with trichuriasis and one in eight Ethiopians lives with hookworm or is infected with trachoma. However, despite these high burdens of infection, the control of most NTDs in Ethiopia is in its infancy. In terms of NTD control achievements, Ethiopia reached the leprosy elimination target of 1 case/10,000 population in 1999 (kebede *et al*., 2012).

4.2.2 Food borne illness

Foods of animal origin are among the favorite and commonly consumed nutrients by most human communities in the world. However, if they are not prepared and handled properly they lead to the cause of many food borne diseases (Avery, 2004). The most prevalent diseases transmissible from animals to man include, tapeworm, anthrax and bovine tuberculosis (MoH, 2004). Organisms such as salmonella (particularly *S. enteritidis* and *S. typhimurium*), Campylobacter and *E. coli* O157:H7 are major food-borne threats, causing illness in millions of people worldwide every year. Chemical and biological contaminants include: veterinary drug residues, such as antimicrobials, and pesticides; chemicals; heavy metals; and naturally occurring mycotoxins and bacterial toxins (FAO, 2009).

Informal food production systems, such as unregulated slaughter in developing countries, make available food that has not met food-safety standards. Many rural and urban poor people buy food in informal and uncontrolled markets and, therefore, face a higher chance of contracting zoon tic and food-borne diseases, resulting in illness and wage loss as well as medical expenses to treat the illnesses (MoH, 2003/4). As economies develop, food processing and preparation tends to shift outside the home, and supermarkets increasingly dominate urban food retailing. In many developing countries, this has led to demands from the

growing affluent middle-class driving improvements in food safety (Karl, 2009).

Food-borne illness is a major international problem and an important cause of reduced economic growth. The contamination of the food supply with the pathogens and its persistence, growth, multiplication and/or toxin production has emerged as an important public health concern. Most of these problems could be controlled with the efforts on the part of the food handlers, whether in a processing plant, a restaurant, and others. In contrast with most chemical hazardous compounds, the concentration of food pathogens changes during the processing, storage, and meal preparation, making it difficult to estimate the number of the microorganisms or the concentration of their toxins at the time of ingestion by the consumer (Cristina, 2008).

It is believed that 30 percent of people in industrialized countries suffer from food borne illnesses of animal origin every year, but the cost of food borne illnesses in many developing countries is not fully known since such cases are often not reported, and systems to track such illnesses are uncommon. In the United States, food borne illness outbreaks linked to animals are estimated to cost more than $8 billion (U.S.)/year. Globally every year, many zoonotic diseases continue to have a tremendous impact on health, food safety, livelihood, and trade (e.g., anthrax, brucellosis, tuberculosis). Poor infectious disease surveillance and control efforts have led to the global spread of diseases of major zoonotic importance, and from responses to these we have learned that disease surveillance systems must incorporate animals, humans, and ecosystems (Radford, 2006).

It might seem paradoxical to discuss on the subject of food safety when millions are suffering from lack of food and of the most inferior quality. At a national level however, both food shortage and lack of appropriate food safety assurance systems are problems that have become obstacles to the Ethiopian economic development and public health safety (FAO, 2007).

Ensuring food safety to protect public health remains a significant challenge in both developing and developed countries. Current and new challenges to food safety include changes in animal husbandry, food or agricultural technology, lifestyle and consumer demands and others. In Ethiopia, key stakeholders involved in food safety management include Ministry of Health, Ministry of Agriculture, Quality and Standards Authority of Ethiopia, Environmental Protection Authority, Ministry of Industry, Ministry of Trade, different Federal and Regional Governmental Bodies, Research Institutions, Ministry of Education, Food Manufacturers, Food distributors and Hotels. Even though effective food safety systems are vital to maintain consumer confidence in the food system and to provide a sound regulatory foundation for domestic and international trade in food, there are gaps in Ethiopian food safety system on legal and policy frame work, food-borne diseases surveillance, coordination of organizations involved in food safety management, and laboratory services for relevant food hazards. Lack of appropriate food safety assurance systems are problems that have become obstacles to Ethiopia's economic development and public health safety. There is no appropriate policy frame work that guides food safety management. Initiating the establishment of National food safety Authority/policy, upgrading the capacity of existing public health laboratory, personnel, food-borne diseases surveillance, and legal and policy frame work are as such suggested to overcome these problems (Theshome *et al*., 2014).

The ultimate goal of food-safety management systems is to prevent unsafe food from entering the food supply. This is achieved by applying good hygiene practices at all stages of the food chain. The role of national authorities is to define the food safety standards that the industry must meet and to provide the necessary oversight to ensure that the standards are met (FAO, 2009).

4.3. Disease Control and Risk Management

Managing livestock disease and improving social welfare requires action on several fronts. Dealing with transboundary diseases requires regional cooperation or "cluster "approaches that take into consideration the rapid spread and evolution of these diseases. Mechanisms for reducing risks from livestock diseases include: Relocating intensive livestock production facilities away from urban population centers; Strengthening animal-health and food safety systems, including information and early warning; the Global Early Warning System (GLEWS), operated by FAO, OIE and WHO; Engaging all stakeholders, including poor people, in decision-making on animal-health programmers; Developing animal-health strategies tailored to specific local circumstances; Improving collaboration between national and international animal-health and food-safety authorities (FAO, 2009).

CONCLUSION AND RECOMMENDATIONS

The dependence of livestock producer and consumers on livestock for their asset and needs exposed them to various impacts from animal diseases. The impact is more prominent in those people whose livelihood is based on livestock. In Ethiopia, animal diseases affect the food security of the livestock producers by decreasing production, productivity and profitability of the animals. Besides the effect on food security, zoonotic diseases become high human health threat. The day to day contacts of people with the animal and extensive production system in Ethiopia aggravates the effect of zoonotic diseases. With the low food safety

and most of the 85-87% of the population in Ethiopia directly involve with livestock for the production of food of animal origin, food borne diseases also have a great effect on the consumers. To minimize the general effect of animal diseases, we should give priority for animal diseases control and risk management.

Based on the above conclusion the following recommendations are forwarded:

- Continuous efforts are required from animal health professionals to create awareness about the economic and public health importance of animal diseases.
- Appropriate disease control programs should be developed at a national and regional level to minimize livestock losses and improve the productivity.
- To minimize human health risks, intensive livestock production facilities should be located far away from urban population centers.
- Food safety and animal-health systems should be strengthened by engaging all stakeholders including producers, consumers and institutions in decision making.
- "One health" principle should be strengthened through collaborations between national and international animal-health and food-safety authorities.

REFERENCES

[1]. Abassa, K. P. (2010): Improving Food Security in Africa: The Ignonored Contribution of Livestock joint ECA/FAO agricultural division. Monograph. No. 14, Addis Ababa, Ethiopia.

[2]. Alemayehu, M. (2004): Country pasture/Forage Resource Profile: Addis Ababa University. Faculty of Computational Science, Biology Department, Addis Ababa, Ethiopia.

[3]. Aleme, A. and Lemma, Z. (2015): Contribution of Livestock Sector in Ethiopia Economy. *Advances in Life Science and Technology,* **29**:2224-7181.

[4]. Alula, A. (2012): Review on emerging and re-emerging bacterial zoonotic diseases. *American-EU Rasian journal of scientific research*, **7(4):** 176-186.

[5]. Animal and Plant Health Regulatory Directorate (2012): Livestock Contribution to Ethiopian Economy.

[6]. Asfaw, N., Shahidur, R. and Berhanu, G. (2011): Livestock production and Marketing. Ethiopia strategy support programme-2, working paper 26, Ethiopia.

[7]. Avery, A. (2004): Red meat and poultry Production and consumption in Ethiopia and distribution in Addis Ababa. Borlaug ruan World Food Prize International Livestock Research Institute, Addis Ababa, Ethiopia.

[8]. Ayele, S., Assegid, W., Jabbar, M. A., Ahmed, M. M. and Belachew, H. (2003): Livestock marketing in Ethiopia: A review of structure, performance and development initiatives. Socio-economic and policy research working paper 52. ILIRI (International Livestock Research Institute), Nairobi, Kenya.

[9]. Azage, T., Berhanu, G. and Dirk, H. (2006): Input supply system and services for market-oriented livestock production in Ethiopia. Proceedings of the 14th annual conference of Ethiopian Society of Animal Production (ESAP) held in Addis Ababa, Ethiopia.

[10]. Central Statistics Authority (1996): Livestock resource and Production statistics in Ethiopia. Central Statistics Authority (CSA). In proceeding fourth Conference of Ethiopian Society of Animal Production (ESAP) 18-19 April.

[11]. Cristina, P. (2008): The impact of food manufacturing practices on food born diseases. *Brazilian Archives of Biology and Technology,* **51**: 815-823.

[12]. Dawit, G. and Shishay, K. (2014): A Review on epidemiology, public health impact and control methods of the most neglected parasite diseases in Ethiopia. *World journal of medical sciences,* **10(2)**: 94-102.

[13]. Ekin, B., Lydia, N., Davesh, R. and Yarbol, Y. (2011): Assessing the livelihood impacts of a livestock disease outbreak. An alternative approach. IFPRI Discussion paper 01081, Addis Ababa, Ethiopia.

[14]. Endale, T. (2010): Food safety and codex activities in Ethiopia. The role of consumers association on ensuring food safety in Ethiopia FAO (2006): Livestock Sector Brief; Ethiopia and Botswana Livestock Information Sector Analysis and Policy branch, AGAL.

[15]. Food and Agricultural Organization (2009): Livestock and human and animal health available at http://www.fao.org/docrep/012/:0680e/i0680e05.pdf

[16]. Food and Agriculture Organization (2007): Joint FAO/WHO Food standards Programme FAO/WHO Coordinating committee for Africa, seventeenth session, Rabat, Morocco, 23-26.

[17]. Fitaweke, M. and Bhnke, R. (2002): The contribution of Livestock to Ethiopian Economy Part 2. IGAD (Intergovernmental Authority on Development), LPI (Livestock Policy Initiative) Working Paper No.02-11.

[18]. Gebremedhin, A. (2007): Major animal health problems of market oriented livestock development in AtsbiWomberta woreda, Tigray regional state. MSc thesis, Addis Ababa

University, Faculty of Veterinary Medicine, DebreZeit, Ethiopia.

[19]. International Livestock Research Institute (1995): Livestock Development Strategies for low income countries. International Livestock Centre for Africa. Addis Ababa, Ethiopia.

[20]. James, P., Dawn, T. and Kamina, J. (2005): Economic impact of Animal diseases. A survey of literature and typology of research approach, International Food and agribusiness management review, issue.

[21]. Karl, M. R., Brain, D. P. and Simeon, K. (2009): Commodity-based trade and market access for developing country livestock product: The case beef export from Ethiopia. International food and agro business management review, 12, Issue 3.

[22]. Kebede, D., Kadu, M., Teshome, G., Asrat, H., Ahmed, A., Abrham, A. and Gail, D. (2012): The burden of Neglected Tropical Disease in Ethiopia and opportunities for integrated control and elimination of parasites and vectors, 1-115.

[23]. Ministry of Agriculture, Animal and Plant Health Regulatory Directorate. (2012): Ethiopia Animal Health Regulatory Directorate 2011, Addis Ababa, Ethiopia.

[24]. Minstry of Health (2003/4): Tropical Zoonotic Diseases

[25]. Netherland-African Business Council (2010): Livestock in Ethiopia and opportunity analysis for Dutch investment. Fact sheet: Livestock Ethiopia.

[26]. OIE (World Organization for Animal Health) (2014): Improving Animal Health and Livestock Productivity to reduce Poverty. Paris, France.

[27]. Radford, D.(2006): Surveillance for Livestock Disease that impact food security and food safety, MSc thesis, Iowa state University, College of Veterinary Medicine, Washington, DC.

[28]. Randolph, T. F., Schelling, E. and Grace, D. (2007): Role of livestock in human nutrition and health for poverty reduction in developing countries. *Journal of animal science*, **85**: 2788-2800.

[29]. Sansoucy, R., Jabbbar, M. A., Ehui, S. and Fitzhugh, H. (1995): The Contribution of Livestock to food security and sustainable development. In proceedings of joint FAO/ILRI Round table on Livestock Development strategy for low income countries, ILRI, Nairobi,Kenya.

[30]. Sisay, G., Girma, Z., Ketema, T. and Tariku, J. (2012): Assessment of awareness on food borne zoonosis and its relation with veterinary public health services in and around *Addis Ababa, Ethiopia. Ethiopia veterinary Journal*, **16(1)**:15-22.

[31]. Teshome, K., Kokeb, B. and Habawi, R. (2014): The Ethiopian perception on food safety System. *Advances in food science and Technology*, **2(9)**: 260-268.

[32]. Thorton, P. K., Randolph, T. F., Kristjanson, P. M. and Ryan, J. G. (2002): Priority assessment for international livestock research institute, Nairobi, Kenya.

[33]. WHO (2004): Water borne zoonosis, identification, causes and control. Available at http://www.who.int/water-sanitation-health/diseases,/zoonosis.pdf.

[34]. WHO (2005): The control of neglected zoonotic disease. Report of joint WHO/DFID-AHP Meeting with participation of FAO and OIE. Geneva, September 2005. Available at http://whglibdoc. Who.int/publication (2006)9789241594301-lng.pdf.

[35]. World Health Organization (WHO) (2010): Managing public health risk, the human ecosystem interface. Strong intersectoral partnership in health. Food safety and zoonosis. Available at http://www.who.int/media center/facts huts/fsogg/enl.

[36]. World Health Organization (WHO). (2010): The Control of Neglected Zoonotic disease: Community-based intervention for prevention and control. Report of the third conference, 23-24, November, Geneva.

[37]. Zinash, S. and Alemu, Y. (2011): Contribution of animal science research to food security.

11/22/2023