

## Historical analysis of animal diseases: Nagana in Southwestern Ethiopia, Gambella.

*Shimels Ayele Yalew*

*Lecturer and Researcher, Department of History and Heritage Management, Bahir Dar University*

Email: [Shimelsaye21@gmail.com](mailto:Shimelsaye21@gmail.com)

### Abstract

Animals and humans have been intimate companions since antiquity. The history of animals discloses diverse episodes in human history. However, the history of animal disease via humans has been the least researched theme. Therefore, this study aimed to explore animal disease history with a special focus on Nagana in Gambella, Ethiopia. The study utilized content analysis of travelers' accounts, archival documents, reports, and secondary sources. It revealed that nagana was endemic in the region due to the presence of dense forests, abundant game resources, and climatic factors. Nagana had direct and indirect repercussions. It caused the loss of domestic animals and productivity. It also influenced the economic, political, and cultural life of the people in Gambella. Moreover, limited prevention efforts exacerbated the repercussions of the disease.

**Keywords:** Animal; Disease; Ethiopia; Gambella; History; Nagana.

### Introduction

The diverse ecological zones bestowed Ethiopia with the copious resource of domestic and wild animals. Ethiopia has the largest livestock (cattle, sheep, goats, equines, camels, and poultry) resources in Africa (Mayen, 2006). Besides, Ethiopia has enormous wild and aquatic animal resources with endemic species, serving as tourist attractions (Zewudie, 2004). Animals have fundamental contributions to the national economy. The livestock in Ethiopia, for instance, has a significant share of the national gross domestic product (GDP). Livestock plays an enormous role in serving food and nutritional security, financial security, sustainable crop yields, employment prospects, social status, and soil fertility. In addition, food products such as meat, milk, and eggs are concentrated sources of high-quality protein, vitamins, and minerals (Abebe, 2004; Admassu, 2002).

Nevertheless, Ethiopia has been facing difficulties to take advantage of the resources at a significant level. Widespread diseases, lack of effective nutrition, problems in policy enforcement, limitations in genetic potential, and poor management practices were the major stumbling blocks (Abebe, 2004; Zewudie, 2004). In line with animal disease, the country has been suffering from noxious diseases caused by bacteria, viruses, protozoa, and parasites. These include Foot and Mouth Disease (FMD), Lumpy Skin Disease (LSD), Contagious Bovine Pleuropneumonia (CBPP), Bovine Tuberculosis (BTB), Peste des Petits Ruminants (PPR), and trypanosomiasis. Some of these animal diseases are zoonotic and parasitic which affect human health directly (FFILLS, 2016).

Nagana is among the endemic parasitic diseases in Ethiopia. It is caused by trypanosomes (blood protozoan parasites) and transmitted mainly by vectors known as Tsetse flies. Tsetse fly (*Glossina*) is the bloodsucking cyclical vector of trypanosomiasis which causes sleeping sickness in humans and nagana in livestock. The disease is transmitted through contact among the host, vector, and parasite. The disease affects animals more than people due to a couple of reasons. The first is the diversity of trypanosomes that can infect animals. Secondly, the fly preferentially bite animal hosts (Alsan, 2015). There are three subgroups of Tsetse flies: Palpalis (riverine), Morsitans (savannah), and Fusca (forest-dwelling). This division is made based on the ecological adaptation of the tsetse flies. The flies exist in more than 30 sub-Saharan African countries that cover around 10 million km<sup>2</sup> area (Lincoln and Dieter, 2017; Waldetensai *et al.*, 2020).

When the vector feed on diseased cattle, sheep, goats, pigs, horses, donkeys, camels, and man, trypanosome parasite get into the host's blood. Later on, it develops into an infective stage inside the insect. During the infective stage of the parasite, metacyclic trypanosomes found in the saliva of the vector inject into animals in times of a fly bite (Waldetensai *et al.*, 2020). Symptoms of Nagana include loss of weight, loss of power, failure to move equally with other members of herds, loss of milk, abortion, swelling of glands, anemia, pale mucus membranes, speedy heartbeat, and death (Puskur and Mulat, 2011).

Nagana is endemic mainly in sub-Saharan Africa for centuries. The region is suitable habitat for the tsetse fly vector (Kuzoe and Schofield, 2004). This vector is found in the western and southwestern lowland rainforest and wooded savannah regions of Ethiopia. It covers an area of more than 200,000 km<sup>2</sup> or 20,000,000,000 hectares of land which is fertile and vegetated, and suitable for

farming and animal rearing (Puskur and Mulat, 2011). This region includes the western part of Amhara and Oromia, Gambella, Benshangul Gumuz, and Southern Nations nationalities and peoples regions (Waldetensai *et al.*, 2020). Animal diseases had several effects since ancient times. For example, Schistosomiasis affected farmers and irrigation laborers and caused the death of sheep and cattle in the ancient Egyptians and Mesopotamia. The effects of animal diseases were common during middle age. It decimated both human and animal populations. It also caused population movements, loss of agricultural production resulting in high mortality amongst livestock, and famine (Swabe, 1999).

Nagana hindered the economic development in African countries (Hamon *et al.*, 1965). It instigated serious threats to the lives and livelihood of entire communities and constitutes the greatest constraint to livestock and crop production in sub-Saharan Africa (Dagnachew *et al.*, 2011). Besides, it affected settlement patterns, land use, draught power use, animal husbandry, and farming (Waldetensai *et al.*, 2020). As a result, nagana forced people to shift the area of settlement due to high livestock mortality. In turn, the secluded areas of the tsetse fly inhabited region have been densely populated (Puskur and Mulat, 2011). Therefore, the disease had a wide-ranging effect on the economic, social, and cultural affairs of people in the areas occupied by the vector.

Similarly, nagana caused devastating direct and indirect impacts in Ethiopia. It resulted in the reduction of fertility (calving rate), weight gain, milk, and meat off-take. The death of affected animals and a decrease in the potential opportunities for livestock and crop production are also common effects (Zelege, 2011). Above all, it has begotten danger to human health and development. The disease posed challenges to animal production and agricultural livelihoods. Nagana hampered progress in crop and livestock production and triggered hunger, poverty, and the suffering of communities.

### **The rationale of the study and methodology**

The history of humans is not an enclave in the ecosystem (Cannadine, 2002). Humans and Animals have had chummier interactions for many years. Animals have played paramount roles in the life of humans since time immemorial (Kalof, 2007). Accordingly, studying the history of animals has various significance. It can provide vital events to explore the different themes of history. In addition, it is crucial to get a deeper understanding of the ecological

challenges that humans face over time (Way *et al.*, 2020). However, the role of animals has been neglected in historiography. Animals were simply treated as one of the economic inputs in history (Fagan, 2015).

Likewise, the historiography of animals in general and animal diseases, in particular, is very scarce in Ethiopia (Brown, 2014). Animal diseases were mentioned in the historical research about the famine of 1889-92 in Ethiopia. In 1889 cattle plague or rinderpest occurred in Ethiopia due to the importation of diseased European oxen into the new Italian colony of Eritrea. Although the disease was not new, the catastrophe caused by the rinderpest was unprecedented. Only around 7 or 8% of the country's cattle had survived in the early years of the plague. The loss of cattle led to a shortage of grain and finally to starvation (Pankhurst, 1961).

Nevertheless, studies on the subject of animal diseases, including trypanosomiasis in Ethiopia, were mainly conducted by veterinary professionals. However, the priorities of these studies were not historical experiences. Rather, the assessment of disease prevalence was the focus of studies on trypanosomiasis (Waldetensai *et al.*, 2020). Besides, the economic and social effects of the disease have won the attention of the researchers. Furthermore, sleeping sickness has been given better recognition than nagana (Endeshaw *et al.*, 1997). There was also research conducted by animal health professionals to identify the prevalence and effects of trypanosomiasis in Gambella by the year 1970. However, it was limited in focus, time, and space. It only researched human sleeping sickness, the 1967-1970 phenomena, and only around the Gilo river (Connell *et al.*, 1970).

Hence, this study aimed at assessing the prevalence and effects of trypanosomiasis in the 20<sup>th</sup>-century southwestern Ethiopian region. It is a history of the animal disease (nagana) in Gambella. This research answered the following questions.

- Why Nagana was endemic in Gambella?
- What were the repercussions of Nagana?
- How the government and the people reacted to the disease?

The accounts of travelers who visited the region during the first half of the 20<sup>th</sup> century, archival sources from the Ethiopian National Archives and Library Agency (NALA), and reports were analyzed systematically. In addition, related content from books, journal articles, and scholarly web sources was analyzed

carefully. Therefore, the study used content analysis of both primary and secondary sources.

## **Nagana in Gambella**

### **Description of the study area**

Gambella is a region situated over 700 kilometers far away from the Ethiopian capital Addis Ababa. It has a size of 25,000 km<sup>2</sup>; a very hot climate with an annual average temperature reaching 37°C; and average annual rainfall of 800 mm. In terms of vegetation, dense tropical forest covers the eastern edge of the region. Savannah forests, grasslands, and marshlands cover the lowland plain as far west as the border with Sudan (Markakis, 2011). The region has been rich in domestic and game animals including cattle, goats, sheep, hens, lions, elephants, tigers, *fiqo*, *qorqi*, *wore*, pigs, buffalo, monkeys, apes, etc. (A memo from Illubabour Province Land and resettlement office, 1977).

Five ethnic groups including Nuer, Anuak, Majang, Komo, Oppo, and various highlanders live in Gambella. The Nuer are among the predominantly pastoralist people of East Africa. Among the four sections, the Nuer in Gambella are Jikany, most of whom live in the districts of Akobo, Jikaw, Lare, and Itang. The Jikany Nuer has further divisions known as Gaajak, Gaaguang, and Gaa-jok (Markakis, 2011). The Eastern Jikany Nuer in the borderlands of Ethiopia and Sudan were once very rich in cattle (Pritchard, 1940). Livestock especially cattle have had various importance for the Nuer including social, economic, and cultural values (Seide, 2017). Economically, for instance, they used milk, meat, and blood for food. Horns and bones were important to furnish numerous household materials (Pritchard, 1940).

The Anuak are also among the ethnic group who live in Gambella (Zewudie, 1976). Based on oral sources from Udiek on the Akobo and Ulan on the Gila, Prichard (1940) wrote that the Anuak arrived at the Baro salient from the southwest of present-day Anuak land. The Anuak are believed to be pastoralists who moved northward with their herds of cattle from their southern homeland to their present location sometime in the 16<sup>th</sup> or 17<sup>th</sup> centuries (Wall, 1976). Although they are now primarily agricultural people with few cattle, there are indications of ancient pastoral interests in their elaborate vocabulary of cattle color names (Lienhardt, 1957). According to Lewis Wall (1976), the Anuak practiced pastoral livelihood in the past. The author took the presence

of pastoral elements in their vocabulary as evidence of a pastoral past. Their language contains many cattle-related words indicative of a nomadic past.

The Majang people are the third largest indigenous ethnic group in the Baro salient. They live in the hills and forests between the Baro salient adjacent to the highlands of Illubabour. Economically, they are dependent on hunting and gathering. Farming has been playing a supplementary role in their livelihoods. The Opo and Komo are also among the inhabitants of Gambella. They are dependent on agricultural livelihood (Ojod, 2013).

### **Historical evidence of Nagana in Gambella**

Shreds of evidence from travelers' accounts, archival sources, and secondary documents indicated that Nagana was endemic in the region. The prevalence of Nagana extended to the adjoining areas of Gambella (Montandon, 1912). The vector tsetse fly was also prevalent in the areas to the north of Gambella. The presence of Tsetse flies in the areas adjoining the streams prohibits the Komo from keeping cattle although goats manage to survive for some time (Corfield, 1938).

The disease also stretched into the southern Sudanese lowlands bordering Gambella. The nagana-affected area of southern Sudan had a horseshoe shape around the Nile swamps with three gaps, the valley of the Bahr el Ghazal with the southern Nuba Hills, the arid country east of Kapoeta, and the Sobat area. There were sporadic outbreaks of nagana that stretches to a distance of some 300 km (about 180 miles) from the main vector inhabited areas. Other biting flies might serve as a vector for the disease. As a result, it kills tens of thousands of cattle in bad years (Lewis, 1949).

According to Jessen (1905), who accompanied McMillan's expedition into southwestern Ethiopia in 1904, only about 60 heads of equines survived from a total of 220 mules, ponies, and donkeys. This happened after three months of travel in the region. Equines were absent in the region due to Nagana. Besides, Jessen did not mention the death of equines throughout his journey over Ethiopian highlands. These two important facts associated the loss of equines with the incidence of nagana in the region.

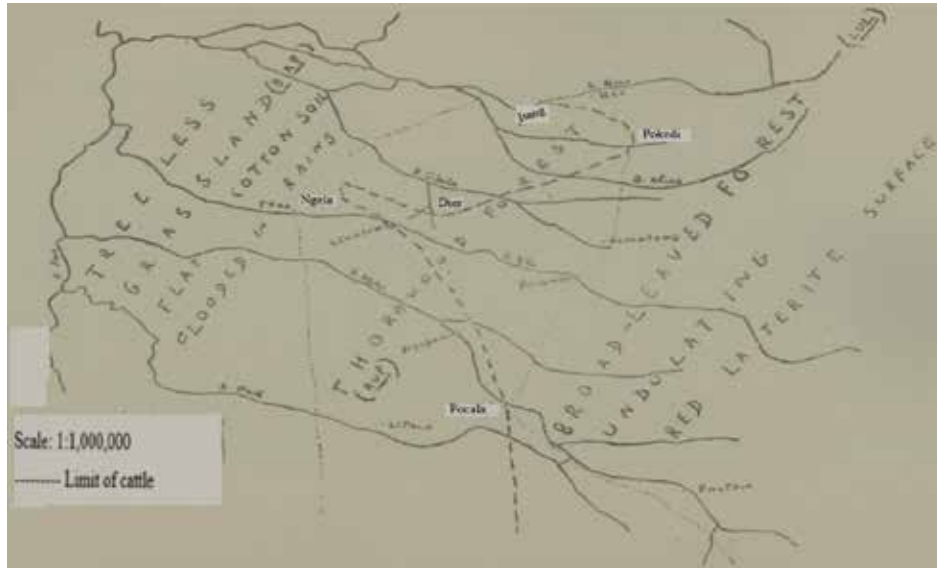
In addition, the trouble that encountered Jessen was experienced by the other traveler George Montandon. Montandon traveled into southwestern Ethiopia

in 1910 and recorded the profuse existence of the nagana vector in the southeastern edge of the region (Montandon, 1912) Montandon writes,

*...On arriving at Badika we found the animals in a deplorable condition. The donkeys, so far from filling out their sides, were dying one after another, whether from the fatigues of the last few weeks or as a result of the bites of tsetse in the valley floor of the Aranga...(Montandon, 1912).*

Moreover, in 1923, traveler Arnold Hodson lost around seven donkeys in the areas to the west of Pibor Post. In his second round travel of 1925, from Pibor post to the highlands of Ethiopia via Gambella, Hodson also lost twenty-five donkeys and a mule. The surviving equines are also deceased after he arrives at Gambella town. Hodson attested to the presence of tsetse in the area to the northwest of the Pibor River (Hodson, 1929). Therefore, the equines might be deceased because of nagana in the long journey from Maji-pibor post-Gambella route.

Evans-Pritchard, who explored western Gambella in 1935, confirmed that the region was difficult to herd cattle because of the tsetse fly. The line that connects Itang, Cenhtoaa, and Pocala from north to south is marked as the line that delimited tsetse areas. Pritchard (1947) states that cattle can be kept only westwards of the line Itang - Pokedi - Dier - Nyiwir - Ngela - Cenhtoaa - Pocala - and thence due southwards. Nagana was characteristically austere in the areas to the east of the line indicated by Pritchard (Figure 1). For example, in the dense forest areas of the Gog district, only dogs are observed around villages. Besides, in the thick riverside forest of lingo, the people could not even keep sheep, goats, or dogs (Pritchard, 1947). A memo from Lemma Gebremariyam (1961, Unpublished), who was the governor of Gambella *Awraja* in the late 1950s and early 1960s, to the Ethiopian Ministry of Interior, supported the testimonies of Pritchard. It revealed that half of Gambella *Awraja* (the current Gambella region) was disastrous to herding cattle and equine.



**Figure 1. Map: pervasiveness line of Nagana in Gambella (Pritchard, 1947).**

However, the vector was observed in the areas west of Pritchard's cattle limit. The line does not exactly correspond to the distribution of nagana in Gambella. For instance, the fly was prevalent on both banks of the Akobo near the village of Nyighum. Pritchard also wrote that a biting fly known as the *Stomoxys* was a threat to the cattle of Eastern Jikany around Jikau and Akobo. Probably this fly was the vector of nagana in parts of Nuerland, especially among the Eastern Jikany. It was evident throughout the year; however, conspicuous in the dry season and early rains (Pritchard, 1940). In addition, some villages keep cattle to the east of the line. Furthermore, all the livestock were not equally victims of the disease. Goats and sheep may have better resistance to trypanosomiasis or are less preferred blood sources for the vector than cattle and hence are less likely to get infected (Finelle, 1983). Thus, they were kept in all the Baro villages as far east as Gambella town (Pritchard, 1947).

Evidence of nagana for the second half of the 20<sup>th</sup> century was obtained from medical research. Medical research by Connell *et al.* (1970) indicated that there was an outbreak of sleeping sickness/human trypanosomiasis in the Gilo River region. The disease increased steadily from 4 confirmed cases in 1967 to 28 in 1968, 173 in 1969, and 27 in the first three months of 1970. The infection was



very high in the areas between the Gilo and Akobe rivers. Endemic sleeping sickness signaled the prevalence of the vector in the region. In those years, the occurrence of animal trypanosomiasis probably climaxed. In the years 1989-1992, there were human trypanosomiasis infections detected among the Anuak and southern Sudan refugees in Gambella (Endeshaw *et al.*, 1997).

### **Causes for Pervasiveness of Nagana in Gambella**

The abundance of dense forest, rich game resources, and climatic conditions were the major factors for the pervasiveness of Nagana in Gambella. The distribution of the tsetse fly follows the distribution of vegetation (Pritchard, 1947). As a result, the existing dense forest in Gambella created suitable habitat for the fly. The forest is denser in eastern Gambella than in the western part of the region. Similarly, nagana was more deadly in eastern Gambella. Whereas the absence of shady forests which, in its turn, is probably due in the main to flooding and partly to firing resulted in the non-occurrence of tsetse that carries trypanosomes pathogenic to cattle in the western part of the region (Pritchard, 1940). This signifies that the level of vegetation cover has had a direct effect on the pervasiveness of nagana.

Rich game resources in the region might have also contributed to the extensive transmission of the disease. Aronold Hudson (1929) wrote that there were substantial resources of game animals in Gambella to the northwest of the Pibor River. The other traveler B. H. Jessen also recorded the abundant presence of game animals in the area to the south of Pokum (A village between Itang and Gambella along the Baro River). These include elephants, giraffes, buffaloes; various antelopes and gazelles, wart hogs, wild pigs, lions, leopards, hyenas, jackals, wild cats, monkeys, etc. (Jessen, 1905).

Game animals serve as hosts and transmitters of trypanosomiasis in their movement. The movement of game animals was most commonly seasonal. The games move from southwestern and western parts of Gambella to the eastern and northeastern directions around the river basins of Akobo and Gila in the dry season starting from October. The western and southwestern grasslands are habitats of games in the rainy seasons (Lyth, 1947). The movement of game animals resulted in the spread of the disease beyond the horizon of highly affected areas and where the fly was less likely to appear probably through mechanical transmission by non-tsetse biting flies.

The climate is the third major factor for the Pervasiveness of nagana in Gambella. The hot and well-watered land of Gambella has been affluent for vegetation and animals (A memo from Illubabour Province Land and resettlement office, 1977). Besides, flooding, the common phenomenon in the Baro salient, had a significant effect on the spread of nagana. It spread as the game, fleeing the floods, came into closer contact with cattle (Johnson, 1989). In some parts of this region prevalence of the fly was more abundant in the less flooded riverine lands than in the interior. However, the danger of the disease reduces in the areas where the rivers top their banks and get flooded (Pritchard, 1947).

### **Effects of Nagana on the people of Gambella**

Nagana influenced the economic, political, and cultural life of the people in Gambella. The disease caused death, and abortion, and affects the dairy yield of the cattle (Pritchard, 1940). Besides, it underdeveloped cattle rearing and caused the absence of equine (A memo from Illubabour Province Land and resettlement office, 1977). According to Tsehay Desta, who was the Governor of Gambella *Awuraja* in 1958, the Nuer in Gambella lost significant herds of cattle due to the disease. Moreover, it has been among the factors that made the region sparsely populated (A Note from Tsehay Desta (Governor of Gambella *Awuraja*) to Ministry of Interior, Gambella, 1958).

Nagana forced the Anuak and Majang to alter their livelihood. It was among the major factors that forced the Majang to change their livelihood. They became dependent on forest and game resources. Moreover, the Anuak were forced to shift their livelihood partly due to this disease. For instance, B. H. Jessen associated the obsession of Anuak with crop production due to the presence of Tsetse. Jessen records,

*--Their chief industry, as before mentioned, is agriculture, with comparatively few cattle, sheep, or goats being raised because a great death rate is caused among all domestic animals by a certain kind of fly (Jessen, 1905).*

People in nagana affected areas of Africa were less likely to use domesticated animals for the plow and had a lower population density. The disease hindered the ability of Africans to generate an agricultural surplus and transport goods overland easily (Alsan, 2015). Likewise, the people in Gambella were unable to use animal drawn plows because of nagana. The absence of animal-drawn plow might partly be due to cultural factors (A Memo from Getahun Tesema

(minister of the Ministry of interior) to Tsehafe Tizaz Aklilu Habtewold (Prime Minister and Ministry of the Pen), Addis Ababa, 1973).

Nagana affected the Political life of the people in Gambella. It halted the Nuer expansion into eastern Gambella. The Nuer had been expanding eastward since the 19<sup>th</sup> century. They were able to expand as far east as the Ethiopian escarpment in the 1840s and 1850s (Stringham, 2016). However, this expansion was checked by the presence of a tsetse fly. The following record of Pritchard substantiates the political effects of nagana.

*The prevalence of tsetse in the forest belt that stretches along the foothills of the Ethiopian escarpment has prevented the Nuer from expanding as far eastwards as they might have done, for it is clear that one of the reasons for their evacuation of Anuak land was the loss of stock (Pritchard, 1940 ).*

Above all, nagana dictated changes in the culture of the people in Gambella. The loss of cattle, for instance, resulted in a reduction in the number of cattle to be paid for bride wealth. Thus, money (cash) was introduced as bride wealth-replacing cattle (Hutchinson, 1992). Agricultural livelihood after the loss of cattle because of Nagana and other diseases reduced interaction and cooperation among different villages of the Anuak. The only economic activities which require the cooperation of groups of people became occasional hunting forays, the erection of fishing dams at certain seasons of the year, and special services to the headman of the village (Lienhardt, 1957).

### **Attempts at disease prevention**

Tsetse flies can be controlled by direct destruction of the fly using the net collection and glued, game destruction, bush clearing, insecticides, and others (Hamon *et al.*, 1965). The 19<sup>th</sup>-century African communities used to fight trypanosomiasis by avoiding tsetse belts and game destruction (Brown, 2014). Nevertheless, knowledge and understanding of the disease are significant in the delivery of veterinary services. The concept of disease in Ethiopia had different stages of understanding among the community. It ranges from a predator, evil spirit, and religious to biomedical chronologically (Tefera, 2012). Indigenous veterinary services in Ethiopia have been recorded since ancient times. Traditional healers used to treat diseased animals by drenching them with herbal drugs, incising and cauterizing abscesses and wounds using sharp

objects and hot metals, mending fractures, and rehabilitating dislocations (Admassu, 2002).

The efforts to cure and prevent nagana in the Gambella region in particular and Ethiopia, in general, were traditional methods until the second half of the 20<sup>th</sup> century. For example, spiritual leaders of the Nuer engage in the healing practice of diseased cattle. They used to put a curse on wild animals harmful to cattle (Markakis, 2011). Several regional and national factors contributed to the absence of modern veterinary services and dependence on only traditional healing practices.

The major factor that hindered the prevention of nagana disease was the absence of modern veterinary institutions and professionals. Veterinary professionals and animal health centers were limited or nonexistent in many parts of the country. Although Modern veterinary service was introduced during the first decade of the 20<sup>th</sup> century by the French Veterinary Mission in 1908, it had been creeping until the 1960s (Admassu, 2002). The coming of Ethiopians after acquiring high-level veterinary training abroad and the establishment and functioning of the National Veterinary Institute and the Animal Health Assistants School were major boosters for the practice of veterinary service in Ethiopia (Admassu, 2002). This slow development in veterinary service delivery limited the initiation of nagana disease prevention efforts in the Gambella region.

The lack of infrastructure was another hurdle to introducing and expanding modern veterinary services to Gambella. The region is geographically remote from the administrative capital of the country. In addition, transportation infrastructure was limited. There were no road infrastructures to distribute the service from the sub-provincial town of Gambella. It took around 28 days to travel by foot to visit Gambella from Akobo. The water transport system needs unavailable boats. The only option was to use air transport (Application letter of Anuak and Nuer *Balabats* of Akobo for Emperor Haile Selassie, 1963). Hence, the lack of infrastructure challenged veterinary services delivery in the region.

The memo written in 1958 indicated that there was no distribution of vaccines and deployment of veterinary service professionals in the region, although government appointees in the sub-province and the people requested continuously. They also requested the establishment of a veterinary service center in

---

the sub-province (A Note from Tsehay Desta (Governor of Gambella *Awraja*) to Ministry of Interior, Gambella, 1958). In the year 1963, there was only one animal health service center in Gambella town (Application letter of Anuak and Nuer *Balabats* of Akobo for Emperor Haile Selassie, 1963). The *Balabats* of Anuak and Nuer in Akobo requested the establishment of health posts to reduce both human and animal diseases in the districts of the sub-province (A memo From *Dejazmach* Dereje Mekonen (regent of Illubabor Province) to Asefa Gebremariam (v/minister of the Ministry of Interior), Gore, 1964). The people in the borderlands used to cross the international boundary into Anglo-Egyptian Sudan for vaccination. However, the Ethiopians were forced to pay for the service while the Sudanese delivered it for free (A memo From Tezera Woldegiorgis (Illubabor Province general secretary) to *Qegnazmach* Feleke Ergetu (Assistant minister of the ministry of agriculture), Gore, 1961).

The fear of possible political discontent and development in the sector brought some changes in the struggle against nagana since the 1960s. Most of the measures employed to fight trypanosomiasis in Ethiopia were trypanocidal drug injection and eliminating the vector in various ways. The issue of medical injection has not shown full success due to the absence of domestic production of medicine, the higher cost of the medicine to purchase from abroad, and adaptation by trypanosomiasis parasite (Puskur and Mulat, 2011).

In early 1960, the government started applying DDT to eliminate the vectors. Thus, there was an improvement in cattle herding in the Gambella district and the surrounding areas, although it was not significant. There were also efforts to introduce trypanosomiasis-tolerant species of equine. The administrators in the sub-province tried to bring donkeys from Begi in Assossa *Awraja* on the assumption that the species is resistant to nagana. It also aimed to alleviate the problem of transportation services in the sub-province (A memo from Lemma Gebremariyam (governor of Gambella *Awraja*) to *Dejazmach* Kifle Erget (Ministry of Interior), Gambella, 1961).

There were efforts to disseminate vaccinations from the provincial capital of Gore in times of severe outbreaks. The efforts were patchy; however, animal diseases became worse and brought huge losses in 1961. In response, the administrative office of Illubabor Province sent vaccinators to the districts of Gambella (A memo from Admasu Mihretie, Ministry of Agriculture Director of Imperial Veterinary Service) to Imperial Veterinary Service Finance Section, 1961). Besides, there were endeavors to establish veterinary service centers in

all districts giving priority to Akobo and Gog, and Jor where there are large livestock resources (A memo From Tezera Woldegiorgis (Illubabour Province general secretary) to *Qegnasmach* Feleke Ergetu (Assistant minister of the ministry of agriculture), Gore, 1961).

## Conclusions

Humans and animals have had intimate interactions since antiquity. Animals played a paramount role in the development of societies. However, historical accounts overlooked the history of animals. Some historical works of literature also mentioned animals for their economic importance. Nevertheless, analyzed evidence from archival sources, travelers' accounts, reports, and secondary literature confirm that animals have influenced the political and cultural life of societies beyond their economic values. The case of nagana in Gambella revealed the significance and the need to record the history of animals. Nagana has been endemic in the southwestern Ethiopian region, Gambella. The abundance of dense forest, rich game resources, and climate were the major factors for the pervasiveness of nagana in Gambella. Nagana influenced the economic, political, and cultural life of the people. It had a significant role in the settlement pattern, preference for livelihood, cultural changes, and political organization of the people in the region. However, the efforts to cure and prevent nagana in the region were limited due to the tardy development of infrastructure and veterinary professionals.

## References

- Abebe, G., 2004. Veterinary Education in Ethiopia. In: Proceeding of the 18<sup>th</sup> Annual Conference of the Ethiopian Veterinary Association, 9-10 June 2004, Addis Ababa, Ethiopia.
- Admassu, B., 2002. Primary Animal Health Care in Ethiopia: The experience so far. In: An international conference, 15-18 October 2002, Mombasa, Kenya.
- Alsan, M., 2015. The effect of the Tsetse flies on African development. *Am. Econ. Rev.*, 105(1), 382–410.
- Brown, K., 2014. Environmental and veterinary history - Some themes and suggested ways forward. *Environ. Hist.*, 20(4), 547-559.
- Cannadine, D., 2002. What is History Now? Palgrave Macmillan Ltd, New York, USA.
- Connell, E.M., Hutchinson, M.P. and Baker, J.R., 1970. Human trypanosomiasis in Ethiopia: The Gilo river area. *Tran. R. Soc. Trop. Med Hyg.*, 64 (5), 683-691.

- Corfield, F. D., 1938. The Koma. *SNR.*, 21(1).
- Dagnachew, S., Girma, H. and Abebe, G., 2011. A cross-sectional study on bovine trypanosomiasis in Jawi district of Amhara Region, Northwest Ethiopia. *Ethiop. Vet. J.*, 15 (1), 69-78.
- Endeshaw, T., Kebede, A. and Aseffa, S., 1997. Observation of blood microfilariae during human trypanosomiasis survey in Gambella, southwest Ethiopia. *Ethiop. J. Health Dev.*, 11(1), 1-5.
- Fagan, B., 2015. *The Intimate Bond: How Animals Shaped Human History*. Bloomsbury Press, New York, USA.
- FFILLS, 2016. Ethiopia: Livestock Disease Management and Food Safety Brief. Feed the Future Innovation Lab for Livestock Systems (FFILLS). Florida, USA.
- Finelle, P., 1983. Disease And Chemotherapy. In: FAO. African Animal Trypanosomiasis. Food and Agriculture Organization of the United Nations, Rome, Italy, Pp 1-8.
- Hamon, J., Challier, P., Mouchet, J. and Rageau, J., 1965. Biology and Control of Tsetse Flies: Inter-regional seminar on entomological methods in vector control. In: World Health Organization, 16 October 1965, Paris, France.
- Hodson, A., 1929. Journeys from Maji, South-West Abyssinia. *Geogr. J.*, 73(5), 401-428.
- Hutchinson, S., 1992. The Cattle of Money and the Cattle of Girls among the Nuer, 1930-83. *Am. Ethnol.*, 19(2), 294-316.
- Jessen, B. H., 1905. South-Western Abyssinia. *Geogr. J.*, 25(2), 158-171.
- Johnson, D. H., 1989. Political ecology in the Upper Nile: The twentieth-century expansion of the pastoral 'common economy. *JAH.*, 30(3), 463-486.
- Kalof, L., 2007. *Looking at Animals in Human History*. Reaktion Books Ltd, London, UK.
- Kuzoe, F.A.S. and Schofield, C.J., 2004. Strategic review of traps and targets for tsetse and African trypanosomiasis control. World Health Organization, Geneva, Switzerland.
- Lewis, D.J., 1949. The tsetse fly problem in the Anglo-Egyptian Sudan. *SNR.*, 30(2), 179-211.
- Lienhardt, G., 1957. Anuak village headmen. I. *Afr.: J. Int. Afr. Inst.*, 27(4), 341-355 .
- Lincoln, G. and Dieter, M., 2017. Sleeping sickness in Liberia-A historical review. *Sierra Leone J. Biomed. Res.*, 9(2), 38-46.
- Lyth, R. E., 1947. The Migration of game in the Boma area. *SNR.*, 28, 191-192.
- Markakis, J., 2011. *Ethiopia: The Last Two Frontiers*. Boydell & Brewer Ltd, UK.

- Mayen, F., 2006. A status report of veterinary education in Ethiopia: Perceived, past history, recent changes, and current and future concerns. *J. Vet. Med. Educ.*, 33(2), 244-247.
- Montandon, G., 1912. A journey in South-Western Abyssinia. *Geogr. J.*, 40(4), 372-389.
- Ojod, O., 2013. Large-scale land acquisitions and minorities/indigenous peoples' rights under ethnic federalism in Ethiopia: a case study of Gambella regional state. Ph.D. dissertation, University of Bradford.
- Pankhurst, R., 1961. The great Ethiopian famine of 1888-1892: a new assessment. I. *J. Hist. Med. Allied Sci.*, 21(2), 95-124. doi: 10.1093/jhmas/xxi.2.95.
- Prichard, E. E., 1940. The relationship between the Anuak and the Föri (Sudan). *SNR.*, 23(2), 337-340.
- Pritchard, E. E., 1940. The Nuer: A Description of the Modes of Livelihood and Political Institutions of a Nilotic People. Clarendon Press, Oxford.
- Pritchard, E. E., 1947. Further observations on the political system of the Anuak. *SNR.*, 28, 62.
- Puskur, R. and Mulatu, W., 2011. How to keep healthy animals and live a healthy life in trypanosomiasis and Tsetse affected areas: Guideline from experience. Nairobi, Kenya.
- Seide, W. M., 2017. The Nuer Pastoralists Between Large Scale Agriculture And Villagization: A case study of the Lare District in the Gambella Region of Ethiopia. The Nordic Africa Institute. Uppsala.
- Stringham, N., 2016. Marking Nuer Histories: Gender, Gerontocracy, and the Politics of Inclusion in the Upper Nile from 1400 – 1931. M.A. Thesis, University of Virginia.
- Swabe, J., 1999. Animals, Disease And Human Society: Human-animal relations and the rise of veterinary medicine. Routledge, London, UK.
- Tefera, M., 2012. Concepts of disease in Ethiopia: from macro predator to microorganism. *Ethiop. Vet. J.*, 16 (1), 71-81.
- Waldetensai, A., Hailemariam, A., Nigatu, W., Gemechu, F., Tasew, G. and Eukubay, A., 2020. Tsetse flies (Diptera: Glossinidae) population in Ethiopia: A review. *Adv. Biochem.*, 8(3), 45-51.
- Wall, L. L., 1976. Anuak politics, ecology, and the origins of Shilluk Kingship. *Ethnology*, 15(2), 151-162.
- Way, G. A., Okie, W.T., Monzote, R.F., Nance, S., Rosenberg, G.N., Specht, J. and Swart, S., 2020. Roundtable: Animal history in a time of crisis. *Agric. Hist.*, 94(3), 444-484.



- Zelege, G., 2011. Preliminary survey on tsetse flies and trypanosomosis at grazing fields and villages in and around the Nech Sar National Park, Southern Ethiopia. *Ethiop. Vet. J.*, 15 (1), 59-67.
- Zewudie, B., 1976. Relations between Ethiopia and Sudan on the western Ethiopian frontier 1898-1935. University of London, London.
- Zewudie, S., 2004. Animal health service delivery system in Ethiopia. In: Proceedings of the 18<sup>th</sup> Annual Conference of the Ethiopian Veterinary Association, 9-10 June 2004, Addis Ababa, Ethiopia.