



FEDERAL
DEMOCRATIC
REPUBLIC
OF ETHIOPIA

NATIONAL ANTHRAX PREVENTION AND CONTROL STRATEGIC PLAN

Joint Ministry of Health, Ministry of Agriculture and Livestock
Resources, Ministry of Culture and Tourism and Ministry of
Environment, Forest and Climate Change Implementation Plan

2018 – 2030

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FORWARD

The Government of Ethiopia is showing encouraging commitment to the livestock and public health sectors. The Ministry of Health and Ministry of Livestock and Fisheries, has been dedicating considerable resources in response to Public Health and animal health threats. Despite this effort, emerging disease epidemics including neglected zoonoses, that is diseases that are transmitted between animals and humans (such as rabies, anthrax, brucellosis and Influenza) bare substantial burden on human health and livelihood.

Anthrax is an immediately reportable disease in Ethiopia. Anthrax outbreaks have been reported from Ethiopia to the World Organization for Animal Health (OIE) every year from 1996 through 2016 and affect one or more districts in the country, with several thousand animal cases reported per year in cattle, sheep, goats, camels and horses. Human cases are also reported, but not always from districts reporting animal cases. Recent work to prioritize zoonotic diseases for inter-sectoral engagement ranked anthrax as one of the top 5 zoonotic diseases of major public health concern in Ethiopia.

We therefore need to work together to plan and prepare ourselves to deal with epidemics of all potential zoonotic diseases that may affect our country and region. Cognizant of the importance of One Health in prevention, combating and control of zoonotic diseases, the tripartite ministries, Ministry of Livestock and Fisheries, Ministry of Health and Ministry of Culture and Tourism (through the Ethiopian Wildlife Protection Authority), in collaboration with development partners (CDC, FAO, USAID, Ohio State University, WHO and other partners) established a national One Health Platform (OHP) with various technical working groups.

This National Strategy for the Prevention and Control of Anthrax, therefore, is drafted by the Ministry of Health (through Ethiopian Public Health Institute (EPHI)), the Ministry of Livestock and Fisheries (through the Veterinary Public Health Directorate, Epidemiology Directorates, Disease Prevention and Control Directorate, National Animal Health Investigation and Diagnostic Center (NAHDIC) and National Veterinary Institute (NVI)), and Ministry of Culture and Tourism (through Ethiopian Wild Life Conservation Authority (EWCA)) and development partners. This strategic document plans to prevent and control anthrax in humans and animals in Ethiopia using a combination of the following strategic areas of focus: Strengthen Surveillance and Reporting system, improving Outbreak Investigation and response, Prevention and Control, strengthen Diagnostic laboratory capacity and Risk Communication. The strategic plans has three phases:

PHASE 1: PLANNING, PREPARATION AND ASSESSMENT PHASE (2 YEARS) (2017-2019)

PHASE 2: IMPLEMENTATION PHASE IN TARGET AREAS (4 YEARS) (2020-2023)

PHASE 3: IMPLEMENTATION PHASE IN EXPANDED AREAS (7 YEARS) (2024-2030)

Successful implementation of the strategy will contribute to significantly reduce and ultimately control the public health impact of anthrax in humans and animals in Ethiopia through sustained surveillance, laboratory diagnosis, prevention and control systems and community awareness. This strategy will build upon and complement existing communicable disease prevention and control programs and frameworks. This will be achieved by consolidating the efforts of strengthening public and animal health systems and enhancing their collaboration in areas of common interest such as surveillance, early detection, diagnosis, rapid response, education and research.

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LIST OF ABBREVIATIONS

ADNIS	Animal Disease Notification and Investigation System
CDC	Center for Disease Control and Prevention
DOVAR	Outbreak and Vaccination Report
ELISA	Enzyme-linked Immuno-sorbent Assay
EPHI	Ethiopian Public Health Institute
EWCA	Ethiopian Wild Life Conservation Authority
FAO	Food and Agriculture Organization of the United Nation
HSDP	Health Sector Development Plans
LIMS	Laboratory Information Management
MoCT	Ministry of Culture and Tourism
MOH	Ministry of Health
MoLF	Ministry of Livestock and Fisheries
MoU	Memorandum of Understanding
NAHDIC	National Animal Health Diagnostic and Investigation Center
NVI	National Veterinary Institute
OHP	One Health Platform
OSU	Ohio State University
PCR	Polymerase Chain Reaction
PPE	Personal Protective Equipment
SOP	Standard Operating Procedure
TAD	Trans Boundary Animal Diseases
TOR	Terms of Reference

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ACKNOWLEDGEMENT

The national Strategy for the prevention and control of anthrax in animals and humans has been prepared by the anthrax Working Group (TWG) composed of participants from Ministry of Health (MoH/EPHI), Ministry of Livestock and Fishery (MoLF/NAHDIC/NVI), Ministry of Culture and Tourism (MoCT/EWCA), Center for Disease Prevention and Control (US-CDC/Ethiopia), Food and Agriculture Organization (FAO-ECTAD), Global One Health Initiative (GOHI), USAID and World Health Organization (WHO).

The preparation of the national Strategy has benefited from the assistance and support of many experts and representatives, including the following:

1. The participants in an Anthrax Stakeholders workshop “Anthrax surveillance, prevention and control in Ethiopia” in March 2-3, 2017 at the Ethiopian Public Health Institute in Addis Ababa, that was organized by US Centers for Disease Control and Prevention (CDC) in collaboration with EPHI.
2. The participants in Stakeholders Meeting aiming at establishment of anthrax Technical Working Group (ATWG) and development of TOR, in April 14, 2017 at Food and Agriculture Organization country office (FAO) in Addis Ababa, that was organized by US-CDC, FAO-ECTAD in collaboration with MoLF.
3. The participants in Anthrax strategic plan write-shop, in July 24-27, 2017 at Asham Africa Resort in Bishoftu town, Ethiopia; that was organized by FAO-ECTAD in collaboration with Ethiopian Public Health Institute (EPHI).
4. The participants in Anthrax strategic plan Monitoring and Evaluation write-shop, in September 18-21, 2017 at Asham Africa Resort in Bishoftu town, Ethiopia; that was organized by FAO-ECTAD in collaboration with Ethiopian Public Health Institute (EPHI).
5. The participants in Anthrax strategic plan costing exercise write-shop, in January 3-5, 2018 at Asham Africa Resort in Bishoftu town, Ethiopia; that was organized by FAO-ECTAD and Global One Health Initiative (GOHI) in collaboration with Ethiopian Public Health Institute (EPHI) and Ministry of Livestock and Fishery (MoLF).
6. E-conferences organized by CDC and FAO-ECTAD for the participants of ATWG.

The Ministry of Health under Ethiopian Public Health Institute (EPHI), the Ministry of Livestock and Fishery, the Ministry of Culture and Tourism wish to thank all experts and partners contributed to the successful completion of the strategic plan for the prevention and control of anthrax in Ethiopia.

CHAPTER

1

INTRODUCTION

1.1. INTRODUCTION

Anthrax is a zoonotic bacterial disease caused by *Bacillus anthracis*. It primarily occurs in herbivorous wildlife and livestock, in which it is usually fatal. Anthrax causes four main clinical forms of disease in humans: cutaneous, gastrointestinal, inhalation and injection anthrax. Humans contract cutaneous anthrax through direct skin contact with *B. anthracis* infected animals or during slaughtering animals or processing animal by-products. Gastrointestinal anthrax results from consumption of raw or undercooked meat contaminated with *B. anthracis*. Humans develop inhalation anthrax through inhalation of spores aerosolized during processing or contact with contaminated hides, bones, hair or wool. Of these forms, cutaneous anthrax comprises >95% of the human infections.

Anthrax affects many domestic and wild animals and humans. The susceptibility of different animal species to anthrax varies considerably. Most warm-blooded vertebrate species (including reptiles and amphibians that have been artificially warmed) have been infected, naturally or experimentally. The disease is enzootic in several regions of the world and *B. anthracis* has always been high on the list of potential agents with respect to biological warfare and bioterrorism.

The Government of Ethiopia is showing encouraging commitment to the public health, livestock and wildlife sectors. A new ministry dedicated to livestock, Ministry of Livestock and Fisheries, has been established, as part of a reform in the sector. Investments in public and animal health, production, infrastructure, and facility development are improving throughout the country. It is clear that the livestock industry will continue to be a focus of the government at all levels. Furthermore, Ethiopia has implemented successive Health Sector Development Plans (HSDP) since 2004, in four phases. During this period the country has made huge stride in improving access to health service and improvement in health outcomes. Ministry

of Health has been dedicating considerable resources to the response to Public Health Emergencies: from epidemics of diseases to widespread malnutrition resulting from drought.

Cognizant of the importance of One Health in prevention, combating and control of zoonotic diseases, the tripartite ministries, Ministry of Livestock and Fisheries, Ministry of Health and Ministry of Culture and Tourism (through the Ethiopian Wildlife Protection Authority), in collaboration with UN agencies (WHO and FAO) and development partners (CDC, USAID, Ohio State University and other partners) established a national One Health Platform (OHP) with various technical working groups. Since the national OHP was established, various activities have been undertaken. One of the tasks was developing a list of priority zoonotic diseases as an entry for a multi-sectoral joint action to reduce and combat the impact of zoonotic diseases on public and animal health as well as on the national economy. The national zoonotic disease prioritization was conducted using a tool developed by CDC and resulted in 5 priority zoonotic diseases for inter sectoral collaboration of which Rabies and Anthrax are the two top priorities.

Following the development of the list of priority zoonotic diseases, the three ministries, in collaboration with partners planned to formulate strategies for the control and elimination of dog-mediated Rabies and for the prevention and control of Anthrax through a One Health approach. This National Strategy for the Prevention and Control of Anthrax, therefore, is drafted by the Ministry of Livestock and Fisheries, the Ministry of Health (through EPHI) and Ministry of Culture and Tourism (through EWCA) and development partners.

1.2. EPIDEMIOLOGY OF ANTHRAX

1.2.1. Etiology and Spore Persistence

Anthrax is caused by *Bacillus anthracis*, a gram-positive, rod-shaped bacterium. *B. anthracis* produces a toxic complex comprising three factors: oedema factor, protective antigen and lethal factor. Together, these factors kill phagocytes, damage capillary walls and interfere with blood clotting, leading to oedema, shock and death. Protective antigen provides the mechanism for lethal factor to enter cells. Once outside the host and exposed to air, *B. anthracis* starts sporulation. Spores are extremely resistant to heat, cold, pH, desiccation, chemicals, irradiation and other adverse conditions, and can survive for years in soil, wool, and hair of infected animals.

1.2.2. Transmission

Bacillus anthracis can be found naturally in soil and commonly affects domestic and wild animals around the world. The animals can become infected when they ingest spores from contaminated soil, plants, or water. Spores form when bacilli in blood or bodily fluids from carcasses are exposed to air, or when carcasses are opened by scavengers. The spores begin to form soon after death, and the process of sporulation is complete within 24 to 48 hours. These spores are very hardy and they contaminate the soil, where they can survive for many years, before being ingested by animals and re-starting the cycle. Vegetative cells within an intact carcass will be outcompeted by other bacteria and die within 2 to 3 days. Biting flies may serve as mechanical vectors after feeding on a carcass, contaminating vegetation.

1.2.3. Clinical presentation

Anthrax has 4 clinical presentations in humans:

Cutaneous anthrax

- A clump of small blisters or lumps that may itch, swell, and eventually develop into an ulcer with a black center; the lesion may be painless and is often located on the face,

neck, arm, or hands or wherever the spores came into contact with the skin

- Incubation period: up to 17 days, but most disease occurs in 1 to 7 days
- Exposure: butchering an animal that died of anthrax or contact with contaminated animal products such as meat, hide, blood, or hair
- Scratches or cuts on skin may increase risk
- Hand washing may decrease risk

Inhalation anthrax

- Initially- fever, chills, and fatigue may be accompanied by cough; slightly later- chest discomfort, headache, and nausea/ vomiting occur; finally- shortness of breath and confusion
- Incubation period: up to 60 days, but most disease occurs in 1 to 7 days
- Exposure: working with spore-contaminated hides in an industrial setting or bioterrorism

Gastrointestinal anthrax

- Development of fever/chills, fatigue, nausea/vomiting, and abdominal pain are common; diarrhea, headache, and confusion occur in about a quarter of patients; swelling of neck, sore throat, or painful swallowing suggest pharyngeal disease
- Incubation period: up to 16 days, but most disease occurs in 1 to 7 days
- Exposure: eating meat from an animal that died of anthrax

Injection anthrax

- Similar to cutaneous anthrax, but injection anthrax has the potential to spread more rapidly throughout the body
- Incubation period: up to 20 days, but most disease occurs in 1 to 7 days
- Exposure: injecting spore-contaminated illicit drugs

1.3. DIAGNOSIS

Suspicion of anthrax arises from the observation of clinical symptoms, the anatomic-pathological findings and epidemiological data.

1.3.1. Clinical signs

Clinical manifestations vary from species to species, presumably reflecting differences in susceptibility. Sudden death in apparently healthy animals which may be accompanied by bloody discharges from natural orifices, rapid bloating of the carcass, incomplete rigor mortis and the absence of clotting of the blood are the common characteristics of anthrax in susceptible animals. In more resistant species, local signs such as swellings of the oral and pharyngeal region are seen. In wildlife, sudden death is the invariable sign, often (but not always) with bloody discharges from natural orifices, bloating, incomplete rigor mortis and the absence of clotting of the blood. Cutaneous anthrax accounts for > 95% of human cases worldwide. The lesions (eschars) are generally found on exposed regions of the body almost invariably accompanied by marked oedema extending some distance from the lesion.

1.3.2. Laboratory diagnosis

The simplest, quickest and best on-site diagnostic method is examination of a polychrome methylene blue-stained blood smear for the capsulated bacilli supported, where possible, with confirmation by culture. Genetically-based confirmation by the polymerase chain reaction (PCR) is highly accepted on a stand-alone basis for many types of specimen and is increasingly available worldwide through commercial kits. Retrospective diagnosis by enzyme-linked immunosorbent assay (ELISA) in animals that have survived infection is possible, but specific antigen for this is

expensive and the test is more a research tool than of practical day-to-day value in the field.

Animals

Rapid diagnostic methods require testing the carcass while it is still fresh. Once the carcass is putrefied or scavenged, culture is required to isolate *B. anthracis*. Samples should be collected without opening the carcass, to prevent further environmental contamination. Specimens can include blood, tissue, exudates, other fluids, and nasal turbinates.

Humans

Specimens can include blood, skin lesion exudates, pleural or ascitic fluid, cerebrospinal fluid, or stool. Specimens should always be collected prior to antibiotic therapy. Culture and Gram stains will likely be negative if specimens are collected after antibiotic therapy has been initiated, regardless of the form of disease. The likelihood that antigen or molecular testing methods will be positive decreases with the length of antibiotic treatment prior to sample collection. All samples (except sera for serology) must be collected prior to the initiation of antibiotics.

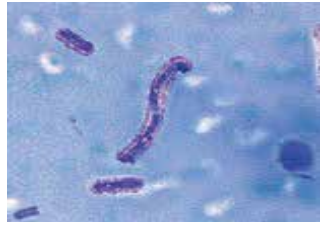
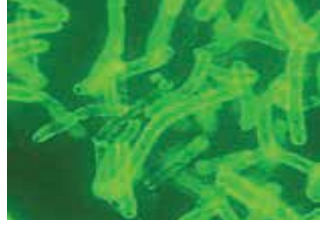
	Available tests	Findings
	Gram stain	Gram-positive rods, square-ended, in pairs or short chains
	Polychrome methylene blue stain (M'Fadyean stain)	Dark blue square-ended rods surrounded by pink capsule. Rods are in pairs or short chains, sometimes as single rods
	Direct antigen detection	Detection of antigen (usually protective antigen, but test will specify)
	Serology	Seroconversion (use as a retrospective diagnosis, as need paired sera collected at least 2 weeks apart)
	PCR	Detection of toxin and capsule DNA
	Culture (Gold standard)	Identification of B. anthracis by: colonial morphology, non-motile, non hemolytic, gamma phage and penicillin-sensitive, and capsule producing

Figure 1- Diagnostic tests and findings for B. anthracis (source: Framework for enhancing anthrax prevention and control, August, 2016)

1.3.3. Differential diagnosis

Anthrax should be differentiated from other causes of sudden death such as: lightning strike and accidental electrocutions, pasteurellosis, piroplasmiasis, blackleg, malignant oedema, food intoxications, botulism, peracute babesiosis, chemical poisoning (heavy metal and other poisoning), plant poisoning, snake bite, metabolic disorders (lactic acidosis), magnesium deficiency, bloat and others.

1.4. PRINCIPLES OF ANTHRAX PREVENTION AND CONTROL

Control of anthrax begins with control of the disease in livestock, and vaccination of livestock has long been the hub of control programs. Anthrax is also responsive to antibiotic therapy provided this is administered early in the course of the infection. In addition to antibiotic therapy and vaccination, specific control procedures are necessary to contain the disease and prevent its spread. In particular:

- Proper disposal of dead animals (burial and/or incineration);
- Not opening the carcass, since exposure to oxygen will allow the bacteria to form spores;
- Quarantine of infected premises;
- Cleaning and disinfection of infected premises and fomites;
- Control of insects and rodents.

1.5. ANTHRAX SITUATION IN ETHIOPIA

1.5.1. Burden of Anthrax in Ethiopia

Ethiopia has a large livestock population and many rural communities depend on animals for food, income and draught power. Disease is one of the major constraints preventing these large livestock resources from being fully exploited. Anthrax is an endemic disease which occurs in May and June every year ('anthrax season') in several farming localities of the country, causing disease both in humans and livestock. In 2000, it was reported that hundreds were affected in the Afar region of Ethiopia, many with oral and gastroenteric infections. It is still a significant risk in most regions in Ethiopia and outbreaks frequently occur in humans and animals.

The diagnosis of reported anthrax cases in humans were based on clinical signs with epidemiological features and all the reported cases were not laboratory confirmed due to limitations in laboratory capacity in public and animal health sectors. Recent surveillance data (2009 to 2013) shows, a total of 5,197 human and 26,737 animal anthrax cases (human to animal ratio 1:5) were reported with 86 human anthrax deaths (Case Fatality Rate:1.7 %). The national human prevalence was found to be 1.3 per 100,000 populations per five years, zero human case was reported from pastoralist regions with 55-216 animal cases. The human prevalence was high in May followed by February (0.20 and 0.15 per 100,000 populations per year respectively). The burden of human anthrax cases was high in the Amahara and Tigray regions. From 2014 -216, a total of 2,218 human anthrax cases with a case fatality rate of 3.16 were reported from five regions. Of which the most cases were reported from the Amahara region followed by Tigray and SNNP regions (table1, below).

Table 1: Distribution of human anthrax cases by region, 2014 – 2016, Ethiopia.

Region	2014			2015			2016		
	Cases	%	AR	Cases	%	AR	Cases	%	AR
Amhara	609	76.03%	3.04	428	55.80%	2.10	395	60.77%	1.90
Oromia	65	8.11%	0.20	73	9.52%	0.22	32	4.92%	0.09
SNNPR	30	3.75%	0.17	151	19.69%	0.83	0	0.00%	0.00
Somali	0	0.00%	0.00	0	0.00%	0.00	112	17.23%	2.00
Tigray	97	12.11%	1.96	115	14.99%	2.27	111	17.08%	2.15
Grand Total	801	100.00%	0.91	767	100.00%	0.85	650	100.00%	0.70

Even if the existing surveillance data in humans indicates the magnitude of anthrax by place and time, there is a limitation on the type of anthrax, the risk groups and personal characteristics. The previous studies indicate that the disease is well recognized by rural communities but little is known about its prevalence, epidemiology and public health significance (Teshale Seboxa *et al.*, 1989; Esser *et al.*, 2003).

1.5.2. Availability of Anthrax Vaccine in Ethiopia

Anthrax livestock vaccine is being produced at National Veterinary Institute (NVI) for the last 50 years. NVI is the sole supplier of the vaccine in Ethiopia and the availability of the vaccine provides favorable opportunity in the control and prevention of Anthrax in Ethiopia.

The vaccine is prepared from live spores of a non-encapsulated but toxigenic variant of *Bacillus anthracis* 34F2 Sterne strain. This seed strain is used worldwide for animal anthrax vaccine production since it is stable and has lost virulence, but is still immunogenic, due to its incapability of forming a capsule, a characteristic coded by the pXO2 plasmid. The vaccine produced is PANVAC certified for its safety and protective efficacy.

The vaccine produced at NVI is composed of *Bacillus anthracis* (Sterne strain) containing 10^7 spores/dose, Saponine (0.1%), Stabilizer (4% skimmed milk). The vaccine is indicated for use in cattle and sheep but can also be used for all susceptible domestic animals which are at risk of acquiring anthrax due to contact with the contaminated soil, forages, or carcasses of

infected animals. The vaccine is administered subcutaneously or intradermally at a dose of 1ml and can effectively confer protection against anthrax for a year.

The final product is available in a vial of 100 doses (100ml) in freeze dried form and must be kept at + 2°C to + 8°C protected from light. These conditions should be maintained from production until utilization. Currently, NVI has a capacity of producing 36 million doses per year, however, the current production capacity needs to be increased to cope up with the increasing trend in Anthrax vaccine demand and for an effective implementation of future anthrax control and prevention programs.

1.5.3. Anthrax Surveillance System in Humans in Ethiopia

1.5.3.1. Epidemiological surveillance

Implementation of anthrax surveillance activities at all levels of health system with prompt laboratory confirmation of circulating pathogen is an essential strategy for early detection of anthrax outbreaks. Anthrax is a rare, epidemic prone disease and one of the twenty priority diseases under the Public Health Emergency Management system that should be reported immediately when encountered.

Routine flow of surveillance data is carried out from reporting sites to the next level up until the information reaches the central level. The community and health facilities, especially health posts, are the main source of information. The information collected from these sites is compiled in standard forms, analyzed and then forwarded, to the WHO. The first 5 suspected

anthrax cases are reported using the Case-Based Reporting Format (CRF). If more than 5 suspected cases are seen within one month, use the Line list to report daily. After 100 cases report, the summary of the line list using Daily Epidemic Reporting Format for

Woreda (DERF-W). The line list is completed for all cases and kept at the health facility and woreda levels. Zones and Regions: use the Daily Epidemic Reporting Format for Regions (DERF-R) to report the summarized suspected outbreak.



Figure 2: Flow of information and Timeline for immediately Reportable Diseases

1.5.3.2. Laboratory surveillance

The prevention and control of outbreaks requires rapid identification of the pathogen and the source of infection. Anthrax is diagnosed by growing the bacteria from blood or other tissues. Final identification of the bacteria must be done by a public health laboratory under strict biosafety and biosecurity precautions. There are several types of specimen samples for human anthrax testing. All potential *B. anthracis* specimens should be documented and properly labeled upon arrival. To increase traceability, samples should be assigned a unique specimen identification number. This number should be clearly labeled on both the testing forms and the specimen container.

The simplest, quickest and best on-site diagnostic method is the one established in the early 1900s – examination of a polychrome methylene blue-stained blood smear for the capsulated bacilli supported, where possible, with confirmation by culture. Modern on-site anthrax-specific antigen tests are being developed and validated but are not currently available commercially. Diagnosis by polymerase chain reaction (PCR) is becoming increasingly accepted as a stand-alone test for many types of specimens and is increasingly available worldwide

through commercial kits. PCR depends on the unique specificity of the toxin and capsule and their genes. *B. anthracis* cultures are easy to grow on nutrient agar medium. Specimens or cultures can be grown overnight on Sheep Blood Agar (SBA) at 35-37°C. Colonies should be observed for hemolysis. Confirmation of identity and differentiation from near relatives is generally easy with both traditional and molecular techniques.

In Ethiopia, in all health institutions except health posts, though the level of complexity is different, laboratory services with limited facilities are available. Due to various reasons such as lack of properly designed laboratory rooms, laboratory personnel with awareness of public health threat from epidemic prone diseases and response mechanisms, shortage of equipment and supplies, absence of effective laboratory equipment maintenance and management system, and weak follow up and supervision, many of these laboratories are not in a position to carry out their responsibilities to the level of standard expected. Currently neither regional nor national Public Health reference laboratories are performing Anthrax diagnosis either presumptive or confirmatory.

1.5.3.3. Outbreak investigation and response

Twenty one immediately notifiable disease and conditions were identified in Ethiopia under IDSR system for immediate outbreak investigation and response. Anthrax is one of the immediately notifiable diseases and a single case of anthrax is considered as an outbreak. A cluster of animal deaths or unusual events resembling the clinical sign of anthrax in humans reported to the health offices at different level followed by verification and outbreak investigation activities.

The purpose of an investigation is to verify the outbreak, recognize the magnitude of the outbreak, diagnose the etiological agent, identify the source and the route of transmission as well as the people at risk, and recommend measures so that the outbreak can be controlled as well as prevented in the future. The outbreak investigation in case of anthrax is based on the epidemiological findings (risk based and clinical findings). Up on notification of suspected anthrax cases the health office immediately investigate the cases and carry out the possible case management and outbreak investigation steps.

Currently there is limited joint investigation mechanism b/n the animal health, human health and other relevant sectors. This might affects the early detection and preparedness for prompt response any upcoming epidemics of anthrax and associated health impacts in humans.

1.5.4. Anthrax Surveillance System in Livestock in Ethiopia

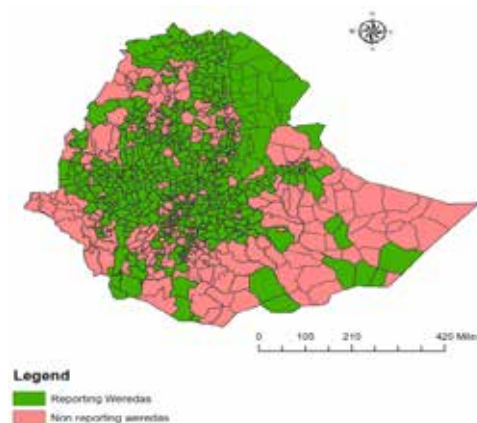
1.5.4.1. Epidemiological surveillance

Active and passive surveillance systems are being implemented nationally by the Ministry of Livestock and Fisher for the animal health related information's. The implementation of the surveillance system with its passive and active components as well as additional surveys have led to a good understanding of the disease dynamics in the country including status of anthrax (Source: Epidemiology Directorate, 2017).

Passive surveillance

Animal health Information system plays an important role in surveillance and provides information for economic assessment of diseases in addition to fulfilling international reporting needs. The passive surveillance system mainly depends on a paper based system from woreda to the regional veterinary laboratory covering the respective woredas that laboratory is mandated to cover. The monthly disease outbreak reports received from woreda level are entered in a web-based Disease Outbreak and Vaccination Activity Reporting (DOVAR-II) system. This reporting system is designed to collect information of any kind regarding animal health related issues such as diseases occurrences or vaccination activities performed in the woreda, including anthrax. Currently the proportion of woredas reporting is around 50%, which is below the international standard of 80% (Source: DOVAR-II database, 2016).

Figure 3. Map of reporting and non-reporting woredas in 2016 (DOVAR)



Syndromic surveillance is practiced in some selected areas using a mobile based daily notification system known as Animal Disease Notification and Investigation System (ADNIS). This system is mainly intended to serve the pastoral areas with a very low or poor reporting rate. It serves for immediate notification and early detection of some selected animal diseases. Currently there are around 300 sites practicing this reporting system, and there is a plan to reach 3600 sites at the end of GTP-2 as a national plan.



Figure 4. Animal Disease Notification and Investigation System (ADNIS) pilot areas

Major gaps of passive surveillance system

Low return rate and poor quality of the reports received, as most of the outbreak reports are not confirmed or not supported by laboratory diagnosis. Hence, mapping of the distribution of confirmed clinical outbreaks is only partially practiced due to the low reporting rate of lab confirmed outbreaks.

Lack of good quality internet connection both at regional veterinary labs for the purpose of accessing semi-web based system, DOVAR-II server and for the immediate notification system server from field sites.

Lack of post-assessment evaluation to quantify the clinical and the socio-economic impact of disease outbreaks.

Another gap in the national surveillance system is that it is not able to capture events in wildlife.

Table 2: DOVAR output demonstrating cases and deaths of anthrax for 2012-2016.

Year	No of cases	No of Deaths	Animal at risk	Control vaccination	Prophylaxis vaccination
2016	788	222	541,319	541,319	941,719
2015	1,486	478	742,041	407,023	351,370
2014	2,297	931	1,223,180	585,021	251,727
2013	4,471	1,270	1,605,727	1,605,727	1,605,727
2012	5,311	1,372	1,927,238	713,241	147,689
Total	14,353	4,273	6,039,505	3,852,331	3,298,232

Table 3: cases and deaths of anthrax from 2007 to 2009 adapted from veterinary epidemiology year book

Year	Outbreaks	Cases	Deaths	PAR	Vaccine production in dose	Vaccine distribution
2007	927	7,781	3,002	2,081,755	8,467,600	6,467,000
2008	801	44,703	3,170	1,883,647	5,258,450	4,924,100
2009	681	4,523	1,772	1,761,990	7,083,200	3,809,500

Active surveillance

Active surveillance is an essential tool for early detection of diseases and introduction of exotic diseases. Additionally, it provides information for declaring a country or a zone disease free. Currently there are 15 regional veterinary laboratories conducting active surveillance, in addition to NAHDIC.

Annual sero-surveillance is being conducted for priority diseases and trade sensitive diseases

Regarding introduction of exotic diseases, annual risk based sero-surveillance is conducted around border areas of the country and other areas with the risk of introduction of exotic diseases.

For other endemic diseases annual surveillance is conducted to know their status and gathering information for national control program.

In order to detect areas with active disease transmission, participatory disease surveillance (PDS) is conducted for some selected diseases.

1.5.4.2. Laboratory surveillance

To deliver effective animal health diagnostic service through outbreak investigation, export testing and to conduct national disease surveillances, the country has established laboratory system with 15 regional veterinary labs working in collaboration with the national referral veterinary laboratory, the National Animal Health Diagnostic and Investigation center (NAHDIC). NAHDIC is also a supporting laboratory for trans-boundary animal diseases for east Africa. NAHDIC has 11 BSL II laboratories; including general bacteriology, bacterial serology and molecular diagnostic laboratories, as well as a BSL-3 laboratory facility for the diagnosis of zoonotic & highly contagious diseases like Bovine tuberculosis, HPAI and planned for the future to diagnose anthrax. The laboratory has implemented quality management system (QMS) and it is ISO/IEC 17025:2005 accredited laboratory by SANAS.

To date in the animal health sector, outbreak reports of anthrax are based on history and clinical signs and there is no laboratory confirmed cases at either the regional or national level. NAHDIC's experience for the diagnosis of anthrax is limited to polychrome Methylene blue staining techniques (M'Fadyean stain), that is through staining blood smears from peripheral blood vessels and observing the square ended, blue rods in short chains surrounded by pink capsule through direct microscopy. Apart from this, confirmatory diagnostic capacity either with molecular techniques (PCR) or through culture using gamma phage is not yet established.

In addition to limitations in confirming anthrax, biosafety and biosecurity issues are also of major concern for culture and identification of *Bacillus anthracis* at the regional veterinary laboratories. There is no harmonized SoP for collection, transportation and handling of samples from anthrax suspected cases and confirmatory test protocol for *Bacillus anthracis* diagnosis at laboratory level. In addition, laboratory staff's at regional and national level are not well experienced and trained on confirmatory diagnostic techniques of anthrax.

The national laboratory also needs to conduct specific risk assessment and prepare SoPs regarding the specific biosafety and biosecurity requirements for anthrax sample handling and analysis.

1.5.4.3. Outbreak investigation and response

The rapid detection of the introduction or sudden increase in any disease of livestock which has the potential of developing to epidemic proportions and/or causing serious socio-economic consequences or public health concerns are the points to be considered in livestock outbreak investigation in the country. The investigation embraces all initiatives and is mainly based on disease surveillance, reporting and epidemiological analysis. These lead to improved awareness and knowledge of the distribution and behavior of disease outbreaks and infection, allows forecasting of the source and evolution of the disease outbreaks, and monitoring of the effectiveness of disease control campaigns.

Whenever livestock disease outbreak occur anywhere in the country, the forefront veterinarians investigate the reports to come up with a diagnosis whose result is largely dependent on tentative judgment made by the clinician himself.

The veterinarian will put his/her utmost effort to find out the real culprits behind the problem to diagnose and ultimately control the disease. Whenever the case is beyond the capacity of the district veterinarian, more help is called up from the next veterinary command chain, the regional veterinary laboratory. Regional veterinary laboratories are responsible for immediate outbreak investigation in their respective operational areas.

If the case is above the capacity of regional laboratories it is referred to NAHDIC. NAHDIC has experience of establishing an immediate outbreak investigation team incorporating experts from the national and regional laboratories as well as national, regional and district veterinarians. Regarding anthrax outbreak investigation most of the diagnostic attempts were based on seasonal occurrence,

epidemiological survey, clinical signs and history. Appropriate tissue and dry swab samples from anthrax suspected cases can be collected for further identification at NAHDIC. All the potential *B. anthracis* suspected samples should be documented and properly labeled upon arrival. It was only in few outbreak cases where the organism was detected from blood smears using M'Fadyean staining technique.

In order to improve the current anthrax outbreak investigation capacity, there is a need to address skill and knowledge gaps and improve laboratory capacity like through organizing specific training for regional and national staff on handling anthrax suspected cases both at field and laboratory (on sample collection, transportation, storage and anthrax diagnostic and confirmatory tests).

1.5.5. Anthrax Surveillance System for Wildlife in Ethiopia

Ethiopia has around 320 species of mammals (36 are endemic), 862 species of birds (18 are endemic), 201 species of reptiles (9 are endemic), 63 species of amphibians (24 are endemic), more than 180 species of fishes (40 are endemic) and over 6,500 species of plants (more than 700 are endemic). Their distribution and occurrence normally vary with elevation which starts at -110 meter at Dalol depression up to 4,543 meter at Ras Dashen Mountain peak, encompassing major ecosystems such as afro-alpine, savanna, desert and wetlands. To conserve biological diversity in the different ecosystem 49 different protected area categories have been established within the country. Of these protected areas 20, 4, 7, 3, and 18 are national parks, sanctuaries, wildlife reserves, community based conservation area and controlled hunting areas respectively.

1.5.5.1. Epidemiological surveillance

Survey of the presence or absence of wild animals' disease is conducted in the protected areas once a year but this survey is

not specific to anthrax. On top of this for any death occurrence to wild animals, the scout automatically reports the death to the park office, and then the park office further reports to the Ethiopian Wildlife Conservation Authority (EWCA). The EWCA veterinarians will assess the situation and if necessary appropriate samples from diseased animals can be collected and submitted to the Ethiopian Public Health Institute (EPHI) or National Animal Health Diagnostic and Investigation Centre (NAHDIC) for identifying the cause of disease outbreaks among the wild animals. Apart from this effort there is no well-organized national surveillance system assisting the immediate notification, investigation and response of disease outbreaks among wildlife.

1.5.5.2. Outbreak investigation and response

Anthrax outbreak has been observed in southern parts of Mago national parks and spread to the northern part within two months beginning from September 1999. Moreover, another anthrax outbreak from September to October 2000 has also been observed in this park. In the former outbreak more than 1,600 wild animals were dead from 21 different species (Table 4, below). Of all the species Lesser kudu was severely affected, which accounts for 95% of mortality and as a result more than 65% of Lesser Kudu's population within the park died. Similarly during the second outbreak even though the extent of the death was not as previous, Lesser kudu was again the most susceptible species. During the second outbreak further spreading of the anthrax was controlled by early detection and proper carcass disposal.

Table 4: Record of the wild animals affected by the anthrax outbreak at Mago national park

Common name	Scientific name	In 1999 G.C (% male)	In 2000 G.C (% male)	In 1996G.C population estimate (CV)*
Ungulates				
Lesser kudu	<i>Tragelaphus imberbis</i>	1531 (44.9)	526 (41.4)	2268 (20)
Gerenuk	<i>Litocranius walleri</i>	19 (68.4)	6 (67)	
Warthog	<i>Phacochoerus africanus</i>	16 (62.5)	1 (0)	161 (37)
Common bushbuck	<i>Tragelaphus scriptus</i>	7 (71.4)	20 (55)	198 (29)
Lelwel hartebeest	<i>Alcelaphus buselophus lelwel</i>	7 (42.8)	0	451 (46)
Dik-dik	<i>Madoqua guentheri</i>	6 (66.7)	5 (50)	
Bush duiker	<i>Sylvicapra grimmia</i>	4 (50)	2 (100)	
Tiang	<i>Damaliscus lunatus</i>	4 (25)		3473 (47)
Oribi	<i>Ourebia ourebi</i>	3 (67)		
Waterbuck	<i>Kobus ellipsiprymnus</i>	2		223 (31)
African buffalo	<i>Syncerus caffer</i>	2 (50)		
Grant's gazelle	<i>Gazella grand</i>	2 (50)		1228 (28)
Aardvark	<i>Orycteropus afer</i>	1		
Elephant	<i>Loxodonta africana</i>	1		
Primates				
Eastem black-and-white colobus	<i>Colobus guereza</i>	1		
Olive baboon	<i>Papio anubis</i>	3		
Carnivores				
Caracal	<i>Felis caracal</i>	1		
Mongoose	Species not recorded	3		
Rodents				
Porcupine	<i>Hystrix cristata</i>	1		
Birds				
Marabou stork	<i>Leptopilos crumeniferus</i>	2		
Hooded vulture	<i>Necrosyrtes monachus</i>	1		

1.5.6. Current Anthrax Prevention and Control Activities in Ethiopia

Even though anthrax is a reportable disease in Ethiopia, poor diagnostic capacity and unreliable reporting make it difficult to estimate the true incidence in the country. However, anthrax is enzootic in most of the regional states in the country and has been reported from nearly every corner of the country with highest frequency from the highland mixed farming areas but precise incidence among animals is unknown.

The fragmented efforts by many actors, including the livestock and public health sector at the different administrative levels (federal, regional)

employed so far were lacking of a central multi-

sectoral coordination framework to harmonize the existing efforts to bring the required result in preventing and controlling anthrax and its impact on animal and human health. The technical, administrative and financial system as well as multi-sectoral and multi-disciplinary coordination, collaboration and harmonization, therefore, requires a strategic approach that should be agreed by all stakeholders.

1.5.6.1. Core Stakeholders for Anthrax Control in Ethiopia

Improving the coordination and collaboration of various actors - federal, regional, state and woreda level sectoral (animal and human health) institutions will improve the prevention and control of anthrax through a One Health Approach. The necessary partners include:

- MoH (EPHI/PHEM, Regional and Woreda

Level Bureaus of Health)

- Ministry of Livestock and Fisheries (Federal, Regional and Woreda livestock bureaus and Veterinary Structures, National Animal Health Diagnostic and Investigation Center, National Veterinary Institute, regional veterinary laboratories)
- Ministry of Culture and Tourism (Ethiopian Wildlife Conservation Authority)
- International Development Partners (USAID funded EPT-2 program, FAO, USAID P&R, PREDICT, OHWF/OCHEA, CDC, WHO, OIE, OHIO University)
- Local and national organizations (private sector actors, sectorial and professional associations eg. Veterinary Professional Associations, Public Health Associations, local universities)

1.5.6.2 Prevention and Control Activities in Humans in Ethiopia

- Anthrax is one of 21 immediately notifiable disease in the country
- In 2003 alone, some 1,096 suspected human cases were reported with a case fatality rate of 1.5% from four regions (Tigray, Oromiya, Amhara and SNNPR)
- There is no guideline for the prevention and control of anthrax disease in Ethiopia
- PHEM unit of EPHI has established a system that enables identification of suspected human anthrax cases.

1.5.6.3. Prevention and Control Activities in Livestock in Ethiopia

- There is animal disease reporting mechanisms (ADNIS, DOVAR) and accordingly acts to control the disease in collaboration with concerned regional and district level animal health offices.
- Vaccination is widely practiced preventive measure all over the country where the disease is endemic but there

is limitations in the coordination system.

- The National Veterinary Institute is the one producing and supplying anthrax vaccine.
- Regional States have their own annual plans for preventive vaccination that they submit to the NVI for production planning.
- Vaccination is usually done during the Anthrax outbreak season (May and June) once a year and involves all animals at risk. However its implementation is not uniformly practiced due to limited coordination, challenges in the cold chain management, trained man power, and limitations in vaccine supply chain system
- When an outbreak of Anthrax occurs (suspected or confirmed) in a certain area, regional states or woredas buy the vaccine from the NVI and conduct ring-vaccination supported by routine sanitary measures to contain the outbreak.
- Movement control is an option implemented to control an anthrax outbreak but there is limitations in the implementation.
- Community awareness creation is a common practice at village levels but there is limitations in formal communication and information dissemination system.

1.5.6.4. Prevention and Control Activities in Wildlife in Ethiopia

Although there are cases encountered in wildlife, the Ethiopian Wildlife Conservation Authority doesn't have any prevention or control plan for the country. This is also partly due to lack of skilled manpower and facilities within the EWCA to identify or diagnose the disease. Recently there was system for coordination and collaboration between the MoLF and EWCA. Vaccination only involves domestic animals. The only measure of control practiced for wildlife is the disposal of carcasses of suspected cases.

1.5.6.5. Policy, Legal and Institutional Framework supporting prevention and control of Anthrax

- Currently, the prevention and control of anthrax is managed separately by institutions under three Ministries (MoLF, MoH and MoCT) mostly at the level of regional bureau of Livestock/Agriculture and/or Health. The national disease prevention and control is guided by the “Animal Diseases Prevention and Control Proclamation no. 267/2002”.
- Health Sector Transformation Plan (HSTP) provides strategic guidance for programing and service provision, and recognized the current and persisting gaps in community health and has put significant emphasis in promoting health service delivery through improving access, coverage, continuity and coordination.
- Livestock Master Plan (2016-2020) informs targets set out in GTP2 for the livestock sector. The LMP document aspires for the reduction of the impact of zoonotic diseases on human health (consumers) by controlling zoonotic diseases and ensuring the safety of animal products.
- Ethiopian National Health Care Quality Improvement Strategy 2016-2020 Reflects the common concern in healthcare and it gives recognition to non-governmental organizations’ role on the issue
- EPHI Strategic Plan (2015/16-20/21) promotes a study on priority zoonotic diseases at human animal ecosystem interface. It emphasized on OH approach as a mechanism to implement the strategy. The SP also indicated the development, institutionalization and implementation of OH approach for strengthening cross-sectoral collaboration and partnership on public health research.

1.6. CHALLENGES IN ANTHRAX CONTROL IN ETHIOPIA

1.6.1. Inadequate Laboratory Capacity and Biosecurity

- Lack of regional and national laboratory capacity on anthrax confirmatory diagnosis (human and livestock)
- Limited supply of diagnostic materials (human and livestock)
- Limited biosecurity and biosafety in laboratories (human and livestock)

1.6.2. Inadequate Surveillance

- Potential under-reporting of anthrax cases and outbreaks (human and livestock)
- Limited laboratory-based surveillance (human and livestock)
- No SOPs/guidelines for anthrax outbreak response

1.6.3. Lack of Prevalence and Burden Estimates

- No clear picture of prevalence since human disease high in areas where animal disease is not reported and vice-versa
- Lack of anthrax burden and health-cost related studies

1.6.4. Inadequate Inter-Sectoral Collaboration and Partnerships

- Poor joint anthrax investigation and response
- No data sharing and surveillance linkage between sectors
- Lack of One Health/multi-sectoral approach to address anthrax

1.6.5. Lack of Educational and Awareness Materials for Anthrax Prevention

- Poor public information on importance of livestock vaccination
- Poor public education and awareness on anthrax prevention and control

- Lack of training materials for health care providers and animal health workers
- Poor notification guidance for public health and animal health workers

1.6.6. Limited Supply and Distribution of Anthrax Vaccine and management of Anthrax vaccines

- The amount of vaccines that can be produced in the country is limited
- Potential disruption in the cold chain
- Lack of national plan/strategy/calendar for anthrax vaccine distribution
- Lack of strong national regulatory body for vaccine quality assessment

1.6.7. Funding Constraints and Competing Priorities

- Existence of competing priorities – other livestock/zoonotic diseases in the country
- Lack of long term funding for activities for enhancing anthrax control and prevention

1.6.8. Lack of Integrated national guidelines and standard operating procedures (SOPs) on anthrax prevention and control

- No SOPs on laboratorial procedure for anthrax diagnosis
- No SOPs on anthrax outbreak investigation and response
- No national guidelines on anthrax prevention and control

1.7. OPPORTUNITY FOR ENHANCING ANTHRAX CONTROL AND PREVENTION IN ETHIOPIA

1.7.1. Establishment of One Health Coordination Structures

- Establishment of National One Health Steering Committee
- Establishment of Anthrax Technical Working Group (ATWG)

- Development of multi-sectoral zoonotic diseases Memorandum of Understanding
- Government commitment to anthrax prevention and control

1.7.2. Increased Interest in Enhancing Anthrax Control and Prevention

- Anthrax has been identified as one of the top five priority zoonotic diseases for inter-sectoral collaboration.
- Increased commitment to joint surveillance and response activities with regards to prevention and control of the disease
- An inter-sectoral technical collaboration has been initiated by the government, resulting in establishment of an Anthrax Technical Working Group.

1.7.3. In-Country Anthrax Vaccine Production

- Anthrax livestock vaccine is manufactured in Ethiopia by the National Veterinary Institute (NVI).
- The 2016 production is about 25 million doses of the vaccine, based on demand. NVI has the capacity to produce up to 36 million doses of the vaccine.
- Vaccine is distributed to regional veterinary bureaus and sold internationally.
- The production target is determined by the requests from the regional veterinary offices on a yearly basis. The vaccine is bought by the regional governments not the federal government.
- Vaccination is recommended once a year for livestock and for ring vaccination during an outbreak.



CHAPTER

2

**THE STRATEGIC
FRAMEWORK**

2.THE STRATEGIC FRAMEWORK

2.1. GUIDING PRINCIPLES OF THE STRATEGY

- Prevention and control of anthrax in animals effectively reduces its impact on public health and the national economy
- A multi sectoral collaborative approach and capacity building are essential for successful prevention and control of anthrax

2.2. VISION

To ensure anthrax is no longer a significant public and animal health problem in Ethiopia by 2030.

2.3. MISSION

To significantly reduce and ultimately control the public health impact of anthrax in humans and animals in Ethiopia through sustained surveillance, laboratory diagnosis, prevention and control systems and community awareness.

2.4. GOAL

To prevent and control anthrax in human and animals in Ethiopia

2.5. GENERAL OBJECTIVES

- Strengthen sectoral and multi-sectoral anthrax surveillance systems for effective preparedness and response;
- Improve laboratory capacity for anthrax diagnosis at national and regional level
- Sustain inter-sectoral collaboration among all stakeholders
- Undertake anthrax prevention and control activities
- Enhance prevention capacity in terms of trained personnel and community awareness

- Generate scientific evidence to inform decision and policy changes on anthrax prevention and control

2.6. STRATEGIC FRAMEWORK FOR THE PREVENTION AND CONTROL OF ANTHRAX

Anthrax is a World Organization for Animal Health (OIE)-listed animal disease that has the potential to affect many animals within a herd. It is important in the trade of livestock and livestock products and is a significant public health issue. Anthrax is a notifiable disease in both the livestock and public health sectors in Ethiopia. A major outbreak of anthrax would cause severe production losses to affected producers, with potential dislocation and financial losses to the livestock producers from effects on exports and a significant potential fatality in humans.

The foundation of anthrax control is vaccination of livestock accompanied by rapid outbreak response to limit environmental contamination and human exposures. Animal outbreak response relies heavily on effective surveillance and the availability of rapid and reliable laboratory diagnostics. The proposed strategic framework includes specific objectives and activities to be performed under each one of the eight main components of the anthrax Prevention and Control Strategic Framework. Chapter Three has the implementation Plan, subdivided into three phase, listing specific activities to be completed in the stipulated timeframe.

This strategic document plans to prevent and control anthrax in humans and animals in Ethiopia using a combination of the following strategic areas of focus:

- Enhancing surveillance and reporting systems
- Implementing outbreak investigation and response
- Improving community awareness on the risks, transmission and prevention of anthrax

- Enhancing anthrax vaccine production, safety, quality, efficacy and distribution in animals
- Planning and implementing vaccination campaigns
- Improving sanitary measures (carcass disposal, disinfection, avoid contact with livestock)
- Improving anthrax diagnostic laboratory capacity
- Developing information, education and communication materials
- Strengthening multi-sectoral collaboration

2.7. COMPONENTS OF THE ANTHRAX PREVENTION AND CONTROL STRATEGIC FRAMEWORK

2.7.1. Surveillance and Reporting Systems

Surveillance is a critical element in the control and prevention of anthrax. Effective anthrax surveillance in humans and animals enhances early detection and reporting of cases, vital for initiating timely responses and enabling informed decisions about when and where to intensify anthrax control efforts. Once interventions are implemented, surveillance is essential in generating data to monitor progress or impact of the control efforts, which is essential for their sustainable implementation.

Specific objectives and activities of surveillance and reporting

Objective 1: Assess and enhance the existing surveillance system including data collection, reporting and analysis (Case definition in humans and animals, develop a reporting formats in human and animals and notification and investigation/verification system)

Activity 1.1. Evaluate the existing surveillance system and databases to identify gaps, strength and barriers of epidemiological and laboratory surveillance in animals and humans

Activity 1.2. Address challenges based on the identified gap

Activity 1.3. Review and develop animal and human anthrax case definition (community and international standards) and update surveillance forms to ensure proper information is collected

Activity 1.4. Develop anthrax surveillance guideline/ SoP

Activity 1.5. Provide trainings to address surveillance capacity gaps and awareness for animal and public health surveillance officers and the community (case definitions (community, suspected, probable and confirmed) reporting, notification, data management, data analysis and mapping and reporting etc).

Activity 1.6. Provide resources (mobiles, laptops...) to improve timely and quality reporting

Activity 1.7. Strengthen national and regional Epi-lab networking (4 way linking)

Activity 1.8. Establish a wildlife anthrax surveillance system and link with the national system

Objective 2: Establish a mechanism for reporting, feedback and information sharing of anthrax surveillance data among stakeholders and relevant sectors

Activity 2.1. Develop SOP and a mechanism for inter sectoral information sharing (surveillance data, risk mapping, hotspot identification)

Activity 2.2. Review and strengthen standard anthrax reporting format and channels

Activity 2.3. Conduct a regular ATWG meetings

Activity 2.4. Prepare and share regular joint anthrax national surveillance reports and provide feedback to the regions and woredas

Activity 2.5. Perform retrospective analysis and publication of surveillance data at regional and national level

Activity 2.6. Develop a plan (SOP) for public announcement/Public disclosure for anthrax outbreak

2.7.2. Outbreak investigation and re-

sponse

Objective 3: Joint planning of preparedness, investigation and response plan (Develop guidelines and SOPs for response of anthrax)

Activity 3.1. Develop a national guideline and SOPs for outbreak investigation and response (case management, infection prevention, environmental sanitation, field investigation forms, roles and responsibilities)

Activity 3.2. Establish a joint national and regional rapid investigation and response team for anthrax outbreaks

Activity 3.3. Prepare outbreak preparedness plan and ensure availability of supplies (vaccines, drugs, human resource, laboratory consumables, and equipment) for anthrax outbreak investigation and response

Activity 3.4. Conduct simulation exercises and/or training for outbreak investigation including sample collection, handling and transportation, after action review and revision of the plan/SoP

Activity 3.5. Conduct/implement joint outbreak investigation and response

2.7.3. Prevention and Control of Anthrax

Objective 4: Enhance anthrax vaccine production, safety, quality, efficacy, distribution and rational use of the vaccine in animals

Activity 4.1. Assess/estimate the national demand production, distribution and storage capacity of anthrax vaccine

Activity 4.2. Improve NVI vaccine production capacity to meet the estimated national demand

Activity 4.3. Conduct cost effectiveness and feasibility of animal vaccination

Activity 4.4. Conduct test vaccine efficacy, safety, quality and a post market assessment/evaluation of the vaccine

Activity 4.5. Develop vaccine supply

chain management system and SOP for monitoring of vaccine, production (GMP), distribution, handling, storage (cold chain) and administration

Activity 4.6. Establish a PPP system for implementation of vaccination campaigns

Activity 4.7. Plan and implement vaccination campaigns

Activity 4.8. Establish a proper unused vaccines disposal system (expired, damaged, and inappropriately stored)

Activity 4.9. Conduct Post vaccination evaluation (using effective method)

Activity 4.10. Training to animal health professionals and technicians on vaccine handling, transport, storage and administration, cold chain maintenance and calibration

Objective 5: Improve sanitary measures (carcass disposal, disinfection, avoid contact with livestock)

Activity 5.1. Develop SOP for proper infected carcass and fomite disposal, environmental sanitation, animal movement control system/isolation

Activity 5.2. Ensure availability of the necessary supplies and equipment (PPE) for disinfection/environmental sanitation

Activity 5.3. Conduct training for animal health, environmental health and public health workers on best environmental sanitary practices (on proper disinfection, case management, and carcass disposal and quarantine techniques)

2.7.4. Anthrax Diagnostic Laboratory Capacity

Objective 6: Improve national and regional animal and public health laboratory capacity for anthrax diagnostic testing

Activity 6.1. Assess national and regional public and animal health laboratory capacity for anthrax diagnostic testing (sample collection and shipment, biosafety, biosecurity, skill and knowledge, testing,

availability of necessary equipment and supplies)

Activity 6.2. Prepare a laboratory development plan based on identified gaps (sample collection, transport, submission, processing and confirmatory testing, training, consumables, and equipment)

Activity 6.3. Review laboratory sample referral SOPs (biosafety, biosecurity, handling, transport, processing and testing)

Activity 6.4. Organize trainings for public and animal health laboratory professionals and field staff (sample collection, preservation and transport, submission, reporting and confirmatory diagnosis)

Activity 6.5. Procurement of necessary laboratory supplies and equipment

Activity 6.6. Introduce anthrax rapid diagnostic field tests; research on new testing methods

Activity 6.7. Strengthen a laboratory quality management system; equipment maintenance and calibration system

Activity 6.8. Build capacity of the National Veterinary Institute to manufacture diagnostic materials

Activity 6.9. Establish a national germ bank to preserve circulating isolates of *B. anthracis*

Objective 7: Establish and enhance inter sectoral inter laboratory networking (public and animal health)

Activity 7.1. Map and linking existing public and animal health laboratories based on the assessment

Activity 7.2. Review compatibility of existing laboratory information management (LIMS and LIS) systems

Activity 7.3. Establish an inter-laboratory resource sharing networking mechanism; MoU, ToR

Activity 7.4. Organize regular inter-laboratory fora (networking, information sharing, joint plan)

2.7.5. Information, Education and Communication

Objective 8: Improve awareness and behavioral change in the community regarding the risks, transmission and prevention of anthrax

Activity 8.1. Assessment of existing communication activities and materials for communities (situational analysis)

Activity 8.2. Conduct community survey to assess KABP (Knowledge, attitude and behavioral practice) in targeted audiences

Activity 8.3. Develop an evidence based national and regional communication strategy (identify different audience groups, appropriate channels, materials and key messages)

Activity 8.4. Develop appropriate anthrax related messages and concept testing based on survey findings for different audience groups

Activity 8.5. Train professionals on communication strategy

Activity 8.6. Produce, pre-test and disseminate Information Education Communication (IEC)/ Social Behavior Change Communication (SBCC) materials

Objective 9: Improve the knowledge and skill of health/veterinary professionals

Activity 9.1. Review of the existing educational materials for health/veterinary professionals

Activity 9.2. Assess the knowledge and skills (KAP) of the health/veterinary professionals

Activity 9.3. Perform field level testing of the developed educational materials

Activity 9.4. Develop training manuals and provide training to public, animal and environmental health professionals

Activity 9.5. Distribute information and educational materials to relevant sectors at all levels (woreda, regional, national)

.7.6. Multi-Sectoral Collaboration

Objective 10: Strengthen existing national platforms (OHSC, Anthrax TWG) and support the establishment of coordination platforms at regional and woreda level

Activity 10.1. Review the existing TOR and conduct regular meeting of ATWG

Activity 10.1. Support establishment of regional and woreda level anthrax prevention and control coordination platforms (Develop TOR and work plan for all regional TWG)

Activity 10.3. Organize regular technical discussions and meetings on data sharing, analysis, risk mapping, recommendation to inform prevention and control

Activity 10.4. Ensure regular communication and reporting to the OH steering committee

Objective 11: Obtain buy in and secure resources for implementation of the plan

Activity 11.1. Develop an advocacy plan to obtain buy-in from governmental stakeholders and engaging private sectors, international partners in a national anthrax control plan

Activity 11.2. Develop a budget for implementation of plan and secure potential source of funding for implementation of the plan

Activity 11.3. Obtain official endorsement of anthrax plan from all relevant ministries to ensure a sustainable public funding mechanism



CHAPTER

3

**IMPLEMENTATION
PLAN**

3. IMPLEMENTATION PLAN

3.1. PHASE 1: PLANNING, PREPARATION AND ASSESSMENT PHASE (2 YEARS) (2017-2019)

During the first phase of the anthrax prevention and control strategy, the Ethiopian anthrax technical working group will focus on working together in a One Health approach to work on activities related to assessment of current situation of anthrax surveillance, outbreak, laboratory and vaccination systems in the country and defining overall responsibility for implementing anthrax control strategies, resource mobilization, training and capacity building. At the end of Phase 1, the country will have a well-established Anthrax TWG, have fully assessed surveillance systems, developed guidelines and SOPs to enhance anthrax surveillance and control, and improved technical capacity and laboratorial capacity to provide confirmatory diagnostic for anthrax. At this point, Ethiopia will be ready to start implementation activities in selected target areas.

3.1.1. Specific activities to be completed in the stipulated time-frame

3.1.1.1. Surveillance and reporting

- Evaluate the existing surveillance system and databases to identify gaps, strengths and barriers to epidemiological and laboratory surveillance in animals and humans
- Address challenges based on the identified gap
- Provide trainings to address surveillance capacity gaps and awareness for animal and public health surveillance officers and the community (case definitions (community, suspected, probable and confirmed), reporting, notification, data management, data analysis and mapping and reporting etc).

- Provide resources (mobiles, laptops...) to improve timely and quality reporting
- Review and develop animal and human anthrax case definition (community and international standards)
- Develop anthrax surveillance guideline
- Establish a wildlife anthrax surveillance system and link with the national system
- Develop SOP and a mechanism for inter sectoral information sharing (surveillance data, risk mapping, hotspot identification)
- Conduct a regular review meeting, workshops with stakeholders
- Prepare and share regular joint anthrax national surveillance reports and provide feedback to the regions and woreda
- Develop a plan (SOP) for public announcement/Public disclosure for anthrax outbreak

3.1.1.2. Outbreak investigation and response

- Develop a national guideline and SOPs for outbreak investigation and response (case management, infection prevention, environmental sanitation, field investigation forms)
- Prepare outbreak preparedness plan and ensure availability of supplies (vaccines, drugs, human resource, laboratory consumables, and equipment) for anthrax outbreak investigation and response
- Conduct simulation exercises; training (outbreak investigation, on sample collection, handling and transportation, after action review, revise the plan)
- Conduct/implement joint outbreak investigation and response
- Establish a joint national and regional rapid investigation and response teams for anthrax outbreaks
- Prepare outbreak preparedness plan and ensure availability of supplies (vaccines, drugs, human resource, laboratory consumables, and equipment) for anthrax outbreak investigation and response

- Conduct simulation exercises; training (outbreak investigation, on sample collection, handling and transportation, after action review, revise the plan)
- Conduct/implement joint outbreak investigation and response

3.1.1.3. Disease prevention and control

- Assess/estimate the national demand production, distribution and storage capacity of anthrax vaccine
- Conduct cost effectiveness and feasibility of animal vaccination
- Conduct test vaccine efficacy, safety, quality and a post market assessment/evaluation of the vaccine
- Develop vaccine supply chain management system and SOP for monitoring of vaccine, production (GMP), distribution, handling, storage (cold chain) and administration
- Establish a PPP system for implementation of vaccination campaigns
- Training to animal health professionals and technicians on vaccine handling, transport, storage and administration, cold chain maintenance and calibration
- Develop SOP for proper infected carcass and fomite disposal, environmental sanitation, animal movement control system/isolation
- Ensure availability of the necessary supplies and equipment (PPE) for disinfection/environmental sanitation
- Conduct training for animal health, environmental health and public health workers on best environmental sanitary practices (on proper disinfection, case management, and carcass disposal and quarantine techniques)

3.1.1.4. Anthrax Diagnostic Laboratory Capacity

- Assess national and regional of public and animal health laboratory capacity for anthrax diagnostic testing (sample collection and shipment, biosafety, biosecurity, skill and knowledge, testing)

- Prepare a laboratory development plan based on identified gaps (sample collection, transport, submission, processing and confirmatory testing, training, consumables, and equipment)
- Organize trainings for public and animal health laboratory professionals and field staff (sample collection, preservation and transport, submission, reporting and confirmatory diagnosis)
- Procurement of necessary laboratory supplies and equipment
- Review laboratory sample referral SOPs (biosafety, biosecurity, handling, transport, processing and testing)
- Organize regular inter-laboratory fora (networking, information sharing, joint plan)

3.1.1.5. Information, Education and Communication

- Assessment of existing communication activities and materials (situational analysis)
- Review of the existing educational materials for professionals
- Assess the knowledge and skills (KAP) of the profession
- Develop appropriate anthrax related messages and concept testing based on survey findings for different audience groups

3.1.1.6. Multi-Sectoral Collaboration

- Review the existing TOR and conduct regular meeting of ATWG
- Organize regular technical discussions and meetings on data sharing, analysis, risk mapping, recommendation to inform prevention and control
- Ensure regular communication and reporting for the OH steering committee
- Develop an advocacy plan to obtain buy-in from governmental stakeholders and engaging of private sectors, international partners in a national anthrax control plan
- Develop a budget for implementation

- of plan and secure potential source of funding for implementation of the plan
- Obtain official endorsement of anthrax plan from all relevant ministries and ensuring sustainable public funding mechanism
- Provide resources (mobiles, laptops...) to improve timely and quality reporting
- Establish a wildlife anthrax surveillance system and link with the national system
- Conduct a regular review meeting, workshops with stakeholders

3.2. PHASE 2: IMPLEMENTATION PHASE IN TARGET AREAS (4 YEARS) (2020-2023)

During Phase 2, Ethiopia will start implementation of the priority activities identified in this Strategic Plan. The implementation will be phased and will start in selected target (high burden) areas, depending on the proposed activity. Activities to be implemented during Phase 2 include pilot Projects, operational research, systems enhancements and development of mechanisms for enhanced anthrax prevention and control. At the end of Phase 2, in addition to the outcomes from Phase 1, target regions will have enhanced surveillance systems, joint outbreak response, improved anthrax control measures, improved laboratorial capacity, improved inter-sectoral collaboration and communication. At this point, Ethiopia will be ready to re-evaluate the strategic plan and extend the implementation area to additional areas, with a goal of extending activities to a national level.

3.2.1. Specific activities to be completed in the stipulated time-frame

3.2.1.1. Surveillance and reporting

- Strengthen national and regional Epi-lab networking (4 way linking)
- Provide trainings to address surveillance capacity gaps and awareness for animal and public health surveillance officers and the community (case definitions (community, suspected, probable and confirmed), reporting, notification, data management, data analysis and mapping and reporting etc).

3.2.1.2. Outbreak investigation and response

- Prepare outbreak preparedness plan and ensure availability of supplies (vaccines, drugs, human resource, laboratory consumables, and equipment) for anthrax outbreak investigation and response
- Conduct simulation exercises; training (outbreak investigation, on sample collection, handling and transportation, after action review, revise the plan
- Conduct/implement joint outbreak investigation and response
- Establish a joint national and regional rapid investigation and response teams for anthrax outbreaks
- Prepare outbreak preparedness plan and ensure availability of supplies (vaccines, drugs, human resource, laboratory consumables, and equipment) for anthrax outbreak investigation and response
- Conduct simulation exercises; training (outbreak investigation, on sample collection, handling and transportation, action review, revise the plan
- Conduct/implement joint outbreak investigation and response

3.2.1.3. Disease prevention and control

- Improve NVI vaccine production capacity to meet the estimated national demand
- Conduct test vaccine efficacy, safety, quality and a post market assessment/evaluation of the vaccine

- Plan and implement vaccination campaigns
- Establish a proper unused vaccines disposal system (expired, damaged, and inappropriately stored)
- Conduct Post vaccination evaluation (using appropriate method)
- Training to animal health professionals and technicians on vaccine handling, transport, storage and administration, cold chain maintenance and calibration
- Ensure availability of the necessary supplies and equipment (PPE) for disinfection/ environmental sanitation
- Conduct training for animal health, environmental health and public health workers on best environmental sanitary practices (on proper disinfection, case management, and carcass disposal and quarantine techniques)

3.2.1.4. Anthrax Diagnostic Laboratory Capacity

- Organize trainings for public and animal health laboratory professionals and field staff (sample collection, preservation and transport, submission, reporting and confirmatory diagnosis)
- Procurement of necessary laboratory supplies and equipment
- Build capacity of the National Veterinary Institute to manufacture diagnostic materials
- Organize regular inter-laboratory fora (networking, information sharing, joint plan)
- Introduce anthrax rapid diagnostic field tests; research on new testing methods
- Strengthen laboratory quality management system; equipment maintenance and calibration system
- Establish a national germ bank to preserve circulating isolates of *B. anthracis*
- Map and linking existing public and animal health laboratories based on the assessment
- Review compatibility of existing laboratory information management (LIMS and LIS) systems

- Establish an inter-laboratory resource sharing networking mechanism; MoU, ToR

3.2.1.5. Information, Education and Communication

- Conduct community survey to assess KABP (Knowledge, attitude and behavioral practice) in targeted audiences
- Develop an evidence based national and regional communication strategy (identify different audience groups, appropriate channels, materials and key messages)
- Develop appropriate anthrax related messages and concept testing based on survey findings for different audience groups
- Train professionals on communication strategy
- Develop training manuals and provide training to public, animal and environmental health professionals
- Produce, pre-test and disseminate Information Education Communication
- Perform field level testing of the developed educational materials
- Distribute information and educational materials to relevant sector

3.2.1.6. Multi-Sectoral Collaboration

- Review the existing TOR and conduct regular meeting of ATWG
- Organize regular technical discussions and meetings on data sharing, analysis, risk mapping, recommendation to inform prevention and control
- Ensure regular communication and reporting for the OH steering committee
- Support establishment of regional and woreda level anthrax prevention and control coordination platforms (Develop TOR and work plan for all regional TWG)

3.3. PHASE 3: IMPLEMENTATION PHASE IN EXPANDED AREAS (7 YEARS) (2024-2030)

During Phase 3, Ethiopia will extend the implementation area to outside the target areas, aiming at extending activities to a national level. Activities implemented at Phase 3 include selected activities successfully implemented during Phase 2, applied to areas where the activity is relevant. At the end of Phase 3, Ethiopia will achieve its goal of substantial reduction of the public health and economic burden of anthrax in the country.

3.3.1. Specific activities to be completed in the stipulated time-frame

3.3.1.1. Surveillance and reporting

- Provide trainings to address surveillance capacity gaps and awareness for animal and public health surveillance officers and the community (case definitions (community, suspected, probable and confirmed), reporting, notification, data management, data analysis and mapping and reporting etc).
- Provide resources (mobiles, laptops...) to improve timely and quality reporti
- Establish a wildlife anthrax surveillance system and link with the national system
- Conduct a regular review meeting, workshops with stakeholders
- Prepare and share regular joint anthrax national surveillance reports and provide feedback to the regions and woreda

3.3.1.2. Outbreak investigation

- Prepare outbreak preparedness plan and ensure availability of supplies (vaccines, drugs, human resource, laboratory consumables, and equipment) for anthrax outbreak investigation and response
- Conduct simulation exercises; training

(outbreak investigation, on sample collection, handling and transportation, after action review, revise the plan

- Conduct/implement joint outbreak investigation and response
- Establish a joint national and regional rapid investigation and response teams for anthrax outbreaks
- Prepare outbreak preparedness plan and ensure availability of supplies (vaccines, drugs, human resource, laboratory consumables, and equipment) for anthrax outbreak investigation and response
- Conduct simulation exercises; training (outbreak investigation, on sample collection, handling and transportation, after action review, revise the plan
- Conduct/implement joint outbreak investigation and response

3.3.1.3. Disease prevention and control

- Conduct test vaccine efficacy, safety, quality and a post market assessment/evaluation of the vaccine
- Plan and implement vaccination campaigns
- Establish a proper unused vaccines disposal system (expired, damaged, and inappropriately stored)
- Conduct Post vaccination evaluation (Sero monitoring)
- Training to animal health professionals and technicians on vaccine handling, transport, storage and administration, cold chain maintenance and calibration
- Ensure availability of the necessary supplies and equipment (PPE) for disinfection/environmental sanitation
- Conduct training for animal health, environmental health and public health workers on best environmental sanitary practices (on proper disinfection, case management, and carcass disposal and quarantine techniques)

3.3.1.4. Anthrax Diagnostic Laboratory Capacity

- Organize trainings for public and animal health laboratory professionals and field staff (sample collection, preservation and transport, submission, reporting and confirmatory diagnosis)
- Procurement of necessary laboratory supplies and equipment
- Build capacity of the National Veterinary Institute to manufacture diagnostic materials
- Organize regular inter-laboratory fora (networking, information sharing, joint plan)
- Specific activities and how they will be prioritized within the stipulated timeframe of the specific phase
- Stakeholders that will take responsibility for specific activities
- Key indicators that will result in an activity being considered as “accomplished”

3.3.1.5. Information, Education and Communication

- Produce, pre-test and disseminate Information Education Communication
- Perform field level testing of the developed educational materials
- Distribute information and educational materials to relevant sectors

3.3.1.6. Multi-Sectoral Collaboration

- Review the existing TOR and conduct regular meeting of ATWG
- Organize regular technical discussions and meetings on data sharing, analysis, risk mapping, recommendation to inform prevention and control
- Ensure regular communication and reporting for the OH steering committee

3.4. WORK PLAN FOR IMPLEMENTING PHASES-ONE

The implementation of each Phase's activities will be based on a phase-specific action plan that will be developed by the Ethiopian anthrax multi-sectoral technical working group. The phase-specific action plans will be composed of documents that will supplement the national strategy by providing detail on the following items:

Table 5: NATIONAL ANTHRAX PREVENTION AND CONTROL STRATEGIC PLAN (TWO YEAR WORK PLAN)

Vision: To see Anthrax is no more a significant public and animal health problem in Ethiopia by 2030

Mission: To significantly reduce and ultimately control the public health impact of anthrax in humans and animals in Ethiopia through sustained surveillance, laboratory diagnosis, prevention and control system and community awareness.

Goal: To prevent and control Anthrax in human and animals in Ethiopia

Note: The detailed work plan for implementation of Phase-one activities are listed on the table below (Table 5),

Strategic Plan Owner- EPHI/MoLF Phase 1: Planning, Preparation and Assessment Phase (2018-2019)												
Monitoring- For Quarterly Progress: Select one of the Option in the Drop Down Menu	Completed On Progress Not Started											
Strategy	Outcomes Outcome1.1. The strength, Weakness/gap, Opportunity and Threat in the existing surveillance system will be identified and Addressed challenges/gaps	Specific Activities	Detail activities	2018	2019							
				Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Responsibility
St 1: Enhancing Surveillance and Reporting Systems		Evaluate the existing surveillance system and databases	Review of the existing surveillance system and data base									EPHI/MOLF
			Prepare checklist to evaluate existing surveillance systems									EPHI/MOLF
			Evaluate the process of case reports (sensitivity, completeness and timeliness of data flow; and association with animal and human case)/surveillance evaluation on selected sites									EPHI/MOLF
			Forward recommendations based on assessment result(Writing a report)									EPHI/MOLF
		Develop anthrax surveillance guideline	Review existing local and international anthrax surveillance guidelines									EPHI/MOLF
			Prepare a concept note									EPHI/MOLF
			Review of literature and other relevant documents									EPHI/MOLF
			Preparation of draft guideline (write shop)									EPHI/MOLF
			Finalize the guideline									EPHI/MOLF

Outcome 1.2: Information sharing mechanism among sectors will be established		Organize a validation workshop printing and dissemination								EPHI/MOLF
	Establish a wildlife anthrax surveillance system and link with the national system	Formulate a team of surveillance in EWCA								EPHI/MOLF
		Prepare a plan/guidance to establish surveillance system								EWCA/ MOLF
										EWCA/MOLF
		Fulfill the necessary supplies/requirements								EWCA/MOLF
		Initiate surveillance activities								EWCA/MOLF
		Identify the necessary supplies/material								EPHI/MOLF
		Procurement of the materials								EPHI/MOLF
		Distribution of the materials								EPHI/MOLF
	Provide trainings to address surveillance capacity gaps	Prepare training materials (presentations, participants guide and instructors guide)								EPHI/MOLF
		Preparation for the training (prepare the Agenda, Venue, Hotel accommodation, invitation of participants etc...)								EPHI/MOLF
		Deliver the training								EPHI/MOLF
		Write training report/evaluation report								EPHI/MOLF
	Review and modify standard anthrax reporting format/ channels and SOP for inter sectoral information sharing	Review existing anthrax reporting formats/channels and identify the limitations								EPHI/MOLF
		Prepare a draft SOP and reporting formats								EPHI/MOLF
		Share the draft work to TWD members to be reviewed and commented								EPHI/MOLF
		Compile the suggestions/comments and finalize the document								EPHI/MOLF
	Prepare and share regular joint anthrax national surveillance reports	Printing and dissemination								EPHI/MOLF
		Review and Monitoring of surveillance data (regularly)								EPHI/MOLF
		Give feedback for reporting sites								EPHI/MOLF
Sharing of the finding/surveillance data (MoLF and EPHI on a regular basis/Monthly)									EPHI/MOLF	
Plan and implement the possible actions									EPHI/MOLF	
	Summarizing and writing report (regularly)								EPHI/MOLF	
	Conduct a regular review meeting, workshops with stakeholders	Plan to conduct a Meeting/Panel/workshop (Identifying the agendas, venue, involved stakeholders etc...)							EPHI/MOLF	
Official communication with the stakeholders (invitation letter)									EPHI/MOLF	
Preparation on presentations for each stakeholders (CDC, EPHI, MoLF, NVI, NAHDIC)									EPHI/MOLF	
		Meeting,/Panel/Work shop							EPHI/MOLF	

St 2: Strengthening Outbreak investigation and response System		Perform retrospective analysis and publication of surveillance data	Collection and analysis of retrospective anthrax surveillance data writing a manuscript Publish the materials									EPHI/MOLF EPHI/MOLF EPHI/MOLF
	Outcome 2.1: Strengthened the outbreak investigation and response system through development of joint preparedness plans and activities	Develop a national guideline and SOPs for outbreak investigation and response	Prepare a concept note									EPHI/MOLF
Review of literature and other relevant documents												EPHI/MOLF
			Preparation of draft guideline, SOP (write shop) share the document for TWG members and Conduct a meeting/ workshop to discuss on the draft document Finalize the guideline and dissemination									EPHI/MOLF EPHI/MOLF EPHI/MOLF
			Prepare a concept note									EPHI/MOLF
			Review of literature and other relevant documents									EPHI/MOLF
		Prepare outbreak preparedness plan and ensure availability of necessary supplies	Preparation of preparedness plan (write shop) share the document for TWG members and Conduct a meeting/ workshop to discuss on the draft document Finalize the EPRP and dissemination									EPHI/MOLF EPHI/MOLF EPHI/MOLF
												EPHI/MOLF
												EPHI/MOLF
		Establish a joint national and regional rapid investigation and response teams for anthrax outbreaks	Prepare for stakeholders meeting Stakeholders meeting (identify the expertise from each sector and prepare a roster) Formulate a team of RRT Develop SOP for RRT activities									EPHI/MOLF EPHI/MOLF EPHI/MOLF EPHI/MOLF
												EPHI/MOLF
												EPHI/MOLF
		Conduct simulation exercises; training	Prepare training materials (presentations, participants guide and instructors guide) Preparation for the training (prepare the Agenda, Venue, Hotel accommodation, invitation of participants etc...) Deliver the training Write training report/evaluation report									EPHI/MOLF EPHI/MOLF EPHI/MOLF EPHI/MOLF
												EPHI/MOLF
												EPHI/MOLF
		Conduct/implement joint outbreak investigation and response	Prepare for field work (meeting, identify all the necessary supplies) Deploy RRT to the affected area Implementation of joint investigation and response									EPHI/MOLF EPHI/MOLF EPHI/MOLF
												EPHI/MOLF
												EPHI/MOLF

St. 3: Enhancing
Prevention and
Control of Anthrax

Outcome 3.1: Improved
vaccine production,
distribution, storage/
handling and administration
system that meets the
demand at national and
regional level

Asses/estimate the national demand production, distribution and storage capacity of anthrax vaccine	Develop a concept note									NVI/MOLF
	Review of the existing situation									NVI/MOLF
	Writing a proposal for estimation of vaccine demand									NVI/MOLF
	Conduct a baseline survey (Onsite/field)									NVI/MOLF
	Writing a baseline survey report and share with TWG									NVI/MOLF
	prepare a concept note and proposal									NVI/MOLF
	Share the concept note and proposal to TWG and finalize the proposal (work plan)									NVI/MOLF
	Conduct cost effectiveness and feasibility of animal vaccination									NVI/MOLF
	Identify the most sustainable vaccination programs and degree of public-private shared responsibilities									NVI/MOLF
	Modeling of the cost effectiveness with government perspective and producers perspective									NVI/MOLF
Support VDFACA to undertake vaccine efficacy, safety, quality and a post market assessment/ evaluation	Writing a report									NVI/MOLF
	Share the report for the relevant sectors									NVI/MOLF
	Writing a concept note									NVI/MOLF/ VDFACA
	Meeting with VDFACA officials and identify SWOT									NVI/MOLF/ VDFACA
Develop vaccine supply chain management system and SOP for monitoring of vaccine chain,	Address the identified gaps									NVI/MOLF/ VDFACA
	Review existing anthrax Vaccine management system (local and international practices)									NVI/MOLF/ VDFACA
	Prepare a draft SOP									NVI/MOLF/ VDFACA
	Share the draft work to TWD members to be reviewed and commented									NVI/MOLF/ VDFACA
	Compile the suggestions/comments and finalize the document									NVI/MOLF/ VDFACA
	Printing and dissemination									NVI/MOLF/ VDFACA

[illegible]

**St. 4: Improving
Anthrax Diagnostic
Laboratory Capacity**

Outcome 4.1: Improved anthrax testing capacity of the national and selected regional laboratories	Assess national and regional of public and animal health laboratory capacity for anthrax diagnostic testing	Review existing laboratory diagnostic capacity assessment tools/ checklists							EPHI/NAHDIC
		Adapt/prepare the checklists and include anthrax diagnostic capacity assessment questions							EPHI/NAHDIC
		Organize review and validation workshops							EPHI/NAHDIC
		Conduct assessment of national and regional public and animal health laboratories anthrax diagnostic capacity and identify limitations (on site visit)							EPHI/NAHDIC
		Writing a report							EPHI/NAHDIC
		Compile sector specific assessment reports							EPHI/NAHDIC
	Prepare a laboratory Diagnostic capacity plan for anthrax (based on identified gaps) and SOP	Support preparation of the lab development plan based on identified gaps							EPHI/NAHDIC
		Organize a consultation meeting to review the development plan							EPHI/NAHDIC
		Finalize the plan and disseminate to the relevant sectors							EPHI/NAHDIC
	Procurement of necessary laboratory supplies and equipment	Identify the necessary supplies/material (access and demand)							EPHI/NAHDIC
		Procurement of the materials							EPHI/NAHDIC
		Distribution of the materials							EPHI/NAHDIC
	Organize trainings on anthrax laboratory testing procedures	Prepare training materials (presentations, participants guide and instructors guide)							EPHI/NAHDIC
		Preparation for the training (prepare the Agenda, Venue, Hotel accommodation, invitation of participants etc...)							EPHI/NAHDIC
		Deliver the training							EPHI/NAHDIC
	Outcome 4.2: Enhanced inter sectoral inter laboratory networking	Write training report/evaluation report							EPHI/NAHDIC
		Review compatibility of existing laboratory information management (LIMS and LIS) systems							EPHI/NAHDIC
		Establish an inter-laboratory resource sharing networking mechanism; MoU, ToR							EPHI/NAHDIC
		Organize regular inter-laboratory fora (networking, information sharing, joint plan)							EPHI/NAHDIC
		Reporting (regular meeting)							EPHI/MOLF

St. 5: Enhancing Information, Education and Communication system	Outcome 5.1: Improved awareness of the community on the risks and prevention of anthrax	Assessment of existing communication activities and materials (situational analysis)	Collect available communication and information materials (bulletins, posters, pamphlets, ...) on anthrax prevention and control							EPHI/MOLF
			Identify type and contents of communication materials which can further be produced							EPHI/MOLF
			Prepare a concept note							EPHI/MOLF
		Conduct community survey to assess KABP	Prepare a proposal (questioners, identify sites)							EPHI/MOLF
			Conduct KABP survey (on identified sites)							EPHI/MOLF
			Writing and disseminate a report							EPHI/MOLF
		Develop an evidence based national and regional communication strategy	Review of standard communication strategy							EPHI/MOLF
			Review of the KABP assessment							EPHI/MOLF
			Develop appropriate anthrax related messages							EPHI/MOLF
			Pre-test of draft IEC/BEC materials							EPHI/MOLF
	Outcome 5.2: Skilled health professionals on IEC system		Produce and disseminate IEC/BEC materials							EPHI/MOLF
		Assess the knowledge and skills (KAP) of the professionals	Review of the existing educational materials for professionals							EPHI/MOLF
			Prepare a proposal (questioners, identify sites)							EPHI/MOLF
			Conduct KABP survey (on identified sites)							EPHI/MOLF
			Writing and disseminate a report							EPHI/MOLF
		Develop training manuals and perform field level test of the materials	Review of standard training manuals							EPHI/MOLF
			Review of the KAP assessment							EPHI/MOLF
			Develop draft training manuals (workshop)							EPHI/MOLF
			Finalize the training manual							EPHI/MOLF
			Printing and disseminate training manuals							EPHI/MOLF
		Provide training to public, animal and environmental health professionals	Prepare training materials (presentations, participants guide and instructors guide)							EPHI/MOLF
			Preparation for the training (prepare the Agenda, Venue, Hotel accommodation, invitation of participants etc...)							EPHI/MOLF
			Deliver the training							EPHI/MOLF
			Write training report/evaluation report							EPHI/MOLF

St. 6: Strengthening Multi-Sectoral Collaboration	Outcome 6.1: Strengthened existing national one health platforms	Regular communication and reporting for the Anthrax TWG and OH steering committee	Review the implemented activities (reports, TOR..)					EPHI/MOLF
			Review the existing TOR and conduct regular meeting of TWG					EPHI/MOLF
			Plan to conduct a Meeting/Panel/workshop on Anthrax surveillance system (Identifying the agendas, venue, involved stakeholders etc...)					EPHI/MOLF
			Official communication with the stakeholders (invitation letter)					EPHI/MOLF
			Preparation on presentations for each stakeholders (CDC, EPHI, MoLF, NVI, NAHDIC, FAO...)					EPHI/MOLF
			Meeting,/Panel/Work shop (Identifying SWOT)					EPHI/MOLF
			Prepare joint and sectorial activity/summary reports					EPHI/MOLF
	Outcome 6.2: Endorsed/ valid national anthrax prevention and control strategic plan	Develop an advocacy plan to obtain buy-in from governmental and non-governmental stakeholders	Avail the reports during OHSC meetings					EPHI/MOLF
			preparation of an advocacy plan					EPHI/MOLF
			Organize/use high level events/workshops to advocate and get endorsement on anthrax prevention and control					EPHI/MOLF
		Obtain official endorsement of anthrax plan from all relevant ministries and	Share the developed strategic plans, guidelines, SOPs and materials for leadership approval					EPHI/MOLF
			Organize a stakeholders validation workshop of the national anthrax prevention and control strategy					EPHI/MOLF
			Finalize the document based on inputs from the validation workshop					EPHI/MOLF
		Secure potential source of funding for implementation of the plan	Printing and dissemination for the relevant sectors and funding agencies					EPHI/MOLF
			Identify the possible source of funding					EPHI/MOLF
			Submit the strategic plan and financial plan to relevant funding agencies					EPHI/MOLF

Monitoring	Monitoring of each activity	Develop a monitoring and evaluation plan /check list							EPHI/MOLF
		Prepare for supervision (identifying the sites, date of supervision, involved stuffs and prepare required materials)							EPHI/MOLF
		Onsite supervision							EPHI/MOLF
		Writing compiled supervision report							EPHI/MOLF
		Share the report with the concerned body (TWG)							EPHI/MOLF
		Preparation for a review meeting (prepare the Agenda, Venue, etc...)							EPHI/MOLF
		Review meeting (identify SWOT and put possible recommendation to be implemented)							EPHI/MOLF
		Writing a report and dissemination							EPHI/MOLF
Evaluation	Intreme evaluation of the phase 1	Review of the planned activities and outcomes							EPHI/MOLF
		Prepare an evaluation plan/checklist							EPHI/MOLF
		Conduct an evaluation on the effectiveness of the implemented activities (onsite visit)							EPHI/MOLF
		Writing a report							EPHI/MOLF
		Organize an evaluation workshop							EPHI/MOLF

3.5 Monitoring and Evaluation

Monitoring and evaluation is the routine and continuous tracking of planned activities using a set of indicators to assess whether objectives are being achieved. The process can be used to measure the effectiveness and feasibility of programs focused on proper prevention and control of anthrax in humans and animals. The time frame for monitoring of each activity will be as described in the work plan (Table 6, above). The effectiveness of each activities planned in Phase-one will be measured and monitored using a measurable indicators as indicated in the table below.

Table 6: ETHIOPIA - ANTHRAX PERFORMANCE MONITORING PLAN

Strategy Output 1: Enhancing Surveillance and Reporting Systems					
Activity	Sub-activities	Measurable indicators of achievement	Deliverable	Target	Means of verification
Assess the existing Anthrax surveillance system	Evaluate the existing surveillance systems and databases	Existing surveillance system and database described	Gaps, Recommendations and Propose a solutions of the existing surveillance system and database documented	1	Assessment report
	Develop anthrax surveillance guideline	Existence of anthrax surveillance guideline	Endorsed Anthrax surveillance guideline	1	Anthrax surveillance guideline
	Establish a wildlife anthrax surveillance system and share information with MoLF	Existence of an interoperable wildlife anthrax and national surveillance system	wildlife anthrax surveillance results integrated in to MoLF national surveillance system	1	Wildlife anthrax Surveillance reports
	Provide resources (mobiles, laptops...) to improve timely and quality reporting	# of reporting equipment distributed	Reporting equipment apportioned	TBD (After the evaluation)	Asset/hand over registry, Timely and complete Surveillance reports
	Train professionals (from all sectors) to address surveillance capacity gaps	# of professionals trained in anthrax surveillance	Competencies anthrax surveillance acquired	120 Participants	Training report
Establish a mechanism for reporting, feedback and information sharing	Review and modify standard anthrax reporting format/ channels and SOP for inter sectoral information sharing	Existence of modified anthrax reporting format and SOP	Modified anthrax reporting format and SOP in place	8 reporting format and 1 SOP	Standardized Surveillance reports; SOP
	Prepare and share regular joint anthrax national surveillance reports	# of joint anthrax national surveillance reports produced	Joint anthrax national surveillance reports shared	8	Surveillance reports
	Conduct a regular review meeting, workshops with stakeholders	# of stakeholder meetings Conducted	Stakeholder meetings convened	4	Meeting minutes
	Perform Joint retrospective analysis and publication of surveillance data	Retrospective burden of anthrax described	Retrospective burden of anthrax documented and published	N/A	Submitted Manuscript/ publication (Research paper)

Strategy Output 2: Strengthening Outbreak Management system					
Activity	Sub-activities	Measurable indicators of achievement	Deliverable	Target	Means of verification
Develop a Joint preparedness, investigation and response plan	Develop a national guideline and SOPs for outbreak investigation and response	Existence of national guideline and SOPs for outbreak investigation and response	National guideline and SOPs for outbreak investigation and response in place	1	National guideline and SOP
	Prepare outbreak preparedness plan	Existence of outbreak preparedness plan;	Endorsed Outbreak preparedness plan;	1	Preparedness plan
	Establish a joint national and regional anthrax rapid investigation and response teams	# of joint national and regional anthrax rapid investigation and response teams established.	Joint national and regional rapid investigation and response teams for anthrax outbreaks in place.	3	RRT roster
	Conduct outbreak management/ response simulation exercises	# of professionals trained in anthrax outbreak management	Competencies on anthrax outbreak management acquired	120 Participants (>75% pass competency test)	Simulation training report
	Conduct/implement joint outbreak investigation and response	Proportion of suspected anthrax cases jointly investigated	Joint outbreak investigations and response conducted	>90% of suspected anthrax cases jointly investigated	outbreak investigation and response reports
Strategy Output 3: Enhancing Prevention and Control of Anthrax					
Activity	Sub-activities	Measurable indicators of achievement	Deliverable	Target	Means of verification
Improve anthrax vaccine production, safety, quality, efficacy, distribution and rational use in animals	Asses/estimate the national demand production, distribution and storage capacity of anthrax vaccine	National demand against production, distribution and storage of anthrax vaccine described	Gaps and recommendations of production, distribution and storage of anthrax vaccine documented	N/A	Assessment reports
	Conduct cost effectiveness and feasibility study of animal vaccination	Alternative vaccination models/ strategies described	Alternative vaccination models/strategies documented	N/A	Study report
	Increase Anthrax vaccine production capacity	Increment of vaccination production level	National demand for anthrax vaccine production fulfilled	TBD	NVI vaccine production report
	Improve vaccine supply chain management system	Presence of Updated vaccine supply chain management system	Vaccine supply chain management system improved	N/A	Assessment reports
	Develop/Update SOP for production, distribution, storage and delivery	# of SOPs developed for production, distribution, storage and delivery	Endorsed SOPs for production, distribution, storage and delivery	TBD	SOPs
	Establish Sanitary mandate contract (PPP) for vaccination campaigns	Number of contractual agreements (PPP)	Enhanced vaccination coverage and efficiency with PPP involvement	TBD	Signed PPP contracts
	train animal health professionals and technicians on vaccine management	# of people trained on anthrax vaccine management	Competencies on anthrax vaccine management acquired	80	Training report

Improve sanitary measures (Carcass disposal, disinfection, Avoid contact with livestock)	Develop SOP for proper disposal of infected carcass and fomite, environmental sanitation, animal movement control system/isolation	# of SOPs developed for proper infected carcass and fomite disposal, environmental sanitation, animal movement control system/isolation	SOPs for infected carcass and fomite disposal, environmental sanitation, animal movement control and isolation in place.	TBD	SOPs
	Ensure availability of the necessary supplies and equipment (PPE)	Proportion of high risk professionals equipped with PPE	Sustainable PPE supplies, in place	>75% of identified sites received the supplies	Procurement records
	Conduct training on best environmental sanitary practices	# of people trained on environmental sanitary practice	Competencies on environmental sanitary practice	80	Training report

Strategy Output 4: Improving Anthrax Diagnostic Laboratory Capacity

Activity	Sub-activities	Measurable indicators of achievement	Deliverable	Target	Means of verification
Improve national and regional animal and public health laboratory capacity for anthrax diagnostic testing	Assess national and regional public and animal health laboratory capacity for anthrax diagnostic testing	#, list of laboratories assessed for anthrax diagnostic testing capacity (16 Animal health and 5 public health labs assessed (including NAHDIC, NVI and EPHI)	Gaps and recommendations of anthrax diagnostic testing capacity documented.	1	Assessment reports
		# of laboratory development plans produced (1 for public and 1 for animal health sector)	Endorsed Laboratory development plans	1	Project report
	Prepare a laboratory development plan and SOP (based on identified gaps)	# number of SOPs (Sample collection, handling & biosafety, preservation & cold chain, transportation and submission, testing and reporting) developed (for each sector)	Endorsed SOPs available for use	4	SOPs
	Procurement and distribution of necessary laboratory supplies and equipment	# of laboratories equipped with the necessary supplies and equipment procured	Laboratory supplies and equipment procured and distributed	4	Asset register
	Train lab staff on anthrax laboratory testing procedures	# of professional staff trained on anthrax laboratory testing procedures.	Competencies in anthrax laboratory testing procedures acquired.	120	Training reports
Establish and enhance inter sectoral inter laboratory networking (public and animal health)	Map and link existing public and animal health laboratories based on the assessment	#, list of public and animal health laboratories mapped.	Public and animal health laboratories mapped.	N/A	Assessment report
		#, list of public and animal health laboratories with interoperable(linked) laboratory information systems	Interoperable/ linked LIM and other communication systems LIMs	15	Laboratory reports

Strategy Output 5: Enhancing Information, Education and Communication system					
Activity	Sub-activities	Measurable indicators of achievement	Deliverable	Target	Means of verification
Improve community awareness of the risks, transmission and prevention of anthrax	Assessment of existing communication activities and materials (situational analysis)	# of institutions assessed for existing communication and advocacy materials	Gaps in the existing communication and advocacy materials documented.	7	Assessment report
	Conduct community survey to assess KAPB recommendations	Findings from the KAPB survey described.	Gaps and recommendations from the KAPB survey documented.	1	KAPB Survey reports
	Develop an evidence based national communication strategy	Existence of an evidence based national communication strategy.	Endorsed evidence based national communication strategy in place.	1	Communication strategy document
	Develop appropriate anthrax related messages ¹ and concept testing for different audience groups	Proportion of developed anthrax related messages tested	Tested anthrax related messages available	100%	Field test report
	Disseminate Information Education Communication (IEC)/Social Behavior Change Communication (SBCC) materials	# of disseminated materials	IEC materials availed to target areas/ communities	5000	Dissemination report
Improve the knowledge and skill of health/ veterinary professionals	Assess the knowledge and skills (KAP) of the professionals	#, list of professionals assessed	Gaps and recommendations of professional's skills documented	150	Study report
	Develop training manuals and perform field level test of the materials	#, list of training manuals developed	Endorsed Training manuals developed	2	Training Manual
	Provide training to public, animal and environmental health professionals	# of professionals using the training manual	Competencies on IEC acquired	80	Training reports
	Distribute information and educational materials to relevant sectors	# of information and educational materials distributed (copies)	Educational materials availed to targets	200	Educational materials

Strategy Output 6: Strengthening Multi-Sectoral Collaboration					
Activity	Sub-activities	Measurable indicators of achievement	Deliverable	Target	Means of verification
Strengthen existing national platforms (OHSC, Anthrax TWG)	Regular communication and reporting for the OH steering committee	Proportion of OH steering committee recommendations addressed	Recommendations implemented	N/A	Steering committee communique
Obtain buy in and secure resources for implementation of the Anthrax prevention and control strategic plan	Develop an advocacy plan to obtain buy-in from governmental and non-governmental stakeholders	Existence of an advocacy plan	Advocacy plan in place	1	Project report
	Obtain official endorsement of the Anthrax prevention and control strategic plan from all relevant ministries and stakeholders	Existence of endorsed national anthrax prevention and control strategic plan	Endorsement of anthrax plan obtained	N/A	Project report
	Secure potential source of funding for implementation of the plan	Sum of resources mobilized	Funding secured	TBD	Financial agreement

NOTE:

Endorsement of all the documents listed in the table will be by the director General of each relevant sectors

The target stated in the table is only for Phase 1(Two years plan) activities and it doesn't indicate the target of all the three Phases (which will be determined based on the evaluation of Phase one implementation statuses

All the assessment findings in Phase one will serve as a baseline data

Laboratory testing: including sample collection, transport, submission, lab analysis, interpretation and reporting

Laboratory Information Systems; may include LIMS and other communication systems

Institutions assessed; Ministry of Health (EPHI), Ministry of Livestock and Fisheries, Ministry of Culture and Tourism (EWCA), Ministry of Environment, Forest and Climate Change, Professional associations (EVA, EPHA), Development partners (OSU, CDC, FAO, etc)

Message tools: posters, flyers, brochures, media messages, etc.

4. BUDGET SUMMARY

An estimated birr 384,200,272.00 (14,125,010.00 USD) is required for the implementation of activities under the three Phases (2018-2030). Of the total estimated cost 16.41% (63,052,864.00 birr/721, 2,318,120.00 USD) will be for the implementation of planned activities under Phase-one of the strategic plan, the remaining 34.38% (45,233,491.20 birr/132,084,288.00 USD) and 49.21% (189,063,120.00 birr/6,950,850.00 USD) will be for the implementation of planned activities under Phase-two and Phase-three aiming to expand at regional level. From the total budget under Phase-one, the majority (85.2%) will be utilized for mass vaccination campaign and laboratory capacity building at national level (NAHDIC and Microbiology laboratory in EPHI) and the remaining 9.3% of the estimated cost also for the capacity building of professionals through training and for development of relevant documents through workshops. The estimated travel costs (5.54%) will be for in-country travels for survey studies and Assessment activities that involves additional stuffs for data collection in identified hot-spot areas. This assessment activities will include evaluation of the surveillance system by conducting surveys in selected areas, for a survey study on the awareness level of the community which will serve as a baseline information. The allocated budget will help the national human health and animal health sectors to strengthen the surveillance and outbreak investigation and response capacity for anthrax in animals and humans in the next two year, through laboratory capacity building at national level, improvement of workforce capacity in surveillance, Outbreak investigation and laboratory testing knowledge and skills.

Table 7: Budget Summary by components of the Anthrax Prevention and Control Strategic Framework (2018-2030)

Strategy (by outcomes)	Phase 1		Phase 2		Phase 3	
	Total Costs (local Currency)	Total Costs (USD)	Total Costs (local Currency)	Total Costs (USD)	Total Costs (local Currency)	Total Costs (USD)
St 1: Enhancing Surveillance and Reporting Systems	\$1,806,624.00	\$66,420.00	\$4,669,696.00	\$171,680.00	\$6,718,944.00	\$247,020.00
Outcome 1.1: The strength, Weakness/gap, Opportunity and Threat in the existing surveillance system will be identified and Addressed challenges/gaps	\$1,421,472.00	\$52,260.00	\$3,899,392.00	\$143,360.00	\$5,563,488.00	\$204,540.00
Outcome 1.2: Information sharing mechanism among sectors will be established	\$385,152.00	\$14,160.00	\$770,304.00	\$28,320.00	\$1,155,456.00	\$42,480.00
St 2: Strengthening Outbreak investigation and response System	\$961,248.00	\$35,340.00	\$1,754,944.00	\$64,520.00	\$1,012,928.00	\$37,240.00
Outcome 2.1: Strengthened the outbreak investigation and response system through development of joint preparedness plans and activities	\$961,248.00	\$35,340.00	\$1,754,944.00	\$64,520.00	\$1,012,928.00	\$37,240.00
St. 3: Enhancing Prevention and Control of Anthrax	\$2,439,840.00	\$89,700.00	\$11,333,696.00	\$416,680.00	\$6,164,064.00	\$226,620.00
Outcome 3.1: Improved vaccine production, distribution, storage/handling and administration system that meets the demand at national and regional level	\$1,671,168.00	\$61,440.00	\$5,803,936.00	\$213,380.00	\$3,619,776.00	\$133,080.00

Outcome 3.2: Improved the environmental sanitation practice nationwide	\$768,672.00	\$28,260.00	\$5,529,760.00	\$203,300.00	\$2,544,288.00	\$93,540.00
St. 4: Improving Anthrax Diagnostic Laboratory Capacity	\$53,657,712.00	\$1,972,710.00	\$106,336,224.00	\$3,909,420.00	\$159,014,736.00	\$5,846,130.00
Outcome 4.1: Improved anthrax testing capacity of the national and selected regional laboratories	\$53,657,712.00	\$1,972,710.00	\$106,336,224.00	\$3,909,420.00	\$159,014,736.00	\$5,846,130.00
Outcome 4.2: Enhanced inter sectorial inter laboratory networking						
St. 5: Enhancing Information, Education and Communication system	\$2,400,672.00	\$88,260.00	\$4,416,192.00	\$162,360.00	\$9,005,376.00	\$331,080.00
Outcome 5.1: Improved awareness of the community on the risks and prevention of anthrax	\$979,200.00	\$36,000.00	\$1,958,400.00	\$72,000.00	\$2,937,600.00	\$108,000.00
Outcome 5.2: Skilled health professionals on IEC system	\$1,421,472.00	\$52,260.00	\$2,457,792.00	\$90,360.00	\$6,067,776.00	\$223,080.00
St. 6: Strengthening Multi-Sectorial Collaboration	\$285,328.00	\$10,490.00	\$570,656.00	\$20,980.00	\$570,656.00	\$20,980.00
Outcome 6.1: Strengthened existing multi-sectorial collaboration	\$285,328.00	\$10,490.00	\$570,656.00	\$20,980.00	\$570,656.00	\$20,980.00
Monitoring	\$1,175,040.00	\$43,200.00	\$2,350,080.00	\$86,400.00	\$4,700,160.00	\$172,800.00
Evaluation	\$611,728.00	\$22,490.00	\$1,223,456.00	\$44,980.00	\$2,446,912.00	\$89,960.00
Total Budget	\$63,052,864.00	\$2,318,120.00	\$132,084,288.00	\$4,856,040.00	\$189,063,120.00	\$6,950,850.00
Grand Total					\$384,200,272.00	\$14,125,010.00

Note: The budget narrative for the implementation of Phase-I activities is presented in annex 5.1, below.

5. ANNEXES

5.1 BUDGET NARRATIVE

Note: the budget narratives described below is only for implementation of planned activities under Phase-I of the strategic plan.

Justification:

A. Assessment Activities

Strategy 1: Enhancing Surveillance and Reporting Systems

Outcome 1.1: The strength, Weakness/gap, Opportunity and Threat in the existing surveillance system will be identified and addressed challenges/gaps

1.1.3. Evaluate the process of case reports (sensitivity, completeness and timeliness of data flow; and association with animal and human case)/surveillance evaluation on selected sites							
Strategy	Items	Cost Per Day (USD)	Average # of Days Per assessment	Average # of Participants Per assessment	Total Rounds of assessment	Total Costs USD	Total Costs (local Currency)
1	Participants Per Diem	\$20.00	10	20	1	\$4,000.00	\$108,800.00
2	Participants Travel/ Transportation (Average)	\$100.00	10	20	1	\$20,000.00	\$544,000.00
Sub total						\$24,000.00	\$652,800.00

Justification

Evaluating the existing surveillance activities in the selected sites will provide the strengths and weakness of the surveillance system. Underreporting and incompleteness of surveillance data might leads to delayed response as a result of late detection of anthrax cases both in animals and animals. Evaluating the sensitivity, flexibility, quality and other factors of the surveillance and reporting system with respect to anthrax helps to identify the gaps. The evaluation will be carried out on selected hotspot areas by using checklists and standard questioners. A total of 5 surveillance officers (EFLTP residents) and 15 data collectors will be involved in the evaluation. The allocated budget will be used for perdiem and other logistics like transportation and stationary.

Strategy 3: Enhancing Prevention and Control of Anthrax

Outcome 3.1: Improved vaccine production, distribution, storage/handling and administration system that meets the demand at national and regional level

3.1.1. Asses/estimate the national demand production, distribution and storage capacity of anthrax vaccine (baseline survey)

Strategy	Items	Cost Per Day (USD)	Average # of Days Per assessment	Average # of Participants Per assessment	Total Rounds	Total Costs USD	Total Costs (local Currency)
S3	Participants Per Diem	\$20.00	10	5	1	\$1,000.00	\$27,200.00
S3	Participants Travel/ Transportation (Average)	\$100.00	10	5	1	\$5,000.00	\$136,000.00
Sub total						\$6,000.00	\$163,200.00

Justification:

National veterinary institute have been producing and distributing anthrax vaccine for animals. The exact animal population that requires anthrax vaccine provides the demand and comparing the production capacity of NVI will help to identify the gaps in the demand and production level of the vaccine. Currently such information is not properly documented and/ or further assessment will be necessary. Furthermore, the vaccine distribution and storage capacity in various regions/areas were not adequately assessed. The allocated **163,200.00 birr** will help to identify the strengths and gaps in vaccine production and distribution (the overall vaccination system); used for perdiem and other logistics like transportation and stationary.

3.1.2. Conduct cost effectiveness and feasibility study of animal vaccination

Strategy	Items	Cost Per Day (USD)	Average # of Days Per assessment	Average # of Participants Per assessment	Total Rounds	Total Costs USD	Total Costs (local Currency)
S3	Participants Per Diem	\$20.00	10	5	1	\$1,000.00	\$27,200.00
S3	Participants Travel/ Transportation (Average)	\$100.00	10	5	1	\$5,000.00	\$136,000.00
Sub total						\$6,000.00	\$163,200.00

Justification:

Understanding of the Coast effectiveness and feasibility of the existing animal vaccination activities is better to strengthen and/or using better vaccination mechanisms adapted from international experiences. The allocated 6,000 USD will help to assess cost effectiveness and feasibility of currently used animal vaccination system.

Strategy 4: Improving Anthrax Diagnostic Laboratory Capacity

Outcome 4.1: Improved anthrax testing capacity of the national and selected regional laboratories

4.1.1. Conduct assessment of national and regional public and animal health laboratories anthrax diagnostic capacity and identify limitations (on site visit)

Strategy	Items	Cost Per Day (USD)	Average # of Days Per assessment	Average # of Participants Per assessment	Total Rounds	Total Costs USD	Total Costs (local Currency)
S4	Participants Per Diem	\$20.00	10	20	1	\$4,000.00	\$108,800.00
S4	Participants Travel/ Transportation (Average)	\$100.00	10	20	1	\$20,000.00	\$544,000.00
Sub total						\$24,000.00	\$652,800.00

Justification

The overall confirmation mechanism for anthrax in animals and humans case is based on the clinical findings and simple staining practices. Such diagnostics practices will provide incomplete evidence on the identification of anthrax and which might leads to false datas. Furthermore absence of laboratory diagnostic capacity for anthrax in veterinary and human health sector will affect the early response, prevention and control efforts towards anthrax. The allocated 652,800.00 birr will help to Conduct assessment of national and regional public and animal health laboratories anthrax diagnostic capacity and identify limitations (on site visit). The assessment will be conducted by four team (5 members in one team) in five selected regions. The assessment of national and regional microbiology laboratories will be carried out using standard checklists that helps to assess their capacity in terms of facilities, supplies, reagents and skilled laboratory professionals. The identified gaps based on the assessment will be addressed and improved for better confirmatory capability at least at national and some selected regional levels. The allocated budget will be used to cover the logistics and perdiem cost of the participants in the assessments.

Strategy 5: Enhancing Information, Education and Communication system

Outcome 5.1: Improved awareness of the community on the risks and prevention of anthrax

5.1.2. Conduct KABP survey (on identified sites)

Strategy	Items	Cost Per Day (USD)	Average # of Days Per assessment	Average # of Participants Per assessment	Total Rounds	Total Costs USD	Total Costs (local Currency)
S5	Participants Per Diem	\$20.00	10	30	1	\$6,000.00	\$163,200.00
S5	Participants Travel/ Transportation (Average)	\$100.00	10	30	1	\$30,000.00	\$816,000.00
Sub total						\$36,000.00	\$979,200.00

5.2.1. Conduct KABP survey (on identified sites for professionals)

Strategy	Items	Cost Per Day (USD)	Average # of Days Per assessment	Average # of Participants Per assessment	Total Rounds	Total Costs USD	Total Costs (local Currency)
S5	Participants Per Diem	\$20.00	10	20	1	\$4,000.00	\$108,800.00
S5	Participants Travel / Transportation (Average)	\$100.00	10	20	1	\$20,000.00	\$544,000.00
Sub total						\$24,000.00	\$652,800.00

Justification:

The allocated budget will be used for the assessment of the knowledge, skill and behavioral attitudes in the community and also health professionals towards the risks of encountering anthrax and the prevention measures. Standard questioners will be prepared and the data collection will be done by trained data collectors. For this activity five teams will be formulated having four data collector, one supervisor and one coordinator. Each team will be assigned in selected one region and a total of five regions will be covered in the survey. The finding will be published and documented. This will give a clear picture in the awareness of the community and leads to develop appropriate IEC materials and systems for improving the awareness of the community.

Monitoring and evaluation**7. 1 Monitoring of each activity (Onsite supervision)**

Strategy	Items	Cost Per Day (USD)	Average # of Days Per assessment	Average # of Participants Per assessment	Total Rounds of supervision	Total Costs USD	Total Costs (local Currency)
S7	Participants Per Diem	\$20.00	10	6	6	\$7,200.00	\$195,840.00
S7	Participants Travel / Transportation (Average)	\$100.00	10	6	6	\$36,000.00	\$979,200.00
Sub total						\$43,200.00	\$1,175,040.00

8.1. Intreme evaluation of the phase 1/Conduct an evaluation on the effectiveness of the implemented activities (onsite visit)

Strategy	Items	Cost Per Day (USD)	Average # of Days Per assessment	Average # of Participants Per assessment	Total Rounds of evaluation	Total Costs USD	Total Costs (local Currency)
S8	Participants Per Diem	\$20.00	10	10	1	\$2,000.00	\$54,400.00
S8	Participants Travel/ Transportation (Average)	\$100.00	10	10	1	\$10,000.00	\$272,000.00
Sub total						\$12,000.00	\$326,400.00

Justification:

Monitoring of the implementation of the planned activities will help to assess the effectiveness of the program towards achieving its objectives. Regular supervision of the selected active sites will address the progress of the planned activities and planned to carry out this activity every four months period. The allocated budget will be for transportation and per diem cost of the supervisors.

Training and others (workshop and meetings)

Strategy 1: Enhancing Surveillance and Reporting Systems

Outcome 1.1: The strength, Weakness/gap, Opportunity and Threat in the existing surveillance system will be identified and addressed challenges/gaps

1.2.4. Preparation of draft anthrax surveillance guideline (write shop)							
Strategy	Items	Cost Per Day (USD)	Average # of Days Per write shop	Average # of Participants Per write shop	Total Rounds of workshop	Total Costs USD	Total Costs (local Currency)
S1	Venue	\$100.00	2	1	2	\$400.00	\$10,880.00
S1	Venue Package/ Tea Break	\$8.00	2	15	2	\$480.00	\$13,056.00
S1	Facilitators Fee	\$20.00	4	5	2	\$800.00	\$21,760.00
S1	Participants Travel/ Transportation (Average)	\$130.00	1	10	2	\$2,600.00	\$70,720.00
S1	Participants and Trainers Per Diem	\$20.00	4	15	2	\$2,400.00	\$65,280.00
S1	Training Materials (Average)	\$10.00	1	10	2	\$200.00	\$5,440.00
S1	Stationery	\$10.00	1	10	2	\$200.00	\$5,440.00
Sub total						\$7,080.00	\$192,576.00
1.2.5. Organize a validation workshop (Surveillance guideline)							
Strategy	Items	Cost Per Day (USD)	Average # of Days Per write shop	Average # of Participants Per write shop	Total Rounds of Training	Total Costs USD	Total Costs (local Currency)
S1	Venue	\$100.00	2	1	1	\$200.00	\$5,440.00
S1	Venue Package/ Tea Break	\$8.00	2	15	1	\$240.00	\$6,528.00
S1	Facilitators Fee	\$20.00	4	5	1	\$400.00	\$10,880.00
S1	Participants Travel/ Transportation (Average)	\$130.00	1	10	1	\$1,300.00	\$35,360.00
S1	Participants and Trainers Per Diem	\$20.00	4	15	1	\$1,200.00	\$32,640.00
S1	Training Materials (Average)	\$10.00	1	10	1	\$100.00	\$2,720.00
S1	Stationery	\$10.00	1	10	1	\$100.00	\$2,720.00
Sub total						\$3,540.00	\$96,288.00

1.2.6. printing and dissemination of surveillance guideline

Strategy	Item Requested	No. Needed	Unit Cost	Amount Requested	Total Costs (local Currency)
S1	Printing of surveillance guideline	1,000	\$4.00	\$4,000.00	\$108,800.00
Sub Total				\$4,000.00	\$108,800.00

Justification:

Guidance for anthrax surveillance activities is important to ensure rapid detection, reporting and effective response to emerging outbreaks of anthrax. This budget will be used to develop a guideline for surveillance of anthrax both in humans and animals. The guideline will incorporate detailed instructions, and protocols on reporting activities, active case searches etc to deal with overall surveillance activities in the involvement of different sectors including ministry livestock and fisheries and ministry of health. Two separate surveillance guidelines will be prepared for veterinary sector and health sector. The guideline will be prepared by the staffs of each ministries and the allocated budget will cover the costs for the workshop (writing shop and validation workshop). The remaining 108,000 birr will be for printing and dissemination of the guideline.

1.3. Provide trainings to address surveillance capacity gaps

Strategy	Items	Cost Per Day (USD)	Average # of Days Per write shop	Average # of Participants Per Training	Total Rounds of Training	Total Costs USD	Total Costs (local Currency)
S1	Venue	\$100.00	2	1	2	\$400.00	\$10,880.00
S1	Venue Package/ Tea Break	\$8.00	2	40	2	\$1,280.00	\$34,816.00
S1	Facilitators Fee	\$20.00	4	5	2	\$800.00	\$21,760.00
S1	Participants Travel/ Transportation (Average)	\$130.00	1	40	2	\$10,400.00	\$282,880.00
S1	Participants and Trainers Per Diem	\$20.00	4	45	2	\$7,200.00	\$195,840.00
S1	Training Materials (Average)	\$10.00	1	10	2	\$200.00	\$5,440.00
S1	Stationery	\$10.00	1	45	2	\$900.00	\$24,480.00
Sub total						\$21,180.00	\$576,096.00

Justification:

Anthrax diseases is known to be shared problem among sectors, the collaboration remains very weak. In this regard, the understanding and practice of joint surveillance for anthrax and other zoonotic diseases in Ethiopia has been lagging behind. Thus, sensitization and awareness creation is very critical. Training for decision makers in public health and animal health from across all regions, and also, animal and human health professionals in the ground will strengthen collaborative efforts against emerging health threats. An estimated 45-45 health and veterinary professionals selected from each region will be trained on joint anthrax surveillance system. This help will be used to cover the cost for the planned training.

1.4. Conduct a regular review meeting, workshops with stakeholders

Strategy	Items	Cost Per Day (USD)	Average # of Days Per write shop	Average # of Participants Per write shop	Total Rounds	Total Costs USD	Total Costs (local Currency)
S1	Venue	\$100.00	2	1	4	\$800.00	\$21,760.00
S1	Venue Package/Tea Break	\$8.00	2	15	4	\$960.00	\$26,112.00
S1	Facilitators Fee	\$20.00	4	5	4	\$1,600.00	\$43,520.00
S1	Participants Travel/ Transportation (Average)	\$130.00	1	10	4	\$5,200.00	\$141,440.00
S1	Participants and Trainers Per Diem	\$20.00	4	15	4	\$4,800.00	\$130,560.00
S1	Training Materials (Average)	\$10.00	1	10	4	\$400.00	\$10,880.00
S1	Stationery	\$10.00	1	10	4	\$400.00	\$10,880.00
Sub total						\$14,160.00	\$385,152.00

Justification:

This budget will be used to cover the costs for conducting a regular review meeting, workshops with stakeholders. The meeting will be held on a regular basis (every quarter) which will further strengthen inter-sectoral communication and information sharing regarding surveillance findings and other related activities.

Strategy 2: Strengthening Outbreak investigation and response System

Outcome 2.1: Strengthened the outbreak investigation and response system through development of joint preparedness plans and activities

2.1.1. Develop a national guideline and SOPs for outbreak investigation and response (write shop)

Strategy	Items	Cost Per Day (USD)	Average # of Days Per write shop	Average # of Participants Per write shop	Total Rounds of Training	Total Costs USD	Total Costs (local Currency)
S2	Venue	\$100.00	2	1	2	\$400.00	\$10,880.00
S2	Venue Package/Tea Break	\$8.00	2	15	2	\$480.00	\$13,056.00
S2	Facilitators Fee	\$20.00	4	5	2	\$800.00	\$21,760.00
S2	Participants Travel/ Transportation (Average)	\$130.00	1	10	2	\$2,600.00	\$70,720.00
S2	Participants and Trainers Per Diem	\$20.00	4	15	2	\$2,400.00	\$65,280.00
S2	Training Materials (Average)	\$10.00	1	10	2	\$200.00	\$5,440.00
S2	Stationery	\$10.00	1	10	2	\$200.00	\$5,440.00
Sub total						\$7,080.00	\$192,576.00

2.1.2. Prepare outbreak preparedness plan and ensure availability of necessary supplies

Strategy	Items	Cost Per Day (USD)	Average # of Days Per write shop	Average # of Participants Per write shop	Total Rounds	Total Costs USD	Total Costs (local Currency)
S2	Venue	\$100.00	2	1	2	\$400.00	\$10,880.00
S2	Venue Package/Tea Break	\$8.00	2	15	2	\$480.00	\$13,056.00
S2	Facilitators Fee	\$20.00	4	5	2	\$800.00	\$21,760.00
S2	Participants Travel/ Transportation (Average)	\$130.00	1	10	2	\$2,600.00	\$70,720.00
S2	Participants and Trainers Per Diem	\$20.00	4	15	2	\$2,400.00	\$65,280.00
S2	Training Materials (Average)	\$10.00	1	10	2	\$200.00	\$5,440.00
S2	Stationery	\$10.00	1	10	2	\$200.00	\$5,440.00
Sub total						\$7,080.00	\$192,576.00

Justification:

Absence of a standard guideline, preparedness plan and SOP for effective outbreak investigation and response faces a great challenge for Ethiopia in outbreak management activities. This budget will help ministries (MOH and MoLF) to develop a separate Outbreak investigation guideline, outbreak preparedness plan and SOP for anthrax. The guideline will be prepared by staffs of the ministries or the TWG in a write shop. The guideline will provide appropriate guidance on the steps and procedures of anthrax outbreak investigation and response for the RRT members and other professionals that might facilitate early control of the spread of the disease and further reduce associated public health impacts.

2.1.3. Conduct simulation exercises; training

Strategy	Items	Cost Per Day (USD)	Average # of Days Per training	Average # of Participants Per training	Total Rounds of Training	Total Costs USD	Total Costs (local Currency)
S2	Venue	\$100.00	2	1	2	\$400.00	\$10,880.00
S2	Venue Package/Tea Break	\$8.00	2	40	2	\$1,280.00	\$34,816.00
S2	Facilitators Fee	\$20.00	4	5	2	\$800.00	\$21,760.00
S2	Participants Travel/ Transportation (Average)	\$130.00	1	40	2	\$10,400.00	\$282,880.00
S2	Participants and Trainers Per Diem	\$20.00	4	45	2	\$7,200.00	\$195,840.00
S2	Training Materials (Average)	\$10.00	1	10	2	\$200.00	\$5,440.00
S2	Stationery	\$10.00	1	45	2	\$900.00	\$24,480.00
Sub total						\$21,180.00	\$576,096.00

Justification:

Limited knowledge and skill on outbreak investigation and response activities (joint outbreak investigation and response) with regard to anthrax in humans and animals has been the challenge for proper implementation of outbreak management activities. This budget will help to provide a simulation exercise and training of veterinary and human health rapid response teams selected from each region. The training is aiming to improve the knowledge and skill of the staffs/team members on proper management of anthrax outbreak in animals and humans.

Strategy 3: Enhancing Prevention and Control of Anthrax

Outcome 3.1: Improved vaccine production, distribution, storage/handling and administration system that meets the demand at national and regional level

3.1.5a. Prepare a draft Vaccination plan (Write shop)

Strategy	Items	Cost Per Day (USD)	Average # of Days Per write shop	Average # of Participants Per write shop	Total Rounds	Total Costs USD	Total Costs (local Currency)
S3	Venue	\$100.00	2	1	2	\$400.00	\$10,880.00
S3	Venue Package/Tea Break	\$8.00	2	15	2	\$480.00	\$13,056.00
S3	Facilitators Fee	\$20.00	4	5	2	\$800.00	\$21,760.00
S3	Participants Travel/ Transportation (Average)	\$130.00	1	10	2	\$2,600.00	\$70,720.00
S3	Participants and Trainers Per Diem	\$20.00	4	15	2	\$2,400.00	\$65,280.00
S3	Training Materials (Average)	\$10.00	1	10	2	\$200.00	\$5,440.00
S3	Stationery	\$10.00	1	10	2	\$200.00	\$5,440.00
Sub total						\$7,080.00	\$192,576.00

Justification:

Absence of standardize anthrax vaccination plan addressing the seasonality, demand and all geographic area with respect to the appropriate time had an impact on the effectiveness of animal vaccination. This challenge might be addressed through development of a standardize vaccination plan based on the assessment findings. This budget will be used to develop a national animal's vaccination plan for anthrax. The vaccination plan will incorporate detailed instructions to deal with overall animal vaccination activities in the involvement of different sectors including ministry livestock and fisheries and partners.

3.1.6. Provide Training to animal health professionals and technicians on vaccine management

Strategy	Items	Cost Per Day (USD)	Average # of Days Per training	Average # of Participants Per training	Total Rounds of Training	Total Costs USD	Total Costs (local Currency)
S3	Venue	\$100.00	2	1	4	\$800.00	\$21,760.00
S3	Venue Package/Tea Break	\$8.00	2	40	4	\$2,560.00	\$69,632.00
S3	Facilitators Fee	\$20.00	4	5	4	\$1,600.00	\$43,520.00
S3	Participants Travel/ Transportation (Average)	\$130.00	1	40	4	\$20,800.00	\$565,760.00
S3	Participants and Trainers Per Diem	\$20.00	4	45	4	\$14,400.00	\$391,680.00
S3	Training Materials (Average)	\$10.00	1	10	4	\$400.00	\$10,880.00
S3	Stationery	\$10.00	1	45	4	\$1,800.00	\$48,960.00
Sub total						\$42,360.00	\$1,152,192.00

Justification:

Limited knowledge and skill on vaccine management has been the challenge for proper implementation anthrax vaccination activities including planning, distributing, handling and administration of the anthrax vaccine. This budget will help to provide training for veterinary professionals selected from each region. The training is aiming to improve the knowledge and skill of the staffs on proper and effective management of vaccination campaign.

Outcome 3.2: Improved the environmental sanitation practice nationwide

3.2.3. Conduct training on best environmental sanitary practices							
Strategy	Items	Cost Per Day (USD)	Average # of Days Per training	Average # of Participants Per training	Total Rounds of Training	Total Costs USD	Total Costs (local Currency)
S3	Venue	\$100.00	2	1	2	\$400.00	\$10,880.00
S3	Venue Package/Tea Break	\$8.00	2	40	2	\$1,280.00	\$34,816.00
S3	Facilitators Fee	\$20.00	4	5	2	\$800.00	\$21,760.00
S3	Participants Travel/ Transportation (Average)	\$130.00	1	40	2	\$10,400.00	\$282,880.00
S3	Participants and Trainers Per Diem	\$20.00	4	45	2	\$7,200.00	\$195,840.00
S3	Training Materials (Average)	\$10.00	1	10	2	\$200.00	\$5,440.00
S3	Stationery	\$10.00	1	45	2	\$900.00	\$24,480.00
Sub total						\$21,180.00	\$576,096.00

Justification:

The best prevention and control measures of anthrax includes proper disposal of dead animal body/carcass and environmental sanitation practices. Limited knowledge and environmental sanitation practice has been one of the challenge that hinders the prevention measures. The allocated budget will help to provide the best environmental sanitation practices to the environmental health professionals selected from all regions. The training will be held in two rounds and an estimated 80 individuals will be participated. This will improve the knowledge of the health professionals on environmental sanitation methods and practices.

Strategy 4: Improving Anthrax Diagnostic Laboratory Capacity

Outcome 4.1: Improved anthrax testing capacity of the national and selected regional laboratories

4.1.3: Organize trainings on anthrax laboratory testing procedures							
Strategy	Items	Cost Per Day (USD)	Average # of Days Per training	Average # of Participants Per training	Total Rounds of Training	Total Costs USD	Total Costs (local Currency)
S4	Venue	\$100.00	2	1	2	\$400.00	\$10,880.00
S4	Venue Package/ Tea Break	\$8.00	2	40	2	\$1,280.00	\$34,816.00
S4	Facilitators Fee	\$20.00	4	5	2	\$800.00	\$21,760.00
S4	Participants Travel/ Transportation (Average)	\$130.00	1	40	2	\$10,400.00	\$282,880.00
S4	Participants and Trainers Per Diem	\$20.00	4	45	2	\$7,200.00	\$195,840.00
S4	Training Materials (Average)	\$10.00	1	10	2	\$200.00	\$5,440.00
S4	Stationery	\$10.00	1	45	2	\$900.00	\$24,480.00
Sub total						\$21,180.00	\$576,096.00

Justification:

Laboratory based surveillance and outbreak investigation has a vital role in early detection and response for anthrax suspected cases in animals and humans. Currently no laboratory confirmation is done for any anthrax suspected cases due to limited laboratory capacity and trained laboratory professionals on anthrax diagnostic tests. This budget will help to provide trainings on anthrax laboratory testing procedures for laboratory professionals selected from all regions which will improve their technical capacity and further strength the surveillance and outbreak investigation activities.

Strategy 5: Enhancing Information, Education and Communication system

Outcome 5.2: Improved health professionals knowledge and skill on IEC system

5.2.2. Develop draft training manuals (workshop)

Strategy	Items	Cost Per Day (USD)	Average # of Days Per write shop	Average # of Participants Per write shop	Total Rounds of write shop	Total Costs USD	Total Costs (local Currency)
S5	Venue	\$100.00	2	1	2	\$400.00	\$10,880.00
S5	Venue Package/Tea Break	\$8.00	2	15	2	\$480.00	\$13,056.00
S5	Facilitators Fee	\$20.00	4	5	2	\$800.00	\$21,760.00
S5	Participants Travel/ Transportation (Average)	\$130.00	1	10	2	\$2,600.00	\$70,720.00
S5	Participants and Trainers Per Diem	\$20.00	4	15	2	\$2,400.00	\$65,280.00
S5	Training Materials (Average)	\$10.00	1	10	2	\$200.00	\$5,440.00
S5	Stationery	\$10.00	1	10	2	\$200.00	\$5,440.00
Sub total						\$7,080.00	\$192,576.00

Justification:

This budget will help to organize a write shop aiming to develop Information, Education and Communication materials/documents. The training manuals will help to improve the health professionals to properly deliver awareness regarding the risks and preventive measures of anthrax to the community and other professionals. The gaps identified on the KABP assessment will be addressed in the manuals and will serve as a national guidance comprising of all the necessary contents and messages regarding anthrax in humans and animals.

5.2.3. Provide training to public, animal and environmental health professionals on IEC system

Strategy	Items	Cost Per Day (USD)	Average # of Days Per Training	Average # of Participants Per Training	Total Rounds of Training	Total Costs USD	Total Costs (local Currency)
S5	Venue	\$100.00	2	1	2	\$400.00	\$10,880.00
S5	Venue Package/Tea Break	\$8.00	2	40	2	\$1,280.00	\$34,816.00
S5	Facilitators Fee	\$20.00	4	5	2	\$800.00	\$21,760.00
S5	Participants Travel/ Transportation (Average)	\$130.00	1	40	2	\$10,400.00	\$282,880.00
S5	Participants and Trainers Per Diem	\$20.00	4	45	2	\$7,200.00	\$195,840.00
S5	Training Materials (Average)	\$10.00	1	10	2	\$200.00	\$5,440.00
S5	Stationery	\$10.00	1	45	2	\$900.00	\$24,480.00
Sub total						\$21,180.00	\$576,096.00

Justification:

Information, education and communication mechanism for delivering of appropriate messages on the risks and preventive measures of anthrax plays a crucial role in improving the awareness of the community. The content of the messages and the method of delivery to the community require special skills and the training will improve the health professionals on effective communication systems. Limited knowledge and skill of the health professionals on the methods of community awareness affects the prevention and control activities of anthrax. The allocated budget will cover the costs for organize the training aiming to improve knowledge and skill of the health professionals on IEC methods. The training will be conducted in two rounds and an estimated 80 individuals will participate on the training

Strategy 6: Strengthening Multi-Sectoral Collaboration

Outcome 6.2: Endorsed/valid national anthrax prevention and control strategic plan

6.2.2.Organize a stakeholders validation workshop of the national anthrax prevention and control strategy							
Strategy	Items	Cost Per Day (USD)	Average # of Days Per workshop	Average # of Participants Per workshop	Total Rounds of workshop	Total Costs USD	Total Costs (local Currency)
S6	Venue	\$100.00	2	1	1	\$200.00	\$5,440.00
S6	Venue Package/Tea Break	\$8.00	2	40	1	\$640.00	\$17,408.00
S6	Facilitators Fee	\$20.00	4	5	1	\$400.00	\$10,880.00
S6	Participants Travel/ Transportation (Average)	\$130.00	1	40	1	\$5,200.00	\$141,440.00
S6	Participants and Facilitators Per Diem	\$20.00	4	45	1	\$3,600.00	\$97,920.00
S6	Stationery	\$10.00	1	45	1	\$450.00	\$12,240.00
Sub total						\$10,490.00	\$285,328.00

Justification:

The national anthrax prevention and control strategic plan developed by the anthrax TWG contains detailed activities that will be implemented in the stipulated timeframe with the vision of significantly reducing and ultimately controlling the public health impact of anthrax in humans and animals in Ethiopia through sustained surveillance, laboratory diagnosis, prevention and control system and community awareness. The allocated budget will help to organize a validation workshop aiming to present the drafted strategic activities and to get approval and buy in from the authorized officials of each ministry for the implementation of proposed activities on the strategic plan.

8. EVALUATION

8.2. Organize an evaluation workshop

Strategy	Items	Cost Per Day (USD)	Average # of Days Per workshop	Average # of Participants Per workshop	Total Rounds of workshop	Total Costs USD	Total Costs (local Currency)
S8	Venue	\$100.00	2	1	1	\$200.00	\$5,440.00
S8	Venue Package/Tea Break	\$8.00	2	40	1	\$640.00	\$17,408.00
S8	Facilitators Fee	\$20.00	4	5	1	\$400.00	\$10,880.00
S8	Participants Travel/ Transportation (Average)	\$130.00	1	40	1	\$5,200.00	\$141,440.00
S8	Participants and Facilitators Per Diem	\$20.00	4	45	1	\$3,600.00	\$97,920.00
S8	Stationery	\$10.00	1	45	1	\$450.00	\$12,240.00
Sub total						\$10,490.00	\$285,328.00

Justification:

The proposed validation work shop is to evaluate the effectiveness of implemented activities on phase-1 with respect to its objective. During the validation work shop the reports on all implemented activities under phase-1 will be presented and the associated outcomes in preventing and control of anthrax in humans and animals. Furthermore, the outcomes will be evaluated based on the identified indicates. The strengths and weakness on the implementation of phase-1 activities will be identified and further improved for phase-2 activities. An estimated 40 delegates from the relevant sectors will be expected to participate on the two days validation workshop and the allocated budget is to cover the costs to organize a validation workshop.

Equipment's and supplies

Strategy 4: Improving Anthrax Diagnostic Laboratory Capacity

Outcome 4.1: Improved anthrax testing capacity of the national and selected regional laboratories

4.1.3. Procurement of necessary laboratory supplies and equipment

Strategy	Item Requested	Unit	Quantity	Unit price (USD)	Total cost (USD)	Total Costs (local Currency)
S4	Thermocycler	Pcs	10	10000	\$100,000.00	\$2,720,000.00
S4	Gel electrophoresis apparatus	Pcs	10	10000	\$100,000.00	\$2,720,000.00
S4	Microfuge	Pcs	10	2500	\$25,000.00	\$680,000.00
S4	UV trans illuminator and Polaroid camera	Pcs	10	2500	\$25,000.00	\$680,000.00
S4	Micropipettes with volume range of 1-10 µl	Pcs	10	300	\$3,000.00	\$81,600.00
S4	Micropipettes with volume range of 5-20 µl	Pcs	10	300	\$3,000.00	\$81,600.00
S4	Micropipettes with volume range of 20-100 µl	Pcs	10	300	\$3,000.00	\$81,600.00
S4	Clean Class II hoods	Pcs	10	15000	\$150,000.00	\$4,080,000.00
S4	vortex mixer	Pcs	10	1000	\$10,000.00	\$272,000.00
S4	Shaker Incubator	Pcs	10	4000	\$40,000.00	\$1,088,000.00
S4	Centrifuge	Pcs	10	8000	\$80,000.00	\$2,176,000.00
S4	Class II cabinet	Pcs	10	15000	\$150,000.00	\$4,080,000.00
S4	Microscope	Pcs	10	5000	\$50,000.00	\$1,360,000.00
S4	Autoclave	Pcs	10	10000	\$100,000.00	\$2,720,000.00
S4	Incubator	Pcs	10	3000	\$30,000.00	\$816,000.00
S4	Waterbath	Pcs	10	1000	\$10,000.00	\$272,000.00

S4	Bunsen burner	Pcs	10	30	\$300.00	\$8,160.00
S4	Permanent Masks	Pcs	10	25	\$250.00	\$6,800.00
S4	Epindorf tube pack of 100	Pack	10	20	\$200.00	\$5,440.00
S4	Disposable face masks pack of 100	Pack	10	10	\$100.00	\$2,720.00
S4	Blood agar base medium, 500gram	Bottle	10	150	\$1,500.00	\$40,800.00
S4	Nutrient Agar , 500gram	Bottle	10	100	\$1,000.00	\$27,200.00
S4	Nutrient broth 500gram	Bottle	10	100	\$1,000.00	\$27,200.00
S4	PLET agar (polymyxin, lysozyme, EDTA [ethylene diamine tetra-acetic acid], thallos acetate)	Bottle, 500gram	10	200	\$2,000.00	\$54,400.00
S4	Penicillin antimicrobial discs (One pack contains 5 cartage each having 50 antimicrobial discs and each disc has 10 units concentration)	Pack /5 Cartage/	10	100	\$1,000.00	\$27,200.00
S4	0.5% McFarland turbidity standard solution	Vial of 5-7ml	100	10	\$1,000.00	\$27,200.00
S4	Mueller Hinton agar, 500gram	Bottle	20	150	\$3,000.00	\$81,600.00
S4	MacConkey Agar	bottle	20	150	\$3,000.00	\$81,600.00
S4	Brain Heart infusion broth	bottle	20	150	\$3,000.00	\$81,600.00
S4	Ready made Polychrome methylene blue stain(MacFadyean's stain)	Bottle of 500ml	20	100	\$2,000.00	\$54,400.00
S4	Ready made Giemsa stain reagent	Vial of 500ml	20	100	\$2,000.00	\$54,400.00
S4	Sodium bicarbonate, 100gram	Bottle	20	50	\$1,000.00	\$27,200.00
S4	Catalase reagent /3% hydrogen peroxide solution/	liter	20	30	\$600.00	\$16,320.00
S4	Nutrient gelatin	bottle	20	100	\$2,000.00	\$54,400.00
S4	Egg yolk agar	bottle	20	100	\$2,000.00	\$54,400.00
S4	Motility medium with tetrazolium salt	bottle	20	100	\$2,000.00	\$54,400.00
S4	Sterile swab, pack of 100	pack	20	80	\$1,600.00	\$43,520.00
S4	Peridish pack of 10	pack	5000	15	\$75,000.00	\$2,040,000.00
S4	Labeling markers pack of 10	pack	150	4	\$600.00	\$16,320.00
S4	Syringe and needles 24-26 gauge pack of 100	pack	1000	10	\$10,000.00	\$272,000.00
S4	Vacutainer needles pack of 100	pack	1000	10	\$10,000.00	\$272,000.00
S4	Vacutainer tubes pack of 100	pack	1000	10	\$10,000.00	\$272,000.00
S4	Test tubes/ bottle screw caps pack of 10	pack	1000	15	\$15,000.00	\$408,000.00
S4	Microscope slides pack of 100	pack	1000	5	\$5,000.00	\$136,000.00
S4	Slide cover slips pack of 100	Pack	1000	3	\$3,000.00	\$81,600.00
S4	immersion oil	Bottle	1000	5	\$5,000.00	\$136,000.00
S4	lens paper pack of 100	Pack	1000	3	\$3,000.00	\$81,600.00
S4	Pasteur pipettes, preferably plastic disposable pack of 100	Pack	1000	15	\$15,000.00	\$408,000.00
S4	Autoclavable discard bags pack of 100	Pack	100	15	\$1,500.00	\$40,800.00
S4	Disinfectant spray "gun"	Bottle	100	4	\$400.00	\$10,880.00
S4	Inoculation loops pack of 10	Pack	160	3	\$480.00	\$13,056.00
S4	Sodium hypochlorite (10,000 ppm) bottle of 1 litre	Bottle	50	100	\$5,000.00	\$136,000.00
S4	Gamma phage of <i>Bacillus anthracis</i> (or cherry phage)	Vial	40	100	\$4,000.00	\$108,800.00
S4	Filter membrane of 0.45 µm pore size pack of 100	Pack	100	100	\$10,000.00	\$272,000.00
S4	Sterne vaccine strain of <i>B. anthracis</i> (34F2)	vial	200	100	\$20,000.00	\$544,000.00
S4	Primers	Vial	1000	100	\$100,000.00	\$2,720,000.00
S4	Nucleotides(dNTPs)	Vial	1000	100	\$100,000.00	\$2,720,000.00

S4	Taq polymerase enzyme	Vial	1000	100	\$100,000.00	\$2,720,000.00
S4	Agarose powder	Bottle	1000	100	\$100,000.00	\$2,720,000.00
S4	PCR grade water	Bottle	1000	100	\$100,000.00	\$2,720,000.00
S4	Positive Control DNA	Vial	1000	100	\$100,000.00	\$2,720,000.00
S4	1kb DNA ladder		1000	100	\$100,000.00	\$2,720,000.00
S4	Microcentrifuge tube racks	Pcs	1000	50	\$50,000.00	\$1,360,000.00
S4	2.0ml microcentrifuge tubes with O-ring pack of 500	Pack	1000	50	\$50,000.00	\$1,360,000.00
S4	1.5ml Microcentrifuge tubes Pack of 500	pack	1000	25	\$25,000.00	\$680,000.00
Total					\$1,927,530.00	\$52,428,816.00

Justification: Currently in our country the national and regional laboratories do not confirm any anthrax suspected cases this is mainly due to limited laboratory capacity and trained laboratory professionals on anthrax diagnostic tests. Hence, these laboratory consumables will be used by the twob211 National referral laboratories, that is bacteriology laboratories at Ethiopian Public Health Institute (EPHI) and National Animal Health Diagnostic and Investigation Center (NAHDIC) for confirming anthrax suspected disease outbreaks both in human and animals. The consumables will be used to collect sample from anthrax suspected case from all over the country and then the collected samples will be cultured and identified at laboratory using biochemical tests and gamma phages. Field level testing of smear samples will also be made using MacFadyean's stain from animal blood smear. Moreover, direct detection of the antigen using PCR techniques will also be carried both from human and animal samples. After establishing and strengthening the national laboratories capacity in diagnosing anthrax, then the experience will be shared for regional laboratories.

List of hospital and regional public health laboratories

Ser. No	Region	Laboratory Assessed	Level of laboratory
	AA	EPHI Bacteriology Lab	National Reference Laboratory
	AA	EPHI Virology Lab	National Reference Laboratory
	Amhara	Bahirdar Regional Lab	Regional Laboratory
	Amhara	Dessie Regional Lab	Regional Laboratory
	Oromia	Nekemt Regional Lab	Regional Laboratory
	Oromia	Adama Regional Lab	Regional Laboratory
	Harar	Harar Regional Lab	Regional Laboratory
	Afar	Afar Regional Lab	Regional Laboratory
	Diredawa	Diredawa Regional Lab	Regional Laboratory
	AA	Aa Regional Lab	Regional Laboratory
	Tigray	Mekele Regional Lab.	Regional Laboratory
	Somali	Somali Regional Lab	Regional Laboratory
	SNNPR	Hawasa Regional Lab	Regional Laboratory
	SNNPR	Mizan Sub- Regional Lab	Sub -Regional Laboratory
	SNNPR	Jinka Sub- Regional Lab	Sub- Regional Laboratory
	SNNPR	Arbaminch Sub- Regional	Sub- Regional Laboratory
	Amhara	Gondar University Teaching Hospital	Hospital Laboratory
	Benishngul-Gumuz	Asossa Hospital	Hospital Laboratory
	Gambella	Gambela Referral Hospital	Hospital Laboratory
	Oromia	Jimma Specialized Hospital	Hospital Laboratory
	SNNPR	Arbaminch General Hospital	Hospital Laboratory
	Tigray	Humera Hospitals	Hospital Laboratory
	SNNPR	Hawasa Unive Teaching Hospital	Hospital Laboratory

Ser. No	Region	Laboratory Assessed	Level of laboratory
	SNNPR	Jinka Zonal Hospital	Hospital Laboratory
	SNNPR	Wolayta Sodo University Teaching Hospital	Hospital Laboratory
	Oromia	Shasheme Referral Hospital	Hospital Laboratory
	Addis Ababa	Yekatit 12 Hospital	Hospital Laboratory
	Somali	Karamara Hospital	Hospital Laboratory
	Oromia	Ambo Hospital	Hospital Laboratory
	Addis Ababa	Alert Hospital	Hospital Laboratory
	Addis Ababa	Armed Force Hospital	Hospital Laboratory
	Tigray	Axum Zonal Hospital	Hospital Laboratory
	Tigray	Haider Referral Hospital	Hospital Laboratory
	Amhara	Tefera Hailu Hospital	Hospital Laboratory
	SNNPR	Mezanaman Hospital	Hospital Laboratory
	Afar	Dubti Hospital	Hospital Laboratory
	Amhara	Debremarkose Hospital	Hospital Laboratory
	Oromia	Metukarl Hospital	Hospital Laboratory
	SNNPR	Mezanaman Hospital	Hospital Laboratory
	Addis Ababa	Black Lion Hospital	Hospital Laboratory
	Addis Ababa	Armauer Hanssen Research Institute	Research Laboratory

List of animal health regional laboratories

s/ no	Name of National and Regional Veterinary Lab	Regional states	Location	Major activities
1	National Animal Health Diagnostic and Investigation Center (NAHDIC)	MOLF	Sebeta	Diagnosis, outbreak investigation, export testing, research, surveillance and capacity building
2	National Veterinary Institute (NVI)	MOLF	Debre Zeit	Diagnosis, research and vaccine production and capacity building
3	Mekele Regional veterinary Laboratory	Tigray	Mekele	Diagnosis, outbreak investigation and surveillance
4	Kombolcha Regional Veterinary Laboratory	Amhara	Kombolcha	Diagnosis, outbreak investigation and surveillance
5	Bahir Dar Regional Veterinary Laboratory	Amhara	Bair dar	Diagnosis, outbreak investigation and surveillance
6	Semera Regional Veterinary Laboratory	Afar	Semera	Diagnosis, outbreak investigation and surveillance
7	Shola veterinary Laboratory	Addis Ababa	Addis Ababa	Diagnosis, outbreak investigation and surveillance
8	Assosa Regional Veterinary Laboratory	Benshangul gumz	Asosa	Diagnosis, outbreak investigation and surveillance
9	Bedelle Regional Veterinary Laboratory	Oromia	Bedelle	Diagnosis, outbreak investigation and surveillance
10	Asela Regional Veterinary Laboratory	Oromia	Arsi	Diagnosis, outbreak investigation and surveillance
11	Hirna Regional Veterinary Laboratory	Oromia	Hirna	Diagnosis, outbreak investigation and surveillance
12	Yabello Regional Veterinary Laboratory	Oromia	Yabello	Diagnosis, outbreak investigation and surveillance
13	Sodo Regional Veterinary Laboratory	SNNPRS	Wolayita Sodo	Diagnosis, outbreak investigation and surveillance
14	Mizan Regional Veterinary Laboratory	SNNPRS	Mizan aman	Diagnosis, outbreak investigation and surveillance
15	Jinka Regional Veterinary Laboratory	SNNPRS	Jinka	Diagnosis, outbreak investigation and surveillance
16	Jijjiga Regional Veterinary Laboratory	Ethiopian Somali	Jijjiga	Diagnosis, outbreak investigation and surveillance
17	Dire Dawa Regional Veterinary Laboratory	Dire Dawa	Dire Dawa	Diagnosis, outbreak investigation and surveillance

