

**Ministry of Agriculture and Rural Development
Department of Animal Health**

Foot and Mouth Disease Control Plan

**Addis Ababa
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Executive Summary

Foot and Mouth Disease is considered by many as the most important livestock disease in the world. The devastating economic and trade impacts inflicted by the disease in many countries has increased their awareness. Importing countries are imposing stringent animal health measures than ever been before. Different countries have tried to combat the problem and secure their international market access by applying different control measures ranging from establishment of disease free zones to mass vaccination of cattle.

FMD is endemic and known for its wider distribution in Ethiopia, although its level of prevalence may have significant variations across the different farming systems and agro-ecological zones of the country.

An estimate of the prevalence of infection in local cattle may be provided by the 15-20% sero-positive results of the pre-export testing made on live cattle originated from southern Ethiopia. Over the past ten years types O, A, C and SAT2 have been identified in Ethiopia of which types O and A are more prevalent and are the major causes of economic and trade losses.

In Ethiopia, where the local economy is heavily dependent on livestock, losses incurred due to FMD in reduced production and efficiency of livestock may be severe and local food security impaired. The impact of the disease in affecting our export trade has been witnessed by import bans imposed by different countries at different times.

At present, FMD is considered as one of the most important livestock diseases demanding urgent control intervention that should result in minimizing the impact of FMD to the level that won't be a major cause of international trade barrier.

The complex nature of the disease, its wider distribution across the country and absence of sufficient amount of FMD vaccine within Ethiopia demanded that

control strategies be implemented progressively on a short (for about 5 years) and medium to long-term basis.

A. Short term

Absolute country or zone freedom from FMD is difficult to achieve in Ethiopia in the short term, thus export zones and production of disease free animals is proposed as the alternative for promoting safer trade in livestock and livestock products.

The concept involves quarantine, inspection, testing, vaccination and certifying of animals, as appropriate, at different times and in different places, as they moved from their origin to export abattoirs and their port of embarkation. Compartmentalization of the animals destined for export at an early stage in pre-quarantine holding areas and an appropriate mitigation of the risk of transmission of diseases through the commodities (livestock or meat) destined for export are the major features of the system.

B. Medium to long-term

The medium to long term strategy envisages strengthening of the veterinary services for compliance with provisions on evaluation of veterinary services, production of FMD vaccine in sufficient quantity and quality, establishment of disease (FMD) free zone (s) at identified locations and conducting mass vaccination programs in other parts of the country.

In the short term it is suggested that emphasis be given to address animal health issues related to:

- Disease surveillance and diagnosis,
- Disease control and
- Policy and SPS measures

1. Surveillance and diagnosis

- It is proposed that all FMD outbreaks be investigated, disease reporting system strengthened, export animals testing performance facilitated and national survey to establish the current status and distribution of the disease be conducted.
- In managing the diagnostic service the NAHRC laboratory will be a national mandated institution to coordinate all activities.
- Some selected regional laboratories will also be trained and equipped to assist export testing of animals.

2. Disease control

Measures such as disease free zone establishment and mass vaccination of the national cattle herds may have important contributions to minimize the impact of the disease. However, these measures will require huge financial and logistic resources that their consideration should be viewed from long term perspective.

The control of the disease in pastoral areas alone through vaccination will require importation about 12 million doses of vaccine at a cost of **60,000,000 Birr** per year. From this it is understood that large scale control should be left till the national capacity for producing sufficient vaccines is built.

Therefore, the short term FMD vaccination program that will be conducted in the coming five years *will give emphasis to the* control of all outbreaks occurring in the country through ring vaccination and vaccination of all export cattle before entering the quarantine stations. To protect export animals from contracting the disease while being kept in quarantine sites cattle found within 10km radius of these sites will be vaccinated. All dairy animals will also be vaccinated.

This will require importation of about 1,340,000 doses of vaccine at a cost of **6,700,000 Birr per year**

Development of the national capacity for the production of FMD vaccine is considered. The total cost required for building this national capacity in the coming five years is estimated to be **215,436,000 Birr (207,000,000 for capital investment and technology shopping and 8,436,000 for developing bulk reconstitution facilities)**,

Among the measures required to strengthen the quarantine and inspection system, establishment of at least one standard live animal quarantine station capable of holding about 20-30,000 cattle and 30 – 50,000 sheep and goats at time in Dire Dawa at a total cost of **about 45,000,000, Birr** is considered.

All export animals need to be identified with permanent identification mechanisms, transported through trucks, should not be contacted with other animals and accompanied by movement permits. Trade stock routes need to be studied and resting sites be identified.

3. Policy and SPS measures

The existing animal health regulations need to be enforced and new regulation such as animal welfare and transport be developed. The national standards for laboratories and quarantine stations need to be developed and cost recovery mechanism for testing of export animals be put in place. Laboratories should go to be accredited by international bodies for their capability in providing quality services.

The federal animal health services need to have the required manpower with appropriate training and facility. Its organizational set up needs to have a minimum of 4 teams. Short term training in areas such as HACCP, Risk assessment, management of disease control programs etc should be given.

The total cost required for executing the different activities in the coming five years is summarized as follows:

Activity	Required finance in Birr	% from total	Remark
Surveillance and diagnosis	19,926,521	6.1%	
			Of which:
			❖ 215,436,000 Birr for vaccine production and reconstitution, and
			❖ 45,000,000 Birr for construction of one quarantine station
Disease control	306,372,405	93.6%	
Policy and SPS	1,110,975	0.3%	
Total	327,409,901	100.0	

I. Introduction

Foot and Mouth Disease (FMD) is considered by many as the most important animal disease in the world. A highly contagious disease, FMD outbreaks incur significant social and economic costs and affected countries are limited in their ability to trade, with subsequent reductions in the value of their meat commodities. As such, FMD surveillance and control is considered a priority by many veterinary authorities around the world.

Depending up on the available financial and logistic resources and epidemiological status of the disease, many countries exercise different prevention and control strategies that were found acceptable to them. Of which establishment of disease free zones (either through vaccination or without vaccination) and implementation of mass vaccination programs in conjunction with other relevant health measures can be worth mentioning.

So far as can be judged, FMD is one of the major endemic trans-boundary diseases in Ethiopia and very little attention is given to its surveillance and control. This can be attributed mainly to the level of importance given to the disease which is reflected by the absence of effective and sufficient amount of vaccine produced within the country.

Given the high level of Government's commitment to enhance the country's livestock and livestock products export market through improved health status and productivity on one hand and increasing concern of the importing countries with regard to FMD and other trans-boundary diseases on the other hand highly necessitates the adoption of a national control program to combat the negative impacts of the disease.

Following the 2 days consultation workshop held in Adama from 5-6 July, 2006, discussing on the possible options of controlling FMD, by taking in to consideration:

- The complex nature of the disease (such as wide range host of domestic and wild animals, rapid and airborne spread over long distance, presence of antigenic variation among sero-types and creation of carrier state among affected animals)
- The huge amount of money required to carryout nation wide control measures and
- The time (4-5 years) required for developing the national capacity to produce sufficient amount of vaccines, it was agreed that *the control intervention measures should be designed from a short and long term perspectives and implemented on progressive basis.*

A technical task force composed of members drawn from relevant stakeholders has taken the first initiative to discuss on the possible control measures that need to be addressed in the short term and prepared this draft document outlining the major areas of intervention, their cost estimates and activity plans.

The objective of this document is therefore to indicate the animal health measures that need to be taken in the coming 5 years so as to ensure the continuation of the livestock and livestock products export with particular emphasis to the pastoral areas and building the national capacity in producing sufficient FMD vaccines that will enable more effective subsequent measure be taken throughout the country.

II. FMD situation in Ethiopia

2.1 Disease status

FMD is endemic and known for its wider distribution in Ethiopia, although its level of prevalence may have significant variations across the different farming systems and agro-ecological zones of the country. The disease is widely prevalent and used to occur frequently in the pastoral herds of the country. Extensive movement of livestock, the high rate of contact among animals at commercial markets, in communal grazing areas and at watering points are undoubtedly the main causes of FMD spread in Ethiopia.

The number of outbreaks reported annually varies between 12 in 1997 and 198 in 1999. However, considering the reporting rate (35%), the figures provided are definitely underestimated and do not reflect the reality of the epidemiological situation in the country.

An estimate of the prevalence of infection in local cattle may be provided by the results of the pre-export testing made on live animals destined for Egyptian market. 15-20% of these local cattle originated from southern Ethiopia (mainly from Borana zone) have showed a positive result to ELISA NSP test indicating that the animals have been infected by FMD virus and for this reason rejected from export.

Despite the widespread occurrence of the disease, clinical and serological studies to characterize the disease have never been exhaustive. Although most of the reported FMD outbreaks remain un-typed, over the past ten years types O, A, C and SAT2 have been identified. Available data indicates that types O and A are more prevalent and are the major causes of economic losses.

2.2 Economic impact of the disease

The most direct economic impact of FMD is the loss or reduced efficiency of production, which reduces farmers' incomes. In Ethiopia, where the local economy is heavily dependent on livestock, the burden may be severe and local food security impaired.

The impact of reduced productivity of animals can be a long -lasting and diseases can have lasting effects on livestock output in a number of "hidden" ways (such as delays in reproduction leading to fewer offspring and the consequences of a reduced population) which often exceed the losses associated with clearly visible illness.

At the local level, FMD reduces farmers' income and food availability for consumption. At the national level, FMD slows economic growth by severely limiting trade opportunities.

Heavy losses occur in small scale mixed farming system when outbreaks affect draft oxen during the planting season. It causes considerable losses of milk yield and weight gain among dairy and fattening stock. Its role in contributing to the suffering and death of livestock particularly when affected at periods of drought (by limiting their access to feed and water) or at early ages is believed to be significant.

The impact of the disease in affecting our export trade has been witnessed by import bans imposed by different countries at different times. Following the 2001 outbreak of FMD in the United Kingdom, Saudi Arabia and Indonesia had imposed trade bans of our export meat and pickled sheep and goatskin respectively. The 2006 FMD outbreak detected in Egypt also became the major cause of live cattle import ban to the Egyptian markets.

III. Justification

The disease is widely prevalent in the country and its impact on the economy and export trade is significant. The growing international concern on the importance of FMD has led animal health requirements set by importing countries getting more and more stringent from time to time.

The exercises of different health measures to control FMD by different importing and exporting countries show that we can not maintain the existing markets and access to new ones unless the health standards of our livestock and livestock products with regard to diseases such as FMD is found acceptable to our customers.

On the other hand, millions of pastoralists who entirely rely on the well-being and marketability of their animals need to be protected as much as possible from facing severe economic losses to be caused by export trade bans as witnessed from 1998-1999 because of Rift Valley Fever Disease. Moreover, the growing private sector who is investing on the livestock and meat industry will not get confidence unless animal health measures that are comparable to other exporting countries that are competing with us in the international markets are put in place.

It is therefore high time to give sufficient consideration to high priority diseases such as FMD and start taking effective actions that can protect the national livestock economy from losing access to international markets and minimize its impact in impairing local food security as a result of production and draft power losses.

2.1 Objectives

2.1.1 General

Maintain and enhance the country's livestock export performance by minimizing the impact of FMD to the level that won't be a major cause of international trade barrier.

2.1.2 Specific

A. Short term

Produce FMD free animals that can be accepted by traditional importing countries by giving emphasis for livestock export potential (pastoral) areas

B. Medium to long term

Control FMD in pastoral and other potential livestock areas through mass vaccination, establishment of disease free zones and combination of other measures so as to maintain the current export markets and have possible access to other new markets.

2.2 Scope and duration

- This program is designed to address FMD as a national issues with more emphasis to the pastoral and export animals.
- The program last for five years.

IV. FMD control strategy

A- Short term

Absolute country or zone freedom from FMD is difficult to achieve in Ethiopia in the short term, thus export zones and production of disease free animals is proposed as the alternative for promoting safer trade in livestock and livestock products.

The concept involves quarantine, inspection, testing, vaccination and certifying of animals, as appropriate, at different times and in different places, as they moved from their origin to export abattoirs and their port of embarkation. Animals would be individually identified to ensure integrity of the process and enable removal of animals that failed testing or inspection. Compartmentalization of the animals destined for export at an early stage in pre-quarantine holding areas and an appropriate mitigation of the risk of transmission of diseases through the commodities (livestock or meat) destined for export are the major features of the system. The totality of risk reduction measures applied within the system would reduce the risk of exporting the dangerous pathogens potentially present to a low or negligible level.

Some of the requirements for effective implementation of the system include:

- Pre-quarantine holding areas where treatments / vaccinations is done. All in all out system to prevent spread of infectious disease through to next compartment;
- Improve livestock identification system and identify export animals by ear tag in holding areas or at areas of purchase;
- Strengthen and develop export quarantine and holding areas demarcated by appropriate barriers in adequate size and number. Quarantine and holding area registered by veterinary administration and under official veterinary supervision;
- Regular audit of export establishments and procedures by the veterinary administration and improve food safety standards in export abattoirs through

introduction of HACCP procedures;

- Improve inspection methods for trans-boundary animal diseases (TADs) at critical points (markets-holding areas-abattoirs-quarantine);
- Improve the capacity for diagnostic tests for FMD and other TADs as required by importing countries;
- quarantine of animals to follow all in all out principle;
- livestock movements between compartments to be by motorized transport;
- Develop good record keeping and documentation of all activities and interventions in export chain of operations

Moreover, regular passive and active FMD surveillance should be instituted in the source population where the livestock originate, to determine the presence and acquire reliable estimates of prevalence, incidence, distribution and dynamics of the diseases influencing market access. This will enable better understanding of animal disease environment from which they are drawn and assist in the design of appropriate mitigation measures to the satisfaction of importing countries.

Huge investment and commitment, both by the public and private sectors is vital from the start for the success of the proposed strategy. To ensure sustainability, acceptability to all concerned partners, stakeholders' consultation will be carried out at different levels. The objective is to assess the scientific basis and technical feasibility of the system, its economic feasibility to local export operators and acceptability to trading partners.

B- Medium to long term*

The OIE's Terrestrial Animal Health Code is based on the precept that countries need to eradicate TADs within their territories or on a zonal basis and prevent their reintroduction. Once this is achieved, trade between such countries is considered to present low risk. In the short term, freedom from FMD is difficult to achieve in Ethiopia for a variety of resource, technical and operational constraints which require finance exceeding its resources. Therefore, a control phase leading

to the creation of zones of assured FMD freedom is proposed as a medium to long term strategy.

The medium to long term strategy envisages strengthening of the veterinary services for compliance with provisions on evaluation of veterinary services, production of FMD vaccine** in sufficient quantity and quality, and other technical necessities to meet the following requirements for zonal freedom from FMD:

- The zone must be demarcated from the rest of the country by appropriate natural, artificial or legal barriers;
- Livestock inhabiting in the zone must be permanently identified;
- Adequate disease surveillance must be observed within the zone to enable detection of specific diseases;
- Specimens collected from suspected diseased animals must be tested at approved diagnostic laboratories using methods that are specified in the OIE manual;
- There must be adequate livestock movement controls into the zone to prevent introduction of disease;
- The integrity of the zone must be ensured through appropriate legislation;
- Transparency in reporting any changes to the disease situation or integrity of the zone (to be verified through a credible audit system) is necessary.

It is believed that the various activities considered under this action plan in the short term would serve as stepping stone towards the establishment of disease-free zones.

** Detail activity and financial plans for medium to long-term strategies are not indicated*

*** Capacity development activities enabling production of FMD vaccine are considered in the short-term plan*

V. Major Short-Term Areas of Intervention

The short term control measures focus on three major intervention areas namely:

- Diagnosis and surveillance
- Disease Control (including quarantine and inspection)
- Policy and SPS issues

5.1 Diagnosis and surveillance

This area of intervention addresses activities to be conducted by field and laboratory veterinary services so as to generate reliable information to be used in subsequent decision making activities. It also involves delivery of testing services for animals destined for export.

5.1.1 Disease investigation

The aim is to investigate all disease outbreaks so as to contain the disease before spreading to other areas. This comprises activities such as:

- Outbreak reporting – (requires involvement of farmers/pastoralists, community, private practitioners, Woreda and Sub-Woreda professionals)
- Field investigation – to be handled by Woreda staff
- Sample collection and submission- to be handled by regional laboratories
- Diagnosis - to be handled by NAHRC as a nationally mandated institution. It can conduct tests such as *Elisa sero-typing, PCR , VNT and virus isolation in cell culture* by itself and send samples to NVI and
- Phylogenic analysis of viral isolates by World reference laboratories as required.

5.1.2 Serological survey:

The aim is to generate a baseline data on the status of FMD in the country which can be used as a bench mark for future intervention measures. This activity will be conducted at one time throughout the country with the prime objective of having clear pictures on the level of *prevalence, spatial distribution and existing sero- types*. Peasant/pastoral association (PA) will be considered as clusters and

the country will be stratified based on existing farming systems (highland lowland)

The following sub-activities will be conducted.

- **Survey design**; will be handled by the Epidemiology and diseases control team of the DAH
- **Sample collection**: will be handled by regional laboratories
- **Laboratory testing**: will be handled by NAHRC laboratory
- **Analysis, interpretation, communication**: will be handled by epidemiology and diseases control team of the DAH

5.1.3 Export animals testing:

- This activity is conducted to ascertain the health status of export animals and issue international health certificates for animals to be exported live.
- About 200,000 heads of cattle that are estimated to be exported live annually will require 3ABC Elisa FMD testing.
- Assumption is made that FMD testing will not be required for sheep and goats to be exported live.

The major sub-activities include:

- **Sample collection and submission**: to be conducted by quarantine and local Woreda animal health staff after being trained and supervised by laboratory personnel (NVI, NAHRC)
- **Export testing**: will be conducted primarily by NAHRC and NVI but some selected regional laboratories will also be involved.
- **Certification and supervision**: will be handled by the quarantine, inspection and veterinary public health team, DAH.

5.1.4 Surveillance:

There is a need to strengthen the current disease outbreak reporting and response system that is already put in place. For this the following sub-activities need to be conducted.

- **Training of professionals** found in pastoral areas in FMD detection and reporting systems
- Introduce community based disease reporting system
- Enhance feedback delivery mechanism through quarterly bulletin, animal health year book etc
- Introduce non-monetary incentive mechanisms to encourage active participation of Woredas in disease reporting
- Establishment of **free telephone call service**
- Preparation of manuals, brochures etc
- Awareness creation of the general public and all stakeholders through mass media and other mechanisms

5.1.5 Other activities:

- **Cost recovery scheme** needs to be introduced to NAHRC and regional labs to recover costs incurred in testing export animals
- Laboratories need to be **accredited for the quality of services** they provide
- **Standard operational procedures (SOPs)** need to be developed through consultancy services
- Regional labs need to be coordinated by the referral diagnostic laboratory

5. 2 Disease control

Under this heading measures that should be taken to limit the spread of the disease and safeguarding the health status of export animals are considered.

5.2.1 Vaccination:

Mass vaccination of the national cattle would be the best control option together with other health measures such as movement control etc. However, this can not be considered at this point in time where we are not producing sufficient FMD vaccines within the country. Even if we consider vaccinating about 6 million pastoral cattle alone, this would require the importation of 12 million doses of FMD vaccine per year at a cost of about **60,000,000 Birr**. For this reason it

agreed that the immediate FMD control activities through vaccination should be limited to the following areas:

5.2.1.1 Ring vaccination of cattle during outbreaks:

- It is estimated that about 80 FMD outbreaks are reported in the country each year.
- To limit the spread of the disease about 10,000 cattle need to be vaccinated once around each outbreak area. This will require about *800,000 doses of vaccine each year.*

5.2.1.2 Vaccination of export animals:

- *About 200,000 cattle* to be export live per year should be vaccinated once in holding areas before entering quarantine sites

5.2.1.3 Vaccination of dairy farms:

- About 70,000 dairy animals are estimated to be vaccinated twice per year. This will require about *140,000 doses each year.*

5.2.1.4 Vaccination of cattle around quarantine and feed lot areas:

- To prevent the export animals from contracting the disease, about 100,000 cattle found within 10kms radius from quarantine and feed lot sites need to be vaccinated twice each year. This will require about *200,000 doses of vaccines each year.*

This shows that for the coming five years the total amount of FMD vaccine required per year will be **1,340,000 doses**. The vaccine need to incorporate all relevant serotypes mainly **A and O** (SAT2 and C may also be considered based on the first year survey result).

5.2.2 Vaccine supply:

For the short term, two major activities should be conducted side by side:

- Developing the capacity of NVI to produce sufficient vaccines within the coming 4-5 years and
- Importation of vaccines as bulk or finished product from abroad.

5.2.2.1 Developing the capacity of NVI:

To develop the capacity of NVI the following major activities need to be conducted.

- A consultancy service to assess the actual situation and recommend the most practical approach to be followed for developing the national FMD production capacity
- Capital investment for constructing vaccine production and laboratory facilities
- Technology (patent) shopping to get the up-to-date scientific knowledge and facility.

5.2.2.2 Importation of vaccine:

In the short term, NVI is expected to import vaccine either as a:

- Finished product and retail it locally or
- Bulk product and reconstitute in the country.

If bulk product is to be purchased and reconstituted in the country, the following activities need to be considered:

- Negotiation and agreement signing with the collaborative institutions
- Construction of vaccine storage cold rooms
- Purchase and installation of equipment
- Purchase of bulk product
- Staff training

5.2.3 Livestock identification:

The primary aim of livestock identification system is to assist the disease control efforts by effectively regulating unauthorized livestock movements. For its implementation, the following points need to be considered.

- **For the long term**, a consultancy study that indicates possible alternative mechanisms to implement identification systems in the country need to be conducted.

- **For the short term**, all animals to be exported need to be identified by a permanent identification system such as ear tagging.
- The animal health department should take the full responsibility in introducing and managing the identification system.

5.2.4 Movement control:

- Available regulations need to be enforced and awareness created
- All animals destined for export markets need to be accompanied by movement permits to move from holding areas and quarantines to the ports of exit or export abattoirs.

5.2.5 Strengthening quarantine facilities:

- For effective quarantine service delivery, the country needs to have standardized quarantine facilities at different parts of the country. In the short term, consideration has been given to build at least one government owned quarantine station at **Dire Dawa**.
- This quarantine station need to be constructed in such a way that it can accommodate about **20-30,000 cattle and 30-50,000 sheep and goats**, with tens of internal partitions to accommodate different batches of export animals, at a time.
- Apart from these quarantine stations there is a need to establish as many privately owned **holding areas or feed lots** particularly in major livestock sourcing areas as possible
- The Department of Animal Health (DAH) in collaboration with other stakeholders needs to **develop construction and operational standards** for holding areas and feedlots enforce its implementations.
- All commercial feed lots need to be relocated out of towns.
- **Training and experience sharing tours** on the handling and management of quarantine stations need also be given to relevant quarantine and inspection staff.

5.2.6 Trade route identification and livestock transport systems

- To minimize disease transmission, trade animals need to be transported by appropriate transportation vehicles along identified routes.
- They have to be rested at identified sites where by the animals can be provided with feed and water without being contacted with other animals.

The following sub activities need to be conducted:

- New regulations on animal welfare and transport be prepared (also considered under 3.3)
- Trade routes identification study be conducted
- Mechanism enabling the introduction and operation of appropriate transportation system (trucking) from collection sites need to sought.

5.3. Policy and SPS

For effective disease control measures be put in place, consideration needs also be given to matters that should be addressed from policy and SPS perspectives.

For this:

- Existing animal health proclamations and regulations need to be **enforced**.
- Stakeholders and public *awareness creation* activities on the existing proclamations and regulations need to be conducted.
- Draft regulation need to be finalized and presented to the Council of Ministers
- New regulations on animal welfare and transport need to be prepared
- A national system that allows the establishment of direct linkage between Federal and Regional animal health services for controlling trans boundary diseases need to be developed
- The Department of Animal Health needs to be strengthened in terms of manpower (including measures to enhance motivation and retain qualified and experienced staff), facility and organizational structure. In this regard

the would be organizational structure is suggested to have at least 4 teams consisting of:

- Disease control,
 - Quarantine, inspection and veterinary public health.
 - Epidemiology and
 - Laboratory services
- Training on Hazard Analysis and Critical Control Point (HACCP) application techniques need to be given for federal experts and export abattoirs' personnel.
 - The DAH needs to establish a HACCP unit under its quarantine and inspection team that should involve in the preparation of national HACCP standards, train practitioners and monitor their implementation
 - Training need also be given for federal staff in *Risk assessment and GIS*. The DAH also needs to have a risk assessment unit under its epidemiology team.
 - The disease control team should include veterinary extension and communication unit under it.
 - Follow up activities need to be conducted to assure the private abattoirs are developing their capacity for de-boning of export meat.
 - A study (preferably by external consultant) to assess the current animal health services delivery status at national level needs to be conducted and come up with possible intervention measures.

VI. Financial requirement

No	Activity	Unit	Total	Unit cost in Birr	Total cost	Year 1	Year 2	Year 3	Year 4	Year 5	Remark
1	Surveillance and Diagnosis				19926521.0	4627380.8	3832154.8	3863645.8	3796669.8	3796669.8	
1.1	<i>Strengthening disease outbreak reporting system</i>				1424711.0	307535.8	274879.8	282535.8	274879.8	274879.8	
1.2	Disease outbreak investigation (80 outbreaks/year)	out break	400	2512970.0	511325.0	508275.0	497790.0	497790.0	497790.0	497790.0	
1.3	Serological survey				476000.0	476000.0	0.0	0.0	0.0	0.0	
1.5	Other activities										
1.5.1	Cost of installing, calibration and maintenance of laboratory equipment	laboratory	10	5000.0	50000.0	0.0	25000.0	25000.0	0.0	0.0	
1.5.2	Cost of accreditation for quality assurance				0.0	0.0	0.0	0.0	0.0	0.0	Considered in other projects
1.5.3	Developing laboratory standard operation procedures (SOPs), 4 weeks consultancy service, at a cost of 3300 Birr/day plus 18,000 Birr for transport	consultant	1	117000.0	117000.0	117000.0	0.0	0.0	0.0	0.0	Considered in SPS-LMM project

No	Activity	Unit	Total	Unit cost in Birr	Total cost	Year 1	Year 2	Year 3	Year 4	Year 5	Remark
2	Disease Control				306372405.0	71770485.0	58331920.0	38090000.0	12909000.0	909000.0	
2.1	Vaccination				42850000.0	8570000.0	8570000.0	8570000.0	8570000.0	857000.0	
2.1.1	Vaccine purchase (importation) cost, 1,340,000 dose/year	dose	6700000	5.0	33500000.0	6700000.0	6700000.0	6700000.0	6700000.0	670000.0	
2.1.2	Vaccination cost				9350000.0	1870000.0	1870000.0	1870000.0	1870000.0	187000.0	
2.2	Vaccine production and reconstitution				215436000.0	37436000.0	29000000.0	29000000.0	1200000.0	0.0	
2.2.1	Consultant service, 2-3 months	consultant	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Considered in World Bank supported project
2.2.2	Capital investment cost to enable production of about 15 million doses/year				20700000.0	29000000.0	29000000.0	29000000.0	1200000.0	0.0	
2.2.3	Bulk vaccine purchase and reconstitution				8436000.0	8436000.0	0.0	0.0	0.0	0.0	
2.3	Livestock identification				2717000.0	637000.0	520000.0	520000.0	520000.0	520000.0	
2.3.1	Consultancy service, 4 weeks	consultant	1	117000.0	117000.0	117000.0	0.0	0.0	0.0	0.0	Considered in SPS-LMM project

No	Activity	Unit	Total	Unit cost in Birr	Total cost	Year 1	Year 2	Year 3	Year 4	Year 5	Remark
2.3.2	Purchase of permanent identification materials such as ear tags for export animals, 200,000/year	pcs	1000000	2.6	2600000.0	520000.0	520000.0	520000.0	520000.0	520000.0	
2.4	Livestock movement control				241920.0	0.0	241920.0	0.0	0.0	0.0	
2.4.1	Awareness creation workshops in 88 Woredas of pastoral areas, 5 people/Woreda for 1 day				161920.0	0.0	161920.0	0.0	0.0	0.0	
2.4.2	Study on stock routes identification, 2 national consultants (1 vet and 1 production expert), for 2 months	consultant	2	40000.0	80000.0	0.0	80000.0	0.0	0.0	0.0	
2.5	Strengthening quarantine facilities and services delivery				45127485.0	25127485.0	20000000.0	0.0	0.0	0.0	
2.5.1	Construction of 1 quarantine station	Quarantine site	1	4500000.0	4500000.0	25000000.0	20000000.0	0.0	0.0	0.0	
2.5.2	Purchase of vehicles, 1/quarantine	Vehicle	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Considered in SPS-WB
2.5.3	Experience sharing tours in Sudan, 10 persons	person	10	25000.0	0.0	0.0	0.0	0.0	0.0	0.0	to be considered in PACE

No	Activity	Unit	Total	Unit cost in Birr	Total cost	Year 1	Year 2	Year 3	Year 4	Year 5	Remark
											project
2.5.4	Training of 15 professionals on quarantine management and related other issues, for 3 days				10485.0	10485.0	0.0	0.0	0.0	0.0	
2.5.5	Consultancy service on developing quarantine and certification standard operation systems (including movement control), 4 weeks	consultant	1	117000.0	117000.0	117000.0	0.0	0.0	0.0	0.0	
2.5.6	Developing construction and operation standards for feed lots (DAH)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	no cost indicated
2.5.7	Follow up activities to ensure the provision of land for feed lots construction (DAH)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	no cost indicated
					45127485.0	25127485.0	20000000.0	0.0	0.0	0.0	
3	Policy and SPS matters				1110975.0	361500.0	349750.0	276725.0	61500.0	61500.0	
3.1	Enforcing existing regulations				0.0	0.0	0.0	0.0	0.0	0.0	
	Conduct consultation workshop with regional staff on draft regulations, (DAH)	person	30		0.0	0.0	0.0	0.0	0.0	0.0	To be considered in PACE project
3.2	Drafting new regulations				49600.0	0.0	0.0	49600.0	0.0	0.0	2nd year

No	Activity	Unit	Total	Unit cost in Birr	Total cost	Year 1	Year 2	Year 3	Year 4	Year 5	Remark
3.2.2	Preparation of draft regulation on establishment and strengthening linkages of Federal and Regional animal health services in combating TBD and conduct consultation workshop on the draft regulation, 80 participants, for 2 days				49600.0	0.0	0.0	49600.0	0.0	0.0	
3.3	Capacity development of animal health services				944375.0	361500.0	349750.0	110125.0	61500.0	61500.0	
3.3.1	Short term training of federal and regional animal health department staff for 2 weeks, in disease control and management, 30 trainees/year				307500.0	61500.0	61500.0	61500.0	61500.0	61500.0	
3.3.2	Training of 5 trainers (TOTs) in HACCP abroad, for 3 weeks	per son	5	60000.0	300000.0	300000.0	0.0	0.0	0.0	0.0	
3.3.3	In country training of 20 inspection and export abattoirs' personnel for 3 weeks		20	1825.0	36500.0	0.0	36500.0	0.0	0.0	0.0	
3.3.4	Training of 15 federal and regional epidemiology staff on GIS for 2 weeks				48625.0	0.0	0.0	48625.0	0.0	0.0	
3.3.5	Training of 10 federal staff on risk assessment and disease modeling, for 3 weeks				251750.0	0.0	251750.0	0.0	0.0	0.0	
3.4	Other activities				117000.0	0.0	0.0	117000.0	0.0	0.0	

No	Activity	Unit	Total	Unit cost in Birr	Total cost	Year 1	Year 2	Year 3	Year 4	Year 5	Remark
3.4.1	Assessment and follow-up activities on private export abattoirs for developing meat de-boning facilities			0.0	0.0						no cost indicated
3.4.2	National study on status and problems of the animal health delivery system, international consultant, 4 weeks	consultant	1	117000.0	117000.0	0.0	0.0	117000.0	0.0	0.0	
3.4.3	Introduction of cost recovery scheme in laboratories and quarantine stations (DAH)			no cost indicated	0.0	0.0	0.0	0.0	0.0	0.0	within 6 months
3.4.4	Preparation of national diagnostic guidelines and test standards for specific livestock diseases (NAHRC)			no cost indicated	0.0	0.0	0.0	0.0	0.0	0.0	within 6 months
3.4.5	Assessment and reallocation of laboratory equipment found at Federal and Regional laboratories (NAHRC)			no cost indicated	0.0	0.0	0.0	0.0	0.0	0.0	within 6 months
	Grand total				32740990	76759365.8	62513824.8	42230370.8	13294816	129481	
					1.0				9.8	69.8	

