Ministry of Agriculture and Rural Development

Department of Animal Health Services

Rift Valley Fever Contingency and Preparedness Plan

Ethiopia

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1. INTRODUCTION

Rift Valley Fever (RVF) is a peracute or acute zoonotic disease of domestic ruminants in Africa. It is caused by a single serotype of a mosquito-borne bunyavirus of the genus Phlebovirus. The disease occurs in climatic conditions favouring the breeding of mosquito vectors and is characterised by liver damage. The disease is most severe in sheep, goats and cattle, in which it produces abortions in pregnant animals and a high mortality rate in the newborn. Older non-pregnant animals, although susceptible to infection, are more resistant to clinical disease. There is considerable variation in the susceptibility to RVF of animals of different genotypes. Those breeds that are exotic to Africa or are from areas where RVF is not endemic tend to be more susceptible. Camels suffer an in apparent infection with RVF, but abortion rates can be as high as in cattle. Humans are susceptible to infection through contact with infected material or mosquito bites. Infection of humans by vectors is a striking feature in countries with a relatively small population of animal hosts. In such areas, RVF may be recognized first in humans. It has caused serious disease in laboratory workers and must be handled with high level biosecurity.

In Ethiopia, clinical RVF has never been detected and reported. The country has given emphasis to the disease following its outbreak in the neighbouring Kenya and Somalia in 1997-98, which has resulted in the imposition of ban on live animals and meat import from the countries of the Horn of Africa by the Gulf Arab countries in 1999. The 2006-2007 RVF outbreaks in Kenya, Somalia and Tanzania following the heavy rainfall and flood, has put Ethiopia at a very high risk of RVF.

Therefore, to clearly understand the situation of RVF in Ethiopia, much work remains to be done involving all stakeholders. This document gives information on the nature of RVF and the principles and strategic options for prevention and control of the disease which has both economic and public health impact. In preparation of this document due consideration was given to OIE International Animal Health Code and FAO Animal Health Manual for Preparation of Rift Valley Fever Contingency Plans.

2. NATURE OF RIFT VALLEY FEVER

2.1. AETIOLOGY

RVF disease is caused by infection with RVF virus, which is a member of the Phlebovirus genus of the family Bunyaviridae. Initially it had been believed that all strains of the virus are identical immunologically and serologically. However, later on three major lineages of RVFv corresponding to distinct geographical origins of the isolates were identified. These include Egyptian, West African and Central-East African isolates.

Other members of the Phlebotomus group particularly sand fly fever can cause potential problems in diagnosis by cross-reacting with RVFv on complement fixation, haemagglutination, ELISA or indirect fluorescent antibody tests.

2.2. SUSCEPTIBLE SPECIES

RVF is a zoonotic disease that affects domestic animals and humans. RVF is highly pathogenic for sheep and cattle. Goats, buffalo and camels are also important hosts. There is also considerable difference in susceptibility amongst different breeds of animal hosts. Breeds of

animals that are exotic to Africa are more susceptible and the indigenous breeds are relatively insusceptible. Such information would also help breed improvement programs to critically consider the threat of RVF when decision is made on introduction of exotic breeds in to the country. Moreover, the indigenous domestic ruminants in most parts of the faunal regions of Ethiopia are believed to be fairly resistant to RVF.

2.3. GEOGRAPHICAL DISTRIBUTION

RVF was first described in sheep in the Rift Valley in Kenya that was characterized by heavy mortality in lambs and abortions in ewes. Till 1977, the disease was restricted to man and domestic animals in Sub-Saharan Africa. In 1977 a sever outbreak of RVF occurred in Egypt and resulted in the death of 600 people as well as several hundreds of domestic animals. This epidemic followed an outbreak in the Sudan in 1976. It occurred in Mauritania in 1987 and Egypt in 1993 following the construction of Diama and Aswan dams, respectively.

The epidemic in East Africa occurred in 1997-1998 involving Kenya and Somalia which has resulted in the imposition of bans on live animal imports from the countries of the Horn including Ethiopia. In 2000, RVF epidemic occurred for the first time outside the African continent in Saudi Arabia and Yemen causing the death of hundreds of people and several hundreds of animals. In 2006-2007 RVF outbreak is reported from Kenya, Somalia and Tanzania.

2.4. DIAGNOSTIC CRITERIA

RVF can be suspected on the basis of clinical history, but laboratory support is required to confirm a diagnosis.

2.4.1. Clinical Signs/Symptoms

Animals

Sheep

- Most severe in lambs up to one week old and mortalities may reach 95%; however, mortalities in adult sheep may be up to 15-30%;
- Affected lambs do not feed, are reluctant to stand, and may exhibit a bloody diarrhea, collapse and death are all that may be seen;
- Affected adult sheep have a high temperature, bloody diarrhea, nasal discharge, vomiting, abdominal colic and jaundice
- Abortion is a very common consequence of RVF infection in pregnant ewes manifested by sudden onset of abortion storms

Cattle

- Affected calves exhibit fever, loss of appetite and weakness, and up to 30% may die within 20-24 hours. Signs that may be observed before death are sero-sanguineous nasal and lachrymal discharges, an elevated respiratory rate and a temperature of 41.5-42.0C
- In adult cattle there is a drop in milk production and abortion, a brief period of temperature rise, with nasal and lachrymal discharges for three to seven days. There may be a brief period of profuse diarrhoea, often accompanied by colic. Photosensitization is a common sequel to RVF virus infections.

Goats

- The disease in goats is similar to that in sheep but is not as severe.

Camels

- Camels do not normally show any clinical signs following RVF infections
- They have a brief period of viraemia
- Abortion is a common consequence of the infection and pastoralists complain of "all their camels are aborting"
- Deaths do occur in the early post-natal period in camel foals born during RVF epizootic periods

Humans

Four clinical syndromes are associated with RVF virus infection. These are described below.

Mild Form:

- Characterized by the sudden onset of a fever that is sometimes biphasic (saddleback fever), rigor (shivering), headache, retroorbital pain (behind the eye socket), severe muscular pain (particularly in the lower back), cloudy conjunctiva, vomiting and loss of appetite;
- These symptoms generally persist for 4-7 days, followed by full recovery within two weeks.

Ocular Form:

- Less common form of RVF presenting initially as a fever;
- Diminution of visual acuity between 7 and 20 days after onset;
- Most commonly, macular, paramacular or extramacular retinal lesions are seen, which are frequently bilateral;
- Oedema, haemorrhage and vasculitis are frequently observed and approximately 50% of more severely affected patients suffer permanent loss of central vision.

Meningoencephalitic RVF:

- Begins with an acute fever of about 5-10 days duration followed by hallucination, disorientation and vertigo;
- Long-term neurological complications have been reported in some patients, although the mortality rate is low.

Hemorrhagic RVF (the most severe RVF syndrome)

- An acute fever of 2-4 days duration is followed by jaundice and hemorrhagic;
- In the following 3-6 days either death occurs or the patient begins to recover slowly

2.4.2. Pathology

2.4.2.1. Clinical Pathology

A viraemia persists over the period of the biphasic temperature reaction and possibly also after this has declined. There is a profound leucopenia associated with RVF infection, which is most obvious in the early period of the infection. Severe liver damage results in high serum levels of the enzymes associated with this pathology, e.g. glutamic dehydrogenase (GLDH).

2.4.2.2. Post-mortem Signs

The most important pathological changes are to be found in the liver.

- Liver enlargement and necrosis, initially focal then often pannecrosis;
- Liver congestion, then later a bronze to yellow colour;
- Petechial and ecchymotic haemorrhages throughout the carcass
- Often sever haemorrhagic gastroenteritis;
- Generalized lymphadenopathy;
- Pulmonary oedema and emphysema;
- Similar pathology in foetus, with autolysis

2.4.3. Differential Diagnosis

Together with all causes of abortion in ruminant animals, diseases to be taken into consideration in the differential diagnosis of RVF include:

- Wesselsbron disease
- Bluetongue
- Enterotoxaemia
- Nrobi sheep disease
- Hepatotoxins
- Rinderpest
- Peste des petits ruminants

2.4.4. Laboratory Diagnosis

2.4.4.1. Collection and Transport of Diagnostic Specimens

Whole blood, liver, lymph nodes and spleen are the tissues of choice for isolation of the virus. Blood samples should be collected from febrile animals into ethylene-diamine-tetra-acetic acid (EDTA) or heparin to which antibiotics have been added as preservatives (penicillin 200 units and streptomycin 200 µg/ml, final concentration). Samples of liver into ethylene-diamine-tetra-acetic acid (EDTA) or heparin to which antibiotics have been added as preservatives (penicillin 200 units and streptomycin 200 µg/ml, final concentration).

Samples of liver and spleen should be collected aseptically both from freshly dead animals at autopsy and from aborted foetuses, if available, and placed in sterile containers. Duplicate tissue specimens should be collected in neutral buffered formalin for histopathology. Blood samples, about 20 ml each, should be collected from animals in the acute and convalescent phases of the disease, for serum.

2.4.4.2. Virus Isolation

The RVF virus can be isolated from whole blood or homogenates of fresh tissues by intracerebral injection of suckling mice or intraperitoneal injection of adult mice or hamsters. It can also be readily isolated in various primary cell cultures (e.g. primary lamb and calf kidney or testis) or cell lines (e.g. BHK-21 and Vero). The identity of the isolated virus is confirmed by polymerase chain reaction (PCR), enzyme linked immunosorbent assay (ELISA), fluorescent antibody staining or virus-serum neutralization tests.

2.4.4.3. Antigen Detection

The RVF antigen may be detected by direct or indirect immunofluorescence tests on impressions smears or cryostat sections of liver, spleen and brain. A rapid diagnosis can sometimes be made by agar gel immunodiffusion (AGID) tests on fresh tissues. Immunocapture-ELISA and histochemical staining of cryostat sections or formalin fixed tissues and PCR are now much more widely used for RVF.

2.4.4.4. Antibody Detection

The ELISA test has now replaced the older inhibition of haemagglutination (IHA), immunofluorescence assay (IFA) and serum neutralization tests as the test of choice. ELISA systems are available to test for the presence of IgM and IgG, which are extremely valuable in epidemiological investigations. The virus-serum neutralization test in microtitre tissue culture systems is still the definitive test system. It is highly specific with little or no cross-neutralization with other phleboviruses. It can be used to detect antibodies in all animal species. However, as it requires the use of live virus, it is not recommended for use outside endemic countries unless a high level of biocontainment is available in laboratories.

2.4.4.5. Detection of Viral Genetic Material

A reverse transcriptase PCR test is now available for detection of viral genetic material. Sequencing of the NS (S) protein-coding region of the genome may be used for phylogenetic analysis (genetic fingerprinting) of virus isolates.

2.5. RESISTANCE AND IMMUNITY

2.5.1. Innate and Passive Immunity

RVF virus infects a very wide range of animal species. However, as the animal becomes older, its susceptibility decreases. Mortality in lambs less than one week old is 90–100%, whereas in older lambs and in adult sheep the mortality drops to between 20 and 60%. However, 95–100%

of pregnant ewes abort when infected with RVF virus. In calves the mortality is 10–70%, dropping to 10-20% in adult cattle. Again 80–100% of pregnant cows abort. Goats have a similar susceptibility to sheep. Passive immunity can be transferred from mother to offspring in colostrum. However, the mother needs to have a sufficient level of antibody, produced by previous exposure to the disease, or by vaccination with an attenuated 'live' virus vaccine. Inactivated virus vaccines do not usually produce a sufficient level of antibody.

2.5.2. Active Immunity

A high level of immunity is produced in animals following exposure to the virus. This immunity may last life-long. IgM antibodies first appear three to five days after the onset of RVF infection, at which time viraemia ceases. They persist for one to two months, or even three to four months in some animals. IgG antibodies appear 10-14 days after the onset of infection and persist for at least one to two years or for life. Convalescent immunity after natural infection lasts for a long time. The offspring of immune mothers may have passively acquired maternal immunity for the first three to four months of their lives.

2.5.3. Vaccination

There are two forms of vaccine generally used in livestock: Attenuated virus vaccines and inactivated virus vaccines. Only the inactivated vaccines are used in humans.

2.5.3.1. Attenuated ('live') Vaccines

Attenuated vaccines have been produced by serial passage through laboratory animals, usually mice. *The Smithburn virus strain produces a high level of immunity and has been used extensively as veterinary vaccine*. However, it causes abortions and birth defects, and some species (e.g. cattle) can be inadequately protected. Attenuated vaccines are produced in South Africa and in Kenya.

2.5.3.2. Inactivated ('killed') Vaccines

Inactivated vaccines are usually formalin or propiolactone treated. South Africa has produced an inactivated vaccine for veterinary use, which protects sheep against RVF challenge. It gives low antibody responses and would require regular vaccination to maintain immunity. The vaccine has been used to prevent spread of RVF in South African sheep. Cattle develop a marginal virus-neutralising response and are protected for a short time.

2.6. EPIDEMIOLOGY OF RVF

RVF is an arthropod-borne viral disease affecting mainly ruminants and humans.

2.6.1. Survival of RVF Virus

RVF virus is very susceptible to acid pH, being readily inactivated below pH 6.2. The virus is most stable within the pH range of 7– 8. The virus

content of meat decreases rapidly following slaughter, the pH dropping as the meat is stored. The OIE guidelines indicate that for RVF infected countries with disease (i.e., in an epidemic period) carcasses that are eviscerated and matured at 2ºC for 24h, are safe. The virus rapidly loses titre at 56^{o}C, but the presence of high levels of proteins, as in whole serum or plasma, can greatly stabilise the virus. Survival times of 3 hours at 56^{o}C, 21 days at 37^{o}C and 4 months at 25^{o}C. The RVF virus is relatively large in size and has a lipid-containing envelope making it susceptible to a range of disinfectants, including detergents.

The RVF virus is excreted in milk but can be inactivated by pasteurisation. There is little known about the persistence of the virus in skins, wool, bones, or manure. Decontamination of blood spills from slaughtered animals is essential to prevent human infection.

RVF is predominantly a vector-borne disease. Adult mosquitoes that become infected with an arbovirus will usually remain so for life. Trans-ovarial transmission is also an important factor for persistence of RVF virus in the field during inter-epizootic periods. The different mosquito vector species from which RVF virus isolated in different countries of East and Southern Africa include *Aedes (Ae.) lineatopolis*, *Ae. cumminii mediopunctatus, Ae. quasiunivitatus, Ae.unidentatus, Ae. dentatus, Culex (Cx.) pipiens, Cx. theileri, Cx. zombaensis, Cx. antennatus, Cx. poicilipes, Mansonia africana and Anopheles coustani.*

2.6.2. Modes of Transmission

2.6.2.1. Vectors transmission*:*

The principal vector is Aedes mosquito although other species of mosquitoes are involved in the transmission and amplification of the

virus during epizootics. A wide range of vertebrate hosts are susceptible to the virus, and transmission through physical contact with infected carcases (e.g. meat workers in an abattoir) has been reported. Laboratory workers have acquired RVF through aerosol transmission during the handling of infected animal tissues.
RVF virus has been isolated from male *Aedes* floodwater mosquitos that emerged from dormant eggs after flooding of breeding sites. This demonstrates that RVF virus can be transmitted vertically between generations of mosquitos without a stage in a vertebrate host and, in particular, can be transmitted into eggs (transovarial transmission).

Trans-ovarial transmission in floodwater *Aedes* mosquitos allows RVF virus to persist between seasons. These mosquitoes lay eggs in which the first stage larvae develop to the point of being ready to hatch but then enter a resting phase until the egg is flooded. As a further due to long-term survival of the species, not all eggs will hatch with the first flooding. Trans-ovarial transmission has important implications for persistence of the virus in the field if it becomes established in an *Aedes* mosquito population. There is no evidence to show how long RVF virus can survive in mosquito eggs, but it may be measured in months or even years.

2.6.2.2 Aerosol Transmission

A high rate of infection with RVF in people involved with slaughter, postmortem examination or laboratory handling of tissues from infected animals shows that aerosol transmission is an important means of infection.

2.6.2.3. Live Animals

There is no evidence that contact transmission plays any significant part in the spread of RVF between live animals or humans.

2.6.2.4. Artificial Breeding

The virus is likely to be present in semen and it is possible that transmission may occur. It is known to be present in ova but is most probably not transmitted.

2.6.2.5. Animal Products and By-products

Direct contact with carcass and organs of freshly slaughtered sick animals has regularly caused disease in humans. Direct contact with blood and viscera of infected animals during slaughter or shortly afterwards poses the greatest risk of infection. Chilled or frozen meat is not likely to present a human health hazard.

RVF virus is excreted in milk during the viraemic phase in animals. However, pasteurisation inactivates RVF virus. The use of fresh, unpasteurised milk should be avoided in any RVF outbreak. Little or no information is available concerning the possible role of wool bones, skins and manure in the transmission of RVF virus.

2.6.2.6. Transmission to Humans

The human epidemiology of RVF is poorly understood. In areas where the disease is endemic, there is no regular seasonal pattern of human infection. Because RVF is a zoonosis, people who are exposed to

susceptible animals or animal carcasses are at risk. At particular risk are abattoir workers, veterinary officers and laboratory staff with animal exposure (see aerosol transmission, above).

3. RISK ANALYSIS

3.1. RISK OF RIFT VALLEY FEVER (RVF) TO ETHIOPIA

The qualitative risk assessment was structured into three linked components. A *release assessment* which is the risk of introduction of RVF into Ethiopia, an *exposure assessment* the risk of susceptible livestock within Ethiopia becoming exposed to RVF infection and a consequence assessment which analyses the risk of infection of livestock, the risk of persistence of the virus and the risk of human infection within Ethiopia. In addition to this, risk assessment was carried out in view of the inter-epidemic and epidemic phases of the disease.

As regards to *release assessment*, many species of mosquito in the genera *Aedes*, *Culex*, *Anopheles*, *Eretmapodites* and *Mansonia* have been shown to be capable of becoming infected with RVF virus under field conditions in Africa.

Aedes vexans arabiensis, belonging to the same subspecies of *Aedes vexans* and the chief enzootic vector of RVF virus, was recorded in Ethiopia, Mauritania, Sénégal, Gambia, Ghana, Nigeria, Sudan, Somalia and South Africa. As RVF virus is maintained by transovarial transmission in mosquitoes during the years when it does not cause endemic diseases, epizootics of the disease occur in years of heavy

rainfall. In these periods, the mosquito population is able to multiply and spread from the permanent water sites where they are normally maintained to breed in surface water in normally dry areas. Therefore, there is a medium risk of occurrence of the disease in the lowland parts of Ethiopia following high rainfall as a result of an increased likelihood of an El Nino effect.

On the other hand, RVF epidemics occur in Africa at irregular intervals of 3-15 years, usually associated with El Nino situations. Some times, the inter-epidemic periods can exceed twenty-five years, particularly, in arid and semi-arid situations where much of the lowland part of the country is belonging. This period is of low RVF risk as the rainfall levels are within normal or lower than normal limits.

From the recent outbreaks of the disease in Kenya and Tanzania in December 2006 and January 2007, respectively, it was realized that the disease epidemic moved from Kenya to Tanzania together with favourable situations like heavy rains and associated flooding. Therefore, it seems that the risk of virus spread in these countries associated with ambient climatic and vector situations than movement of cattle and other animals as well as wind spread of mosquitoes from one country to the other.

As regards to *exposure assessment*, the presence of conducive ecological conditions in Ethiopia similar to that of the rest of the Horn of Africa would favour the establishment and spread of the virus and the occurrence of RVF epidemic in the lowland parts of the country. This may pose a significant risk of transmission of the diseases to livestock raised along communal grazing lands and to those which are kept in areas close to over flooded and irrigated areas. If epidemic situations

occur in Ethiopia, the disease may spread from infected to non-infected areas through viraemic animals and infected mosquitoes. During such times, humans may also be exposed to the disease when slaughtering and handling infected animals and if they consume raw meat.

During the inter-epidemic period, the risk of transmission of the disease into livestock along the lowland parts of the country is negligible. However, there is a medium risk of exposure of livestock and humans along these areas if the disease reaches epidemic proportions as a result of an increased El Nino effect.

The *consequence assessment* concludes that if there is an epidemic situation of the disease in the lowland parts of the country, infection of livestock with RVF through exposure to infected and infectious vectors is highly likely, and that it may increase in case of multiple exposures.

The probability of persistence of RVF virus within these areas as a result of entry of infection into the greater vector population of these areas is considered higher than negligible, possibly much higher depending upon climatic conditions. The likelihood of infection of humans through handling or consumption of products derived from infected animals is considered higher than negligible for butchers, slaughterhouse staff and related occupations, and perhaps too optimistically even much higher during epidemic phases, but it is considered negligible during the inter-epidemic periods.

3.1.1. Risk estimation

Inter-epidemic period: RVF virus activity is usually evident whenever riverine floodwater plains are inundated for prolonged periods and result

in the formation of dambos or water pans. The situation allows for mosquito species to breed and colonize wider areas.

In areas with relatively high rainfall, some RVF virus activity may occur every 2-3 years. However, in the drier bushed and wooded grasslands, the epizootics occur in 5- to 15-year cycles and little or no RVF virus activity may be detected between epizootics. On the other hand, RVF virus activities occur in the arid and semi-arid areas more rarely at an interval of 35 years, although 15-30 years might be a more reliable range. However, it is highly unlikely for RVF virus activity to be detected during the inter-epizootic periods in the lowland parts of the country.

3.1.2. Risk management

The risk of RVF can be summarized into three separate levels based upon known rainfall patterns and/or confirmed outbreaks of the disease. RVF epidemic is dependent upon flooding of specific mosquito habitats and thus periods of high risk are either when heavy rainfall or flooding makes outbreaks likely or after outbreaks of the disease are confirmed. Periods of rising risk (pre-epidemic periods) are when meteorological conditions predict increased probabilities of high rainfall, for instance increased likelihood of an *El Nino* effect. Periods of low risk (inter-epidemic periods) are when rainfall levels are within normal or lower than normal limits. Therefore, risk management options, which aim at reducing the risk of transmission of RVF in each of these three states, were recommended.

The recommendations resulting from this risk assessment include the development of early-warning systems based on prediction of RVF epidemics and setting up sentinel herds in high risk areas. The ecology

of potential mosquito vectors needs to be better understood so that rises of multiplication and persistence can be better estimated. Contingency plans need to be developed to allow a rapid and effective response during an RVF outbreak. This includes setting up the required laboratory capacity to be able to handle RVF diagnosis, as well as development of effective vaccines for livestock. Veterinary staff needs to be trained such that they are able to recognise the disease as early as possible.

3.1.3. Options available

Inter-epidemic period

- In order to limit the surveillance zones and monitor the disease cost effectively, areas which are at risk of RVF will be delineated using a thematic GIS of different ecological zones.
- To early detect the possibility of viral circulation and subsequent occurrence of RVF epidemic along the pastoral areas of the country, surveillance programs (cross sectional studies and sentinel herd monitoring) will be conducted along high-risk areas.
- Risk analysis will be conducted periodically based on the occurrence and spread of the diseases using climatic (rainfall) and epidemiological data.
- Governments, public and private animal health providers, and livestock traders will remain alert and actively seek out evidence of RVF outbreaks in livestock or humans.
- Pre-positioning of RVF vaccine stocks for livestock will be considered when it is perceived that there would be a high likelihood for the occurrence of RVF outbreak in animals.

Pre-epidemic period

- Surveillance and monitoring activities will be heightened along the high-risk areas.
- Pre-export inspection and certification procedures will be conducted on all export animals to reduce the risk of RVF to trading partners.
- Based on the requirements of the importing country, vaccination of export animals 21 days before shipment will be considered.

Epidemic period

- Any international trading partners will be immediately alerted and export of animals will be halted to protect the health and security of the trading partners.
- Vaccination of susceptible livestock at high risk of infection will be considered.

4. STRATEGIES TO PREVENT AND CONTROL RVF

Animal exports are vital to the livelihoods of several millions of pastoralists, who have little alternative means of earning cash to buy food and other consumable items. There is a need to seek ways of mitigating the impact of RVF, by avoiding future bans on livestock imports from Ethiopia and severe production losses and public health impacts due to mortality and morbidity of both animal and human populations in the country.

The strategy is to early detect RVF and if the disease occurs, instigate a control program using a combination of strategies including:

- Surveillance, which involves monitoring of the proxy indicators of excessive rainfall using remotely sensed satellite data, monitoring of sentinel herds and vectors

- Quarantine and movement controls on animals in declared areas to prevent spread of infection
- Public awareness campaigns to facilitate cooperation from the community and prevent human infection
- Mitigate the effect of RVF to trading partners through measures that involve:-
  - Purchase of animals for export from areas that have no evidence of epidemic activity;
  - Vaccination of all animals destined for export after negotiation with trading partners**.**

4.1. EARLY WARNING PLANNING

Early warning enables rapid detection of the appearance of or sudden increase in the incidence of *serious livestock diseases before* they develop to epidemic proportions and provoke serious socio-economic consequences. It embraces all the initiatives, mainly based on disease surveillance, reporting and epidemiological analyses that lead to improved awareness and knowledge of the distribution and behaviour of disease outbreaks (and of infection).

Early warning programmes are critical for RVF. In regions where RVF is present, forecasting of the high probability of epidemics at least three months, and possibly up to six months, before they start will enable an effective response to be mounted against the disease.

As the success of a country's capability for forecasting and rapid detection of outbreaks of RVF depends on continuous monitoring of factors that predispose its occurrence, the following methods are selected for early warning of RVF in Ethiopia.

4.1.1. Monitoring of Climate

The occurrence of RVF outbreaks has been demonstrated to correlate with above normal rainfall. Periodic outbreaks of RVF over a 40 years period were found to collate with the positive values of a statistic based upon the number rainy days and the quantity of rainfall.

Therefore, a monthly NDVI data is obtained and interpreted from the African Data Dissemination Service website in order to monitor environmental situations that predispose RVF occurrence in the country. There is also a plan to establish network with national, regional and international climate & RVF monitoring bodies (such as National Meteorology Authority, WFP and EMPRES) and get awareness of the monthly regional risk assessment data generated from RSSD sources.

If climate data received from these sources show any indications for a likely occurrence of RVF virus activity, veterinary personnel in the field will be alerted to follow the situation closely. They will be informed to report if there are any unusual rainfall, flooding and indications of RVF activity and vector build up in the area.

If information from field seems to be consistent with satellite data, the following activities will be undertaken in the areas:

4.1.2. Active Disease Search

An investigation team composed of different disciplines (veterinary virologist and or pathologist, epidemiologist, veterinarian with extensive experience of epidemic diseases and entomologist) will be mobilized into the suspected areas for investigation of clinical RVF. In addition to investigation of the case based on field observations, the team will take different samples for laboratory verification and if necessary send samples to regional or world reference laboratories.

Based on information from other countries, it's believed that the ecological limits of RVF epidemic are bushed and wooded savannah grasslands as well as arid and semi-arid areas. However, epidemic has been more severe in arid and semi-arid areas.

Therefore, it is anticipated that if it occurs at all, epidemic of RVF, will involve lowland parts of Ethiopia. As a result, the early warning system of the country gives due emphasis to these parts of the country.

4.1.2.1. Serological Survey

The investigation team will also undertake serological survey to determine presence of recent RVF infection in the suspected areas. For this, blood samples will be collected from these areas and analyzed at the National Animal Health and Disease Investigation Centre (NAHDIC) at the earliest possible time.

4.1.2.2. Vector Survey

In addition to clinical disease search and serological survey, the team will carry out investigation on the abundance and distribution of vectors that are responsible for RVF transmission and amplification.

4.1.2.3. Sentinel Herd Monitoring

After getting sufficient data on the prevalence of conditions for RVF virus activity in the suspected areas, sentinel herds will be established and followed up in order to monitor the dynamics of virus activity. Arrangements should be made with livestock owners to ensure that the sentinel animals are available for regular inspection and sampling and that the animals are permanently identified. Animals from the sentinel herds will be investigated and bled twice to four times annually with an emphasis during and immediately after the rainy seasons to determine sero-conversion rates. Then the results will be used to support decisions with regard to declaration of RVF epidemic and following measures.

4.1.3. Passive Surveillance

In addition, the passive surveillance system that has been in place for many years in the country will enable the capture of RVF earlier before its devastation. The district veterinary services are obliged to report (compulsory reporting) to the Federal animal health department and their respective regional veterinary services any indications of RVF predisposing factors or symptoms of RVF (RVF-like disease) in their catchments within 24 hours.

The passive surveillance system also uses information that will be collected from public health services (Ministry of Health, Regional Health Bureaus).

4.1.4. Public Awareness Programs

In order to ensure early capture of RVF occurrence, it is very essential to create awareness on the disease among the general public in general and livestock owners in particular, especially in those areas that are regarded as high-risk areas for RVF epidemic. In this regard continuous awareness of livestock owners, particularly community animal health workers will be made on the importance and identification of RVF through different training programs including through mass media.

The public is also required to report any RVF like symptoms in their flocks or humans to the nearby health authorities (veterinary or public) as early as possible (preferably within 24 hours).

4.1.5. Epidemiological Studies

Ethiopia, though a member of countries of the Horn of Africa, has never encountered epidemic RVF so far. The following issues need to be addressed in order to have a comprehensive knowledge about the disease situation in Ethiopia:

- Study the type and dynamics of RVF vector population in the country
- Isolate RVF virus from either mosquitoes or viraemic animals (if encountered any)
- Validate laboratory diagnostic tools in local situations

4.2. EARLY REACTION PLANNING

Countries where RVF virus persists need to prepare contingency plans based on the area that epidemics of the disease are forecast and/or detected as early as possible and immediate action taken to prevent

outbreaks or at least limit their geographic range and size. The aim is thus to minimize the socio-economic; trade loss and public health consequences of the disease.

The early warning that epidemiological and environmental conditions suggest pre-epizootic conditions for RVF and that outbreaks are likely to occur provides a window of opportunity for national animal and human health authorities to mount an effective response.

When there is forecast that RVF activity may be imminent, the first thing to do is to define the areas that are likely to become infected, based on the following points:

- Scientific evaluation of satellite and other data on weather patterns and vegetation growth
- Information on topographical features such as altitudes, watercourses, dams, likely flood areas and irrigations, to demarcate the extent of potential mosquito breeding habitats
- Epidemiological and entomological evidence from field, gathered by active surveillance targeted to define the range of primary and secondary RVF vector species and likely density
- Distribution and density of susceptible livestock populations
- Historical information on the virus/disease distribution and epidemic behaviour during previous RVF outbreaks.
- Definition of potential extension zones for RVF in the country based upon ecological zones and livestock populations
- Estimation of likely duration period for RVF virus propagation based upon historical ecological and climatic information

4.2.1. Disease Prevention and Control Activities

If information from the early warning activities is indicative of RVF epidemic, the following control methods will be put in place in order to prevent further spread and mitigate the effects of RVF on the populations of the nation and our trading partners:

- Local administrators, farmers and other stakeholders will be notified of the situation in order to restrict movement of all animals from the affected areas;
- The public will be informed to take the necessary precautions in order to prevent infection. Continuous awareness will be made ahead and during outbreaks to decontaminate livestock products and safely dispose aborteous and other infectious materials;
- Export of animals from infected areas will be suspended based on the OIE regulation and export animals will be from parts of the country that are apparently free from RVF till the situation is reversed to normal;
- Animals destined for export will be vaccinated for RVF if agreement is reached with trading partners to do so.
- Until capacity is built for the production of vaccines domestically, there will be import of vaccines.

4.2.2. Surveillance and Diagnosis of RVF

4.2.2.1. RVF disease surveillance

Activities should be directed towards active disease surveillance in order to build up baseline information on inter-epidemic virus transmission

patterns, areas at risk and early warning of any increased virus activity or build-up in vector mosquito populations.

This surveillance should be carried out by:

- Regular field visits and contact with livestock owners and communities;
- Periodic purposefully designed and geographically representative serological surveys and participatory epidemiological techniques. The detection of RVF virus activity by serology is usually too late to be of any relevance to control.
- Sentinel herds, which are an important means of obtaining baseline epidemiological information on RVF. These are small ruminant herds located in geographically representative areas. Locations where mosquito activity is likely to be greatest, e.g. near rivers, swamps and dams, should be selected. Arrangements should be made with owners to ensure that sentinel animals are available for regular inspection and sampling and that the animals are permanently identified by ear tagging.
- Sentinel herds should be sampled twice to four times annually, with an emphasis during and immediately after rainy seasons.
- Arrangements made so that any illness in the herds can be reported and investigated quickly. Serum samples should be collected at regular intervals from 20-30 young adult small ruminant animals in the herds and tested for both IgM and IgG antibodies against RVF.

Surveillance is an essential component of the control strategy of the disease. Both active and passive surveillance methods would be employed in effecting this strategy.

Field veterinary services should be engaged in the overall planning, coordination, execution, monitoring and evaluation of the surveillance system.

The objectives of the RVF surveillance are:

- To generate appropriate and timely data that serves to evaluate different factors as related to the occurrence and distribution of RVF, which ultimately would enable informed decision making.
- To introduce an effective early warning system that enhances the rapid detection, diagnosis and decision making to take prompt response.

The above objectives will strengthen an effective RVF surveillance system through:

- Strengthening the monthly animal disease outbreak reporting network
- Conducting active and passive surveillance
- Initiate and strengthen the collaboration of human and animal health surveillance systems
- Establishing efficient communications systems on animal disease surveillance among different sectors.

Major areas of emphasis are:

- Adopt Standard Operation Procedures, guidelines / protocols, and necessary formats for RVF surveillance
- Conduct active and passive surveillance in all phases

- Conduct a cascade of training on RVF surveillance and outbreak investigations to the relevant staffs in the animal health services delivery systems
- Develop RVF surveillance networks through establishing networks among regions and other countries
- Strengthening the involvement of the community in surveillance
- Develop a system for linking surveillance information in animals and humans

4.2.2.2. Laboratory diagnosis

The rapid and certain diagnosis of diseases can only be assured in fully equipped laboratories, with a range of standardized diagnostic reagents, with experienced staff and a sufficient through put of diagnostic specimens to maintain expertise. The relatively simple facilities required for testing sera by ELISA are a realistic possibility for most countries with P-2 facilities. Handling live RVF virus (e.g. SN tests), should only be attempted in laboratories with appropriate biosafety facilities (P-3/P-4).

If RVF is deemed to be a high-threat disease, consideration should be given to developing capabilities for some primary key diagnostic tests for the RVF antigen (formolized tissue and immuno-histochemistry or PCR) and antibody detection (ELISA tests).

Specimen transport containers should be kept at both central and regional veterinary laboratories and be made readily available for specialist diagnostic teams. Containers should ideally consist of primary leak proof glass universal bottles with a metal screw top and rubber washer or good-quality plastic screw-top jars. These are then packed into a leak proof secondary container with absorbent material and an ice

pack, and finally put into a well-labelled robust outer container. Specimen advice notes should also be provided.

Potential or confirmed aetiological agents from emergency disease outbreaks must be sent to the appropriate International Reference Laboratory for further characterization. It is recommended that several isolates from different geographic locations and at different phases of the outbreak be forwarded. Submission of samples to any laboratory outside the country of origin should always be subject to prior agreement with the recipient and transportation in containers meeting IATA regulation standards. Reference laboratories and collaborating centres can provide, for example, opportunities for training, provision of specialized advice in planning and standardized diagnostic reagents.

Collection and transport of diagnostic specimens**:** Whole blood, liver, lymph nodes and spleen are the tissues of choice for isolation of the virus. Blood samples should be collected from febrile animals into ethylene-diamine-tetra-acetic acid (EDTA) or heparin to which antibiotics have been added as preservatives (penicillin 200 units and streptomycin 200 µg/ml, final concentration). Samples of liver and spleen should be collected aseptically both from freshly dead animals at autopsy and from aborted foetuses, if available, and placed in sterile containers. Duplicate tissue specimens should be collected in neutral buffered formalin for histopathology.

Blood samples, about 10 ml each, should be collected from animals in the acute and convalescent phases of the disease, for serum.

4.2.2.3. Strengthening of laboratory diagnostic services

NAHDIC should be supported with appropriate funds to undertake diagnostic and training required for testing of samples collected for diagnostic and surveillance activities. Based on the previous project experiences, laboratory testing cost is estimated to be 50 Birr per sample. Training of relevant or technical staff and provision of kits, reagents, chemicals and also laboratory operational cost are immediate needs to be assessed at the national level. Regional veterinary laboratory and selected field veterinary staff should be trained and supported with appropriate sample collection, processing and protective materials and operational funds and vehicles for sample collection.

The objectives of the diagnostic activities are to generate laboratory based data to confirm the presence of RVF and evaluate determinant factors related to the occurrence and distribution of the disease.

An effective RVF diagnostic system shall be strengthened through:

- Upgrading the capacity of the referral laboratory to practice viral isolation as a confirmatory procedure through training in the international reference laboratory and establishing high biosecurity level 2+ or 3 in the virology laboratory (construction of a standardized new virology laboratory or modification of the existing laboratory is required),
- Building the capacity of regional laboratories to conduct appropriate diagnosis,
- Establishing networks of laboratories within the country and internationally to support the RVF surveillance system,
- Conduct training programs on RVF diagnostic and investigation techniques.

Emphasis will be given to the following major activities:

- Enhance the capacity of the national and regional laboratories for RVF diagnosis
- Conduct a cascade of training on RVF sample collection, laboratory diagnosis, outbreak investigations and reporting system,
- Develop strong networks among regional and federal laboratories**.**
- In collaboration with relevant international reference laboratories introduce the most sensitive, specific and rapid diagnostic techniques and quality control and assurance system.

4.2.3. Serum collection design

4.2.3.1. Critical considerations

- A budget on the basis of the previous project activities in the lowlands may be 50 Birr per sample. It includes minor repairs of the vehicle, perdiem, fuel and lubricants and labour cost in the field. The perdiem cost should include (for 1 vet, 1 lab tech, a driver, woreda vet, village guide and a language interpreter) and labour cost for animal handling, equipment transport to villages inaccessible by vehicle and other local support.

- Determine whether the virus that causes RVF is present and active in this country. This could be realized by targeted sampling of the specific age groups. Therefore, the preferred age group is between 1 - 3 years of age. This estimation may clear doubts of ages between 7 months and that of 3.5 years, where there is no recording system and most people are in doubt in estimating precise ages of animals. Estimating age of the animal using tooth reading is laborious and

may not be practical in the field conditions in pastoral production areas as most of the animals are aggressive to handle. **???**

- Determine species: Assume that cattle, sheep, goats, and camels are affected. All species of animals should be sampled as there might otherwise be a bias towards certain species.
- Determine Geographical distribution of the disease using stratified multistage clustered sampling techniques of the target population.

4.2.3.2. Serum Collection

About 10 -15 ml blood will be collected by jugular vein puncture using venoject needles and vacutainer tubes. The blood will be left to clot overnight in cold boxes or small field refrigerators. Serum will be decanted into sterile tubes and will be kept on ice for transportation to the laboratory. In the laboratory the serum will be centrifuged to remove the remaining red blood cells before being transferred to 2 ml Nalgene cryovials and stored at - 20°C before testing.

Village based Livestock health information from sample collection sites, at woreda and zone level may be comprehensive and informative. The laboratory test results will be compiled with disease information on the data sheet.

Number of samples to be collected from targeted strata

Strata	Region	Number of Zones	Number of woredas	Number of clusters	Species of animals to be sampled per cluster or site				Total of samples ???
					Sheep	Goat	Cattle	Camel	
1	Somali	3	5	20	10	10	10	10	800
2	Afar	3	5	20	10	10	10	10	800
3	Amhara	2	2	10	10	10	10	10	400
4	Dire Dawa	2	2	20	10	10	10	10	800

3	South Oromia	2	4	20	10	10	10	10	800
4	South Omo	1	4	20	10	10	10	10	800
5	Gambela	2	2	10	10	10	10	10	400
6	Rift Valley		6	30	10	10	10	10	1200
7	Central Highland	3	5	20	10	10	10	10	800
Total		18	35	180					6800

5. DUTIES & RESPONSIBILITIES OF DIFFERENT ACTORS

For effective implementation of the different strategies indicated for early detection, prevention and control of RVF, there should be clear definition of responsibilities and co-ordination among different actors that are directly or indirectly involved in the matter. The following are the main actors that are believed to be responsible for the prevention and control of RVF.

5.1. The Federal Department of Animal Health (FDoAH)

The FDoAH, which is mainly responsible for its prevention and control as RVF is an OIE listed disease that is important in export trade and is of major public health significance.
The FDoAH will have the following major duties and responsibilities:

- Collecting, analyzing and interpreting Remotely Sensed Satellite Data (RSSD), specifically NDVI;
- Alerting all stakeholders on risk of RVF epidemic if there is any indication;
- Strengthening the surveillance system;
- Coordinate surveillance and control activities of RVF and its vectors;
- Training and public awareness campaigns;
- Negotiate with trading partners in order to sustain export trade based on their requirements and international agreements;
- Ensure the availability of RVF vaccine when ever required

5.2. Regional Veterinary Services

The regional veterinary services will have the following major duties & responsibilities in RVF prevention & control programs:

- Collect and report timely data on any indications of predisposing factors of RVF to the FDoAH
- The woreda veterinary service is required to report to the FDoAH & the respective regional veterinary service any RVF-like syndromes of disease in their catchments within 24 hours
- The regional and woreda veterinary services together with the FDoAH and other relevant institutions (public health offices) will actively participate in awareness creation campaigns and training activities of the public and para-professionals
- Actively participate in the surveillance, prevention and control activities
- Together with other relevant government institutions (local administrations, police), enforce movement control restrictions during RVF epidemic

5.3. Diagnostic Laboratories

In order to establish a clear understanding on the situation of RVF during inter-epidemic, pre-epidemic and epidemic periods, the role of veterinary diagnostic laboratories in ascertaining virus activity and vector build up is very essential. Therefore veterinary laboratories will have the following duties and responsibilities in RVF prevention and control programs:

5.3.1. National Animal Health and Disease Investigation Centre (NAHDIC)

- Together with staffs from FDoAH, regional and/or district veterinary services, the NAHDIC shall be responsible for undertaking active disease search of RVF in suspected areas;
- Together with staffs from FDoAH, nearby regional diagnostic laboratories and regional and/or woreda veterinary services, the NAHDIC shall be responsible for carrying out investigation on serological evidence of RVFV activity, virus isolation and vector identification in suspected areas;
- Together with staffs from FDoAH, nearby regional laboratories and regional and/or district veterinary services, the NAHDIC shall establish sentinel herds and follow their RVF status;
- To further understand the epidemiology of RVF in the country, the NAHDIC together with the FDoAH shall carry out studies during inter-epidemic period in order to ascertain existence, abundance and dynamics of RVF vectors in the country.

5.3.2. Regional Veterinary Laboratories

- Together with the NAHDIC, the regional laboratories shall be actively involved in active disease search
- Under the supervision of NAHDIC they shall participate in serological study of RVF and isolation of RVFv and vector identification
- Under the supervision of NAHDIC, they shall closely follow and collect blood samples from sentinel herds

5.4. Public Health Services

RVF is not only impacting the livestock sub-sector but also has major public health significance by causing serious illness in humans. Therefore, not only exchange of information will have tremendous contribution but also collaboration on field activities with public health

authorities will ensure an efficient early warning and early reaction of RVF in the country.

The Ministry of Health (MoH) and local health authorities shall have the following major duties and responsibilities on RVF prevention and control programs:

The MoH shall provide updated information to the FDoAH on the situation of RVF in humans in the country; (only this?)

5.5. National Veterinary Institute (NVI)

As one of the strategies to mitigate the effects of RVF to our trading partners is through vaccination of all exported animals, building of capacity for domestic production of RVF vaccines will be important. Therefore the role of NVI in RVF prevention and control shall be ensuring the availability of a high quality RVF vaccine in the country.

5.6. The Public

The involvement of the public, particularly those in livestock business is very essential for early capture of RVF activity and other conditions that will predispose RVF epidemic.

Therefore the public has the following duties and responsibilities in RVF prevention and control in the country:

- Report as soon as possible unusual climatic situations (rainfall and flooding) to the nearby local health authorities (veterinary or public);
- Report any indications of RVF-like syndromes in their herd or other humans to the nearby health authorities;

- Cooperate with the local administration and health authorities at times of animal movement restrictions during RVF emergencies.

6. Organizational Arrangements

A close working relationship developed between the Ministry of Agriculture and Rural Development (MoARD) and Ministry of Health (MoH)) for the avian human influenza threat is currently being used for RVF. Through this development an effective response can be mounted against RVF and other serious livestock diseases that have a significant public health component. Agreement has already been reached on a joint framework for preparing RVF contingency plans and other preparedness program that are consistent with each other and complementary. The National Coordination Committee has decided to use the Avian Human Influenza structure for RVF as well as other emerging diseases of zoonotic nature. The experience gained in developing preparedness and response plan for avian human influenza pandemic threat has helped to explore the opportunities for sharing resources between the two ministries, where appropriate and avoid unnecessary duplication.

Areas in which collaboration and sharing of resources should be developed include:

- Coordinated RVF epidemiological surveillance and evaluation programs.
- Development of efficient mechanisms for the rapid exchange of emergency disease reports and other key epidemiological information between the two ministries at federal regional and woreda levels
- Sharing of diagnostic reagents and of expertise between government veterinary and medical laboratories (it is unlikely that there will be

two laboratories providing the required level of disease security in any country).

- Joint specialist diagnostic teams and field missions.
- Joint training and public awareness programs.
- Shared cold-chain facilities for vaccines.

The FDoAH has overall technical responsibility for preparedness and management of animal disease emergencies including RVF. The appropriate government minister would of course be ultimately responsible.

- The FDoAH assumes overall responsibility for responding to the emergency, and will be directly answerable to the MoARD.
- A mechanism for cooperation among different Ministries if necessary to control the disease (e.g. police, army, education, media and health) through the National Coordination and Technical Committees
- Regional veterinary staff will come under the line management of the FDoAH in dealing with RVF emergency response programs.
- Arrangements need to be put in place to ensure that regional field and laboratory veterinary services are fully involved in RVF emergency preparedness planning and training activities, and are in collaboration with Federal Animal Health Services in providing early warning of emergencies (including emergency disease reporting to MoARD).
- Similar arrangements for all essential government veterinary services, including the NAHDIC, to come within the command structure of the FDoAH for the purposes of the emergency response.

National Zoonotic Diseases Emergency Coordination Committee (NZDECC): The terms of reference of NCC are as follows:

1. Approve the national preparedness and responses plan to Rift Valley Fever
2. Monitor the overall performance of the technical committee and disease prevention and control activities of the country
3. Communicate with Donor Agencies and Governments for possible financial and technical assistances sought
4. Approval of relevant policies that assist RVF prevention and control measures
5. Declare infected zone of the country in cases of disease outbreaks and authorize the implementation of all required measures to control the disease
6. Approve implementation plans (short, medium and long term) and present to donor agencies
7. Meet every month during emergency situations and as required at other times to discuss and pass appropriate decisions based on the situation assessment report produced by the technical committee

National Zoonotic Diseases Emergency Technical Committee **(NZDETC):** The national technical committee is accountable to the national coordination committee. It will meet on weekly basis during emergency situations and as required at other times and is expected to accomplish the following activities:

1. Provide guidance and facilitate the complete planning process including preparation through a continuous expertise forum
2. Prepare national preparedness and response plan that envisages animal and human health and present to the coordination committee, monitor its implementation

3. Provide technical input for the vulnerability and risk mapping and identification of reliable early warning indicators on RVF epidemic
4. Establish, implementing and maintaining an education program to inform and advise the public
5. Identify RVF high risk areas
6. Identify laboratories to be involved in the disease investigation and diagnostic activities
7. Identify major activities to be performed and prepare their detailed implementation action plans during the emergency period and afterwards
8. Identify and prepare lists of chemicals, diagnostic kits, reagents, laboratory and field equipment required for the emergency program.
9. Strengthen information exchange activities with regions and other relevant bodies through all available means
10. Monitor the overall activities being conducted at regional and institutional levels and propose corrective actions
11. Establish coordination and collaboration modalities with relevant UN agencies and other partners
12. Establish sub-committees to deal with specific issues
13. Assist in defining principles and establishing criteria for prioritizing procurement and training activities
14. Developing procedures and protocols to coordinate resource deployment to various sectors/levels
15. Briefing relevant bodies on status/progress of committee's assignment
16. Compiling and submitting periodic report
17. Identify budgetary assistance needs and presenting to the coordination committee

18. Ensure the proper implementation of decisions passed by the national coordinating committee.
19. Assess the continental, regional and country situations on the disease distribution, prevalent risk factors and produce monthly reports to be presented to the national coordination committee during emergency situations.

7. PREPAREDNESS PLAN

7.1. Inter-epidemic period

Core activity	Sub activity	Responsible body	Material/personnel requirements
Strengthening the capacity of the veterinary services in the country	The government should secure adequate funding for various activities,	MoARD	Manpower (staffing and training) Budget Legal support
Surveillance and diagnosis	Assess climatic and satellite data from FAO for early warning	FAO, AHD	Internet connection, training, pro-med subscription
	Capacity building for RVF Surveillance Diagnosis Disease mapping Vector identification	AHD, NAHDIC	Training, sentinel herds establishment with necessary incentives (e.g. free anthelmintic treatments, etc), sampling materials,
	Preparation of training manuals	AHD, NAHDIC, NVI	budget
	Establishing core team and contact person at the MoARD and BoARD levels	AHD, BoARD	Letter of assignment
	The MoARD should establish good early warning system and make use	AHD	EMPRESS newsletter

	of available climatic and satellite data for RVF detection,		
	NAHDIC should build its capacity to conduct vector ecology survey (biological vectors/mechanical vectors) and isolate/detect RVF virus in vectors	AHD, NAHDIC	Training, survey materials
	The MoARD should strengthen the reporting of major diseases by introducing a system of accountability of district veterinary services,	AHD, BoARD	Discus with Regions on modalities of integrating disease reporting into BPR and result oriented evaluation systems
Disease management	The MoARD should establish and strengthen partnership with stakeholders (e. g. the MoH, etc),	AHD	Information network, regular meetings
	Permanent and key RVF persons with clear TOR must be assigned at Federal and Regional levels,	AHD, MoH, BoARD, BoH	Letter of assignment, TOR
	Depending on requirements of trading partners, arrange mechanisms to vaccinate export animals with RVF vaccine,	AHD, NVI	Ice box, RVF vaccine, vaccination syringe, needle, training
	Livestock trade routes should be identified and mapped,	MoARD	Mapping software

	RVF risk based stock movement control permits should be developed,	AHD	Risk map, Circular letter
	Training/capacity building should be conducted for Regions on cold chain, storage, dispatch, etc of RVF vaccine (additional training requirements need to be assessed and listed down),	NAHDIC, NVI	Training, handouts
	RVF vaccines should be procured and stockpiled until NVI builds its capacity	AHD, NVI	Budget, proforma, cold storage
	The capacity of NVI should be built to produce RVF vaccine locally	MoARD, NVI	Equipment, training, budget
	The MoARD should conduct resource (staff, infrastructure, etc) inventory along high RVF risk areas	AHD, NAHDIC	Telephone, field trip, documentation
Communication	Communication and awareness creation programs should be conducted for vet services at grass root levels,	AHD, Regional AHS	Communication materials, handouts, brochures, budget
	Workshop and seminars for awareness creation for Federal,	AHD, Regional AHS, NAHDIC	Communication materials, handouts, brochures, budget

	laboratory and regional staff at high risk areas		
	The Federal and Regional AHS should plan and work together to establish better information system	AHD	Disease reporting database at Regional level, telephone, internet connection
	Communication materials must be agreed upon and prepared,	AHD, NZDECC	Communication materials, handouts, brochures,
	There should be a mechanism for information exchange among stake holders,	AHD, , NZDECC	Internet connection, report

Pre-epidemic period

Core activity	Sub activity	Responsible body	Material/personnel requirements
Surveillance and diagnosis	Serological and clinical surveillance	NAHDIC, Regional labs	RVF Sampling materials, case definition, WRL
	RVF risk areas should be identified, mapped and delineated based on lab results, altitude, temperature, rainfall, flooding, soil, vegetation, mosquito habitats, etc,	AHD, NAHDIC, BoARD, Regional Labs.	Mapping system, GPS, meteorological data
	Virological investigations on suspected samples	NAHDIC, Regional Labs.	RT PCR, sampling kit
	Vector identification	NAHDIC	Stereo microscope, WRL
	Laboratory training for NAHDIC at WRL	NAHDI, MoARD	Budget
	Surveillance training (field staff and livestock owners)	AHD, Regional AHS, NAHDIC	Handouts, guidelines
	Emergency preparedness (resource inventory)	AHD, NZDECC , Regional AHS	EP/CP document, telephone, field trip, documentation
	The MoARD should monitor high rainfall/flooding and high vector	AHD, Meteorological services	Meteorological data

	density along RVF risk areas,		
	The MoARD should make available adequate Emergency Preparedness Plan for mobilization of field and lab services	MoARD	EP Plan/CP
	RVF compatible syndromes (mass abortion, death in young, etc) must be closely monitored and reported	Regional AHS & labs	Case definition guidelines
	The MoARD should establish sentinel herd monitoring in high risk areas as part of early RVF detection system	AHD, NAHDIC, Regional Labs	Ear tag, applicator, incentive, (anthelmintic), sampling kit
Disease management Communication	The MoARD must keep informing trading partners on the status and risk of RVF and efforts taken to counter its spread,	AHD	Website, status report
	The MoARD should impose risk based livestock movement control along high risk areas,	AHD, Regional AHS, Regional/Woreda administration	Risk map, Circular letter
	Cattle, shoats and camels found along high risk areas should be	AHD, Regional AHS, NVI	Ice box, attenuated RVF vaccine, vaccination syringe, needle,

	vaccinated with RVF vaccine,		training
	Training on disease management for field and laboratory personnel	AHD, NAHDIC	Training manual
	Resource inventory (human and material) required for disease management activities	AHD, NZERC	Telephone, field trip, documentation
Communications	The public should be alerted on means of transmission and consequences of RVF virus infection as well as personal protection measures against the disease,	MoARD, MoH, NZERC, **EVA**	Radio, hotline, brochures, poster, budget
	Communication packages on vaccination should be agreed upon and prepared for livestock owners, journalists, politicians, etc.	AHD, NZERC, **EVA**	Radio, hotline, brochures, budget
	Workshop and seminars with invited international experts on epidemiology and diagnostics	AHD, NAHDIC	Laptop, projector

7.3. Epidemic period

Core activity	Sub activity	Responsible body	Material/personnel requirements
Surveillance and diagnosis	Serological, clinical and virological surveillance with support from World reference laboratory	NAHDIC, Regional labs, AHD	Sampling kit
	Submission of laboratory results to MoARD the earliest possible time	NAHDIC	Report
	Refresher training on surveillance and diagnosis	NAHDIC	Training manual, budget
Disease management	Declaration of RVF outbreak to OIE	AHD	Status report

	Demarcation of outbreak site	AHD, Regional AHS, local administration	Mapping facility, GPS
	The MoARD should impose risk based livestock movement control along epidemic foci and high risk areas,	AHD, Regional AHS, local administration	Risk map, Circular letter
	Apply strict bio-security measures to contain the disease and minimize the spread	AHS, Regional AHS, local administration	Bio-security guidelines, CP
	The MoARD and MoH should plan and implement a joint action plan to contain the spread of the disease to other areas,	MoARD, MoH, NZERC	CP and action plan
	The MoARD should cease export of animals from infected and suspected areas,	MoARD, Private operators, local administration	Circular letter
	The MoARD must keep informing trading partners on the status and risk of RVF	AHD	Status report

	and efforts taken to counter its spread.		
Communication	The public should be aware on means of transmission and consequences of RVF virus infection as well as personal protection measures against the diseases,	MoARD, MoH, NAHDIC, NZERC, EVA	Radio, hotline, brochures, poster, budget
	The public should be aware of the situation to comply with the disease control options	MoARD, MoH, NAHDIC, NZERC, EVA	Radio, hotline, brochures, poster, budget

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Annex 8.4: List of responsibility centres, contact addresses and resource inventory

Table 1: List of responsibility centres and addresses of contact persons at the Federal level for Emergency Preparedness to prevent and control Rift Valley Fever in Ethiopia

Key Responsibility Centres and Offices	Name of key contact persons	Contact Address				Remarks
		Office Phone	Mobile Phone	E-mail	P.O. Box	
Minister, MoARD Chairman, National Zoonotic Diseases Emergency Coordination Committee **(NZDECC)**	H.E. Ato Addisu Legesse	011 5522261	XXXXXXXXXXX		62347	Issues of concern at a national level and to be addressed by the **NZDECC**
Minister, MoH, Co-Chairman, National Zoonotic Diseases Emergency Coordination Committee **(NZDECC)**	H.E. Dr Thewodros Adhanom	011 5517011 Ext. 216	XXXXXXXXXX			
State Minister, MoARD, Secretary,	H.E. Dr Abera Deressa	011 5522276	XXXXXXXXXX		62347	Issues of concern at a

National Zoonotic Diseases Emergency Coordination Committee **(NZDECC)**						national level and to be addressed by the NZDECC • Outbreaks, disease management, diagnosis and communication functions
Head, Animal Health Services, Chairperson, National Zoonotic Diseases Emergency Technical Committee **(NZDETC)**	Dr Amsalu Demissie	011 5536334	0911 409067	tseddey@yahoo.com.au, nat.pace@ethionet.et		• Regular passive and active RVF surveillances • Outbreak investigations • Decision on disease management schemes (bio-security, culling, compensation,
Head, Disease Prevention and Control Department Co-Chairperson, National Zoonotic Diseases Emergency	Dr. Zerihun Tadesse	011 5159682				

Technical Committee **(NZDETC)**						vaccination, movement control, etc)
Head, National Animal Health Research Centre (NAHDIC)	Dr Mesfin Sahile	011 3380894/98	0911933248			• Issues related to surveillance of suspected outbreaks and diagnosis
RVF Laboratory Unit Head, NAHDIC	Dr Melesse Balcha	011 3380894/98	0911868942			• Surveillances of suspected outbreaks, sample submission and related arrangements • Confirm reception of laboratory samples, processing and results
Other Key person dealing with RVF at	Ato Africa Teferi	011 3380894/98				• Confirm reception of

NAHDIC						lab. Samples, processing and results
Director General, National Veterinary Institute (NVI)	Dr Berhe Gebreegziabher	011 4338411	0911 254377			RVF vaccine storage, dispatch Assistance on laboratory diagnosis during outbreak pressure Other expertise contribution
Chairperson, National Advocacy and Communication Sub Committee	Ato Ahimed Emano	011 5517011 Ext. 203 011 5511392	0911 941869			Provision of accurate, timely, simple and consistent RVF communicatio n
FAO/MoARD AI	Dr. Yilma Jobre	011 5511392	0911 408220	Yilma.Jobre@fao.org		Coordinate

project National Coordinator						and follow up national RVF surveillance and diagnostic activities Advice MoARD on RVF prevention and control
National Emergency Operation Centre Focal Person and FAO National Consultant	Prof. Getachew Abebe	011 5543272	0911-407260	Getachew.Abebe@fao.org		Follow up RVF activities undertaken by various stakeholders Technical backstopping during the implementation of RVF outbreak containment
Ethiopian Veterinary Association	Dr Laikemariam Yigezu,	011 5525020	0911 686326	eva.hq@ethionet.et		Participate in the prevention

	President Ato Mulushoa Besha, Office Manager W/t Kalkidan Negash, Secretary		0911 403068 0911 346885			and control of RVF Mobilize members to actively engaged in the application of AI control options
Ethiopian Assistant Veterinary Association	Ato Gebeyehu Afework, President,		0911 478250			

Table 4: List of responsibility centres and addresses of contact persons at Regional level for Emergency Preparedness to prevent and control Rift Valley Fever in Ethiopia

Afar Regional State				
Key Responsibility Centres and Offices	Name of key contact persons	Contact Address		
		Office Phone	Mobile Phone	E-mail
BoARD	Head: Awol Arba Deputy Head: Amin Abdulkadir	0336660109 0336660107	0911483840 0911461927	-
Animal Health Services	Head: Dr. Melese Bedane Deputy Head: Arage Tiku	0336660109 0336660109	0911079183 0911796160	sileshimekonnen@yahoo.com
Regional Veterinary Laboratory	Head: Deputy Head:	-	-	-
Regional Coordination Committee	Chairperson: Awol Arba Co-Chairperson: Amin Abdulkadir Secretary: Alemu Ebsa	0336660109 0336660107	0911483840 0911461927	-

Regional Technical Committee	Chairperson: Alemu Ebsa Co-Chairperson: Dr. Yenew Tizazu Secretary: Dr. Melese Bedane	0336660109 0336660016 0336660109	0911967222 0911989200 0911079183	sileshimekonnen@yahoo.com
Regional Advocacy and Communication Sub Committee	Chairperson: Hussein Mohammed Co-Chairperson: Dr. Gezahegn Eshete Secretary: Dr. Yalelet Worku	0336660109 0336660109 0336660109	0911136052 0911119608	sileshimekonnen@yahoo.com
Head, Regional Emergency Operation Centre	Dr. Melese Bedane	0336660109	0911079183	sileshimekonnen@yahoo.com
Store Keeper				
FAO National Consultant	Dr. Sileshi Mekonnen	0336660572	0911445844	Sileshi.mekonnen@fao.org sileshimekonnen@yahoo.com

Amhara Region State				
Key Responsibility Centres and Offices	Name of key contact persons	Contact Address		
		Office Phone	Mobile Phone	E-mail
BoARD	Head: Ato Tefera Derebew Deputy Head: Ato Teshome Walle	O582201366	0918340129	
Animal Health Services	Head: Dr Kassa Teferi Deputy Head:	O582205851	0918781376	
Regional Veterinary Laboratory	Head: Dr Darsema Gulima (Bahir Dar) Head: Dr Girma Abeto (kombolcha)	0582200017 033510020	0918701155 0911830110	
Regional Coordination Committee	Chairperson: H.E. Ato Demeke Mekonnen Co-Chairperson: Ato Tefera Derebew	0582201366	0918340129	
Regional Technical Committee	Chairperson: Ato Aklilu Woldu Co-Chairperson: Dr Kassa Teferi	0582202603 O582205851	0918765190 0918781376	
Regional Advocacy and Communication Sub Committee				

Head, Regional Emergency Operation Centre	Dr Zewdu Belay	0582205851		pastzewdubelay@yahoo.com
Store Keeper				
FAO National Consultant	Dr Alekaw Sinshaw	0582222071	0918764142	Alekaw.Sinshaw@fao.org

Benshangul Gumuz Regional State				
Key Responsibility Centres and Offices	Name of key contact persons	Contact Address		
		Office Phone	Mobile Phone	E-mail
BoARD	Head: Dr Mekonnen Golasa Deputy Head: Ato Abdul-Mamud Ibrahim Mohammed	0577750178 0577750919	0911-853004 0911-790894	
Animal Health Services	Head: Dr Kassaye Erkihun Deputy Head: Dr Mollalegn Bitew	0577750151 0577750151	0911-564098 0911-735280	Molalegne23@yahoo.com
Regional Veterinary Laboratory	Head: Dr Tefera Alemu Deputy Head:	0577750412		
Regional Coordination Committee	Chairperson: H.E. Ato Yaregal Ayisheshum Co-Chairperson: Dr Mekonnen Golasa Secretary: Ato Abera Asfaw	 0577750178 0577750151	 0911-853004	
Regional Technical Committee	Chairperson: Ato Abera Asfaw	0577750151		

	Co-Chairperson: Ato Getachew Habte Secretary: Dr Kassaye Erkihun	0577750171	0911-564098	
Regional Advocacy and Communication Sub Committee	Chairperson: Co-Chairperson: Secretary:			
Head, Regional Emergency Operation Centre	Dr Tefera Alemu			
Store Keeper				
FAO National Consultant	Dr Ademe Zerihun	0577750412	0911-408137	ademe.zerihun@fao.org

Dire Dawa Council				
Key Responsibility Centres and Offices	Name of key contact persons	Contact Address		
		Office Phone	Mobile Phone	E-mail
BoARD	Head: Ato Abdurehman Aliye Deputy Head:	0251110460	0915734935	ddagroff@ethionet.et
Livestock development department Animal health service	Head: Ato Masresha Yimer Team Leader: Dr. Fasika Belete	0251110460 0251110460	0911712010	fasikabelete@yahoo.com
Regional Veterinary Laboratory	Head: Dr. Fantu Ashine Deputy Head:	0251114177	0915737153	
Regional Coordination Committee	Chairperson: Ato Mehamed Amin Co-Chairperson: Dr. Abdurehman Alye Secretary: Ato Masresha Yimer	0251121098 0251110460 0251110460	0915734935	ddagroff@ethionet.et
Regional Technical Committee	Chairperson: Ato Masresha Yimer Co-Chairperson: Dr. Gebremedhin Aklilu Secretary: Ato Ermias Desalegn	0251110460 0251112330 0251112330		ddagroff@ethionet.et
Regional Advocacy and Communication Sub Committee	Chairperson: Not established Co-Chairperson:			

	Secretary:			
Head, Regional Emergency Operation Centre	Dr. Fasika Belete	O251110460	0911712010	fasikabelete@yahoo.com
Store Keeper	Mestawot W/Agegn	0251110460	0915761038	
FAO National Consultant	Dr. Yosef Seyoum	0257757491	0915741455	Yosef.Seyoum@fao.org

Gambella Regional State				
Key Responsibility Centres and Offices	Name of key contact persons	Contact Address		
		Office Phone	Mobile Phone	E-mail
BoARD	Head: Engineer Olero Opieo Deputy Head: Ato Mach Koth	047 5510229 047 5511475	0911 755297	
Animal Health Services	Head: Dr Belachew Tefera		0911 746308	
Regional Veterinary Laboratory				
Regional Coordination Committee	Chairperson: H.E Ato Umad Ubong Co-Chairperson H:E Ato Guaner Yef Secretary: Engineer Olero Opieo	047 5510003 047 55101031 047 5510229	0911 755297	
Regional Technical Committee				
Regional Advocacy and Communication Sub Committee				
Head, Regional Emergency Operation Centre				
Store Keeper				
FAO National Consultant	Dr Miressa Keno		0911	Miressa.Keno@fao.org

			406014	

Harari Regional State				
Key Responsibility Centres and Offices	Name of key contact persons	Contact Address		
		Office Phone	Mobile Phone	E-mail
BoARD	Head: Ato Abdiqadir Aden Deputy Head: Dr. Sultan Haji Temam	0256666686 0256660449	- 0915330465	sultan2ht@yahoo.com
Animal Health Services	Head: Ato Belayneh Niguse Team Leader: Firdaweq Tesfaye	0256661794 0256661794	0915740933	
Regional Veterinary Laboratory	Head: - No lab Deputy Head: No lab			
Regional Coordination Committee	Chairperson: Ato Murad Abdulahi Co-Chairperson: Ato Abdiqadir Aden Secretary: Dr. Kassa	025661727 0256666686 0256661733		
Regional Technical Committee	Chairperson: Dr. Sultan Haji Temam Co-Chairperson: Secretary:	0256666686	0915330465	sultan2ht@yahoo.com
Regional Advocacy and Communication Sub Committee	Chairperson: Co-Chairperson: Secretary:			
Head, Regional Emergency	Dr. Fekadu Belay	O256663324	091574328	fkadu_belay@yahoo.co

Operation Centre			4	m
Store Keeper				
FAO National Consultant	Dr. Yosef Seyoum	0257757491	0915741455	Yosef.Seyoum@fao.org

Oromiya Regional State				
Key Responsibility Centres and Offices	Name of key contact persons	Contact Address		
		Office Phone	Mobile Phone	E-mail
BoARD	Head: Driba Kuma Deputy Head: Tadese Guta	011515158907	0911407015 0911894259	
Animal Health Services	Head: Dr Dereje Gudeta Deputy Head: Dr Ahimed Ibrahim	011515158907 0115522208	0911708034 0915320246	
Regional Veterinary Laboratory	Head: Dr Hailu Wondimu (Asela) Deputy Head: Dr Yohanes Head : Dr Adugna Tadese (Bedelle) Deputy : Dr Aster Tadese Head : Dr Bekele Biru (Hirna) Deputy: Dr Ketema Bogale	0223311324 0223313428 0474450169 0474450170 0254410439 0254410439	0911841050 0912120889	
Regional Coordination Committee	Chairperson: Dirba Kuma Co-Chairperson: Dr Zenebech Yadete	0115527306 0115158907	0911407015 091170803	

	Secretary: Dr Dereje Gudeta		4	
Regional Technical Committee	Chairperson: Dr Dereje Gudeta Co-Chairperson: Dr Kedir Mohamed Secretary: Dr Ahimed Ibrahim	0115158907 0115527306 0115522208	0911 70 80 34 0915320246	
Regional Advocacy and Communication Sub Committee	Chairperson: Information and communication Bureau Co-Chairperson: Tourism and trade Bureau Secretary: Fekadu Tefera	0111573193 0115505966 0911347312		
Head, Regional Emergency Operation Centre	Dr Ahimed Ibrahim	0915320246		
Store Keeper				
FAO National Consultant	Dr Tesfaye Alemu	0115522208	0911866928	Tesfaye.Alemu@fao.org

SNNP Regional State				
Key Responsibility Centres and Offices	Name of key contact persons	Contact Address		
		Office Phone	Mobile Phone	E-mail
BoARD	Head: Ato Mulugeta Fetene Deputy Head: Ato Usman Surur Siraj	(0462) 208843 (0462) 205400	(0916) 823356 (0911) 387939	
Animal Health Services	Head: Dr Daniel Mulugeta	(0462) 201317	(0916) 827572	
Regional Veterinary Laboratory	Head: Dr Terzu daye (Soddo) Dr Zewdu Dagne (Mizan)	(0465) 512593 (0473) 351113	(0916) 831914	
Regional Coordination Committee	Chairperson: Ato Tsegaye Mamo Ato Mulugeta Fetene Co-Chairperson: Dr. Shiferaw T/Mariam Secretary: Ato Goa Mamo	(0462) 206167 (0462) 208843 (0462) 209209 (0462) 201317	(0911) 228725 (0916) 823356 (0911) 237530 (0912) 009231	Goa_mamo@yahoo.com
Regional Technical Committee	Chairperson: Ato Goa Mamo Co-Chairperson: Ato Demise Burbamo Secretary: Dr Daniel Mulugeta	(0462) 201317 (0462) 205950 (0462) 201317	(0912) 009231 (0912) 050659 (0916) 827572	
Regional Advocacy and Communication Sub Committee	Chairperson: Ato Alemu Zewde Co-Chairperson: Hussen Abdu Secretary: Tsehay Assefa	(0462) 206139 (0462) 202042 (0462) 209209	(0916) 580387 (0916) 828822	

Head, Regional Emergency Operation Centre	Dr Daniel Mulugeta	(0462) 201317	(0916) 827572	
Store Keeper				
FAO National Consultant	Abel Mersie (Dr)	(0462) 216760	(0915) 732919 (0911) 056033	

Tigray Regional State				
Key Responsibility Centres and Offices	Name of key contact persons	Contact Address		
		Office Phone	Mobile Phone	E-mail
BoARD	Head: H.E Berhane Hailu Deputy Head:	034440 40 10	0914 709382	berhanehai@yahoo.com
Animal Health Services	Head: Dr Kebede W/Giorgis Deputy Head:	03444 40 10	0914 72 48 15	
Regional Veterinary Laboratory	Head: Dr Girmay W/Selassie Deputy Head:	0344 403665	0914 720038	girmayewelde@yahoo.com
Regional Coordination Committee	Chairperson: H.E Ato Tsegay Berhe Co-Chairperson: Secretary:		xxxxxxxxxxxxxx	
Regional Technical Committee	Chairperson: Dr Kebede W/Giorgis Co-Chairperson: Secretary:	03444 40 10	0914 72 48 15	
Regional Advocacy and Communication Sub Committee	Chairperson: Co-Chairperson: Secretary:			
Head, Regional Emergency Operation Centre	Dr Kebede W/Giorgis	03444 40 10	0914 72 48 15	
Store Keeper				

Somali Regional State				
Key Responsibility Centres and Offices	Name of key contact persons	Contact Address		
		Office Phone	Mobile Phone	E-mail
BoARD	Head: Ato Abdulahi Aden Deputy Head: Dr. Ahmed Mohamed	0257753584 0257754980	0915330178 0915330193	abdullahidn@yahoo.com xarshin34@yahoo.co.uk
Livestock Development Department Animal Health Service	Head: Dr. Abdihakim Mohamed Team Leader:Dr.Getahun Bizabih	0257754980	0911809217	hanimco2005ets@yahoo.com
Regional Veterinary Laboratory	Head: Eshetu Zewde (acting) Deputy Head:	0257756950	0915745112	
Regional Coordination Committee	Chairperson: Ato Abdulahi Hussen (president) vice-Chairperson: Ato Abdulahi Aden Secretary:Dr. Ahmed Mohamed	0257752914 O257753584 0257752681	0915330178	abdullahidn@yahoo.com
Regional Technical Committee	Chairperson: Dr Abdihakim Mohamed	0257754980 0257752681	0911809217	kalane54@hotmail.com

	Co-Chairperson:Dr. Abdurehman Abdulahi Secretary: Dr Yosef Seyoum (FAO)	0257757491	0915741321 0915741455	Yosef.Seyoum@fao.org
Regional Advocacy and Communication Sub Committee	Chairperson: Co-Chairperson: Secretary:			
Head, Regional Emergency Operation Centre	Dr. Getahun Bezabih	O257753584	0915744010	drgetahun@yahoo.com
Store keeper	Ato Ejigayehu Habte	0257756950	0911792484	
FAO National Consultant	Dr. Yosef Seyoum	0257757491	0915741455	Yosef.Seyoum@fao.org

Table 5: Human Resource (Federal)

Federal	Classification	Federal Institutes						Remarks
		MoARD	NAHDIC	NVI	EHNRI	FVM/ AAU	IPB/AA	
	Veterinarians	71	24		**4**		5	
	Animal Health Assistants	7	11		3	15	1	
	Animal Health Technicians	94*						*89 Lab Technicians
	Meat inspectors	22						

Table 6: Human resource (Regions)

Regions	Classification	Number of animal health professionals						Remarks
		Regional Office	Regional	Zone	Woreda	Private	Others*	
Addis Ababa	Veterinarians	3	2		7			
	Animal Health Assistants		9		30*			*24 meat inspectors
	Animal Health Technicians				6			
	CAHWs							
Afar	Veterinarians	4	-	-	10	-	-	
	Animal Health Assistants	1	-	-	29	1	-	
	Animal Health Technicians	-	-	-	30	-	-	
	CAHWs	-	-	-	669	-	-	
	Number of personnel trained in Bio-security, culling and vaccination	3	-	-	60	-		
Amhara	Veterinarians	1	22		54		2*	Meet inspectors
	Animal Health Assistants		31	9	218		20*	Meat inspectors
	Animal Health Technicians							

	CAHWs				1116			
Benshangul Gumuz	Veterinarians	3	3	-	2	1	1	
	Animal Health Assistants	-	2	-	30*	-	-	*Assosa Technical and Vocational Institute
	Animal Health Technicians	-	-	-	27	-	-	
	CAHWs	-	-	-	-	58*	-	*50 of them will be trained in April
Dire Dawa	Veterinarians	1	4				1*	*quarantine
	Animal Health Assistants	1	4		6		5*	*abattoir
	Animal Health Technicians	1			20		3*	*abattoir
	CAHWs							
Harari	Veterinarians	2						
	Animal Health Assistants	2			4			
	Animal Health Technicians							
	CAHWs				6			
Gambella	Veterinarians	1		2				
	Animal Health Assistants	1		4	1			
	Animal Health Technicians			40				
	CAHWs			45				
Oromiya	Veterinarians	6	11	9	94			
	Animal Health Assistants	2	16	4	377			
	Animal Health Technicians	-	6		884			

	CAHWs							
SNNP	Veterinarians	3	10	5	36	1	9*	*8 Vets (University) 1 vet (Municipality)
	Animal Health Assistants	1	8	1	170	5	5*	* 5 AHA Urban administration
	Animal Health Technicians	1	10	-	311	17	1*	* 1AHT Urban administration
	CAHWs					91		
Somali	Veterinarians	4			7		1*	*research
	Animal Health Assistants		2		59	2		
	Animal Health Technicians		2		>395			
	CAHWs				>1047			
Tigray	Veterinarians	3	6		34		14*	*University
	Animal Health Assistants				75			
	Animal Health Technicians				53			
	CAHWs				286			

Table 7: Resource inventory

Items	Regions											Total
	NAHDIC	Afar	Amhara	Benshagul	Dire Dawa	Gambella	Harari	Ormia	SNNP	Somali	Tigray	
Antiviral disinfectant (Kg/Packs)												
Apron white, Disposable pack of 100												
Bio-hazard labels pack of 10												
Chlorine bleach 10% (lits)												
Coverall blue Elas Medium CS25												
Coverall Blue Elas SM												
Coverall blue Elas XL. CS25												
Coverall white Elas Medium. CS25												
Coveralls (pack of 25)												
Decontamination kit SK960												
Disposable Apron (cases)												
Disposable boot cover (pairs)												
Disposable Gloves (case of 100)												
Disposable head cover(pcs)												

First aid kits (Pcs)												
Ear tag (plastic)												
Ear tag applicator												
Goggle, safety protector												
Ice box (Pcs)												
IgG ELISA for RVF												
IgM ELISA for RVF												
Knapsack sprayers (Pcs)												
Large plastic bags (kgs)												
Latex glove pack of 100												
N-95 mask(pcs)												
Plastic gallons (Pcs)												
Rubber boot (Pairs)												
Safety goggles (pcs)												
Sampling kits												
Shoe cover pack of 75												
Syringes with needles (Pcs)												

Annex 8.5: Advocacy and communication

Annex 8.6: Recommended quarantine and movement controls

Area	Activities	Measures
Infected (IP), dangerous contact and suspect premises (DCP): IP: A premises on which RVF is confirmed or presumed to exist—total movement control is imposed. DCP: A premises containing susceptible animals that have been on an IP—total movement control is imposed.	*Movement out of susceptible animals*	• Prohibited
	Movement in of susceptible animals:	• Prohibited
	Movement out of specified products:	• Milk must be acidified and buried. • Other ruminant products including camel must be destroyed.
	Movement out of other animals:	• No movement of any animal capable of being naturally infected.
	Movement in and out of people:	• People will be advised to use insect repellent and appropriate clothing. Only authorized personnel will be allowed on to infected premises. Personnel and stockowners and their families who have been on an infected premise must undertake to contact the Chief Medical Officer of the area where they are at the time of developing symptoms to report any symptoms that might be due to Rift Valley fever.
	Movement in and out of vehicles and equipment:	• Vehicles leaving an infected premises or dangerous contact premises must be sprayed with a knockdown aerosol insecticide. • Water holding containers should be removed or sprayed and then covered
	Movement out of crops and grains:	• No restriction.
Restricted area (RA): will be drawn around all IPs and DCPs. The distance in	*Movement out of susceptible stock:*	• No ruminants may leave restricted area except fully immune vaccinated animals under permit.
	Movement in of susceptible stock:	• No ruminants to enter restricted area.

any one direction is determined by factors such as livestock concentrations, the weather and prevailing winds, the distribution and movements of susceptible wild animals, the presence of possible vectors, and should be at least 10 km from the location of any known infected animals. It is important to prevent the spread of the disease by animal movements although some local spread my still occur due to aerosols. A distance of 10 km should ensure that the disease will be contained if there is	*Movement within of susceptible stock:*	Not allowed (except within a property) but fully immune vaccinated animals may move under permit.
	Movement through of susceptible stock:	Not allowed
	Movement of specified products:	Milk must be boiled or pasteurised. Semen/embryos, movement out prohibited. Other ruminant products under permit.
	Movement of other animals, people, equipment:	No restriction. People should be advised to see their doctor if they develop symptoms consistent with RVF.
	Vehicles:	No restriction.
	Sales, shows etc:	Not allowed.
	Enterprises:	Abattoirs can only receive under permit and all staff must be fully briefed as to the human health risk of RVF. Milk factories can receive under permit and supervision. Milk must be boiled or pasteurised as soon as possible and equipment disinfected as directed.
	Stock routes, rights of way:	No movement.

no insect vector spreading the disease and no illegal movement of animals. A high level of movement control and surveillance will apply.		
Control area (CA): will be imposed around the RA. The purpose of the CA is to control movement of susceptible livestock for as long as is necessary to complete trace-back and epidemiological studies. Less stringent movement control and surveillance will apply than for the RA. Once the limits of the	*Movement out of susceptible stock:*	Ruminants may be sent for slaughter at an approved abattoir under permit. Fully immune vaccinated animals may leave control area under permit.
	Movement in of susceptible stock:	May move under permit.
	Movement within of susceptible stock:	May move under permit.
	Movement through of susceptible stock:	A permit may be issued in urgent circumstances.
	Movement out of susceptible stock:	May move under permit.
	Movement through of susceptible stock:	A permit may be issued in urgent circumstances.
	Movement of specified products:	Milk must be boiled or pasteurised.
	Movement of other animals,	No restriction. People should be advised to see their doctor if they develop

disease have been confidently defined, the CA boundaries and movement restrictions should be relaxed or removed. However, if the disease becomes widespread in an insect vector population, the CA may be expanded to include that vector's known geographical range. The CA must include all premises adjacent to known IPs. (In settled areas adjacent premises are likely to be part of the RA.)	*people, equipment:*	symptoms consistent with RVF.
	Vehicles:	No restriction
	Sales:	Can be held under permit.
	Enterprises:	As for restricted area.
	Stock routes, rights of way:	Movement under permit.