

**LIVESTOCK VACCINATION CAMPAIGN FOR MANAGEMENT OF
EAST COAST FEVER**

PEST MANAGEMENT PLAN

BOMET COUNTY

AUGUST 2020



ACRONYMS

CDSO	Chief Drug Strategy Officer
CDVS	County Director of Veterinary Services
CECM	County Executive Committee Member
CESSCO	County Environment and Social Safeguards Compliance Officer
CGB	County Government of Bomet
CIDP	County Integrated Development Plan
CIG	Common Interest Group
CO	Chief Officer
COVID-19	Corona Virus Disease-2019
CPC	County Project Coordinator
CPCU	County Project Coordinating Unit
ECF	East Coast Fever
EMCA	Environment Management and Co-ordination Act
FMD	Foot and Mouth Disease
GHG	Green House Gases
GRM	Grievance Redress Mechanism
IVM	Integrated Vector Management
KCSAP	Kenya Climate Smart Agriculture Project
KES	Kenya shillings
KEVEVAPI	Kenya Veterinary Vaccines Production Institute
M&E	Monitoring & Evaluation
MOH	Ministry of Health
NEMA	National Environment Management Authority
OHSOP	Occupational Health and Safety Operational Policy Operation Policy
PDO	Project Development Objective
PO	Producer Organization
PMP	Pest Management Plan
SMS	Short Message Service
VMG	Vulnerable and Marginalized Group

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EXECUTIVE SUMMARY

Milk production is one of the main sources of economic livelihood to farmers in Bomet County and as such cattle are reared by most farmers in the County. The enterprise encounters several challenges with the main challenge being diseases such as East Coast Fever (ECF).

The County Government of Bomet (CGB) has in her County Integrated Development Plan (CIDP) envisioned vaccinating all cattle against ECF in an effort to caution farmers against economic and nutritional losses that may arise from these diseases. Vaccination campaign against the two diseases is also in the annual work plan of the Directorate of Veterinary Services in the County and also dairy farmers have asked for support in this area. CGB, through the Department of Agriculture, Livestock and Fisheries, has identified this vaccination campaign as one of the projects that the county Government would like to be supported by the Kenya Climate Smart Agriculture Project (KCSAP).

Environmental and Social Safeguard screening has been done on the proposed project which has identified several positive impacts and a few negative impacts whose mitigation measures have been highlighted in this Pest Management Plan (PMP). The positive impacts are reduced mortality in cattle, improved quantity and quality of milk and beef production, reduced chances of loss of livelihoods for people employed directly or indirectly by dairy and beef industry.

Negative impacts are wastes from empty vaccine containers and used needles. These wastes will be managed by ensuring that they are all collected and disposed off safely using the NEMA protocol of disposing off such wastes.

The project is estimated to cost KES 15,000,000 and this is the amount requested from KCSAP. The sub project funds will be managed under CPCU project account including PMP activities. Over 15,000 heads of cattle are targeted for vaccination. The proposed vaccination will be carried out countywide and the expected number of beneficiaries is 1,800 households.

The proposed vaccination project, once carried out, will have huge positive economic benefits to the County in general and to individual dairy farmers specifically as it would reduce mortality rate in cattle and loss in quality and quantity of milk and beef.

1. BACKGROUND INFORMATION

Bomet County lies between latitudes 0° 29' and 1° 03' south and between longitudes 35° 05' and 35° 35' east. It is bordered by four counties, namely: Kericho to the north, Nyamira to the west, Narok to the south and Nakuru to the north-east covering an area of 2,037.4 Km². The county is the source of major rivers such as Mara and Itare which flow into Lake Victoria (see Fig.1).

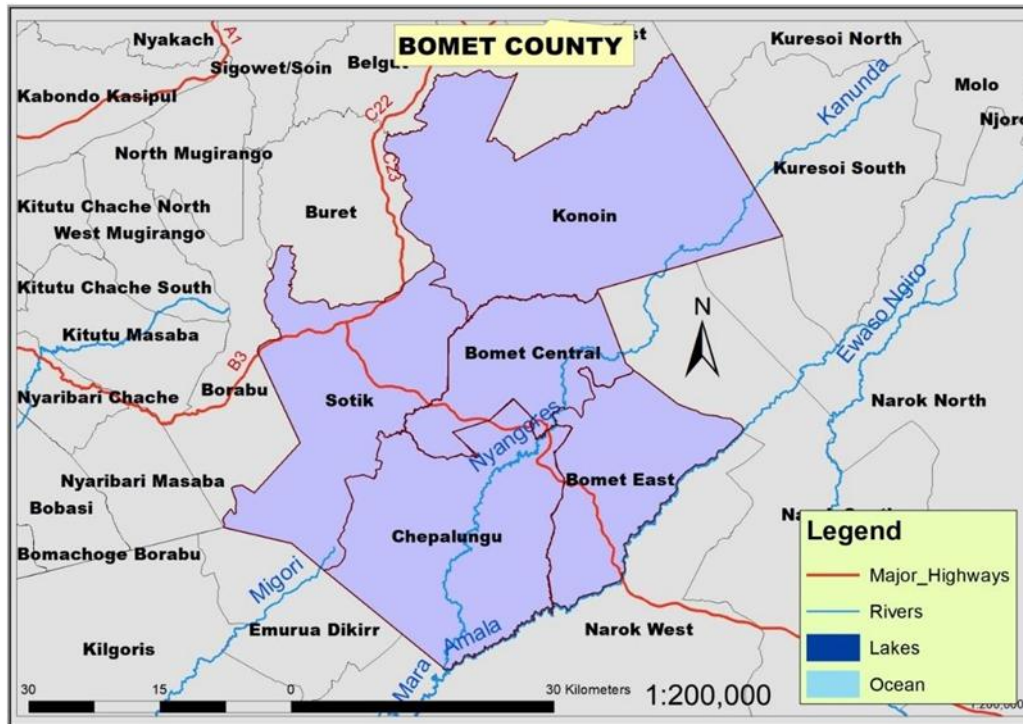


Figure 1: Map of Bomet County

A large part of the county is characterized by undulating topography that gives way to flatter terrain in the south. The overall slope of the land is towards the south, except the north eastern part which rises eastwards towards the 3,000m high Mau Ridges. The land slopes gently from Kericho plateau to about 1,800m in the lower area where the land is generally flat with a few scattered hills in Chepalungu and Sigor plain.

The County has several rivers: Kipsonoi River flows through Sotik to Lake Victoria, Chemosit flows through Kimulot in Konoin Sub-County, Nyongores flows from the Mau Forest southwards through Tenwek area, Amalo which originates in the Transmara Forest (Kimunchul) flows along south western boundary of the county, and Tebenik/Kiptiget Rivers which flow along the northern boundaries of the county. Dams are found in the drier zones of Chepalungu, parts of SotiksubCounty and Longisa in Bomet East sub-County. The County is made up of volcanic as well as igneous and metamorphic rocks. In addition to tertiary lava (phonolites) and intermediate igneous rocks there are basement systems (granite), volcanic ash mixtures and other pyroclastic rocks. Also present are quaternary volcanoes to the south west parts and faults along the Mau escarpment bordering Narok County. The higher altitudes in the north eastern parts of the county are particularly suitable for tea and dairy farming. The middle part of the county which lies 2,300m above sea level is suitable for tea, maize, pyrethrum and coffee farming. In the southern parts of the county such as Sigor and parts of Longisa, the main economic activity is livestock production, while milk production is a major economic activity in Sotik sub-county. Areas between 1,800m and 2,300m above sea level are mostly suitable for maize, pyrethrum, vegetables and beef production.

The county borders a long stretch of Mau forest which is an indigenous forest and home to different species of animals and plants. However, due to human encroachment, animal life is threatened and certain species of animals, birds, insects and plants are already extinct. Public sensitization on environmental conservation and the need for people to co-exist with other organisms is necessary if this trend is to be reversed. In addition, economic empowerment of the residents is needed to ensure they are able to meet their basic needs and thus promote environmental conservation.

Rainfall in the county is highest in the lower highland zone with a recorded annual rainfall of between 1000mm and 1400mm. The upper midland zone which lies west of the Rift Valley experiences uniform rainfall while in the upper midland zone on the southern part of the county experiences low rainfall.

Rainfall is evenly distributed except for the short dry season in January and February. The wettest months are April and May. Overall, there is little break between short and long rains in the whole county. In the extreme south, rains start in November and continue intermittently until June. The period from June to November is the driest season. In the extreme north, rains start towards the end of March and continues intermittently up to the end of December. The temperature levels range from 16 0 C to 24 0 C with the coldest months being between February and April, while the hot seasons fall between December and January. There are abundant water sources and even distribution of rainfall almost throughout the year. This explains why agriculture and livestock production are the main economic activities of the county.

Table 1: County Cattle population, milk production and households

Sub-County	Households	Cattle(2019)			Milk production in liters (2019) Av.
		Exotic Dairy	Exotic Beef	Indigenous cattle	
Bomet East	29,958	11,505	1,568	40,425	11,044,800
Konoin	38,178	13,991	843	20,863	13,431,360
Sotik	47,315	32,606	2,173	60,227	31,301,760
Bomet Central	38,259	19,907	1,069	31,885	19,110,720
Chepalungu	33,931	21,179	1,689	58,279	20,331,840
TOTAL	187,641	99,188	7,342	211,679	95,220,480

Source: 2017 Annual Report- Department of Agriculture, Livestock and Fisheries, County Government of Bomet

East Coast fever, also known as theileriosis, is a disease of cattle which occurs in Africa and is caused by the protozoan parasite *Theileria parva*. The primary vector which spreads *T. parva* between cattle is a tick, *Rhipicephalus appendiculatus*. East Coast fever is of major economic importance to livestock farmers in Kenya. Management of the diseases is done by treatment and vaccination of cattle using approved vaccines. The Kenya Veterinary Vaccines Production Institute (KEVEVAPI) is the authorized government institution charged with production of ECF vaccines among other livestock vaccines.

World Bank policies on Environment and Social Safeguards especially OP4.09 on Pest Management and OP4.01 on Environmental Assessment will be triggered in this project since the project is procuring vaccines, which are categorized as pesticides, and wastes from this activity are likely to impact negatively on the environment. OP4.09 encourages reduction in reliance on synthetic chemical pesticides, advocates promotion of Integrated Vector Management (IVM), and calls for minimization of environmental and health hazards of pesticide use. OP4.01 on Environmental Assessment requires that all WB funded projects are environmentally and socially sound and sustainable. This policy is triggered in this vaccination project since the vaccination process is likely to contaminate the environment with wastes such as empty vaccine bottles, bent or broken injection needles, used antibiotic vials, empty antihelmintic containers, used needles, disposable plastic syringes, discarded cotton wool and expired vaccines.

The triggering of the two WB policies calls for critical analysis of administration of the vaccines and management of all wastes that will emanate from this activity, hence the need for preparation of this PMP.

This vaccination project has been agreed upon after thorough and meaningful consultations carried out among all the relevant stakeholders, who mainly comprise dairy farmers, County leadership, County Technical Departments (CTDs), especially the Veterinary Department, milk traders and processors. The project is meant to benefit approximately 15,000 dairy farmers in Bomet County and since it will be free-of-charge it is envisioned to reach out to the most vulnerable individuals from all parts of the sub-County.

Bomet County is one of the 24 Counties in the country that is benefiting from the World Bank agricultural support under the Kenya Climate Smart Agriculture Project (KCSAP). In Bomet County, KCSAP is in 3 Sub-counties namely Konoin (Embomoss and Mogogosiek Wards), Bomet East (Kipreressand Longisa Wards), and Sotik (Ndanai/Abosiani and Rongena/Manaret Wards).

KCSAP is supporting farmers through micro-projects in four value chains of Dairy, Indigenous Chicken, Bananas, and Irish potatoes and also through sub-projects and Producer Organizations (POs).

Most farmers in Bomet County are mixed farmers who grow crops and at the same time keep livestock (dairy cattle, sheep and poultry). The cattle are mainly reared for milk production. The dairy farmers are the worst hit in case of an outbreak of ECF and they are the ones who have requested that the CGB vaccinate their animals against the disease.

The County Government of Bomet, through the Department of Agriculture, Livestock and Fisheries has requested KCSAP for support in funding for implementing vaccination programme of 5,000 cattle in the county against ECF as a sub-project. Dairy farmers in the County have asked for the vaccination of their cattle in order to save them huge economic and livelihood losses that may occur when their animals are infected by this disease. The vaccination programme is already captured in the CIDP and is also a key activity in the directorate of Veterinary Services in the Department of Agriculture, Livestock and Fisheries. In this programme, CGB will facilitate the vaccination exercise while KCSAP will procure the required vaccines.

2. JUSTIFICATION OF CARRYING OUT VACCINATION OF CATTLE AGAINST ECF

Notifiable animal diseases are highly infectious, rapidly contagious with high morbidity rates and varying mortality rates. They are referred to as notifiable diseases as they are supposed to be reported to authorities when they occur. They spread across the farm, county and national borders. Their mode of spread is through: - direct animal contact, wind and dust, human movement through vehicle, fodder and equipment e.g. milk containers from infected farms and through vectors. For Bomet County, the main notifiable diseases that occur are-

- East Coast Fever
- Foot and mouth disease
- Lumpy Skin Disease (Reported in Bomet 2018/2010 Veterinary reports)
- Anthrax

Some of these diseases are viral, bacterial and protozoan in nature hence no cure once the animals are infected and curable ones are very expensive to treat. This therefore calls for the establishment of preventive measures to ward off infections. They cause huge economic losses in the dairy industry through:

- Loss in production of milk as affected animal takes long to recover and resume production.
- Animal deaths from the disease
- Cost of treatment and control as supportive therapy.
- Loss in man hours spent attending to the sick animals.

The imposition of quarantine affects trade of livestock and livestock products by limiting access to markets.

Farmers, Milk transporters, agro-dealers, farm workers, and those in the hotel industry would likely lose their economic livelihoods in case of an outbreak of the diseases.

Milk processors would incur enormous economic losses in an eventuality of an outbreak due to loss of quantity and quality of milk.

The management of these diseases is through prevention (Vaccination), control of vectors, treatment and control of livestock movement.

Throughout the year, the county is faced with constant outbreaks of some of these diseases, notably the East Coast Fever disease. The disease is tick-borne and though it is treatable, the drugs used are very expensive and most of the time the animals affected die because the farmers cannot afford to buy the drugs. While the infected animal is undergoing treatment, the milk is discarded and in some cases the in calf cows abort resulting in loss of lactation cycle. To govern this disease, the vectors should be controlled by use of acaricides i.e. by spraying or dipping the animals weekly. Usually farmers spray their animals irregularly due to expensive acaricides and hence poor control of the disease. Consequently, the effective way to control ECF disease is by use of vaccination. Though the ECF vaccination is expensive, the good thing about it is that the animal is given the vaccine once in its life time and it is protected.

The department has hitherto managed to prevent and control this disease through giving subsidy to the dip committees to acquire the acaricides, which is not sustainable in the long run and the budgetary allocation to the department is not sufficient.

Although ECF vaccination is captured in the CIDP and the annual work plan of the technical Department of Veterinary Services, there is no budgetary allocation given despite its economic importance. Owing to the high

economic disadvantages of the disease, there is need to prevent their occurrence. Over 15,000 heads of cattle are targeted for vaccination. The proposed vaccination activities will be carried out countywide and the expected number of beneficiaries is 1,800 households.

The proponent of the sub-project are the County Department of Agriculture Livestock & Fisheries and KCSAP.

For the vaccination to be successful various stakeholders will be involved in the implementation. They include; Dairy farmers, County Government, KCSAP, Dairy cooperatives, NEMA, Media, private animal health practitioners, Public Health and the Ministry of Interior and Coordination of National Government.

The subproject will immensely benefit dairy farmers in the county since it will reduce/eliminate outbreaks of ECF and as a result there will be increased income from sales of milk, reduced death of cattle, available cattle for sale by farmers and saved cost of treating animals when they get the diseases. In addition, livelihoods of people who are employed directly or indirectly by the dairy and beef value chains will be maintained and also improved. These people are milk transporters, agro-dealers, hotels and farm workers. Dairy cooperatives will also benefit from increased sale of milk by the members. Consumers of milk and other dairy products will benefit from consumption of healthy products that are free from antibiotics that are used to give supportive treatment to cattle suffering from ECF. The environment protection will be enhanced since the amount of pesticides (acaricides) will be reduced and used items such as vials and used syringes will be minimized.

3. VACCINATION PROCESS

3.1. TARGETING AND MOBILIZATION

Vaccination will take place in the whole county that is; 5 Sub Counties/25 wards (See table 1 below).

Table 2: Targeted areas

SUB-COUNTY	NO. OF WARDS	WARDS
Sotik	2	Ndanai/Abosi
		Rongena/Manaret
		Kipsonoi
		Kapletundo
		Chemagel
Chepalungu	0	Kong'asis
		Nyangores
		Sigor
		Chebunyo
		Siongiroi
Bomet East	2	Longisa
		Kiprerres
		Chemaner
		Merigi
		Kembu
Bomet Central	0	Silibwet Township
		Nadaraweta
		Singorwet
		Chesoan
		Mutarakwa
Konoin	2	Mogogosiek
		Kimulot
		Embomos
		Boito
		Chepchabas

The Mobilization exercise will be undertaken by the Veterinary Directorate staff in collaboration with local community leaders. During mobilization Sub-county administrators, wards administrators, chiefs, Assistant chiefs,

Dairy cooperatives and influential community elders will mobilize target communities through barazas, meetings and through short messages (SMS). Publicity will be done through the most popular radio in the county in both Kiswahili and Kalenjin languages so as to create awareness to all dairy farmers in the County. This will ensure that all vulnerable and marginalized dairy farmers in the County get informed of the vaccination activity and participate in it. The County Government of Bomet through the Directorate of Veterinary Services will ensure that there are adequate vaccination crushes in each ward. Arrangements will be made for Aged farmers who may not be able to drive their cattle to the crushes to have their animals vaccinated on their farms. Political leadership will be informed on the project during mobilization. Thus various stakeholders have been mapped as depicted in table 3.

Table 3: Stakeholder Mapping

STAKEHOLDER	ROLE
Farmers/ beneficiaries	<ul style="list-style-type: none"> -Own the project and take their animals for vaccination -Construction and repair of crushes -Provide& prepare venue where vaccination will take place -Cooperate with the vaccination team -Participatory monitoring -Comply with the ministry of health guidelines in containing the spread of COVID-19 disease by wearing face mask, keeping the required physical distance, and washing hands as necessary during the vaccination exercise.
Dairy Cooperatives	- Publicity
Min. of Interior and Coordination (Chiefs)	<ul style="list-style-type: none"> -Publicity -Monitor the Vaccination exercise -Reporting
MOH-CG	-implementation and monitoring of COVID-19 guidelines
County technical department of Vet Services	<ul style="list-style-type: none"> -Provide technical teams to undertake the vaccination exercise -Provide technical expertise -Ensure the vaccine cold chain is properly maintained -Prepare the program for the vaccination exercise -Procurement of vaccines and equipment -Reporting -Participate in monitoring
NEMA	<ul style="list-style-type: none"> -Environmental safety -Supervise collection and safe disposal of waste -Reporting
GRM Committees	<ul style="list-style-type: none"> -Receive and handle all complaints and conflicts that may arise during the implementation process -Contribute 10% of the total cost of the vaccination sub project
County Government (Chief officer)	<ul style="list-style-type: none"> -Release officers to participate in the vaccination exercise -Provide means of transport to enhance mobility of officers during the exercise -Publicity (ward administrators) -Participate in monitoring
KCSAP/ CPCU	<ul style="list-style-type: none"> -Coordination of the subproject activities -Ensure safeguard issues are taken care of in the implementation process -Monitoring the implementation process -Reporting -Undertake an impact assessment of the subproject

Risks associated with the vaccination programme are environmental pollution, injury to livestock, hypersensitivity and vaccines reaction. These will be communicated to the community during mobilization. In order to mitigate the associated risks PMP will be implemented, safety of crushes improved for proper restraint and antihistamine available.

To effectively cover and reach the target animals good publicity and mobilization of the community to agree on dates and sites of vaccination will be undertaken.

Vaccine & equipment Procurement

This will be the responsibility of the veterinary directorate. The CDVS will initiate the procurement process with guidance from the CPCU. 15,000 doses of East Coast Fever (ECF) will be procured. The county has adequate refrigerators and cool boxes that will be used to maintain cold chain during the vaccination exercise (See table 4).

Table 4: Vaccination equipment & consumables

Item	Quantity
East Coast Fever Vaccine	15 000 doses
Liquid Nitrogen container 3litres	15
Liquid Nitrogen container 30 litres	4
Oxytetracycline 100ml 30% (vials)	5000
Antihistamines 100mls (vials)	10
Butalex 40ml (vials)	10
Albendazole 10% 1 litre container	700
Liquid Nitrogen (litres)	400
1cc Disposal syringe	15000
20cc Disposal syringe	15000
Hypodermic disposable needles 18 gauge	30000
60cc Disposal syringe	150
Eartags-branded	15000
Eartag applicator	15
Weighing band	16
Fridge	1
Scissors	20
Ordinary Thermometers	20
Surgical spirit	60
Cotton wool (Rolls)	15
Plastic Cool boxes	
Stationary	
• Marker pen	
• Masking tape	
• Photocopy papers	
• Flip chart	
Gumboots	20
Overall	20
Disposal gloves	60
Vehicle Transport-hire	4
Vaccinators allowances (man days)	450
Safety box (to store used needles)	15
Box to store used syringes	15
Provide provisional sum Supervision	1

3.2. VACCINATION PLAN

Since this exercise generally deals with vaccines and associated chemicals, they may be harmful to human life, animal life or the environment at large if mishandled. The effect may be even more pronounced if the exercise is extended for a period of time. There is also the issue of generation of potentially hazardous waste. Therefore, some safety

guidelines should be adopted from the outset and instilled through briefings to the vaccination team. These guidelines are informed through the regulations governing them. Important regulations and World Bank Policies to keep in mind are:

Occupational Health and Safety Act 2007 particularly sections 83 to 86. Section 83 gives provisions for handling, transportation and disposal of chemicals and other substances; Section 84 gives provisions for material safety data sheet; Section 85 provides for proper labeling and marking of all chemical packaging; while Section 86 advocates for classification of hazardous chemicals and substances.

Waste Management (EMCA) Regulations 2006 particularly sections 33, 34, and 35 (Part V on Pesticides and Hazardous wastes). The sections give provisions for classification, registration, labeling, packaging, advertising, distribution, storage, transportation, handling and disposal of pesticides.

World Bank policies on Environmental Assessment especially OP4.09 on Pesticide Management and OP4.01 on Environmental Assessment. These policies are aimed at ensuring that all WB projects reduce reliance on synthetic chemical pesticides, promotes Integrated Pest and/or Vector Management, and minimize environment and health hazards of pesticide use.

The county plans to carry out vaccinations against Foot and Mouth Disease and Lumpy Skin Disease in all the wards in Bomet County;

The exercise will be carried out by five teams in 30 days. Before rolling out the vaccination exercise, there will be proper briefing to staff participating in the activity prior to its commencement. The staffs involved have undergone IPM safeguards sensitization and will wear protective gear during the period of vaccination. The vaccination equipment will be provided by the project and County Director of Veterinary Services, Bomet County.

The exercise will start with publicity that will take 5 days. During this time of COVID-19 Pandemic when public gatherings are highly discouraged, publicity will be done using electronic and print media. Radio announcements and SMS messages in Kikuyu and Kiswahili languages will be used to pass the intended information on the proposed project. Fliers, posters and banners will also be used to publicize the project and mobilize the community.

The community will be mobilized using radio announcements, text messages, posters and telephone calls. Dairy cooperatives, County administrators, chiefs, and local leaders would also come in handy in mobilizing the community mainly using telephone calls. Gatherings would be in small groups of people who should comply with the following guidelines:

- i. The number of people should not be more than 10,
- ii. The attendees should keep a distance of 2m from each other,
- iii. All in attendance should wear face masks,
- iv. The venue should have clean running water and soap or alcohol-based hand sanitizers,
- v. There should not be any hard copy of informational materials distributed to the gathering.

The county public health department will be incorporated to ensure temperature checks are done accordingly to all participants besides complying with other COVID-19 regulations.

About 399 crushes are to be covered names of which are to be provided by the community during community mobilization. The status of the crushes will be verified and repairs will be done to prime it for the exercise. The County has a limited number of crushes and as such makeshift crushes will be constructed for vaccination exercises. The entire Foot and Mouth and Lumpy Skin disease vaccination exercise will take at least 35 days (5 days for publicity, 30 days for the actual vaccination process).

3.3. LOGISTICS & COLD CHAIN MANAGEMENT

The vaccine proposed for use against ECF will come from KALRO.

The vaccine is kept under subzero temperature under liquid nitrogen and the diluent is kept within a temperature range of between +20C and +80C. The antibiotics and antihelmintic which will be used will be kept under room temperature.

For the vaccines to remain viable during transportation, storage, and administration, there is need to have efficient refrigeration facilities throughout the vaccination exercise. Doses of the vaccines will be procured and collected from KALRO in batches that can be handled comfortably by the available refrigeration equipment in the County. This will ensure that there is minimal wastage of vaccines due to viability loss arising from temperature related causes.

The directorate of veterinary services will supervise the maintenance of the cold chain throughout the vaccination period.

3.4. DISPOSAL AND WASTE MANAGEMENT

Waste that are expected from the exercise include; Syringes and needles, drugs and vaccines and their containers, NEMA will oversee waste collection and disposal at the burning chambers in the County. Waste will be segregated and put in well labeled Biohazard bags and sharps containers which will be provided to the field teams and a schedule for collection given to them. The waste will then be deposited at the County designated burning chambers in the Sub-counties and later be disposed in accordance with waste management best practices officers who will form the waste Disposal team (see Table 6).

Table5: The Waste Disposal team

RESPONSIBLE OFFICER	DEPARTMENT
CDSO (COUNTY DISEASE SURVEILLANCE)	VETERINARY
COUNTY DIRECTOR- NEMA (SUPERVISOR)	NEMA
M&E/CESSCO	KCSAP
PUBLIC HEALTH OFFICER	HEALTH
2 DRIVERS	

4. POTENTIAL IMPACTS OF THE VACCINATION SUB PROJECT

The sub project is in category B and has potential to cause harm both to the environment and the social aspect of human life. It was subjected to screening so as to identify potential adverse impacts and propose necessary mitigation measures. Several partners were consulted during the screening exercise including County veterinary staff, NEMA, public health staff and dairy farmer groups throughout the County.

4.1. POSITIVE IMPACTS OF VACCINATION

Vaccination improves animal health hence improved productivity. This will lead to increased availability and accessibility of livestock products; milk and meat which will enhance household nutrition and Increased household income through sale of livestock products e.g. meat and milk. Vaccination will also ensure access and stability of markets. Since ECF is a notifiable disease, its occurrence calls for imposing of quarantine as a measure to contain the diseases and avoid their spread to other regions. This disruption, leads to reduced income as farmers cannot access market for their livestock and livestock products. In addition, women will be deprived of income as they supply to these markets other products like vegetables, eggs, chicken, cereals and other wares. Vaccination also leads to reduced cost of production as farmers will not spend money on disease treatment which is a threat in absence of vaccination.

This will lead to increased investment in agriculture as farmers will plough back the profit accrued leading to increased agricultural productivity.

4.2. POTENTIAL NEGATIVE ENVIRONMENTAL, SOCIAL IMPACTS AND RECOMMENDED MITIGATION MEASURES

In line with World Bank Environmental and Social Safeguard Policies, an agricultural development project which uses agrochemicals in a wide scale such as this will actuate World Bank's Operational Policy OP 4.09(Pest Management Plan-PMP). This policy supports safe use and environmentally sound pest management and promotes the use of biological and environmental control methods. This PMP covers the existing national and international legislations, current practices on the use of vaccines in prevention of livestock disease infection. It has identified vaccines handling, storage, transportation, environmental and health and disposal risks that may be encountered during the campaigns and how to mitigate against each one of them. Each specific risk or negative impact has mitigation measures as proposed which have been captured as per consultations with key players in the proposed exercise hence contributing to PMP preparation. Major groups consulted and trained on pest management included all county veterinary staff, NEMA, cold chain store managers, and private veterinary practitioners, public health staff and Country waste disposal staff. The key risks and impact areas in the county were identified in procurement, on transit to county, in the county cold stores, on transit to vaccination sites, during actual vaccination, post vaccination and disposal. General mitigation practices that will be carried out have been outlined. Vaccines are biological substances used for the purpose of covering the animal from adverse effects caused by pathogens.

The vaccination exercise will trigger OP 4.01 on Environmental Assessment because it is likely to introduce wastes into the environment mainly from empty vaccine bottles and damaged needles. The negative impact that would be caused by these wastes is minimal since they would be collected as soon as they are generated and disposed off safely as per NEMA directives. This PMP will be sufficient in addressing issues concerning negative impacts that may arise in the course of implementing the vaccination programme.

4.2.1. Environmental

Veterinary waste around vaccination sites:

Vaccination team may throw or leave all waste around and within vaccination site that may be picked by livestock owners, passersby and children oblivious of the danger posed by such waste.

In this vaccination campaign, the vaccine that will be used will come in plastic straws from where the vaccine can be drawn using a needle without causing spillage of the vaccine. The vaccine will be mix with a diluent in a plastic bottles. Vaccination will be done by injecting animals using disposal plastic syringes and needles. This means that there will be minimal or nil chances of vaccine spillage. Veterinary Waste, therefore, will only comprise of empty plastic vaccine straws, plastic syringe, needles, plastic straws, antibiotic glass vials and antihelmintic plastic containers. The disposal team will ensure that all the empty plastic vaccine bottles and syringes are collected from the crush sites and put into disposal bins for transportation to incineration point. These waste disposal containers shall be handled by licensed waste handlers, and documentation of volume or quantity done.

4.2.2. Air Pollution

Movement of livestock on bare earth surface and improper disposal of empty containers leads to air pollution. To reduce the impact of air pollution during disposal of the waste will be done in selected incinerators that have been approved by NEMA. All systems in the incinerator should be operating as desired so that the gases that are released

into the air and ashes that are left behind are inert such that they don't cause any negative impact to the environment. Possibility of returning the empty plastic bottles to KALRO for recycling would also be explored in order to avoid air pollution through incineration.

4.2.3. Social Risks

Failure by some farmers to take their cattle for vaccination due to fear of the animals being infested by ticks, worms or being mounted by bulls from other herds. Members of some marginalized communities may fail to avail their animals for the vaccination due to cultural factors that prohibits their animals to mix with animals from other communities. All these factors may hinder this vaccination exercise. Social and/or professional misconduct by the vaccination team, handling of grievances/complaints arising out of the vaccination are some of the social risks foreseen with this sub project. Proper publicity and mobilization of the community to agree on dates and sites of vaccination will be undertaken and a team of seven members headed by CPC is already in place as county grievances redress committee to handle complaints/ grievances received from communities before, during and after vaccination campaign. Farmers who do not want their animals to mix with other herds will have their animals vaccinated on their farms. VMGs will also be identified and purposively targeted in the exercise by constructing crushes within their neighbourhood.

4.2.4. Health & Safety

Accidental self-jabbing or through skin exposure by direct contact with the vaccine are some of the health and safety risks associated with the vaccination exercise. This will be mitigated through proper sensitization and also protective clothing.

PPEs will be used by all the vaccinators, therefore minimizing cases of injury and exposure to the vaccines and antibiotics. The supervisors will ensure proper sensitization of the community on potential exposure risk and ensure that children are kept away from vaccination crush sites.

Consumption of livestock products such as meat and milk from the vaccinated animals before the elapse of the chemical residual period may cause human health problems both within and outside the project area as the products may as well be sold by the beneficiaries. The vaccination team will create awareness of the vaccination exercise and the side effect of such during the publicity barazas.

Injury of the vaccination team by the animals, this will be mitigated through proper restraining of the animals in crushes; worn out crushes will be repaired and new ones constructed in areas without. In addition, provision of first aid kits in case of injury.

Spread of COVID-19 may increase during the vaccination exercise as farmers, herders, vaccinators, drivers, health officers and other staff monitoring the exercise congregate at the vaccination site. This will be mitigated by:

- Starting the vaccination exercise early enough in the morning so that there is no building up of large herds of animals or crowds of people.
- Strictly following the guidelines of the ministry of health of social distancing, wearing of face masks, washing hands with running water and soap or use of alcohol based sanitizer and social distancing.

4.2.5. Economic

Beneficiary households will be deprived of income from sale of livestock products (meat and milk during the vaccination period).

This will be a short term effect that will be overcome through sensitization of the beneficiaries to have an alternative source of income during the vaccination period.

5. PEST MANAGEMENT PLAN

Pest Management Plan is a tool used to ensure undue or reasonably avoidable adverse impacts of the project implementation are prevented and that the positive benefits of the project are enhanced. During the implementation of the livestock vaccination project at various stages various mechanisms and activities, safeguards and controls will be put in place to ensure that the beneficiaries both the animals and humans receives the potentially maximum utility from the planned vaccination exercise (See table 7).

Table 6: Pest Management Plan –East Coast Fever

Impact Issue/Risk	Mitigation	Input	Responsible Person	Monitoring / Verifiable Indicators	Estimated Cost (KES)
AT PROCUREMENT					
Packaging of the wrong vaccine, Insufficient diluent	A team with S-12 will be responsible for confirming the packaging, the expiry date and amounts	Night outs for the persons, vehicle, fuel	CDVS/ CDSO	-No of properly packaged, non-expired vaccines procured. -No. of qualified personnel involved in procurement of the vaccines -No of accidents witnessed -No of vials damaged -No of temp monitors available -No of letters sent, -No of SMS sent, -No of emails sent, No of phone calls made,	15,000,000
Packaging of poor quality vaccines	Checklist, check the expiry dates and quantities of the drugs.	S12 and any other relevant documents			
Unqualified personnel collecting the vaccines.	Qualified vet personnel to collect the vaccines.				
Accidents	Use well trained drivers		CDVS/ CDSO		
Leakages, less volumes and lack of labels.	Verification at dispatch of vaccine. Officer collecting the vaccines should be a technical staff	Personnel	CDVS/ CDSO		
Absence of temperature monitors during transit	Use temperature monitor	Temperature Monitors	CDVS/ CDSO		
Lack of communication and proper arrangement for vaccine collection and transport	Timely arrangement with vaccines supplier and communication with supplier and destination	Airtime and data bundles	CDVS/ CDSO		
ON TRANSIT FROM KALRO TO COLD STORE					
Poorly maintained and serviced vehicle	Use of hardtop carrier and reliable well maintained and serviced vehicle ,Rescue vehicle in case of breakdown.	Fuel	CPC/ CDVS	Amount of fuel used. No of well-maintained vehicles available No of vehicles with Emergency stickers -No of freezers procured -No of vehicles	25,000
Unnecessary police check and stoppage	Provision of labeled Stickers urgent, don't delay on the cool boxes and vehicle.	Emergency Stickers.	CPC/ CDVS		

Impact Issue/Risk	Mitigation	Input	Responsible Person	Monitoring / Verifiable Indicators	Estimated Cost (KES)
Inadequate storage Facilities (freezer, plastic tubing)	Purchase of more freezers and plastic tubing	Funds	CPC/ CDVS	specifically assigned vaccination duty only -No of cool boxes delivered in time -No of temp monitors installed in the cool boxes	
Diversion of the co-duty.	Work ticket should be Specific. Avoid double duty	car tracker	CPC/ CDVS		
Using of inappropriate tools to transport vaccines (cartons, instead of cool boxes)	Ensure the vehicle carries cool boxes with ice packs	Cool boxes, icepacks and motorized cool boxes	M&E/ CDSO		
Lack of gadgets to monitor vaccines temperatures	Transport and storage Temperature monitors to be in the cool boxes and fridges.	Temperature monitors	M&E/ CDSO		
IN CDVS COLD STORE					
Inadequate staff at the store to offload and count the vaccine	Staff mobilization in good time both casuals and regulars.	Personnel	M&E/ CDSO	No of both skilled and unskilled personnel deployed to the exercise -No of firefighting equipment available -Store space available for storage of vaccines -No of automatic standby generators available -Volume of emergency ice cubes available, -No of fridges available, -No of technicians trained and available for the exercise. -No of contamination incidences, -No of staff trained in	75,000
-Lack of firefighting equipment Inadequate store space & equipment	Ensuring proper firefighting facilities are available, -well ventilated space & equipment	Firefighting equipment -Adequate store	CDVS/ CDSO		
Power disconnection and blackout	Timely payment of electricity bills	Automatic Standby generator.	CDVS/ CDSO		
Failing of Cooling system	Ready ice cube for emergency, well maintained fridges, training of technical staff on basic maintenance of fridges and provision of fridge guards.	Funds, personnel	CDVS/ CDSO		
Danger of infection from some vaccines while handling by the officers.	Knowledge of proper handling of vaccines and management of contamination	-Funds for training for staff -Provision of PPE	CDVS/ CDSO		
Faulty deep freezer/ fridges	1. Frequent checks of the freezers and fridges	1) A developed check list 2) Funds for	CDVS, CDSO		

Impact Issue/Risk	Mitigation	Input	Responsible Person	Monitoring / Verifiable Indicators	Estimated Cost (KES)
	2) Have a backup freezer	Repairs		handling vaccinations,	
Inadequate adherence to the protocol of acquisition of vaccines from the stores	All officers including VO should be sensitized on the need to follow the protocols	Memo produced and circulated to all relevant persons	CO, CDVS	-No of PPEs available, developed protocols on management of vaccinations, -No of water-proof stickers available,	
Inadequate labeling especially of vaccines returned from the field	The VO from the field should clearly inform the cold chain manager of the vaccines, the batch numbers and expiry dates of the vaccines returning from the field before receiving them for storage	Water proof stickers clearly labeled with the details of vaccine details	Team Leaders	-Amount of dry ice available, -No of temp tracking sheets developed, -No of disposal receptacles available,	
Inadequate cold chain materials	1) Procure enough polythene tubing for making ice packs 2) Or alternatively dry ice	Polythene tubing Dry ice/frozen Carbon dioxide	CDSO/ Storeman	-Amount of clean water and soap available	
Inadequate monitoring of temperature	Regular monitoring of the temperature of the freezers using a temperature tracking sheet and a thermometer	Temperature tracing sheet. thermometer	CDSO, Storeman		
Bio safety problems	1) Provision of Personal protective clothing to the store man	-PPEs	CDVS		
	2) Provision of clean water at the store 3) Receptacles for disposal	-Water supply Tank Receptacles for waste			
TRANSIT TO THE VACCINATION SITES					
Inadequate/missing vaccination equipment	-Ensure availability of extra equipment -Confirm availability of all equipment via checklist during loading	Funds for extra equipment	CPC, CDVS	-No of planning meetings held, -No of Vaccination equipment available,	550,000
Failure to collect essential equipment	1.Prepare a detailed Checklist 2) Assign task to specific officer to tick the checklist during loading	Detailed Checklist	Team Leader	-No of vaccination equipment to be procured -Number of Checklist developed,	
Inadequate vaccination equipment	Proper planning between CPC and CDVS to procure all required equipment prior to start of vaccination	Joint planning Meetings	CPC, CDVS	-Duty Roster prepared -Number of PPEs available, -Number of PPEs to be procured.	
	Forgetting some vaccination equipment	Detailed procurement list	Team leaders		

Impact Issue/Risk	Mitigation	Input	Responsible Person	Monitoring / Verifiable Indicators	Estimated Cost (KES)
	and vaccines	-Vaccines -Disposable syringes -Vaccine Diluents Cool boxes -Ice packs -PPE (overalls, gumboots, Masks, gloves) -disposal Equipment (sharp containers, biohazard bags) -Surgical spirit -Cotton wool -Stationaries (Pens, books, vaccination manifests).			
ACTUAL VACCINATION					
Mechanical breakdown during vaccination (including punctures and tyre bursts) mobile pressure machines Driver to ensure spare tyre is in good condition	Provision for stand by vehicle (if available)	Vehicle Funds	CPC/ CDVS	-No of standby vehicles available for the exercise -No of hired private practitioners, -Allowances allocated for hiring the private practitioners -No of animals vaccinated at home, -Total number of animals vaccinated, -No of vehicles & personnel assigned the work of home vaccination -No of First Aid Kits available, Number of injury incidents reported	1,562,000
Inadequate vaccination personnel ie due to staff shortage, sickness/ emergency commitment	1.Have standby personnel 2)Co-opt from private practitioners	Provide for field allowance for the personnel	SCVO		
Animals unable to visit vaccination crushes due to Pregnancy or high intensive zero grazing system	Carry out farm visits	Provide vehicles	Vaccination team leaders		
Accidents/ Injuries	Provide first aid kits	Kits	CDVS		
Animals not being availed for vaccination	Carryout adequate publicity	Publicize through electronic and print media and through SMS	CPC, CDVS	-No of radio announcements, newspaper adverts, sms and posters made.	330,000

Impact Issue/Risk	Mitigation	Input	Responsible Person	Monitoring / Verifiable Indicators	Estimated Cost (KES)
COVID-19					
Contraction of COVID-19 by staff during procurement and transportation of vaccines, and during publicity	-Provide double-cab vehicles carrying only two staff to ensure social distance, - staff and driver to wear face mask, -vehicle to be equipped with alcohol based sanitizer.	-Double-cab vehicles, -Face masks, -Alcohol based sanitizers.	CDVS	-No of Double Cab vehicles available, - No of face masks, soap and sanitizers procured, -Amount of clean running water availed, -No of people whose temperature is checked	150,000
Contraction of COVID-19 during the actual vaccination process	-Provide water, soap, sanitizers and temperature guns. -All persons to wear masks, -Animals to be vaccinated as soon as they arrive at the site, -Check the temperature of all participating in the vaccination exercise each day.	-Face Masks, -Alcohol based sanitizers, -Clean running water. -Soap -Temperature guns	CPC, CDVS, Director Public Health		

Table 7: Implementation schedule

ACTIVITY	SCHEDULED TIME											
	DEC 2020			JAN 2021			FEB 2021			MARCH 2021		
Preparation of PMP	█	█	█									
Holding planning meetings	█	█	█	█								
Procurement of vaccines- ordering and preparation				█	█							
Zoning and mapping of crushes				█	█							
Identification and repair of vehicles to be used			█	█	█							
Carrying out publicity					█							
Presentation of the PMP to NTAC; revision; forwarding to WB for clearance				█	█	█	█	█	█			
Collection of vaccines from KEVAVAPI by CDVS									█	█	█	
Collection of vaccines from CDVS stores and distribution to vaccination sites										█	█	█
Carrying out the Vaccination exercise										█	█	█
Monitoring and evaluation of the vaccination process			█	█	█	█	█	█	█	█	█	█

6. MONITORING AND REPORTING

6.1. MONITORING

Monitoring will be a continuous exercise throughout the implementation process (as depicted in table 8). It will be participatory by CTAC representative, CDVS, public health personnel, M&E, CPC & CPSC representatives and two drivers. The team will oversee implementation at community level by visiting vaccination teams and meeting community development committees (CDDCs) who will be overseeing the exercise. The monitoring team will address technical, environmental, social and welfare issues during the exercise.

6.2. GRIEVANCE REDRESS MECHANISM

Complaints/grievances received from communities during and after vaccination campaign will be channeled to the CDVS and escalated to County Grievance Redress committee for redress. The community will be given the contacts of the CDVS to forward their complaints and compliments. A Grievance log register for the sub project will be opened to launch all complaints.

6.3. REPORTING

During the preparation and actual vaccination exercise, the following reports will be generated. The reports will include information on: livestock vaccination manifest detailing the Ward, Sub location, Crush site, Names of farmer, Number of cattle vaccinated and photographs during the exercise (See table 9).

Table 8: Reports to be generated

Report Type	Frequency	Responsible
Vaccine procurement	Once	CDVS/CPC/Procurement Officer
Publicity report	Once	CDVS/SCVO/M&E KCSAP
Cold Chain Management	Once	CDVS/SCVO
Daily vaccination report	Daily	CDVS/SCVO
Monitoring report	Once	CDVS/M&E KCSAP
Safeguard report	Once	CESSCO/NEMA/CDVS
Waste disposal report	Once	NEMA/CDVS/ESSO
Knowledge management	Once	CPCU-M&E
Overall vaccination report	Once	CDVS/ CPCU-M&E
COVID-19 Containment report	Once	County Director of public Health

7. CONCLUSION

After the screening exercise, it was found out that the proposed vaccination subproject is socially, environmentally and technically feasible but has minimum adverse environmental and social impact during the implementation process. These negative impacts will be avoided or minimized through the proposed mitigation measures. Furthermore, a pest management plan is in place as a mitigation measure against all threats that may be posed by the vaccination exercise. It is broadly accepted as a development milestone by the beneficiaries and other relevant stakeholders as it will contribute to increased livestock productivity, increased resilience and reduced greenhouse gas emission. Implementation of this Sub project will be smooth and effective social and environmental unrest.

ANNEXES

**ANNEX 1.
APPROVED
SUB-
PROJECT BY
CTAC AND
CPSC**

S/No	Disease	Species commonly affected
1.	Lumpy skin Disease	Cattle
2.	East Coast Fever	Cattle
3.	Rift Valley Fever	Sheep, goats, cattle, camels, buffaloes, humans
4.	Foot and Mouth	Cattle, pigs, sheep, goats, wild cloven- hoofed species
5.	Rinderpest	Cattle, buffaloes
6.	Anthrax	Domestic and wild
7.	Rabies	Domestic and wild
8.	Contagious Bovine Pleuro Pneumonia	Cattle
9.	Mange in horses and mules	Horses and donkeys
10.	Johnes Disease	Domestic and
11.	Bovine Spongiform Encephalopathy	Cattle, humans
12.	Scrapie	Sheep, goats
13.	Heart water	Cattle, sheep, goats
14.	Newcastle Disease (Fowl pest)	Domestic fowls,
15.	Mucosal Disease Virus Diarrhoea Complex	Cattle
16.	Avian encephalomyelitis	Domestic fowl
17.	American foulbrood	Bee
18.	European foulbrood	Bee
19.	Varrosis	Bee
20.	Acarapisosis	Bee
21.	Tropilaelapis	Bee
22.	Brucellosis	Cattle, sheep, goats, pigs, camel, buffalo, antelopes,
23.	Infectious bronchitis	Chicken
24.	Infectious bursal disease	Chicken
25.	Foul paralysis	Chicken
26.	Avian leucosis	Chicken
27.	Peste des Petit Ruminants	Goats, sheep
28.	Sheep scab	Sheep, humans
29.	Tuberculosis	Cattle, sheep, goats, equines, camels, pigs, buffaloes, wild boars, deer, antelopes, dogs, cats, rats, primates, kudus, elands, elephants, rhinoceroses, hares, lions, leopards, humans and birds
30.	Psittacosis or Ornithosis	Chicken, parrots
31.	Pullorum disease	Chicken, turkeys
32.	Avian Influenza	Domestic fowl, other
33.	Farcy	Cattle
34.	Epizootic lymphangitis	Equines
35.	Bacillary White Diarrhoea	Domestic fowl
36.	Sheep pox and goat pox	Sheep, goats
37.	Contagious, Caprine Pleuro Pneumonia	Goats
38.	Swine Fever	Domestic and wild pigs
39.	Swine Erysipelas	Pigs
40.	Atrophic rhinitis	Pigs
41.	Glanders	Horses, donkeys
42.	Surra and Trypanosomosis	Cattle, sheep, goats, camels, horses, donkeys, humans

ANNEX 2.
NOTIFIABLE DISEASES
REPORTED IN KENYA IN
THE LAST 10 YEARS

Foot and Mouth Disease
Anthrax
African Swine Fever
Lumpy Skin Disease
East and Coast Fever
Rabies
Surra and Trypanosomiasis
Contagious Caprine Pleuro Pneumonia
Rift Valley Fever

Brucellosis
Sheep pox and goat pox
Bacillary White Diarrhoea
Contagious Bovine Pleuro Pneumonia
Johnes Disease
Tuberculosis
Sheep scab
Heart water
Peste des Petits Ruminants

ANNEX 3.
SUB-PROJECT
PROPOSAL

PROPOSAL FOR DAIRY CATTLE VACCINATION AGAINST EAST COAST FEVER (ECF) FOR IMPROVED PRODUCTION

BOMET COUNTY

1. TITLE PAGE

Name of Subproject ...VACCINATION OF DAIRY CATTLE AGAINST EAST COAST FEVER FOR IMPROVED PRODUCTION

County **BOMET** ...Ward **Ndanai, Rongena, Mogogosiek, Embomos, Longisa and Kiprerres...**

2 EXECUTIVE SUMMARY

2.1 Project Background

2.1.1 COUNTY BACKGROUND INFORMATION:

Bomet County is branded a dairy county. The county has a total of 303,384 dairy animals with average daily milk production of 4.2litres/cow/day translating to daily milk production of approximately 497,890litres/day.

The major breeds in the county are Friesian, Aryshires, jersey and very few Guernsey but most of the dairy animals are crosses of the above breeds. There are also the indigenous zebu breeds in the lower parts of the county. Brown Swiss are also kept by few farmers. Most of the animals in the county are not registered, only 400.

Bomet County has five Sub counties; Bomet East, Bomet Central, Chepalungu, Konoin and Sotik.

The area is, 2,154.7 Sq. Km with an altitude range of between 1300-2500 M a.s.l.

The rainfall is bimodal, ranging between 1,500 - 2,000mm per year.

Human population is 875,906 persons as per 2009 Census, giving a population density of 300 persons per Km².

The average farm holding is 5 acres.

Dairy Cattle Population

Sotik	96,246
Central	42,150
East	35,797
Konoin	43,273
Chepalungu	85,919
Total	303,384

Dairy Herd structure

	% Propotion
Calves	15
Weaners	15
Heifers	10
Incalf	10
Lactating	30
Dry cows	10
Young bulls	7
Breeding bulls	3
Total	100

DISEASE SITUATION

We acknowledge that in our County, East Coast fever (ECF) is one of the major diseases that pose a significant threat to the cattle livestock sub- sector due to its high morbidity and mortality, resulting in production losses in all production systems.

The etiological/causative agent of ECF is a protozoan parasite called *Theileriaparva*. It is transmitted to cattle through the bites of the brown ear tick, *Rhipicephalusappendiculatus*. Exotic cattle breeds are more susceptible to the disease than indigenous cattle breeds. This has hindered the introduction of the ECF susceptible, but more productive exotic breeds of cattle to ECF endemic regions hampering the development of the livestock sector considerably. Economic losses due to ECF disease are more concentrated on small-scale resource-poor households.

Control methods:

i) Tick control

Tick control is conventionally done by use of acaricide. This has been an ongoing activity since the advent of acaricides but challenges has been encountered along the way due to emergence of acaricides-resistant to ticks or resistance due to prolonged use of acaricides posing an increasing threat to livestock production because of heavy dependence on acaricide for tick control. The cost of the measures taken to control ticks cause a financial burden to dairy farmers and has led to increase in ECF cases being reported in the county. This cost is however not to prevent ECF alone but also other tick borne diseases. Even though the County Government of Bomet has supported several dips through purchase of acaricides and repairs of dormant dips, ECF is still a major concern. Furthermore, this control method has become less effective because of poor management and maintenance of dips, and uncontrolled cattle movements.

The locations of these dips are about 3-5 kilometers apart. In average then animals have to travel over 5 kilometers to the dip site and back home which is not cost effective for the high breed dairy animals.

The other challenge his method pose to the dairy production is breeding diseases and inbreeding occasioned by bull mating with the dairy females as the mingle during dipping exercise.

ii) Immunization (Infection & Treatment)

The strategy, known as the infection-and-treatment method, involves inoculating live *Theileriaparva* parasites into an animal while simultaneously treating the animal with a long-acting antibiotic. This combination provokes, in the immunized

animal, a mild reaction to the parasite infection and development of immunity to further infections. This immunity lasts up to three years in the absence of further tick infestations; the immunity is life-long immunity if ticks continue regularly to challenge the immunized animal. This strategy is based upon immunization and controlled exposure to ticks through strategic acaricide use.

iii)Treatment

Therapeutic intervention to clinical cases of ECF can be done by injection of parvaquone or buparvaquone (antiprotozoan) together with oxytetracycline antibiotic cover against opportunistic bacterial infection. The treatment is more effective if administered early in the disease.

ECONOMIC IMPORTANCE OF ECF

a) The cost of therapeutic treatment;

The cost of treatment is very high, up to an average of Kshs. 5,000, per animal, which may not be affordable for most of our livestock keepers. On average, the incidence of ECF in the county is 175 cases reported monthly. There are however other unreported cases which are almost 50% of the reported cases which is equivalent to 87 cases a month. These unreported cases are those which are attended by the private vets (25%) and the unattended cases (25%). This approximately totals 263 cases in a month translating to 3156 annually. It will amount to Ksh.15, 780,000 if these cases are treated at an average cost of Ksh. 5000, which farmers are spending annually not factoring those which dies with or without treatments.

Cases per group

	% Propotion	No.
Calves	15	473
Weaners	15	473
Heifers	10	316
Incalf	10	316
Lactating	30	947
Dry cows	10	316
Young bulls	7	221

Breeding bulls	3	94
Total	100	3156

No. of cases	Average cost of treatment	Total cost/Year
3,156	5,000	15,780,000

b) Loss of milk due to long withdrawal period for treated animals

Taking the proportion of lactating animals in a herd as 30%, 947 lactating animal are treated of the disease and the withdrawal period for milk is normally fourteen days. Therefore losses due to this will amount to Kshs. 1,670,508.

No. of lactating Animals	Daily production(4.2 ltrs/day/cow)	Two-Weeks production(litres)	Total Cost (Kshs.30/ litre)
947	3,977.4	27,841.8	1,670,508

c) Loses due to mortalities

The disease is characterised with high mortality rates (100%) in untreated cases while treated cases may not respond to treatment or occurrence of relapse which may lead to death.

Average losses due to deaths/Year

	%propotion	No.	Unattended/ Mortalities(25%)	Average cost(Kshs)	Total cost (Kshs)
Calves	15	473	118	8,000	944,000
Weaners	15	473	118	15,000	1,770,000
Heifers	10	316	79	25,000	1,975,000
Incalf	10	316	79	45,000	3,555,000
Lactating	30	947	237	60,000	14,220,000
Dry cows	10	316	79	50,000	3,950,000
Young bulls	7	221	55	10,000	550,000

Breeding bulls	3	94	24	40,000	960,000
Total	100	3156	789		27,924,000

d) Cost of tick control

The cost of acaricide application, being done weekly, which is the primary means of tick control, is estimated to range between Ksh.1300 and Ksh.2000 per adult animal per year. This means that the 303,384 heads of cattle multiplied by Ksh. 1300 will translate to Ksh.394,399,200 being spent by farmers annually on acaricides on dairy animals. However with ECF immunization in place, targeting entire dairy herd with reduced frequency of acaricide application to two weeks. The cost of tick control will be reduced by half. That is Kshs.197,199,600 being saved annually.

Total herd	Rate (Ksh)	Annual Dipping cost(Ksh)	Amount being saved (Ksh)
303,384	1300	394,399,200	197,199,600

e) Environmental pollution due to use of acaricide

Chemical control of ticks using acaricide, have been in place since the advent of these chemicals. However, this vector control method has detrimental effect to the environment. On average, 5 millilitres of amitraz is spent in dipping on animal perweek. Therefore with weekly dipping frequency, 260mls per animal will be used/ released to the environment. With a dairy population of **303,384, 78,879,840** Mls, equivalent to 78,879.84 litres of chemical is being released to the environment. This huge amount chemicals will be cut by half to 39,879.84 litres of amitraz being released to the environment annually, with ECF immunization in place hence safe environment.

TOTAL LOSSES DUE TO THE DISEASE/ YEAR

	COST (KSHS)
Treatment costs	15,780,000
Loses due to milk withdrawal (fourteen days)	835,254

losses due to deaths	27,924,000
Cost of tick control	197,199,600
TOTAL	241,738,854

ECF Immunization

The infection and treatment immunization procedure employs well characterized live protozoites forms of theileria parasites administered to cattle simultaneously with a long acting antibiotic oxytetracycline which suppressed the infection and the result is an asymptomatic or mild episode of ECF followed by animals' live long immunity. In Bomet County the uptake of ECF vaccination being done by the private sector, has been very low due to high cost of intervention and requirement attached that 40 animals must be presented for one vial of the vaccine. This calls for a need to aid the farmers in the provision of this important disease prevention exercise.

In our county (Bomet county) we have trained 15 Veterinarians on ECF vaccination (3 from each Sub county).The training was done in September 2018 at KALRO Muguga.

Bomet County Assembly, which is the representation of the people of Bomet, had on 20th march 2018 written to the Executive Committee Member for Agriculture, Livestock and Fisheries, to consider subsidizing the cost of livestock vaccine, in particular for East Coast Fever (ECF).The resolution the motion by the County Assembly and the response by The County Executive Committee Member for Agriculture, Livestock and Fisheries is hereby attached.

To carry out ECF vaccination in our county

With the estimated current cattle population of **303,384** dairy herd, 50% are adult cows, 10% heifers, 15% calves, 15%weaners and 10 % bulls.

ECF vaccination should target;

- i) 5% of calves aged; one month old which are immuno- competent and females due to their high longevity.
- ii) 7.5% of weaners, i.e. females only.
- iii) All Heifers because of their high longevity in production.
- iv) All incalf cows

- v) 15% lactating cows, targeting up to the fifth parity.
- vi) 5% dry cows, targeting up to the fifth parity.

	% Propotion	Target %
Calves	15	5
Weaners	15	7.5
Heifers	10	10
Incalf	10	10
Lactating	30	15
Dry cows	10	5
Young bulls	7	0
Breeding bulls	3	0
Total	100	52.5

Therefore 52.5 % of **303,384** translate to 159,277.

159,277cattle to be vaccinated at the cost of Ksh. 1,200 each will cost Kshs. 191,132,400/.

2.2 Project beneficiaries

- a) Project duration: Start: 1st November 2019 End: 30th January 2019
- b) No. of beneficiaries: **225 000** Male: **112,450** Female:**112 550**
- c) Direct beneficiaries: **75 000** Male: **38 000** Female: **37 000**
- d) Indirect beneficiaries: **150 000** Male: **76 000** Female: **74 000**
- e) Vulnerable beneficiaries (poor, widows/widowers, orphans, physically challenged, elderly, HIV/AIDs affected/infected: 4400 Male 2150. Female 2250
- f) Location of the project (coordinates):
 Long: -0.78429 Lat: 35.33749 Alt: 1962M
 Physical locations of the subproject, Bomet County Headquarters

3.0 Project Identification

- i. How was the project identified? **During PICD process the farmers raised the disease as one of the problematic in the project areas. This is a disease which causes high mortality and very expensive to treat.**
- ii. Who was involved? (Beneficiaries' participation in the subproject proposal development process) - **County government, Community members, Community leaders, Technical departments (Agriculture, Livestock, Cooperative, and Administration) were involved.**
- iii. What events took place in developing the project idea? **The farmers were consulted on how the disease effect can be reduced. The farmers requested vaccination.**
- iv. Compliance status to various statutory requirements Land ownership, legal agreements and related procedures

Other statutory requirements. **The vaccine has met legal requirements of Kenya veterinary board and other statutory bodies.**
- v. Beneficiary management committee: for instance give details on- how they were Constituted e.g. democratically; composition, GRM, Frequency of meetings

4.0 Project Framework

- a) What is/are the expected *results* post-implementation (increased household income, livelihood diversification, food security through water availability/accessibility, reduced land degradation etc) - **reduced mortality of the cattle**

- Increased milk production increased income through sale of produce.
- Reduced use of antimicrobials and acaricides which harm the environment.
- Enhanced food security due to increased production and survival of calves.
- Reduced residues in milk and meat safeguarding human health
- Increased use of farmyard manure.
- Diversification of income sources.

b) What is/are the *objective(s)* of the project? - **Increased farm gate income**

- Reduced mortality rate of cattle
- Enhanced food and nutrition security
- Protection of environment by reducing use of antimicrobials and pesticides.
- Safeguard human health by reduction of antimicrobial residues in food of animal origin.

c) What problems does the project aim at addressing at the community level?

- i. **environmental contamination**
- ii. **diversification**
- iii. **Food and nutrition insecurity**
- iv. **Low agricultural productivity**
- v. **Low household income**
- vi. **livestock diseases**
- vii. **Soil conservation**

d) **Activities to be carried out:**

S/No.	Activity	Who will provide advise & training (institution or person):	Time frame

1.	Mobilization of livestock farmers for creation of awareness	Technical departments,Administration, Community leaders	November 2019
2.	Training of project management committees.	Technical departments,Administration, Community leaders	November 2019
3.	Procurement of vaccines and other accessories.	CPCU,CTD	November 2019
4. N	Repair of vaccination crushes	Community, community leaders, subcounty technical departments	November/December 2019
5.	Publicity of the activity	Community, community leaders, subcounty technical departments	December 2019
6.	ECF vaccination	Community, community leaders, subcounty technical departments	December 2019/January 2020
7.	Monitoring for animal reactors	Sub county technical department	December 2019 - March 2020
8.	Monitoring and evaluation of the activity	CPCU, CTDs, ,Administration, Community leaders, community	December 2019 - March 2020
9.	Impact of the activity evaluated	CPCU, CTDs, ,Administration, Community leaders, community	June 2020

e) List the collaborators you will work with

No	Collaborator	Area of collaboration
1.	County veterinary department	operation and guidance
2.	County and National Administration	Community mobilization
3.	Community	Availing livestock
4.	Agriculture and Livestock	Crops and livestock husbandry/ climate smart agriculture

		technologies/livelihood diversification
5.	Cooperative/Social Services Department	Group mobilization/ farmer Cooperatives
6	KALRO/NARS	Promotion and training of technology and innovation and management practices, supply of ecf vaccines
7	CBOs and FBOs	Community mobilization
8	Pharmaceutical companies	Supply of drugs and other accessories
9.	Livestock farmers	Present their cattle for vaccination

5.0 Project Log frame

	Narrative	Objectively Verifiable indicators	Means of verification indicators	Assumptions
Goal	Reduced poverty through increased income and food security/nutrition	-household income increase by 10% -malnutrition reduced by 20%	-national household income survey -National household health survey	The demand for milk continue to increase.
Development objective	Increased farm productivity	-Amount of milk sold to outlets -Number of calves reaching maturity.	-livestock market surveys -milk outlets reports	All the milk produce is sold within the project area
Outcomes	The prevalence of east coast fever disease reduced to management level.	-Number of ECF diseases being reported. -Amount of antimicrobials sold by outlets	- DVS disease surveillance reports -county disease surveillance reports -drug outlets reports	- The drugs sold by outlets is all used within the project area -All the animal health providers will

				cooperate in reporting of diseases
Output(s)	1. 50 000 head of cattle vaccinated against east coast fever. 2. 30 project management committees trained. 3. 9 vaccination teams constituted 4. vaccination equipment procured.	- Number of vaccination crushes repair and used -trainings held - vaccination provided and in use	-Veterinary department monthly reports -farmers reports	All farmers respond to the call
Activities	1.Mobilization of livestock farmers for creation of awareness 2.Training of project management committees. 3.Procurement of vaccines and other accessories. 4.Repair of vaccination crushes 5.Publicity of the activity 5.ECF vaccination 6.Monitoring for animal reactors 7.Monitoring and evaluation of the activity 8.Impact of the activity evaluated	1. Community meetings 2. CTDs planning meetings	- CTDs reports - Farmers inquiring on the vaccine - payment vouchers - S11 and S13	All the materials are procured on time

6.0 Monitoring of Progress

- a) Who will be involved in monitoring? **Community, community leaders, CTDs, CPCU**
- b) How frequent will the progress report be submitted? **Weekly**
- c) Who will be responsible for reporting? **CTDs,farmers**
- d) How will the report reach the community members? **Community baraza**

- e) How will the proposed project assist in achieving the Project Development Objective (PDO) which is to increase agricultural productivity, build resilience and reduction of GHG emissions in the long term? (indicate the targeted coverage in terms of type of livestock numbers or acreage of crops/types) - **increase milk and meat production by reducing mortality and farmers will keep high grade animals.**
- **Protect environment the antimicrobial use will be reduced.**
- f) How will you measure your success in planning, implementing and managing your projects in a sustainable and socially inclusive manner?
- **Management committee to ensure proper record keeping for accountability for number of farmers which participated in the activity.**
 - **Participatory Monitoring and Evaluation periodically carried out with the beneficiaries and the reports disseminated appropriately**
- g) How will you ensure sustainability of the project? - **The county to legislate on possibility of making vaccination compulsory.**
- **Charge small fee for the activity**
 - **County to put aside a budgetary allocation for the activity**
- h) How will you manage the benefits that will accrue from the project?
- **Although the benefits accrue mostly is to the individual farmer, the community will get access to replacement animals and milk.**
- i) Strategy on operation and maintenance

7.0 Detailed Budget

Project cost including community and County Government contribution

ITEM NO	DESCRIPTION OF ACTIVITY	UNIT	QTY	RATE (KSHS)	TOTAL COST (KSHS)	COMMUNITY CONTRIBUTION (COUNTY)	KCSAP	TOTAL AMOUNT
1.	ECF vaccine	dose	15000	250	3750,000	-	3,750,000	3,750,000
2.	Liquid Nitrogen container 3litres	No	15	60000	900000	-	900,000	900,000
3.	Liquid Nitrogen container 30 litres	No	4	112000	448000	-	448000	448000
4.	Oxytetracycline 100ml 30%	vials	5000	1000	5,000,000	-	5,000,000	5,000,000
5	Antihistamines 100mls	vials	10	600	6000		6000	6000
6	Butalex 40ml	vials	10	4000	40000	-	40000	40000
7	Albendazole 10% 1 litre container	pack	700	600	420000	-	420,000	420000
8	Liquid Nitrogen	Litres	400	250	100000	-	100000	100000
9	1cc Disposal syringe	No	15000	10	15000	-	15000	15000
10	20cc Disposal syringe	No	15000	15	225000	-	225000	225000
11	Hypodermic disposable needles 18 gauge	No	30000	5	150000	-	15000	15000
12.	60cc Disposal syringe	No	150	100	15000	-	15000	15000
13	Eartags-branded	No	15000	165	2475000	-	2475000	2475000
14	Eartag applicator	No	15	2500	37,500	-	37500	37500
15	Weighing band	No	16	2000	32000	-	32,000	32,000
16	Fridge	No	1	52,040	52040		52,040	52040
17	Scissors	No	20	400	8000	-	8000	8000

18	Ordinary Thermometers	No	20	200	4000	-	4000	4000
19	Surgical spirit	Litres	60	200	12000	-	12000	12000
20	Cotton wool	Rolls	15	200	3000	-	3000	3000
21.	Plastic Cool boxes	No	15	2000	30000	-	30000	30000
22.	Stationary							
	Marker pen	No	12	80	960	-	960	960
	Masking tape	No	15	100	1500	-	1500	1500
	Photocopy papers	Reams	24	500	12000	-	12000	12000
	Flip chart	No	6	500	3000	-	3000	3000
23.	Gumboots	No	20	1000	20000	-	20,000	20000
24	Overall	No	20	1000	20,000	-	20,000	20,000
25.	Disposal gloves	packets	60	250	15000	-	15,000	15000
26.	Vehicle Transport-hire	No	4	180,000	720,000	-	720,000	720,000
27.	Vaccinators allowances	No	450	1500	675000	-	675000	675000
28	Safety box (to store used needles)	No	15	200	3000	-	3000	3000
29	Box to store used syringes	No	15	50	750	-	750	750
30.	Repair of vaccination crushes	No	150	1000	150,000	150,000	-	150,000
31	Provide provisional sum Supervision	Pc	1	100,000	100,000	-	150,000	150,000
	Subtotal					150,000	15,193,750	15,343,750
	Add 2.5% Contigencies						379,843	379,843
	Grand total				15,000,000	150,000	15,573,593	15,723,593

List the in-kind contribution that the group will provide:

- A.** Labour (man-days & value) 50,000
- B.** Materials (Nails, post) – 100,000
- C.** County Contribution – 2,414,500

(For official use only)

Comments by the Relevant CTD: The ECF Vaccination project
will drastically reduce the rate of livestock mortalities
resulting in increased dairy production in the
County.

Recommended:

Sign : Date

[Signature] 3rd October 2019

Comments by the CTAC:

The project is recommended
for implementation therefore its approval
to be funded. The project will improve
farm production.

Endorsed: Yes



No

Date of meeting



(Attach minutes)

Chairman Name:

Eric Baird

Signature:

[Signature]

Forwarded to NPCU by CPC

Name:

KENOSIWA JULIA

Signature:

Date:

18/10/2019

Official rubber stamp:

