***Original Research Article***

# Livestock keepers' perception on East Coast fever-immunization (ECFiM) in KajiadoCentral, Kenya.


## Abstract

The study was carried out in Kajiado County to gain information on livestock keepers' perception on East coast Fever disease and its vaccines utilization. East Coast fever (ECF) is a major constraint to livestock production, ranking among those of high economic importance. The high input cost in ECF management, control and treatment steeredthe development of the East Coast Fever Immunization vaccines (ECFiM) as envisaged to be effective and economical.The main aim of the study was to realize livestock keeper's perception on theEast Coast Fever Immunization vaccines (ECFiM). The data was collected using a survey of 88 households, fifteen focus groups with livestock keepers, key informant interviews and a workshop. Frequency counts and percentages were used to analyses data. Type of livestock kept by the community and their preference; cattle 37.5%, sheep 28%. Prioritized livestock diseases: ECF 42.5%, FMD 25%. Sources of ECFiM-vaccines information were ranked as Kenya Agricultural Livestock Research Organization (KALRO) employees 26.25% and veterinarians16.25%.The importance the ECFiM was ranked asas reduced mortality 38.75% and reduced tick control 25%.

Main factors constraining the adoption of ECFiM vaccine as given by the respondents were two that is, inadequate technology 31.25% and finances 21.25%. Agriculture being a devolved function, the County government should formulate policies that enhance working relationship between (KALRO) so that they can train the farmers on the use of ECFiM vaccine. There is need for the County government to link the farmers with financial institutions where they could have access to loans to purchase the vaccine.



**Keywords**: East coast fever, immunization, livestock keepers' perception and Kajiado Central


## Introduction

East Coast fever (ECF) disease is caused by the protozoan parasite *Theileriaparva,* transmitted by brown ear tick (*Rhipicephalusappendiculatus)* that is a major constraint in cattle production in Kenya and other African countries (Mukhebi*et al.,* 1992).The mortality rate caused by ECF can reach 100% in herds of exotic cattle introduced in an endemic area, and in indigenous animals the rate can be as high as 30% (Anon, 1990). Animals that recover from ECF show substantial losses in milk yield and live weight gain (Young *et al.,* 1990; Rumberia, 1992).

ECF is mainly controlled by intensive application of acaricide chemicals. However, there are several drawbacks of this approach. These include high costs, resistance to the acaricides by ticks, increased environmental pollution (Mbogo*et al*., 1996), and lack of appropriate infrastructure such as dips in most of this region. In Kenya, although therapeutic drugs such as buparvaquone (Butalex®, Mallinckrodt Veterinary, UK) are currently available, they are not affordable by most resource-poor small-scale farmers.ECF immunization 'Infection and Treatment Method' (ITM), leads to lifelong immunity to the disease and offers the most reliable control of ECF. Mukhebi*et al.,* (1989), working on a beef cattle farm in coastal Kenya showed that cattle immunized against ECF had lower case mortalities, higher weight gains and greater marginal rates of returns. In Zambia, Pegram*et al.,* (1996) working on beef

cattle showed that on farms where theileriosis was a serious problem, immunization coupled with a strategic dipping programme was economically very attractive. Immunized cattle required 6 strategic dipping per year to reduce the effects of ticks, representing an 85% reduction in acaricide use. In view of existence of other tick-borne diseases like babesiosis and "anaplasmosis, tick control programme of dipping has to continue albeit at a lower interval. The current delivery system of the vaccine is based on KALRO staff training to private and public veterinarians who are left to offer the services at a cost to the farmers.

The adaptation of the "infection-and-treatment method (ITM)" of immunizing cattle against ECF, is still very low. The reasons for this are yet to be elucidated. In view of this it was. In view of this it was found prudent to study livestock keepers' perception on the status and performance of ECFiM in Kajiado County.

## Materials methods

### Study area

The study was carried out in Kajiado Central sub county in Kajiado County which has a human population of 102,978 (GoK, 2009). The Sub County has five wards: IIdamat, Dalalekutuku,Porko, Matapato North and Matapato South. The Sub-County is classified as arid and semi-arid, characterized by low rainfall less "than 500mm per year and high temperatures ranging from $24^0$c to $37^0$c. The in-consisted rainfall makes pastoralism the only suitable economic activity. Most of the vegetations are perennial grasses, shrubs and thorn trees.

### Data Collection methods

The quantitative data was collected through a semi-structured questionnaire administered to 88 households randomly selected from five wards. The data was collected from two different households, 80 ECF vaccinated households to determine the effects of ECF- vaccination and 8 none ECF vaccinated households for determining the net effect of the ECF vaccination. Qualitative data were collected through workshops and key informant interviews with livestock stakeholders to gain information on the constraints encountered by livestock keepers and animal health service providers, above their perception to ECF immunization and dissemination constraints.

### Data analysis

Data obtained from focal group discussions were sorted out and interpreted in relation to the research general objective, to enable the researcher to provide overall interpretation of the findings showing how thematic areas and issues relate to one another. On the other hand, quantitative data derived from the household interviews were edited, coded and analyzed using the Statistical Package for Social Sciences (SPSS) software version 20 spread sheets.

Descriptive statistics which included frequencies and cross-tabulations were generated and used to characterize pastoralists' perception on ECFiM uptake and other animal health constraints.

## Results and discussion

### Livestock production

The priority of livestock kept in the area is shown in table 1. Cattle, goats and ship were the. Cattle, goats and ship were the preferred livestock species. This could be attributed to the prevailing climatic conditions for the sheep and goats` browsing natural shrubs and cattle for provision of milk.

**Table 1: Priority livestock species kept and reasons for preference by the Maasai community**

| Livestock species | Frequency (f) (n=88) | Percentage | Ranking reasons for preference | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| Cattle | 33 | 38 | Milk (16) | Income(11) | Meat (4) | Skin ( 2) |
| Goats | 25 | 28 | Income (13) | Security (8) | Drought resilience (3) | Milk (1) |
| Sheep | 23 | 26 | Drought resilience (14) | Security (6) | Skin (3) | |
| Donkey | 5 | 6 | Transport(3) | Income(2) | | |
| Chicken | 2 | 2 | Income (2) | | | |

Livestock production is the main source of livelihood in Kajiado Central. Sahiwal cattle breed is dominant andand is preferred due to its dual purpose traits of milk and beef production and adaptability to the dry climatic conditions. Due to losses of many animals occasioned by frequent drought conditions and inadequate feed resources, there is a gradual shift to use of improved breeds in milk production. However, use of improved vaccines, forages and skills in fodder conservation are still limited. The capacity building of livestock stakeholders is therefore needed.

### Priority livestock diseases as perceived by livestock keepers.

The pastoral community prioritized livestock diseases based on impact on morbidity, mortality and loss of incomes in Kajiado central as shown in table 2. Important diseases affecting the Cattle were East coast fever, Foot and Mouth, Heart water, Pneumonia and Anthrax. Capacity building through ECFiM vaccine awareness is needed as East coast fever is a priority threat, to mostly improved breeds.

**Table 2: Important livestock diseases as perceived by livestock keepers**

| Diseases | Frequency | Percentage |
|---|---|---|
| East coast fever (ECF) | 34 | 42.5 |
| Foot and Mouth Disease (FMD) | 20 | 25 |
| Heart water | 11 | 13.75 |
| Pneumonia (Contagious Bovine pleuropneumonia-CBPP) | 9 | 11.25 |
| Anthrax | 6 | 7.5 |
| | **n=80** | **100** |

**Sources of ECF vaccine information as perceived by Pastoral Community**

Livestock keepers ranked sources of information on ECFiM vaccine as shown in table 3. KALRO employees whether television shows or in the field disseminate the information.

**Table3: Sources of ECF vaccine information as perceived by Maasai Community.**

| Sources | Frequency | Percentage |
|---|---|---|
| KALRO Employees | 24 | 32.50 |
| Veterinary officers | 13 | 16.25 |
| Non-Governmental Organization | 11 | 13.75 |
| Community Animal health workers | 10 | 12.5 |
| Agricultural Shows of Kenya (ASK) | 8 | 10 |
| Neighbours | 6 | 7.5 |
| News media ( TV, Radio) | 5 | 6.25 |
| | n=80 | 100 |

**Evidences of ECFiM preferences by livestock keepers**

Livestock keepers supported earlier research done on the following merits of using ECFiM vaccines on herds: Immunization against ECF resulted lower case mortalities, reduced tick control through strategic dipping programme thus reducing the use of acaricides. Due to the existence of other tick-borne diseases like *babesiosis*andanaplasmosis, tick control programme has to continue albeit at a lower interval, greater marginal rates of returns in terms of labour and acaricides cost and higher weight gains.

**Table4: Importance of ECFiM as perceived by livestock keepers.**

| Importance of ECFiM | Frequency | Percentage |
|---|---|---|
| Reduced mortality | 31 | 38.75 |
| Reduced tick control (cost) | 20 | 25 |
| Higher weight gains | 12 | 15 |
| No adverse reproduction | 9 | 11.25 |
| Higher marginal rate of return | 8 | 10 |
| | **n=80** | **100** |

**ECFiM adoption constraints perceived by animal health service providers**

**Technical know-how (technology):** Animal health service providers expressed that the technology was intricate, as this was a prerequisite to manage the vaccine. Livestock keepers cannot buy it from the counter. A significant number of animal health service providers cannot afford to buy and maintain liquid nitrogen containers, due to which condition they are unable to offer the vaccine. The vaccine stockiest need to be trained by KALRO for operationalization.

**Input capital:** Veterinarians need capital to start with adaptation of this technology. They lack initial capital for purchasing ECFiM vaccine and training. Animal health service providers could have pooled resources but poor livestock keepers are not ready to make upfront payment. They need free services as they receive from the Non-Government

Organizations (NGOs). County government, bank loans providers and KALRO need to create awareness on the service payment requirements.

**Service payment:** The monetary conditions in the County have negated ECFiM adoption. Livestock keepers' needs education from KALRO and County on the issue of value of money for services as livestock keeping is a private business

**Awareness:**Most of the livestock keepers are not aware of ECFiM-vaccine. Those aware are not facilitated to inform others. The Animal health service providers and stockiest assume that livestock keepers would demand the vaccine without its promotion. Kenya Agricultural Research Organization and NGOs are needed to increase the promotion and awareness creation programmes.

**Packaging:** Livestock keepers rely more on service providers for this information which is often 'compartmentalized', because it is given by different service providers dealing with different commodities and the information is not always accurate because it is influenced by the desire to sell the service. ECFiM technology is irrationally packaged, whereas the demand for 3-5 animals may not be met since the straw contains 20 doses of the vaccine for twenty animals. Packaging of ECFiM vaccine in small doses may enhance adoption by the livestock owners with 3–4 dairy animals.

**Transportation:** Due to vastness of Kajiado County with many remote areas transportation of the vaccine is very costly. Lack of transport, poor road network for Animal health service providers limits the dissemination of the vaccine. The farmers were of the view that County Government should assist in providing transport and storage services. These constraints were ranked according to their weight by livestock keepers (table 5).

**Table 5: Constraints to ECFiM adoption as perceived by animal health service providers**

| Constraints | Frequency | Percentage |
|---|---|---|
| Technical know-how | 25 | 31 |
| Financial | 16 | 21 |
| Services payment | 14 | 17 |
| Unawareness | 12 | 14 |
| Packaging | 7 | 9 |
| Poor infrastructure | 6 | 8 |
| | n=80 | 100 |

**Livestock keeper's perception on accessibility, affordability and acceptability of ECFiM vaccines**

**Accessibility:** Access to ECFiM vaccine for livestock production is constrained by inadequate extension staff, insufficient funding, lack of facilities, weak stakeholder linkages and poor infrastructure- road network, water and power. They resolved that animal health assistant due to proximity should be more empowered to handle ECFiM followed by Agro vets for vaccine storage.

**Accessibility of inputs and service providers to livestock owners**

All the livestock owners resolved that KALRO should assist them in training Animal health assistants on ECFiM techniques and agro vets storage.

**Affordability:** The affordability parameter assessed the ability of households to pay for the vaccines. This survey realized that the Maasai have no problem with ideal costs of inputs is beneficial.

**Acceptability:** The livestock keepers interviewed felt that the technology if properly used. They welcomed immunization but were critical due to unavailability of ECFiM vaccine. This high level of interest inECFiM vaccine was related to the fact that farmers recognized ECF as a major constraint to cattle production.

## Discussion

Drugs such as buparvaquone (Butalex®, Mallinckrodt Veterinary, UK) are currently available, they are not affordable by most resource-poor small-scale livestock keepers. ECF immunization 'Infection and Treatment Method' (ITM), leads to lifelong immunity to the disease and offers the most reliable control of ECF. Mukhebi*et al.,* (1989), that cattle immunized against ECF had lower case mortalities, higher weight gains and greater marginal rates of returns as supported Kajiado county benefits of immunization. In Zambia, Pegram*et al.,* (1996) showed that on farms where theileriosis was a serious problem, immunization coupled with a strategic dipping programme was economically very attractive. Immunized cattle required 6 strategic dipping per year to reduce the effects of ticks, representing an 85% reduction in acaricide use. In view of existence of other tick-borne diseases like babesiosis and "anaplasmosis, tick control programme of dipping has to continue albeit as supported Maasai Cattle keepers.

## Conclusions

Cattle, sheep and goats are the most preferred livestock species, cattle for milk and sheep and goats owing to the climatic conditions. These species are accustomed to browsing on shrubs. Priority cattle diseases were East Cost Fever, Foot and Mouth Disease, Heart water, CBPP and Anthrax. Sources of Ecf-vaccines information included: KALRO– employees, private veterinarians, NGOs, CAHW, ASK and media. The benefit of Ecf-Vaccines included: reduced mortality, reduced tick control costs, increased weight gains and high marginal returns. The constraints in adaptation of ECFiM included technical know-how, financial, services payment, unawareness, high number of doses per pack and poor infrastructure.

## Recommendations

Agriculture being a devolved function, the County government should formulate policies that enhance working relationship with Kenya Agricultural Livestock Research Organization (KALRO) as it is the main source and the trainer in ECFiM delivery and dissemination. County government should provide soft term loans to stakeholders in ECFiM delivery. KALRO should come up with tick control strategy to be followed after immunization, in order to reduce acaricides effects on the input costs, build-up of resistance and environmental pollution. County government should provide soft term loans to stakeholders in ECFiM delivery for easier availability and affordability. KALRO should come up with tick control regime to be followed after immunization, in order to reduce acaricides effects on the input costs, build-up of resistance and environmental pollution. County government should formulate polices that government veterinary extension and Community Animal health

Workers after training to be used to encourage the utilization of ECFiM technology through service provision business at livestock keeper's costs.

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