World Organisation for Animal Health

FMD CONTROL INTERVENTIONS IN UGANDA

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PCP FMD FOCAL POINT

MINISTRY OF AGRICULTURE, ANIMAL INDUSTRY AND FISHERIES

Workshop on FMD Epidemiology, Surveillance, and Diagnostics to Strengthen Control Efforts in Eastern Africa

21st - 23rd October 2025, Mombasa, Kenya

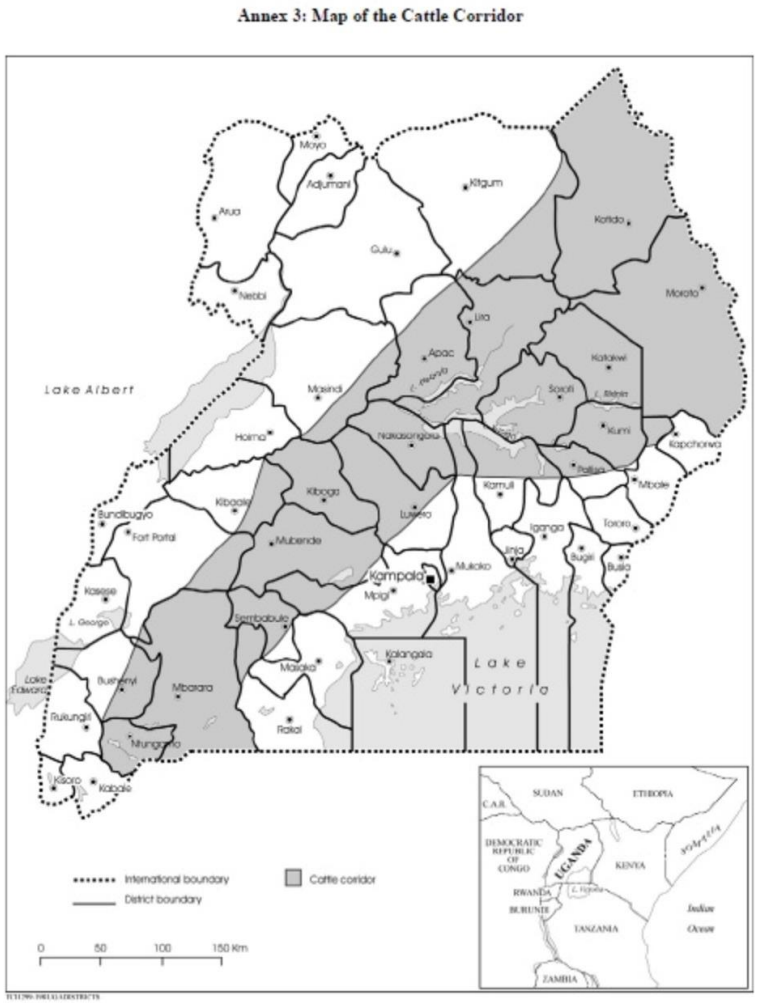
COMESA SPS Project

Presentation Outline

- Country context and epidemiology
- PCP-FMD governance and approach
- Surveillance system
- Laboratory distribution and capacity
- Impact of FMD outbreaks
- Control interventions
- Gaps and Challenges
- 12-month priorities and partner support

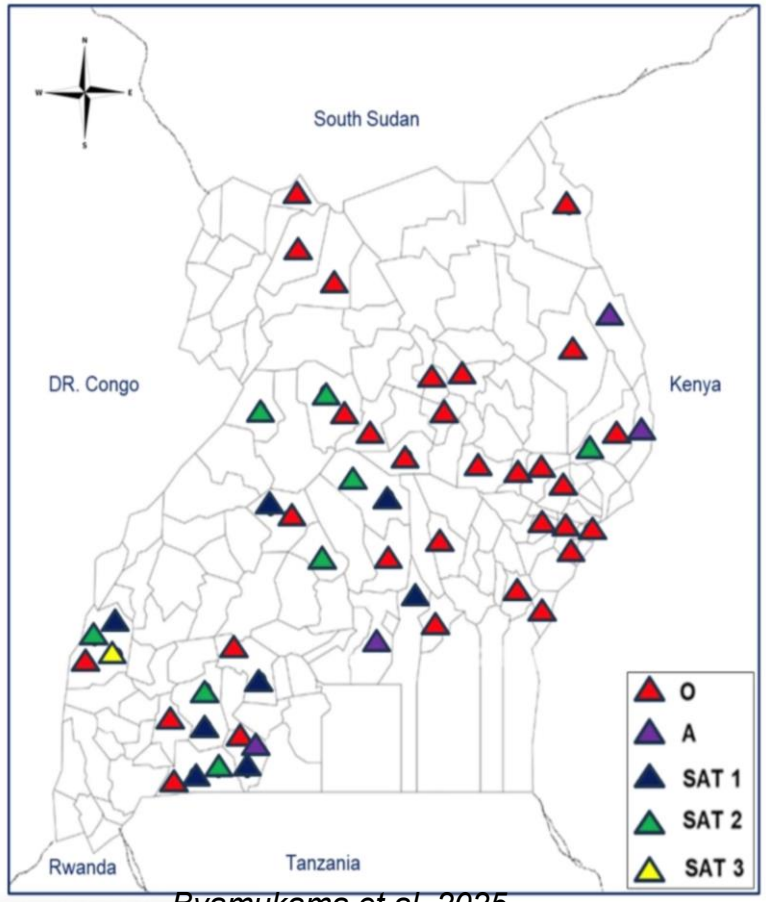
Country context

- Uganda is found in the eastern part of East Africa
- Number of susceptible livestock populations: Cattle 14.5M; Goats 17.4M; Sheep 4.4M; Pigs 7.1M
- The agriculture sector currently contributes about 24.9% to the national GDP of which 8% is attributed to the livestock subsector
- The cattle corridor: Stretches from South western Uganda to North Eastern Uganda-
- Border districts; Kyotera, Rakai, Isingiro, Ntungamo, Moroto, Napak, Kaabong, Karenga, Nakapiripiriti



Epidemiology of FMD in Uganda

- Uganda has been an Endemic FMD country since 1953, with recurrent flare-ups in cattle-corridor districts and cross-border interfaces.
- Large susceptible populations: cattle, goats, sheep, pigs. All characterized by mixed livestock production systems
- The predominant serotypes between 2001-2024 serotypes O, A, SAT 1 and SAT 2;
- SAT 3 serotype was identified in buffaloes in 2003 QUENP.
- National strategy oriented to progressive, risk-based control aligned to PCP-FMD, currently at stage 2 with 67% having achieved the planned targets



Byamukama et al, 2025

Epidemiology of FMD

- Frequency and the number of outbreaks have increased since 1993
- Reported average of 1-15 outbreaks annually from 1996-1999 (Ayebazibwe et al., 2010)
- Increased to 28-38 outbreaks annually from 2000 to 2010 (Muleme et al., 2012
- 62 outbreaks annually from 2011- 2015 (Risk-Based Strategic Plan For Control of Foot-and-Mouth Disease in Uganda, 2015).
  - 36 outbreaks were reported between October 2023 and June 2025, of which 16 were confirmed outbreaks by the laboratory.
  - No spatial pattern, but outbreaks concentrated in the cattle corridor.
  - ❖ Most outbreaks (51%) were reported in the cattle corridor, 33% along international borders, 16% sporadically or in districts neighbouring the outbreaks

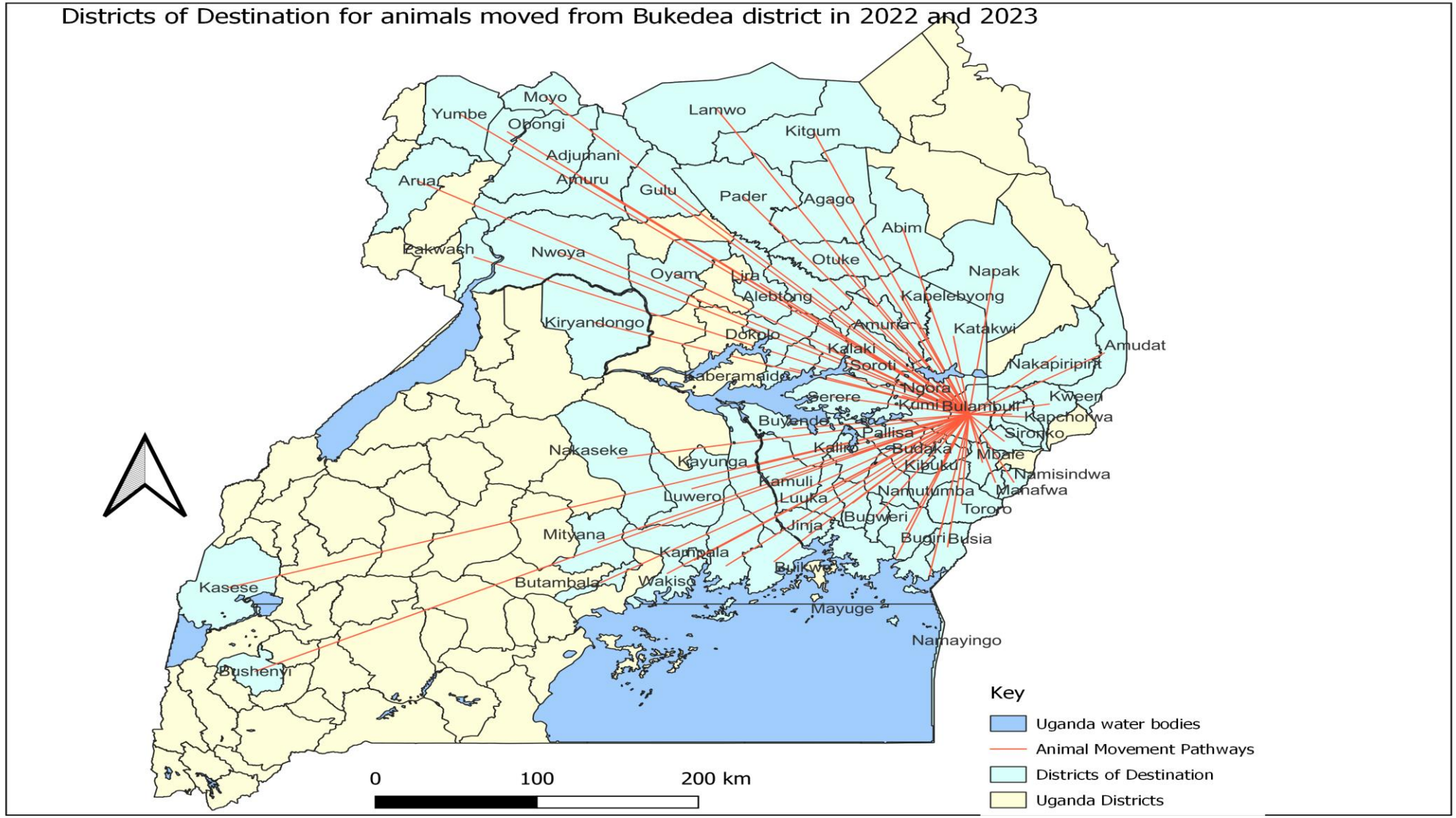
Transmission and Epidemiological Risk Factors

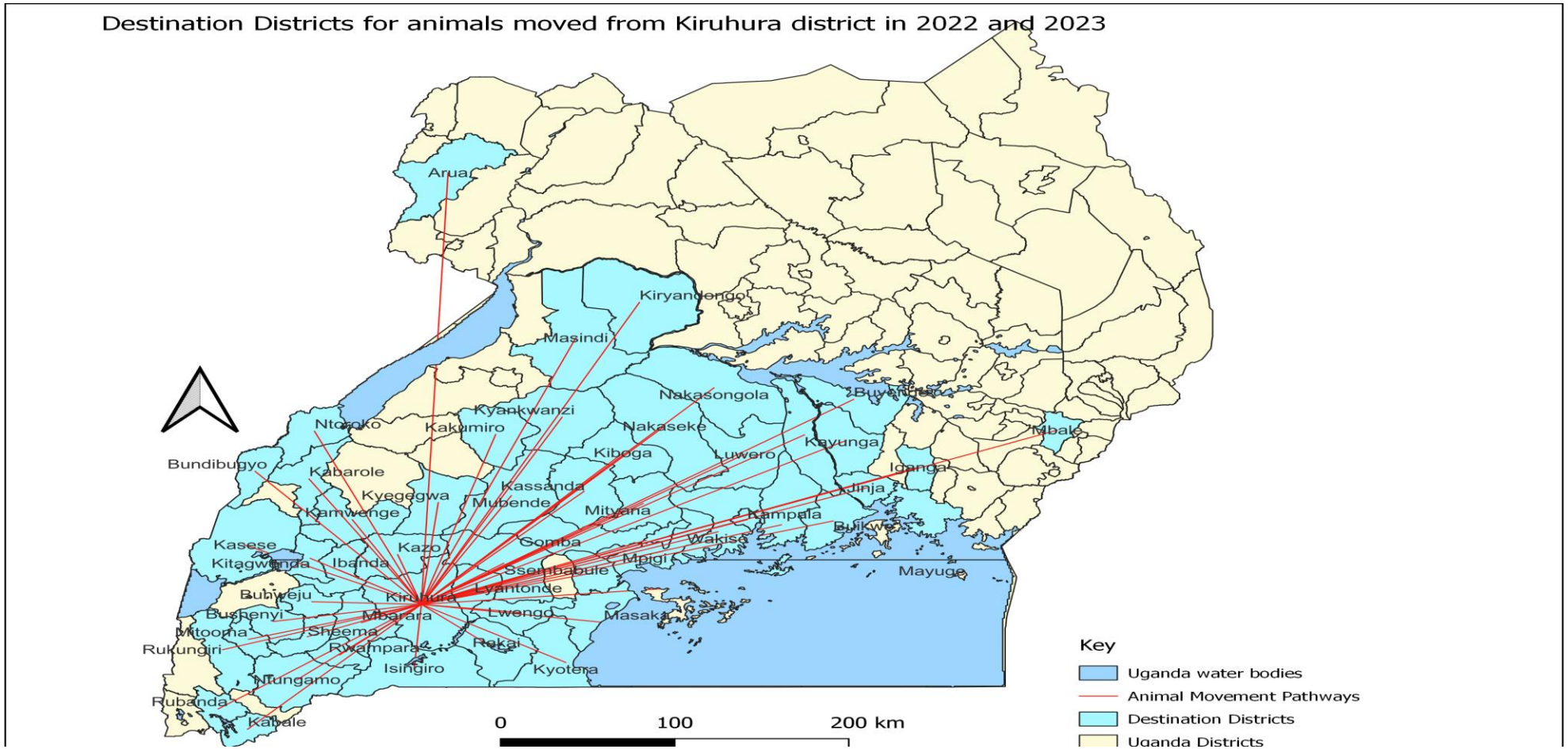
- FMD is primarily transmitted through direct contact between infected and susceptible animals.
- Indirect transmission can occur via contaminated equipment, vehicles, feed and clothing
- The virus can also spread through aerosols (small liquid particles that an infected animal breathes out).
- Additionally, the consumption of contaminated animal products/feed can contribute to the spread of the disease.

Epidemiological Risk factors

- Trade and seasonal cattle movement attributed to FMD transmission
  - Open Livestock markets, especially during peak market seasons, like Christmas holidays
  - Increased movement in drier months as livestock search for water and pasture (transhumance)
  - informal livestock movements,
  - Cross-border movement contributes to the spread.
- Wildlife/domestic animal interface - abundance of wildlife, acts as reservoirs or carriers of the foot and mouth disease virus;
- Communal grazing and watering of animals;
- Inadequate biosecurity measures/husbandry practices at the farm.
- Porous borders,

Socio-economic dependency on the livestock trade increases incentives for unmanaged movement during restrictions


Districts of Destination for animals moved from Bukedea district in 2022 and 2023
Moyo
Yumbe
Obongi
Lamwo
Kitgum
Adjumani
Arua
Amuru
Gulu
Pader
Agago
Abim
Pakwach
Nwoya
Otuke
Napak
Oyam
Lira
Alebtong
Kapelebyong
Kiryandongo
Amuria
Katakwi
Dokolo
Amudat
Kalaki
Soroti
Nakapiripirit
Kaberamaido
Ngora
Serere
Kumi
Bulambuli
Kween
Buyende
Kapchorwa
Pallisa
Sironko
Nakaseke
Kaliro
Budaka
Mbale
Kayunga
Kibuku
Namisindwa
Kamuli
Namutumba
Manafwa
Luwero
Luuka
Tororo
Jinja
Bugweri
Mityana
Bugiri
Busia
Kampala
Buikwe
Butambala
Wakiso
Kasese
Mayuge
Namayingo
Bushenyi
0
100
200 km
Key
Uganda water bodies
Animal Movement Pathways
Districts of Destination
Uganda Districts

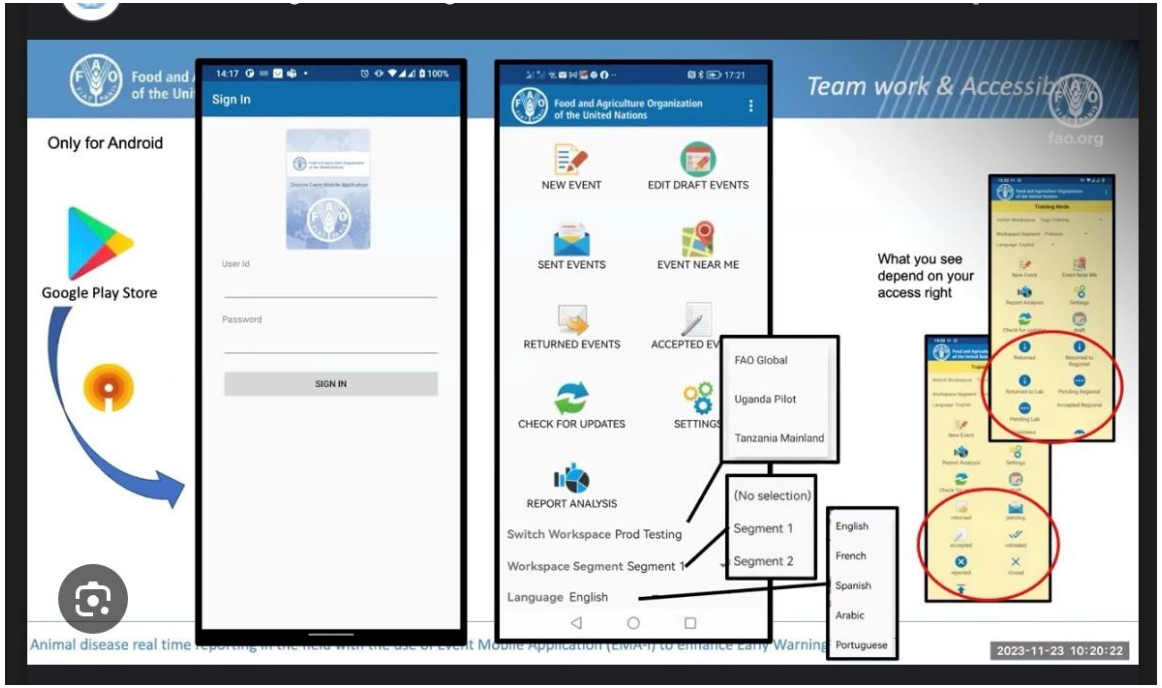

Destination Districts for animals moved from Kiruhura district in 2022 and 2023
Arua
Kiryandongo
Masindi
Nakasongola
Buyende
Kyankwanzi
Ntoroko
Kakumiro
Nakaseke
Mbale
Kayunga
Kiboga
Luwero
Bundibugyo
Kabarole
Iganga
Kassanda
Jinja
Kyegegwa
Mubende
Kamwenge
Mityana
Kampala
Bukwa
Kasese
Kazo
Gomba
Wakiso
Kitagwenda
Ibanda
Mpigi
Ssembabule
Mayuge
Lyantonde
Buhweju
Kiruhura
Bushenyi
Mbarara
Lwengo
Masaka
Mitooma
Sheema
Rukungiri
Rwampara
Rakai
Isingiro
Kyotera
Ntungamo
Rubanda
Kabale
0
100
200 km
Key
Uganda water bodies
Animal Movement Pathways
Destination Districts
Uganda Districts

PCP-FMD Governance and Approach

- Lead: Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) — Commissioner Animal Health as per the Animal Diseases Act, Cap 48
- National multi-stakeholder coordination with districts, labs, research, academia, and private sector
- Risk-based vaccination focused on high-risk districts; ring vaccination around outbreaks and prophylactic vaccination countrywide
- Progressive strengthening of surveillance, laboratory capacity, movement control, and post-vaccination monitoring (PVM)

Surveillance System- architecture and process flows

- Event-based and risk-based surveillance anchored at district level (DVOs, field veterinarians)
- Targeted active surveillance with special focus markets, border points, major stock routes, outbreak foci
- Sample collection and forwarding to national and reference laboratories (NADDEC and Pirbright UK)
- Increasing use of standard case definitions, line lists, and digital tools (EMAi) where feasible
- Standardized case definitions, line lists, and sample referral pathways
- Data flow: farm/vet → DVO → NADDEC/central → national situation updates and response tasking
- Information sharing via national coordination meetings and outbreak updates



Laboratory Network: Distribution and Roles

Tier	Facility	Core Functions
National Hub	NADDEC (Entebbe)	Serology (SP ELISA, LB-ELISA), molecular referral, QA, epi support
Zonal/Regional	ZARDIs (MBAZARDI –), Moroto, Mbale, Mbarara, Gulu, Kabarole, Masaka	Sample triage and referral; training;
District	Diagnostic mini-laboratories	Specimen reception; cold-chain; selected rapid tests; referral logistics

Laboratory Capacity- Core competencies

- **Serology:** SP ELISA (incl. LB-ELISA) for post-vaccination antibody responses
- **Molecular:** central-level capacity (qPCR and conventional PCR); with referral partnerships; Pirbright, UK
- **QA systems**: SOPs, proficiency testing,
- Cold-chain for specimens and reagents; phased backup power to reduce temperature excursions
- **Gaps:** Reagent stock-outs (sometimes), uneven coverage, variable Turn Around Time (TAT) in remote districts

Impact of FMD outbreaks

- FMD is the most economically devastating trade-sensitive livestock disease globally
- The impacts include production losses, lost income due to a decrease in milk and meat sales and live animals, and loss of government revenue, as well as costs related to control and prevention measures
- In endemic regions, it causes an estimated annual loss of $6.5-$ 21 billion.

Impact of FMD outbreaks- Uganda scenarios

- In a study by the Nyama platform in 2014, Nakaseke District lost $5.05M in live animal sales in livestock markets and $0.55M in milk sales over a six-month quarantine period.
- In a 2021 study conducted in Karamoja, every household lost about $696 annually due to the FMD outbreak that occurred in the region.
- This household economic cost included 39% mortality losses, 30% abortion losses, 15% crop losses, 6.9% milk losses, 6% salvage losses, 1.6% treatment and vaccination costs and 1.5% animal traction losses.

Uganda scenario-1

- Disruption of the social well-being of communities:
  - A six-month livestock market closure in Amudat and Kaabong caused revenue losses of $363,169, with 76.8%, 12.2%, and 11% of the losses incurred by livestock traders, meat butchers, and the local government, respectively.
  - The lost sales in livestock over the same period for the two districts were USD 2,863,820 and USD 301,000 in lost meat sales.
  - At the household level, the cattle are salvaged for USD 160 less than the actual price (Kerfua et al., 2023).

Uganda's scenario -2

- Disruption of the social well-being of communities:
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Control interventions in Uganda

- The control of FMD is a centralised function vested in MAAIF by the Constitution of Uganda and the Animal Diseases Act Cap. 48.
- These interventions are implemented by the DAH together with Veterinary Services in the Local Governments (LGs) as per the Local Government Act Cap. 243.
- The primary methods of control for FMD are:
  - ❖**TEST AND SLAUGHTER**; Not done in Uganda
  - ❖Risk-based vaccinations (Strategic vaccinations and Ring vaccination)
  - ❖Quarantine and Animal Movement Control
  - ❖Biosecurity measures/Good husbandry practices- disinfection at the farm, fencing, etc.

Quarantine and Animal Movement Control During Outbreaks.

- **Quarantine** refers to the imposition of stringent restrictions on entering or leaving an area or region where a disease is known to exist or is suspected to exist.
- During an FMD outbreak, a quarantine broadly prohibits the movement of animals, animal products, and fomites from a specified farm/premise, area, or region.
- ***Consideration is given to critical movements, such as those involving feed trucks.***
- ***In Uganda, the Quarantine restrictions cover the entire District because of the contagious nature of FMD.***

Ring vs strategic vaccination strategies

Ring vaccination:

- ❖Focuses on vaccinating animals within a specific area surrounding an outbreak, aiming to create a buffer zone and prevent further spread.
- ❖It is a reactive measure to contain outbreaks

Strategic vaccination:

- ❖It involves the targeted and planned vaccination of susceptible animal populations in high-risk areas or regions (hotspots) with a history of FMD outbreaks, or areas with high livestock densities, for example, the cattle corridor, to build immunity and reduce the likelihood of disease spread.
- ❖ It is a proactive measure to protect high-risk areas; border districts

Both strategies have been part of a comprehensive FMD control program for Uganda.

FMD Vaccination strategy- new thinking is borne

- In May, 2024, the Ministry initiated a nationwide strategic vaccination campaign to contain Foot-and-Mouth Disease (FMD) outbreaks, which had spread rapidly affecting 30 districts at that time
- This initiative followed a cabinet decision to undertake emergency vaccination measures to protect the national herd by securing12.85 M doses of FMD vaccine
- To date, 12M doses have been delivered and utilized in 136 District Local Governments nationwide;
- The target initially was the 14.5M H/C; representing 82.7% coverage.
- All this was considered as a public good initiative; cover all hotspots and highly risk areas.

Mass Vaccination and Cost-Recovery Scheme- Paradigm shift

- Countries that have successfully controlled and eradicated Foot-and-Mouth Disease (FMD) have instituted mandatory biannual FMD vaccinations for the entire susceptible domestic animal population.
- The Government approved the adoption of a mass vaccination strategy as the best option to protect the national herd.

Mass Vaccination and Cost-Recovery Scheme- Paradigm shift

Under this arrangement,

- ❖Vaccination against FMD is compulsory
- ❖All the susceptible domestic animals (cattle, goats, sheep and pigs), which are approximately 44.5 million, are to be vaccinated twice a year.
- ❖ Farmers to pay for each animal vaccinated to cover the cost of the vaccine.
- ❖ The Government to bear the cost of vaccine administration, management, logistical support, and program oversight, ensuring efficient vaccine distribution.
- ❖The government is to continue financing disease surveillance, managing animal movement controls, and covering other essential operational costs

Post-Vaccination Monitoring (PVM)

- Sero-monitoring using SP ELISA (e.g., LB-ELISA) to assess antibody responses post-campaign
- Sampling frames aligned to vaccinated cohorts; thresholds (e.g., PI ≥ 50%) for seropositivity
- Use of results to adjust vaccine targeting, booster intervals and campaign scheduling
- Need for routine NSP testing and genomic surveillance to track circulation and strain match

Review > Trop Anim Health Prod. 2013 Jan;45(1):35-43. doi: 10.1007/s11250-012-0254-6. Epub 2012 Sep 7.

Effectiveness of vaccines and vaccination programs for the control of foot-and-mouth disease in Uganda, 2001-2010

Michael Muleme [1], Robert Barigye, Margaret L Khaitsa, Eugene Berry, Anthony W Wamono, Chrisostom Ayebazibwe

Affiliations + expand

PMID: 22956440 DOI: 10.1007/s11250-012-0254-6

> Vaccine. 2024 Dec 2;42(26):126325. doi: 10.1016/j.vaccine.2024.126325. Epub 2024 Sep 12.

Evaluation of commercial quadrivalent foot-and-mouth disease vaccines against east African virus strains reveals limited immunogenicity and duration of protection

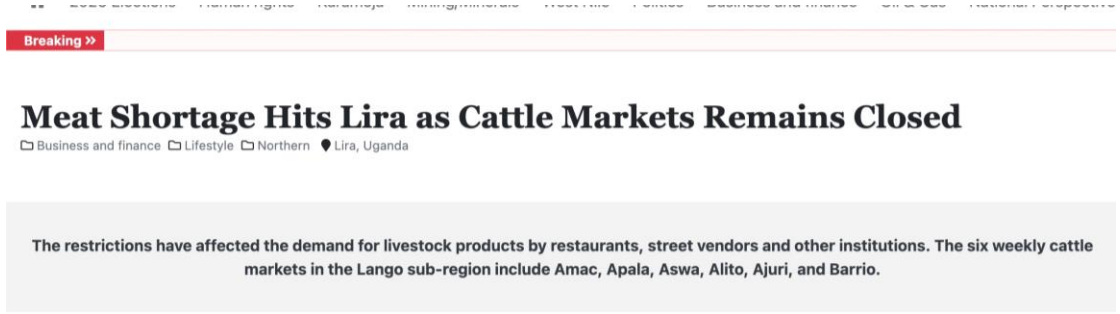
Susan D Kerfua [1], Daniel T Haydon [2], Ginette Wilsden [3], Anna Ludi [3], Donald P King [3], Rose Ademun Okurut [4], Stella Atim [4], Moses T Dhikusooka [5], Ivan Kyakuwa [5], Paolo Motta [6], David J Paton [3]

Affiliations + expand

PMID: 39270355 DOI: 10.1016/j.vaccine.2024.126325

Movement Control and Biosecurity

- Temporary quarantines and movement permits in affected zones
- Market controls: inspection, closure of high-risk avenues when indicated
- Checkpoints and coordination with local authorities and law enforcement
- Farmer and trader sensitization on reporting, vaccination, and biosecurity practices



Key Gaps and Constraints

- Quality-control and international logistics delays impacting vaccine arrival windows
- Cold-chain power reliability and maintenance at district level
- Livestock identification and traceability system is still lacking;
- Laboratory coverage and reagents; limited field transport and sample turnaround in remote areas
- Enforcement capacity for movement control; cross-border coordination

24-Month Priorities

- Scale risk-based mass vaccination across the Country to raise effective coverage, starting Jan-February 2026 Cycle;
- Institutionalize PVM (SP/NSP serology) and targeted genomic surveillance
- Expand zonal/district lab functionality, QA systems, and sample transport networks
- Expand backup power for district cold-chain; deploy continuous temperature monitoring
- Digitize farmer registration, vaccine payments, and movement permitting for traceability
- Strengthen cross-border collaboration and joint outbreak management
- Establish disease control infrastructure e.g. Quarantine stations, holding grounds etc

Thank You

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