भा.कृ.अनु.प. -राष्ट्रीय खुरपका और मुंहपका रोग संस्थान

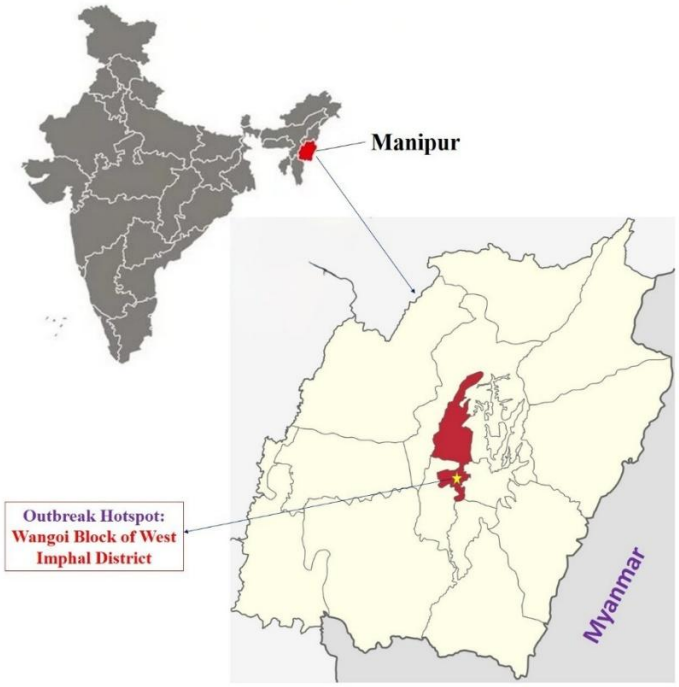
ICAR - National Institute on Foot and Mouth Disease

FMD Case Study Series-2025

Conceptualized by: **Dr R.P. Singh**
Drafted by: **Dr Rahul Singh Arya and Dr Sabitri M.**
Reviewed by: **Dr S. Subramaniam and Dr J.K. Mohapatra**

Case Study Number:		**03/2025**
State involved:		Manipur
Area/District:		Chajing Karam Village, Wangoi Block, West Imphal District
Month/Year:		April/2025
Primary Species affected:		Cattle

Investigation of a Foot-and-Mouth Disease (FMD) Outbreak in Imphal West, Manipur



Sample collection from affected cattle

Case History: An outbreak of Foot and Mouth Disease (FMD) was investigated in cattle at Chajing Karam Village of Wangoi Block located in West Imphal District of Manipur state in North-Eastern India. Manipur shares a porous international border of approximately 398 kilometres with Myanmar in the east, forming part of the total 1,643 km India-Myanmar border that also touches other north eastern states of Arunachal Pradesh, Nagaland, and Mizoram. The outbreak hotspot is roughly 110-150 km from the Myanmar border crossing at Moreh. The first clinical case was reported on 02nd April, 2025. The affected animals were procured through local purchase. The FMD-susceptible animal population in the region was 179, comprising 114 Cattle and 65 pigs. The average number of animals held in the concerned region was approximately 3 cattle and 4 pigs per household. It was reported that four cattle belonging to three

different households were clinically affected. The rest of the animals in the region remained unaffected. So the morbidity rate was calculated to be 0.035% (4/114). The affected animal exhibited profuse drooling of saliva, vesicular lesions in the oral cavity and lips, and vesicles in the inter-digital space of the hooves, consistent with classical FMD symptoms. All affected animals received prompt symptomatic and supportive treatment and completely recovered by 19th May, 2025. No mortality was recorded during the outbreak.

Field Investigation and Epidemiology: Field investigation revealed that each household in the village rears cattle and pigs, indicating a mixed-species livestock rearing system. The villagers procure animals through local purchase. Animals were allowed to graze on common grazing lands, which likely facilitated virus transmission through close contact and contaminated fomites. The affected animals were provided with soft chewable feed with supportive and symptomatic treatment, including oxytetracycline (to prevent secondary bacterial infection), NSAID (Melonex- Meloxicam) for pain and inflammation, multivitamins (Tribivet), and topical agents (Topicure spray and Himax ointment) for wound healing and maggot prevention. The affected animals were isolated, and the farm premises were disinfected (4% Sodium carbonate), and visitors were restricted. Although regular biannual FMD vaccination is practiced in the area, a breakthrough infection occurred, suggesting possible waning immunity, antigenic variation, or field exposure to circulating virus strains. It is noteworthy that the currently circulating FMDV serotype A field strains in India are antigenically mismatched with the vaccine strain A/IND40/2000 used in the Indian trivalent FMD vaccine formulation. At the time of the collection of information, the vaccination status in the region was 59.7%, leaving 1/3rd of animals unvaccinated. Following confirmation of the outbreak, post-outbreak ring vaccination was carried out to limit further spread. The outbreak remained limited to a few animals without any mortality, indicating early detection, rapid intervention, and effective containment measures. No new cases were reported after implementation of control strategies.

Manipur's international border is shared with Myanmar (Burma), extending for approximately 398 kilometres, along its eastern side. Imphal is located less than 150 km from the road connection point Moreh, with Myanmar. This border connects Manipur to Myanmar's Chin State and Sagaing Region, facilitating historical trade and cultural exchange. However, with the ongoing Free Movement Regime (FMR) and border crossings like the one near Moreh, there are always chances of transboundary animal disease spread. Myanmar had reported FMD outbreaks primarily caused by Serotype O, with Serotype A also present. Transboundary strain of Asia 1, which was new to Myanmar, was also reported in the past.

Laboratory Diagnosis: A total of eight serum samples and three tissue samples were collected from clinically affected animals on 02nd, 03rd and 06th April, 2025. All the samples were dispatched to ICAR-NIFMD, Bhubaneswar, on 07th April, 2025 and were received on 21st April, 2025. Laboratory investigations included serotyping by sandwich ELISA and RT-multiplex PCR (RT-mPCR). The final laboratory report issued on 28th April, 2025 confirmed FMDV serotype A as the causative agent.

Control strategy: North-Eastern India remains endemic for FMD, with periodic outbreaks in cattle as well as other susceptible species, including Mithun and Yak. The region’s porous international borders and extensive informal cross-border animal movement significantly increase the risk of sustained endemic circulation as well as introduction of transboundary FMDV strains. An effective FMD control strategy in this region must therefore integrate routine management of endemic transmission with robust preparedness for potential incursions of transboundary strains. The control strategy must include the following points:

- Reduce FMD incidence and virus circulation caused by endemic strains.
- Prevent introduction and establishment of transboundary FMDV strains.
- Enable early detection and rapid response to outbreaks.
- Protect livestock-dependent livelihoods and regional trade.
- Strengthen veterinary infrastructure and community participation.

Control Strategy for Endemic FMD Strains

Vaccination Strategy

- Biannual mass vaccination of all susceptible species (cattle, buffalo, pigs) using trivalent vaccines (O, A, Asia-1), incorporating the new serotype A vaccine candidate A/IND27/2011.
- High coverage (>80%) at village, block, and district levels.
- Cold-chain maintenance in remote and hilly terrain through mobile vaccine carriers.
- Sero-monitoring post-vaccination to assess protective antibody levels and regular vaccine matching.
- Strategic vaccination timing before seasonal animal movements and festivals.

Surveillance and Early Detection

- Passive surveillance: farmer-based reporting of vesicular disease.
- Active surveillance in high-risk zones (border districts, animal markets).
- Sentinel herds in endemic hot-spots.
- Routine serological and virological surveillance using ELISA and RT-PCR.
- Integration of pig populations, which act as amplifiers of FMDV.

Biosecurity and Farm-Level Control

- Segregation of newly introduced animals for at least 14 days.
- Avoidance of shared grazing and watering points during outbreaks.
- Regular cleaning and disinfection of animal sheds and equipment.
- Controlled disposal of vesicular debris and secretions.
- Promotion of species-wise housing, especially the separation of pigs from cattle.

Movement Control

- Regulation of animal movement within districts during outbreaks.
- Temporary closure or regulation of livestock markets and fairs.
- Mandatory health certification for inter-district animal transport.

Control Strategy for the introduction of FMD virus from the other side of the border

Border and Transboundary Control

- Strengthening veterinary check-posts along international borders.
- Quarantine and health screening of imported or transboundary animals.
- Surveillance of illegal or informal animal movement routes.
- Collaboration with border security and customs authorities.

Emergency Preparedness and Contingency Planning

- Development of FMD Emergency Response Plans at state and district levels.
- Identification of rapid response teams trained in outbreak investigation.
- Stockpiling of emergency vaccines and disinfectants.
- Designation of high-containment diagnostic laboratories for transboundary strains.

Diagnostic and Laboratory Strengthening

- Rapid differential diagnosis to distinguish endemic vs transboundary strains.
- Virus isolation, sequencing, and phylogenetic analysis for strain identification and characterisation of origin.
- Linkage with national reference laboratories for confirmation.

- Time-bound reporting to enable swift decision-making.

Emergency Control Measures

- Immediate stamping-out or strategic culling in case of confirmed transboundary strain introduction, where necessary.
- Strict movement ban and zoning (infected, surveillance, and free zones).
- Ring vaccination using appropriate vaccine strains, if available.
- Intensive disinfection and bio-containment of infected premises.

Integrated One-Health and Community Participation

- Awareness campaigns in local languages on early signs of FMD.
- Training of para-veterinary staff and community animal health workers.
- Farmer education on reporting, vaccination compliance, and biosecurity.
- Inclusion of pig farmers and backyard livestock owners, which is often overlooked.
- Coordination among animal husbandry, forest, wildlife, and local governance bodies.

Monitoring, Evaluation, and Sustainability

- Regular impact assessment of vaccination campaigns.
- Mapping of FMD hot-spots using outbreak data.
- Gradual progression toward FMD-free zones with vaccination.
- Continuous updating of strategies based on viral evolution and field realities.

Conclusion: This case study documents a localized outbreak of FMD caused by serotype-A FMDV in cattle in Imphal-West district of Manipur. Despite regular vaccination practices, the occurrence of infection highlights the continued risk of FMD in endemic regions. Early disease reporting, laboratory confirmation, prompt symptomatic treatment, and post-outbreak ring vaccination effectively contained the outbreak, resulting in 100% recovery of affected animals and preventing further transmission. An effective FMD control strategy for North-Eastern India must strike a balance between routine management of endemic strains and robust preparedness against potential incursions of transboundary viruses. Sustained mass vaccination with vaccines antigenically matched to currently circulating field strains (A/IND/27/2011 for serotype A), strengthened surveillance systems, enhanced farm-level biosecurity, and active community engagement form the backbone of endemic disease control. Simultaneously, heightened border vigilance, emergency preparedness, and rapid diagnostics capabilities are critical to prevent catastrophic outbreaks due to transboundary strains. A region-specific, risk-based, and integrated control approach is essential to protect livestock health, rural livelihoods, and achieve long-term disease control elimination goals in North-Eastern India.