

One Health at the Frontline of Animal Disaster Risk Reduction: From Preparedness to Resilience

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1. Introduction: Why an Animal Disaster Is Never Only a Veterinary Problem

Ask a flood-hit farmer what he lost and he rarely says "some animals". He says the morning milk cheque, the school fee due next month, the bullock saved for the next sowing. One drowned cow removes income, protein and draught power in a single night. Then a second wave arrives. There is contaminated water, carcasses nobody knows how to dispose of, and a dispensary cut off by a broken road. In some seasons there is also a zoonotic disease that reaches the family. This is why One Health has moved out of conference halls and into the cattle shed. The idea is simple. The health of people, animals, plants and ecosystems forms one connected system, not four files on four desks (One Health High-Level Expert Panel [OHHLEP], 2022). Extension workers are well placed to act on it, because we stand where these systems meet every day.

2. Drivers of Risk: Climate, Land Use and Spillover Pathways

Nature has not become crueller. We have moved closer to it. Forests give way to farms and mines, wild animals are pushed towards livestock and settlements, and a warming climate shifts the range of vectors such as mosquitoes and ticks (Wannous, 2020). Between 2008 and 2017 the world recorded 3,751 natural disasters, mostly weather-related, with more than two billion people affected (Wannous, 2020). World Bank mapping places South and Southeast Asia, India included, among the regions of concentrated spillover risk. The reasons are dense human and livestock populations, high biodiversity, rapid land-use change and stretched veterinary services (Berthe et al., 2022).

Sikkema and Koopmans (2026) describe viral emergence as a sequence. First come conditions that let a pathogen multiply in animal hosts. Then comes a spillover event, then onward spread, and finally the damage to health, nutrition and equity. The practical message is that each link is an opportunity to intervene. The links closest to the animal are also the cheapest to break.

3. Surveillance and Early Warning: Detecting Threats at the Animal-Human-Environment Interface

How we watch decides how early we know. Drewe et al. (2023) distinguish two complementary approaches. Risk-based surveillance directs scarce resources towards high-risk

species, production systems and locations. Syndromic surveillance treats unusual clinical signs or mortality patterns as an alarm, even before a laboratory names the pathogen. Any extension worker knows the village version. When milk yield drops in one lane on the same day, or several animals abort within a week, somebody needs to be told. Such signals are data, and a system that waits only for laboratory confirmation will always lag behind the disease. Wannous (2020) goes further and argues for early warning and information systems that link climate data with disease incidence. The same author argues that animal health and livestock should be written into national climate commitments. For a climate-sensitive country like ours, that is a sensible ask.

4. The One Health Animal Disaster Management Cycle

Table 1. The One Health animal disaster management cycle applied to a dairy village

Stage	What it asks for	How it may look on the ground
Planning	Agree roles before trouble starts	A village plan for moving animals and arranging feed
Prevention	Stop hazards becoming disasters	Timely vaccination, safe water, controlled animal movement
Mitigation	Soften hazards that cannot be stopped	Raised sheds, fodder reserves, shade and ventilation
Preparedness	Build skills and stocks in advance	Trained animal health volunteers, medicine and cold-chain stock
Response	Act while the event unfolds	Rescue, emergency fodder, quick reporting of sick animals
Recovery	Restore basic functions	Restarting milk collection, treating survivors
Reconstitution	Rebuild better than before	Better housing, stronger biosecurity, hardier animals

Source: Stages adapted from Anthony and De Paula Vieira (2022); village-level examples by the author.

Anthony and De Paula Vieira (2022) describe animal disaster management as seven linked stages that feed back into each other. Whatever a disaster teaches goes straight into

the next round of planning. Table 1 is my reading of those stages for a dairy village.

5. Evidence from Practice: Integrated Response to Rift Valley Fever in Rwanda

Rwanda’s 2022 Rift Valley fever outbreak shows the cycle at work. Surveillance confirmed 3,112 infections in cattle, goats and sheep, including 1,254 abortions and 516 deaths. Among people, 173 cases were confirmed and 22 deaths were recorded (Ishema et al., 2024).

The figures are sobering, but the response is the instructive part. Animal and human health services shared information, carried out joint investigations, restricted livestock movement, monitored vectors and vaccinated animals in high-risk areas. Community engagement improved the reporting of abortions and animal deaths (Ishema et al., 2024). An abortion storm was treated as a public health warning, not a private loss. That habit is exactly what our field systems need.

6. Overlooked Dimensions of Vulnerability: Companion Animals, Gender and Multispecies Communities

Human-animal bond: Emergency responders interviewed in Australia regarded human life as their responsibility, yet reported an emotional toll from decisions that cost animals their lives (Travers et al., 2022). The same study notes that pet loss after Hurricane Katrina deepened survivors’ mental health problems. When millions fled Ukraine, several host countries relaxed animal entry rules because people would not abandon their pets (O’Carroll et al., 2024). Those authors also note that existing pet-evacuation laws are often unfunded mandates. Replace the pet with a milch cow and the logic holds in our villages. A family that will not leave its cow behind will not leave a flooded house either.

Gender: Wenham et al. (2024) report that women often handle backyard poultry, raw milk and milk products, and yet have less access to information and less voice in emergency decisions. In dairying, that describes a great many households.

Who is counted as vulnerable: Jeleff et al. (2022) reviewed 36 studies of local-level vulnerability assessment. They found that participatory methods help bring diverse stakeholders into the assessment and avoid labelling groups as permanent victims. Mattes (2024) adds that planning has long treated animals either as a risk or as lost property, and argues for community resilience that includes non-human members.

7. Institutional Landscape in India: Progress and Persisting Gaps

India has real momentum. At the National One Health Mission Assembly in November 2025, the union

Health minister described the Mission as a whole-of-government, whole-of-society collaboration (Press Information Bureau [PIB], 2025). In 2026 the National Disaster Management Authority issued guidelines that bring animals into disaster planning. They cover joint human-animal surveillance, biosecurity in emergency shelters, scientific carcass disposal, food safety and antimicrobial resistance (National Disaster Management Authority [NDMA], 2026).

Guidelines, however, are not practice. Taaffe et al. (2023) still find weak grassroots communication, limited cross-sector surveillance, fragmented systems and inadequate training. Chen et al. (2022) summarise the underlying weakness as four Cs: concept, communication, coherence and continuity. They also caution that misinformation and fear of consequences can make people hesitant to report. They recommend trained spokespersons from every sector. In my reading, a farmer who fears a movement ban or culling may likewise stay silent, which is an extension problem as much as a policy one.

Ghai et al. (2022) offer a workable sequence of five stages: engagement, assessment, planning, implementation, and monitoring with evaluation. Table 2 pairs each reported gap with a fix an extension system could attempt.

Table 2. Gaps reported in India and practical ways to close them

Gap reported	What it looks like in a dairy village	A workable fix
Weak grassroots communication	Farmers learn of an outbreak through rumour	Short, regular alerts through cooperative societies and women’s groups
Limited cross-sector surveillance	Vet, doctor and forest officer never compare notes	A shared monthly reporting sheet at block level
Fragmented systems	Animal and human health follow separate chains of command	A joint district task force that outlasts any single outbreak
Inadequate training	Paravets and health workers train in separate rooms	Combined One Health refresher courses

Policy gaps	Carcass disposal and shelters belong to nobody	Village disaster plans that name each task and a responsible person
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Source: Gaps as reported by Taaffe et al. (2023), read with the four-C framework of Chen et al. (2022) and the staged approach of Ghai et al. (2022); village examples and fixes are the author’s suggestions.

8. Translating Preparedness into Resilience: A Pathway for Extension Systems

Preparedness is what we build before the water rises. Resilience is how well a community absorbs the shock, adapts and recovers (United Nations Office for Disaster Risk Reduction [UNDRR], 2017). The road between the two is made of ordinary things. Dairy cooperatives, paravets and village vets can report on the same line as the health officer. Farmers, women especially, can learn to treat an unusual abortion or sudden milk drop as news worth sharing. Fodder reserves, shelters and carcass disposal can sit inside every village plan. None of this needs new technology. It needs habit, trust and someone assigned to keep the loop turning.

9. Conclusion

Animal disasters are health events for the whole community. The evidence from Rwanda, from pet-evacuation studies and from India’s own reviews points the same way. Early signals at the animal end, shared across sectors and acted on with communities, are cheaper and kinder than late rescue. The nineteenth-century physician Rudolf Virchow is credited with saying that no real dividing line separates animal medicine from human medicine. Our disaster plans should finally admit it.

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