

One Health Policy: Using Data to Protect People, Animals, and the Planet

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doi.org/10.64643/IJIRTV12I7-188305-459

Abstract- COVID-19 pandemic and recurring zoonotic outbreaks have exposed the vulnerabilities of unprepared and fragmented health systems across the world. India, owing to its dense population, rapid urbanization, and rich biodiversity, faces increased health risks that cross human–animal–environmental boundaries. These health risks are bound to get amplified due to climate change, extreme weather events, land-use alteration, agricultural intensification, and wildlife trade. Despite the launch of India’s National One Health Mission, data from human, animal, and environmental sectors continue to exist in isolation. Despite multiple institutional mandates, there is currently no unified data exchange mechanism linking human health with animal health and environmental health. The article discusses existing policy and programmatic issues that hinders real-time, multi-sectoral surveillance which eventually weakens India’s capacity to prevent, detect and manage zoonotic threats and the resultant morbidity, mortality and economic losses. Leveraging India’s strong digital infrastructure, health and climate monitoring network, the article suggests various ways to build ‘One-Health’ ecosystem and policy roadmap to further strengthen global health security and sustainable development.

Keywords: One Health, Zoonotic Diseases, Emerging Infectious Diseases, Surveillance, Health Security, National One Health Mission, Animal Health

I. PROBLEM STATEMENT: ISSUE AND WHY IT MATTERS

The health of people, animals, and the planet are intricately connected. India, with its dense population, rapid urbanization, and rich biodiversity, faces increasing health risks that cross human–animal–environmental boundaries. Despite the launch of India’s *National One Health Mission*, data from the human, animal, and environmental sectors continue to exist in isolated silos. Zoonotic and climate-sensitive diseases are rising, yet our institutional response remains fragmented. The COVID-19 pandemic and

recurring outbreaks such as Avian Influenza, Nipah Virus, have exposed the vulnerabilities of this fragmented system.

When human health data (from the Ministry of Health and Family Welfare, NCDC, IDSP, ICMR), animal health data (from ICAR and the Department of Animal Husbandry), and environmental data (from the Ministry of Environment, Forest and Climate Change and IMD) are not inter-connected and operate independently - opportunities for early detection and coordinated action are lost.

In the absence of a unified, interoperable data ecosystem, India risks limited preparedness, delayed outbreak response, and ineffective mitigation strategies for future health crises. As climate change intensifies, disease patterns and migration of vectors, the need for a digitally integrated *One Health* approach is urgent as ever.

II. EVIDENCE BASE: KEY DATA POINTS

1. Zoonotic disease burden: Globally, approximately 60% of all known human infectious diseases are zoonotic in origin, and nearly 75% of emerging infectious diseases originate in animals (World Health Organization [WHO], 2023; Council on Foreign Relations [CFR], 2024). A recent systematic review noted that zoonotic pathogens continue to emerge due to increased human–animal contact, urbanization, and ecological disruption (Kumar et al., 2024). In India, diseases such as Nipah virus, avian influenza, and scrub typhus exemplify the zoonotic threat landscape, underscoring the need for coordinated surveillance across sectors.
2. Climate impact: The India Meteorological Department (IMD) reports that India’s annual mean land-surface air temperature has increased by approximately 0.62°C per 100 years between

1901 and 2020 (India Meteorological Department, 2021). More recent assessments indicate that the annual mean temperature anomaly for India in 2024 was +0.65°C above the 1991–2020 baseline (India Meteorological Department, 2025). These climatic changes are expanding the transmission windows for vector-borne diseases such as malaria, dengue, and chikungunya, particularly in northern and northeastern states (National Centre for Vector Borne Disease Control [NCVBDC], 2024).

3. Policy insights: The Confederation of Indian Industry (CII), in its landmark report *The One Health Paradigm: Unifying Health for a Sustainable Future* (CII, 2023), identified digital interoperability, disease surveillance, and data governance as the three critical pillars for implementing India’s National One Health Mission. Similarly, deliberations at the 2023 Digital Health Summit, co-organized by CII and the Ministry of Health and Family Welfare (MoHFW), emphasized a “One Digital Framework” for cross-sectoral data sharing and standardized interoperability (Press Information Bureau [PIB], 2023).
4. Epidemic experiences: Recent outbreaks — notably COVID-19, Nipah virus, and Avian Influenza — have demonstrated the interconnected nature of human, animal, and environmental health. Many of these diseases are driven by land-use change, agricultural intensification, wildlife trade, and climate variability (World Organisation for Animal Health [WOAH], 2024). The COVID-19 pandemic highlighted that health threats originating at the human–animal interface can escalate rapidly in the absence of early-warning systems and integrated surveillance. Nipah Virus outbreak in Kerala, in 2018 pointed towards critical issues such as a lack of proactive, continuous disease surveillance in animal populations; early signals of animal morbidity captured by local veterinary centres were not tapped to inform IDSP or IMD climate data, which resulted in delayed human health alerts. Necessary prevention efforts could have been planned much earlier had the animal

morbidity data and human disease surveillance data were integrated.

5. Data governance gap in India: Despite multiple institutional mandates, there is currently no unified data exchange mechanism linking human health systems (MoHFW, NCDC, IDSP, ICMR) with animal health systems (ICAR, Department of Animal Husbandry) and environmental health databases (MoEFCC, IMD). This fragmentation hinders real-time, multi-sectoral surveillance and weakens India’s capacity to detect and manage zoonotic threats (Indian Journal of Community Medicine and Public Health [IJCMPH], 2024). Data silos also impede ecosystem-level health risk analysis and predictive modelling, which are critical for future ‘One Health’ readiness.

III. INTERPRETATION: WHAT DATA REVEALS

The data points highlight a central issue — India’s health surveillance is reactive, not predictive. Diseases emerge and spread before systems can respond effectively because information remains scattered across departments. Without digital integration, health authorities will not be able to identify cross-sectoral patterns — such as livestock disease trends that precede human infections, or climate anomalies that amplify vector transmission.

An integrated data framework — connecting human, animal, and environmental health — could enable predictive analytics and rapid response. Artificial Intelligence (AI) and Machine Learning (ML) algorithms, combined with Geographic Information Systems (GIS) and digital health platforms under the Ayushman Bharat Digital Mission (ABDM), can transform how India monitors disease risks. For instance, real-time animal morbidity data from ICAR or District Veterinary Hospitals could be cross-linked with OPD data from Health Centers and temperature or rainfall data from IMD. Such convergence can generate early-warning signals for zoonotic outbreaks or vector proliferation, triggering timely interventions. In short, fragmented data weakens preparedness, while integration empowers prevention.

IV. IMPLICATIONS: WHO IS AFFECTED AND HOW

The absence of a unified One Health data ecosystem affects multiple stakeholders:

- Public health systems: Fragmented surveillance leads to delayed outbreak containment and inefficient use of resources.
- Veterinary and agriculture sectors: Farmers lose livestock and income due to unmonitored zoonotic infections that could have been prevented with early alerts.
- Environmental governance: Lack of integrated data obscures the health impacts of deforestation, urban sprawl, and climate change on disease emergence.
- Citizens: Outbreaks translate into higher morbidity, mortality, and economic losses — especially among marginalized and rural populations dependent on livestock.
- Policymakers: Without consolidated evidence, strategic decision-making for disease control, climate adaptation, and public health investment remains suboptimal.

Therefore, data integration is not merely a technological challenge — it is a governance imperative that determines the nation's resilience to future pandemics and ecological crises.

V. RECOMMENDATION: THE WAY FORWARD

India can leverage its strong digital public infrastructure — including ABDM, CoWIN, ICMR data systems, and IMD's climate monitoring networks — to build a unified, data-driven One Health architecture. The following recommendations provide a policy roadmap:

- Develop a National One Health Data Grid (NOHDG): Establish a federated digital platform integrating datasets from MoHFW, ICMR, ICAR, MoEFCC, IMD, and the Department of Animal Husbandry. The platform should enable interoperability using open standards and APIs, aligned with ABDM principles.
- Institutionalize Data Governance and Interoperability Frameworks:

Create a clear regulatory and ethical framework for cross-sectoral data sharing, ensuring privacy, consent, and quality assurance. This can be anchored under the *National One Health Mission* with dedicated data stewardship cells.

- Enable AI/ML-Driven Disease Surveillance: Deploy predictive analytics and AI-enabled dashboards for real-time monitoring of zoonotic, antimicrobial, and climate-linked disease trends.
- Invest in Digital Capacity Building: Train epidemiologists, veterinarians, data scientists, and environmental experts in digital literacy, cross-sectoral analytics, and risk modelling. Build regional One Health resource centers for skill development and operational coordination.
- Foster Public-Private Partnerships (PPPs): Encourage collaboration with digital health innovators, startups, and academic institutions to design tools for visualization, modelling, and forecasting of disease outbreaks.
- Integrate Climate and Environmental Indicators: Incorporate data from IMD, CPCB, and NDMA into health risk assessments to link ecosystem degradation and extreme weather events with emerging disease risks.

By embedding these elements within a formal National One Health Policy Framework, India can transition from fragmented surveillance to a coordinated, data-driven governance model.

VI. CONCLUSION

Data is the backbone of a resilient and future-ready health system. A data driven One Health approach will enable India to move from reaction to prediction, from siloed governance to systemic integration, and from fragmented responses to coordinated preparedness.

Integrating human, animal, and environmental health data is not just a technical reform — it is an ethical and strategic necessity to safeguard public health, ensure food security, and sustain ecological balance.

As India envisions “*One Earth, One Family, One Future*,” operationalizing a digital, data-enabled One Health ecosystem can become the cornerstone of global health security and sustainable development.

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