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Research article

# An operational One Health framework for enhanced multi-sectoral coordination and collaboration in Tanzania

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## Abstract

The One Health (OH) approach promotes integrated, multi-sectoral collaboration to address complex health threats at the human-animal-environment interface. This study examined operational gaps and opportunities to strengthen multi-sectoral OH coordination in Tanzania, drawing on empirical data and lessons from recent Marburg virus disease outbreaks. Given the growing number of emerging and re-emerging threats, the research aimed to develop a context-specific framework to enhance OH governance, communication, collaboration, and capacity building. A descriptive cross-sectional design included 101 participants from the health, livestock, agriculture, environment, and wildlife sectors across three regions (Arusha, Iringa, and Dodoma). Data were collected via semi-structured questionnaires and analyzed using quantitative and qualitative methods to assess knowledge, awareness, communication, and institutional structures. General findings revealed weak inter-sectoral coordination, limited awareness of OH guidelines, siloed operations, ad hoc communication, inadequate training, and insufficient financial resources, particularly at the subnational level. At the subnational level, only 33.7% (n=34) reported awareness of OH, and 27.7% (n=28) could identify core elements of OH. Coordination was largely reactive: 76.2% (n=77) were engaged only during crises, while routine operations remained fragmented. Communication was similarly ad hoc: 58.4% (n=59) reported it, and only 28.7% (n=29) reported regular interaction during outbreaks. Resource mobilization was donor-dependent and unpredictable, constraining preparedness and response. A striking 78.2% (n=79) of subnational participants reported a lack of policy integration and limited awareness of OH guidelines, while 56.4% (n=57) indicated unclear roles and responsibilities. The proposed framework offers a practical roadmap for institutionalizing OH in Tanzania. Its implementation is expected to enhance preparedness, early detection, and response to health threats, while fostering resilience and whole of government collaboration. It provides a scalable model for strengthening health security and operationalizing OH in similar contexts. Therefore, it is recommended that the proposed operational framework be tested and its performance systematically evaluated during future outbreak responses in Tanzania and extended to broader contexts beyond.

**Keywords:** Collaboration, Communication, Gaps and opportunities, Multi-sectoral coordination, One Health, Operational framework, Tanzania

## Introduction

The growing frequency and severity of zoonotic pandemics have reinforced the need for integrated strategies that cut across sectors and disciplines. Emerging threats, including antimicrobial resistance (AMR), climate change, ecosystem degradation, biodiversity loss, food safety challenges, and vector-borne diseases, continue to pose significant risks to humans, animals, plants, and the environment [1, 2]. If left unaddressed, these threats jeopardize economic stability, political cohesion, and social resilience, thereby escalating humanitarian needs in affected communities [3]. Lessons from pandemics such as COVID-19, Ebola virus disease, Marburg virus disease, and Mpox have highlighted the critical importance of adopting a One Health (OH) approach, grounded in robust multi-sectoral coordination and collaboration, to effectively contain and control emerging pathogens [4]. These events have shown that siloed responses are insufficient to address the complex relationships among human, animal, and environmental health.

Recognizing the intrinsic interdependence and aligning with Global Health Security (GHS) priorities, OH multi-sectoral coordination is essential [5]. Tanzania's experience with Marburg virus disease, including outbreaks in 2023 and 2025, provides a context-specific case study that highlights operational gaps and opportunities to strengthen OH implementation [6, 7]. The OH approach offers a strategic pathway for addressing complex health challenges that no single sector can manage in isolation [3, 8]. This holistic and collaborative model is necessary when the scope and resource demands of a health threat exceed the capacity of a single sector [9, 10, 11]. Fostering inclusive engagement with key stakeholders, from community actors to national and international institutions, facilitates the co-development of interventions, cross-sectoral information sharing, and stronger coordination mechanisms. This collaborative model enhances innovation, accelerates responses to evolving threats, and strategically leverages diverse expertise and resources. Tanzania's recent experience with Marburg virus disease, particularly the 2025 outbreak in the Kagera region, illustrates the operational necessity of

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such an approach: gaps in coordination, surveillance integration, and risk communication across sectors constrained the response effort [6, 7, 12].

Globally, the OH approach has been adapted to detect and respond to complex, multidisciplinary issues at the human-animal-environment interface, necessitating coordinated multi-sectoral action and communication [13, 14, 15]. Multi-sectoral governance for OH has emerged as a global priority, as emphasized in the quadripartite guide. The term quadripartite refers to the formal collaboration among four major international organizations, the Food and Agriculture Organization of the United Nations, the United Nations Environment Program, the World Health Organization, and the World Organization for Animal Health (FAO, UNEP, WHO, and WOAH), working together to address health risks at the human–animal–environment interface [2]. Yet, persistent challenges in cross-sectoral collaboration continue to hinder implementation [11]. Since 2007, Tanzania has prioritized OH coordination, initially catalyzed by outbreaks of Rift Valley Fever and Avian Influenza [16]. To institutionalize this approach, the OH section (originally the OH Coordination Desk) was established within the Prime Minister's Office (PMO) as a central coordinating body. This led to the development of the first and second five-year National OH Strategic Plans (i.e., 2015-2020 and 2022-2027) and an OH implementation guideline that embeds OH principles within the country's disaster management structure. These frameworks enabled collaboration among the health, livestock, agriculture, wildlife, and environmental sectors and engaged civil society and the private sector in knowledge exchange, resource mobilization, and joint health responses. Tanzania's disaster management framework operates through committees at the regional and district levels, with emergency responses coordinated by the PMO and focused on natural disasters, including floods, droughts, landslides, and earthquakes [17]. However, the Ministry of Health leads disease emergencies, creating structural differences that became evident during the 2023 and 2025 Marburg outbreaks. Limited coordination between disaster and disease response mechanisms resulted in delayed cross-sectoral engagement and harmonized action [6, 7].

Currently, Tanzania's OH governance structure lacks a formalized communication pathway for reporting OH interventions from subnational levels to the Prime Minister's Office – Regional Administration and Local Government (PMO-RALG), the ministry mandated to coordinate local government operations and serve as a liaison to the PMO. This structural gap creates a disconnect between local implementation and national-level coordination, limiting the timely flow of information and hindering integrated decision-making. In response, this study proposes a comprehensive operational framework to enhance multi-sectoral coordination and collaboration, communication and information sharing, policy and governance, knowledge and awareness, and resource sharing. The proposed framework aims to strengthen multi-sectoral coordination and collaboration, particularly from the subnational to the national level, to improve prevention, early detection, preparedness, response, and recovery from epidemic, emerging, and pandemic-prone diseases [18, 19, 20].

## Methodology

### *Theoretical foundation for framework development*

The development of the proposed framework followed a systematic, evidence-based approach. It was guided by the principle that effective coordination mechanisms should be grounded in empirical evidence, theory, policy context, and stakeholder experiences. In developing the operational OH framework, several parameters, such as coordination, communication, collaboration, and capacity building, were considered core elements guiding the institutionalization of OH to ensure both relevance and applicability for implementation. The framework was anchored in global and regional standards, including the International Health Regulations (2005), the Tripartite Zoonotic Guide, and the Quadripartite guidance, to guarantee alignment with international guidelines. National governance structures were examined, positioning the PMO as the central coordinating authority and clarifying mandates across the health, livestock, environment, agriculture, and wildlife sectors. Empirical evidence from prior studies by Sanga et al. (2024) highlighted the benefits and challenges of multi-sectoral coordination and included an empirical assessment of knowledge gaps among OH actors at national and subnational levels [21].

The identified gaps, including knowledge gaps, training inequalities, weak communication, unclear governance roles, and resource constraints, especially at the subnational level, were the main barriers to effective OH operationalization in Tanzania [22]. The integration of rapid-response principles, such as the 7-1-7 approach, and lessons learned from the Marburg virus disease outbreaks in 2023 and 2025 [6] further informed the framework's design. Finally, sustainability enablers, including dedicated budget lines, joint planning mechanisms, national communication strategies, and monitoring and evaluation systems, were incorporated to strengthen long-term operationalization and resilience.

### *Study area*

The assessment was conducted across three purposively selected regions: Arusha, Iringa, and Dodoma, spanning six districts (Monduli, Arusha, Mufindi, Iringa, Kondoa,

and Kongwa). The areas were selected for their ecological diversity, livestock–wildlife interfaces, and complex interactions among humans, animals, and ecosystems. The study regions and districts were purposively selected to reflect diverse zoonotic risk drivers and ecological contexts across Tanzania. In Arusha Region, urban–peri-urban livestock trade hubs and pastoralist activities near wildlife corridors increased the risk of rabies, brucellosis, and anthrax [23, 24]. In Iringa Region, smallholder livestock farming adjacent to the Ruaha ecosystem, along with the convergence of forestry, agriculture, and animal husbandry, exposed communities to leptospirosis, bovine tuberculosis, and zoonotic influenza [25]. In Dodoma Region, rapid land-use changes and climate-driven vulnerabilities in livestock-based economies increased susceptibility to brucellosis, anthrax, and Rift Valley Fever [26, 27, 28]. Collectively, these districts provided representative settings for analyzing zoonotic spillover risks and multi-sectoral coordination challenges.

### *Study design*

This descriptive study employed a cross-sectional design to develop a context-specific operational framework to strengthen OH multi-sectoral coordination and collaboration in mainland Tanzania. The study design was adopted to identify gaps and barriers to OH implementation across the core competencies of coordination, communication, collaboration, and capacity building, with a focus on the subnational level. The framework was intended to translate theoretical principles into actionable strategies for strengthening OH governance and multi-sectoral coordination. The emphasis was placed on operationalization to ensure applicability, particularly at sub-national levels in Tanzania.

### *Data collection and analysis*

A survey was conducted using semi-structured questionnaires to collect data from 101 participants. Participants were conveniently and purposefully recruited at their workplaces. Participants included professionals and experts from the health, livestock, environmental, agricultural, and wildlife sectors at the national and subnational levels. The questionnaire assessed participants' familiarity with the OH concept, including whether they had heard of OH, understood its meaning, and could identify its core competencies, namely coordination, collaboration, communication, and capacity building (the 4Cs). Participants were asked about the modes and frequency of communication among sectors, the existence of information-sharing platforms, and the regularity of inter-sectoral engagement in emergency response. To assess governance structures, the study examined whether subnational coordinators supported OH implementation, whether guiding documents were available, and whether OH activities were integrated into annual plans. Regional planning officers were interviewed about the availability of financial resources and budgetary allocations for OH implementation.

### Data analysis

Data were analyzed using Microsoft Excel and the Epidemiological Information Software (Epi Info) to generate frequencies and proportions. Qualitative responses were analyzed using content analysis to identify recurring concepts in the participants' responses. Conceptual analysis and an inductive approach were used to group the concepts into categories, which were manually coded in a Word document and tallied using Microsoft Excel to obtain the frequencies and percentages. These findings were synthesized to inform the design of the proposed operational framework for OH.

## Results

### Demographic information

Generally, the study involved 101 participants, of whom 12.9% (n=13) were at the national level and 87.1% (n=88) at the subnational level. Among the participants, 71.3% (n=72) were male, and 28.7% (n=29) were female, with ages ranging from 18 to more than 56, and education levels ranging from certificate level to higher degree, as presented in Table 1.

The study findings revealed that, at the national level, 13 participants (12.9% of all, 100% of national participants) were aware of OH, multi-sectoral coordination and collaboration, and the guidelines for implementing OH. The majority of them (n=10) had received training on OH through short courses such as Continuous Professional Development (CPD) and seminars. However, eight declared that no mechanisms were in place to promote cross-sectoral collaboration and communication, and seven reported that information sharing across sectors was through formal letters.

At the subnational level, participants were 88, as described in Table 2. The study revealed a range of operational challenges that constrain effective multi-sectoral coordination and collaboration in implementing the OH approach in Tanzania, as outlined in the core parameters and summarized in the table below.

### Identified gaps in One Health implementation

#### *Governance*

The study identified key gaps in country governance structures, noting that the existing structure, primarily designed for natural disaster management, does not adequately support OH implementation (Table 3). The findings indicated that 78.2% (n=79) of participants at the subnational level reported a lack of policy integration and limited awareness of OH guidelines, which hinder OH

implementation. Moreover, 56.4% (n=57) did not know the clear roles and responsibilities among actors, sectors, and levels.

### *Multi-sectoral coordination and collaboration*

Coordination across sectors was reported primarily during emergencies, with 76.2% (n=77) of participants indicating engagement in crisis periods, while routine operations remained siloed. Disaster committees were present at subnational levels, but no participants identified formal One Health coordination responsibilities, suggesting limited institutionalization of multi-sectoral collaboration. Although they were aware of multi-sectoral coordination, 68.3% (n=69) reported no cross-sector collaboration.

**Table 1:** General summary of demographic information of the participants at the national and subnational levels.

| Variable | Age group (years) | Frequency % (n) from a total of 101 | Exact 95% LCL | Exact 95% UCL |
|---|---|---|---|---|
| **Age** | >56 | 5 (5) | 1.63% | 11.18% |
| | 44 -56 | 32.7 (33) | 23.67% | 42.72% |
| | 31 -43 | 53.5 (54) | 43.27% | 63.45% |
| | 18 -30 | 8.9 (9) | 4.16% | 16.24% |
| **Education level** | Higher degrees | 16.8 (17) | 10.12% | 25.58% |
| | Bachelor degree | 57.4 (58) | 47.19% | 67.21% |
| | Diploma | 24.8 (25) | 16.70% | 34.33% |
| | Certificate | 0.9 (1) | 0.03% | 5.39% |

In the results, frequencies are presented as percentages, and (n) denotes the number of respondents in each category under analysis. The Lower Confidence Limit (LCL) marks the lower boundary of the 95% confidence interval for the estimated proportion, while the Upper Confidence Limit (UCL) indicates the upper boundary. Collectively, the 95% Confidence Interval (95% CI) defines the range in which the true population proportion is expected to fall with 95% certainty, thereby providing a measure of both the precision and reliability of the estimate.

**Table 2:** Summary of demographic information of the participants at the subnational level.

| | | Regional | District |
|---|---|---|---|
| **Category** | **Data** | **Frequency % (n) from a total of 26** | **Frequency % (n) from a total of 62** |
| **Sex** | Male | 73.1 (19) | 69.4 (43) |
| | Female | 26.9 (7) | 30.6 (19) |
| **Age in years** | >56 | 0 | 4.8 (3) |
| | 44 -56 | 42.3 (11) | 25.8 (16) |
| | 31 -43 | 53.8 (14) | 56.5 (35) |
| | 18 -30 | 3.8 (1) | 12.9 (8) |
| **Qualification** | Certificate | 3.8 (1) | 0 |
| | Diploma | 7.7 (2) | 35.5 (22) |
| | Bachelor degree | 61.5 (16) | 62.9 (39) |
| | Higher degrees | 26.9 (7) | 1.6 (1) |

**Table 3:** Summary of identified gaps in One Health implementation at the subnational level.

| Area of concern | Gaps identified |
|---|---|
| Policy and governance | Weak inter-ministerial and inter-departmental coordination, lack of OH policies, limited awareness of OH guidelines and disaster-focused structures |
| Collaboration and coordination | Lack of coordination at the subnational level, siloed operations and reactive collaboration during emergencies |
| Communication and information sharing | Ad hoc communication, conflicting reporting mandates, lack of data sharing and platforms |
| Knowledge and awareness | Limited understanding of the OH approach and competencies, and inadequate training |
| Resources | Insufficient government funding, reliance on external support and unpredictable financing mechanisms |

### *Communication and information sharing*

The findings revealed that 58.4% (n=59) of participants reported communication across sectors as largely ad hoc, with only 28.7% (n=29) reporting regular interaction during outbreaks. Conflicting mandates and parallel reporting channels from subnational authorities to PMO-RALG and sector ministries further undermined coordination, reduced accountability, and fragmented implementation. Furthermore, 22.8% (n=23) reported no data sharing across sectors, while 28.7% (n=29), 7,9%

(n=8), 5.9% (n=6), and 21.8% (n=22) reported data sharing via letters, verbally, electronically, and all mechanisms, respectively.

### *Knowledge and awareness*

Knowledge gaps regarding the OH approach were evident. Only 33.7% (n=34) of participants at the subnational level reported being aware of OH, but they were unable to articulate its meaning or operational components. Few participants, 27.7% (n=28), could identify the core competencies, the 4Cs essential for effective implementation, as covered during OH training workshops. Most participants, 59.4% (n=60), had never attended any training on OH implementation. Figure 1 summarizes the overall results across the key components of One Health operationalization.

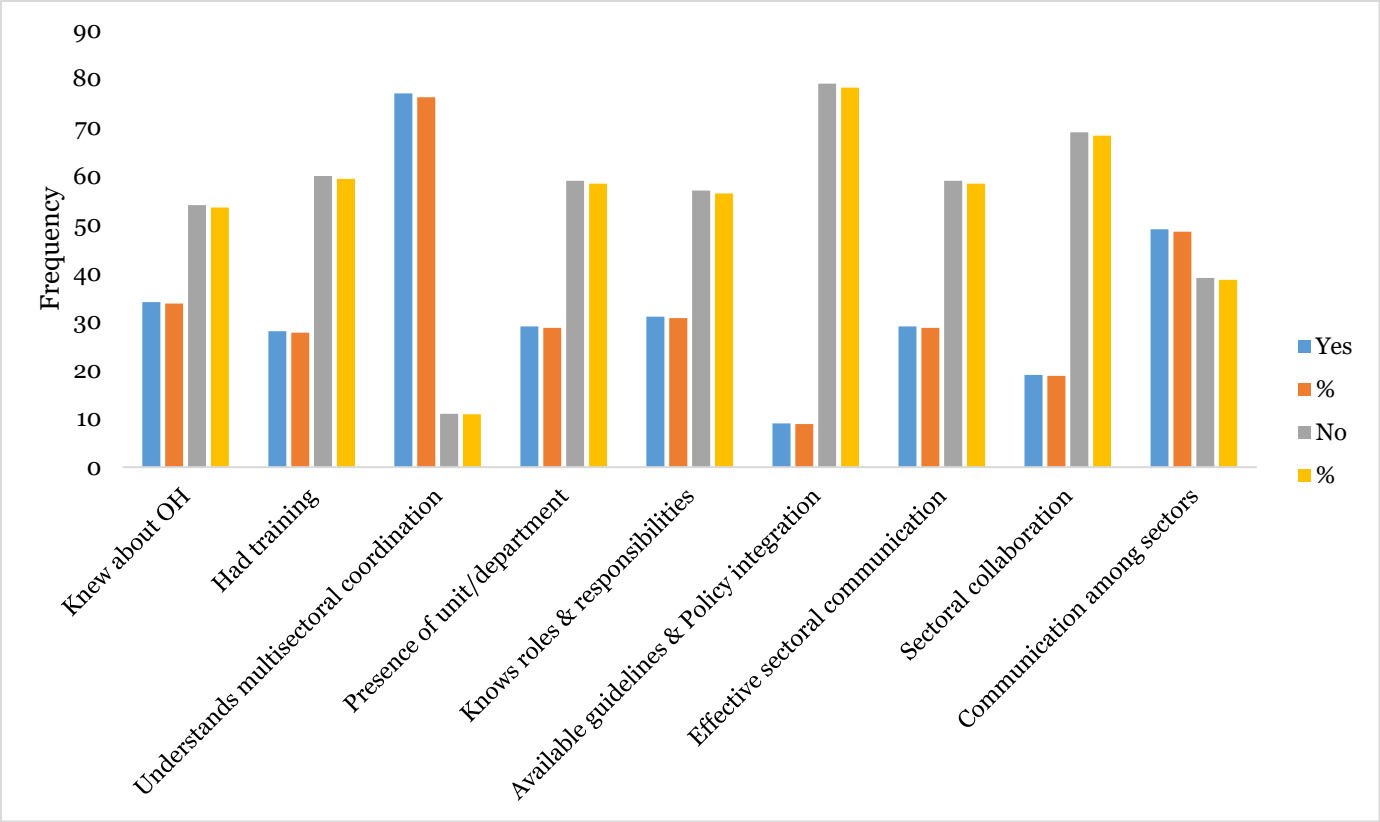



**Figure 1:** Summary of the results described in the core element for One Health operationalization.

### *Proposed framework description*

Building on the gaps highlighted by this study, the proposed framework is designed to guide and streamline the institutionalization and operationalization of the OH approach at the national and subnational levels. These study results contributed to the proposed framework and its logic, emphasizing empirical grounding, contextual relevance, integration of international guidelines, lessons from outbreaks, and a focus on sustainability. The framework is designed to enhance coordination, communication, collaboration, and capacity building among OH implementers, thereby enabling them to prevent and respond to public health threats effectively.

### *Purpose and rationale*

The proposed operational One Health Framework was designed to address the systemic gaps identified in Tanzania's current multi-sectoral coordination landscape. It responds to fragmented communication, limited awareness, weak institutional linkages, and resource constraints identified through field assessments and outbreak case scenarios.

### *Framework logic*

Built on the foundational OH competencies and the 4Cs, the framework is designed to advance whole-of-government participation. It institutionalizes OH principles across governance structures, ensuring proactive, coordinated, and sustainable responses to public health challenges (Figure 2). By integrating established institutions such as PMO-RALG and the PMO and establishing formal connections between local actors and national coordination mechanisms, the framework transforms fragmented, reactive practices into a forward-looking system that leverages sectoral synergies and community perspectives.

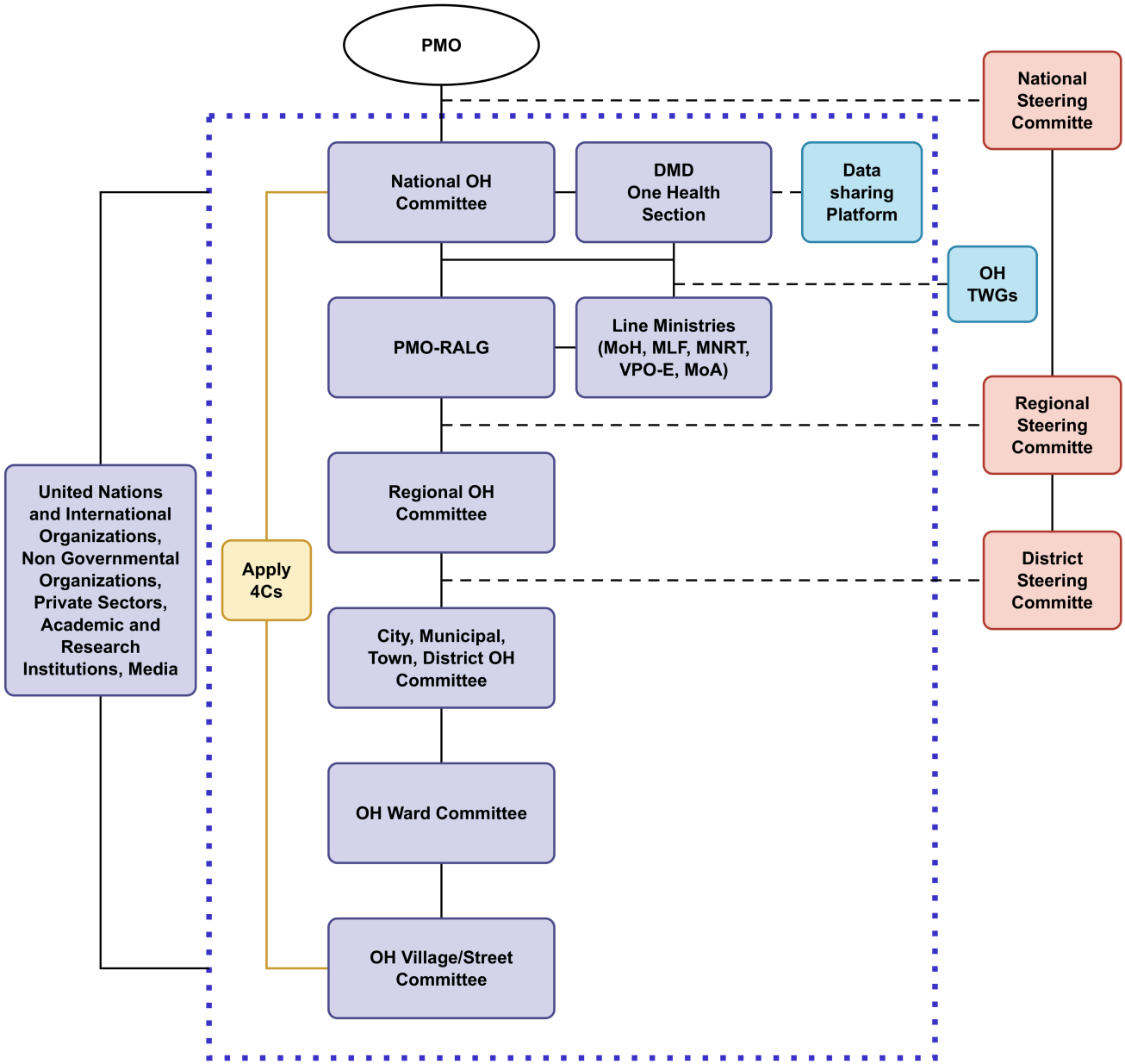



**Figure 2:** Proposed organizational structure for One Health management in Tanzania. OH=One Health, PMO=Prime Minister's Office; TWGs=technical working groups, PMO-RALG=Prime Minister's Office – Regional Administration and Local Government authorities, DMD=Disaster Management Department, MOH=Ministry of Health, MLF=Ministry of Livestock and Fisheries, MNRT=Ministry of Natural Resources and Tourism, VPO-E=Vice President's Office – Environment, MOA=Ministry of Agriculture, 4CS=Coordination, Collaboration, Communication and Capacity Building

The diagram in Figure 2 illustrates the hierarchical, multi-sectoral coordination framework guiding OH preparedness and response in Tanzania. It delineates the vertical flow of authority and communication from the PMO and national-level committees to village- and street-level OH structures. Horizontal linkages among line ministries (MoH, MLF, MNRT, VPO-E, MoA), technical working groups (OH TWGs), and external stakeholders, including UN agencies, NGOs, academia, the private sector, and the media, underscore the integrated, whole-of-society approach. The "Apply 4Cs" principle anchors operational coherence across all levels.

### *Values and principles*

Effective multisector coordination requires shared values and principles among stakeholders. These include mutual recognition of interdependence, trust, transparency, inclusiveness, responsiveness, and accountability. Buy-in to the collaborative process is essential for success, as is a shared vision and mission across sectors and disciplines. The framework promotes good governance by embedding these principles into operational structures and decision-making processes.

### Core components

The framework comprises five interlinked components that collectively strengthen OH implementation.

***Governance and Institutional alignment:*** Establish clear mandates and reporting pathways among the PMO, PMO-RALG, and subnational actors. Strengthen the role of the One Health Section (OHS) within the PMO and of TWGs to provide technical guidance and support implementation efforts. Align with the International Health Regulations (IHR 2005), the Tripartite Zoonotic Guide, and the Multisector Coordination Mechanism.

***Communication and information sharing:*** Establishes formal, bidirectional communication channels across governance levels and improves accountability. Introduces digital platforms for real-time data exchange and outbreak alerts and streamlines roles through standardized protocols to reduce duplication.

***Multi-sectoral coordination and collaboration:*** Operationalize joint planning and response mechanisms across the health, livestock, environmental, wildlife, and agricultural sectors. Institutionalize regular coordination meetings and simulation exercises, and foster community engagement and civil society participation. Encourage recognition of sectoral interdependencies and shared responsibilities.

***Capacity building and knowledge strengthening:*** Delivers targeted training in OH principles, systems thinking, and outbreak response. Cultivates soft skills, including negotiation and cross-sectoral reasoning, and supports mentorship and peer learning across regions and disciplines.

***Resource mobilization and sustainability:*** Calls for establishing dedicated One Health budget lines at all administrative levels, from districts to the national government. It also promotes pooled financing mechanisms and public–private partnerships to support health emergencies and ensures that OH activities are systematically integrated into routine planning and monitoring processes.

### Discussion

The One Health approach emphasizes the need for integrated, multi-sectoral action to address complex health threats at the human-animal-environment interface. Central to this approach are the four foundational 4Cs, which must be rooted across all levels of governance and among all relevant sectors and disciplines [29, 30]. Despite global advocacy, including efforts by the quadripartite, implementation of OH remains uneven, particularly in low- and middle-income countries where country ownership and stakeholder buy-in are limited [11, 18].

In Tanzania, siloed operations, unclear mandates, and fragmented reporting pathways have hindered effective OH coordination, especially at the subnational level. Disaster management guidelines address OH principles only partially, contributing to institutional fragmentation and weak operationalization at all levels [20]. The 2025 Marburg outbreak in Biharamulo provided valuable insights and practical lessons; however, it also highlighted significant weaknesses in multi-sectoral coordination, particularly structural gaps between subnational actors and national coordination bodies [6, 7, 12]. Only 4.8% of respondents reported functional coordination mechanisms at the subnational level, with most efforts concentrated at the national level [12, 21]. The proposed operational OH framework directly addresses these challenges by institutionalizing the 4Cs and aligning with international standards, including the IHR (2005) and the Tripartite Zoonotic Guide [18, 31].

#### *Strengthening governance and institutional linkages*

The framework clarifies the chain of command for reporting OH interventions, establishing PMO-RALG as the central coordinating body at the subnational level. This promotes accountability, enhances collaboration, and empowers local committees to assume their responsibilities. The OH TWGs will work closely with these committees through PMO-RALG to provide technical guidance and support the implementation of the OH Strategic Plan. This structure ensures that coordination is not only top-down but also horizontally integrated across sectors and vertically aligned from the community to the national level.

#### *Joint strategic planning and leadership*

Strategic planning is a cornerstone of effective multi-sectoral action. The framework promotes joint planning processes that foster a shared understanding of vision, mission, and goals across all levels. The PMO coordinates national planning, while PMO-RALG leads at the subnational level [32]. Successful collaboration requires clarity of objectives, mutual trust, and inclusive leadership. OH coordinators are tasked with institutionalizing multisector coordination by engaging public and private stakeholders, with support from focal persons in line ministries and partner institutions.

#### *Enhancing communication and collaboration*

Effective coordination depends on robust communication and collaboration mechanisms. Regular interaction among OH implementers ensures timely information exchange and fosters trust and confidence. The framework guides the establishment of formal data-sharing platforms, institutionalizes regular committee meetings, and fosters both horizontal (intersectoral) and vertical

(intergovernmental) communication channels. A national communication strategy will guide these efforts, ensuring clarity in mandates and reducing duplication. In cases of conflicting mandates, PMO-RALG will serve as the coordinating authority, reporting to relevant ministries and ensuring harmonized implementation.

Improved interaction among ministries and stakeholders will facilitate collaborative planning, early detection, and timely response. Anchoring these efforts in the 7-1-7 principle ensures that multi-sectoral collaboration is not only strengthened but also measured against clear, time-bound targets that enhance accountability and accelerate outbreak control [11, 33]. Systems thinking can be promoted by embedding OH policies and strategies that explicitly recognize interconnections across human, animal, and environmental health. Such integrated approaches institutionalize joint planning platforms, harmonize surveillance systems, and establish mechanisms for shared risk management and benefit sharing [34, 35]. By fostering continuous feedback loops, cross-sectoral learning, and collective accountability, these policies enable stakeholders to align their efforts, anticipate cascading impacts, and respond adaptively to complex health threats [36, 37, 38].

### *Community empowerment and equity*

Empowering communities and marginalized groups is essential for inclusive OH implementation. The framework emphasizes the right of all people to participate in the prevention, surveillance, monitoring, control, and mitigation of health threats, while respecting indigenous knowledge and cultural practices [39, 40]. Community-level engagement strengthens early warning systems, builds trust, and ensures that interventions are contextually relevant and socially accepted.

### *Policy and legal structures*

Policy and legislation are critical enablers of OH implementation. Tanzania's OH Strategic Plan, its implementation guidelines, and the Disaster Management Act No. 6 of 2022 provide a legal foundation for multisector coordination in the country. However, effective operationalization requires political commitment and dissemination of OH guidelines to all levels. Furthermore, a dedicated OH policy is recommended to reduce sectoral fragmentation and simplify institutionalization. Integration of OH into existing systems, supported by legal reinforcement and strategic partnerships, will facilitate early detection, prevention, and response to health threats [17, 41, 42]. This aligns with the Tanzania Development Vision 2050 (DIRA 2050), which underscores the importance of robust policy and legal frameworks in ensuring good governance, justice, accountability, and effective local governance. By embedding OH within these broader national priorities, Tanzania can strengthen institutional coherence, foster collective accountability, and create an enabling environment for sustainable outbreak preparedness and response [43].

### *Sustainable financing*

Financial resources are essential for sustaining OH interventions. Currently, emergency funding relies heavily on budget reallocations and external support, which are often insufficient, unpredictable, and delayed. This undermines timely response and community resilience. The framework guides the establishment of risk financing instruments and the allocation of domestic resources to support OH activities. Moreover, sectoral annual plans should include OH preventive measures, and OHS should lead strategic resource mobilization efforts in collaboration with stakeholders [18, 44]. Sustainable financing will ensure continuity of OH interventions and strengthen early warning systems at all levels.

### *Capacity building*

Capacity building is a cornerstone of effective OH implementation, supported by several global frameworks and scholarly contributions. The World Health Organization (2016) highlights the importance of the International Health Regulations (IHR) Implementation Framework in strengthening surveillance and preparedness capacities across countries [45]. Similarly, the World Organization for Animal Health (WOAH) [46] underscores the role of the OIE Performance of Veterinary Services (PVS) Pathway in evaluating and improving veterinary systems to foster multi-sectoral collaboration. Complementing these institutional tools, the Tripartite Zoonotic Guide provides operational guidance for countries to address zoonotic diseases through integrated approaches at the human–animal–environment interface. In addition, Pelican et al. (2019) argue that synergizing such tools enhances workforce development and outbreak response, thereby strengthening OH operationalization [47]. Collectively, these frameworks and scholarly perspectives demonstrate that training, mentorship, and harmonized capacity-building strategies are essential for resilient OH systems capable of addressing emerging and re-emerging health threats. Extending this knowledge from basic levels to the community is critical to strengthening resilience.

### *Public-private partnerships and crosscutting integration*

The framework promotes public-private partnerships (PPP), with the government coordinating collaboration among stakeholders at all levels. It accounts for the division of functions and responsibilities across national, regional, district, and village levels. Strengthening

committees and promoting crosscutting interventions will reduce silos, optimize resource use, and enhance cooperation in addressing endemic, emerging, and pandemic threats, including antimicrobial resistance. Ultimately, the framework provides a structured pathway for achieving well-organized, timely, and effective OH preparedness and response [2].

### *Monitoring and evaluation*

Monitoring and Evaluation (M&E) are integral to the OH framework, providing the foundation for evidence-based decision-making, accountability, and adaptive implementation across sectors. The OH M&E structure comprises five interconnected components: inputs, processes, outputs, outcomes, and impact, each designed to capture the complexity of multi-sectoral collaboration. Inputs include strategic policies, resources, and integrated data systems that enable coordinated action across human, animal, and environmental health domains (Figure 3). Processes encompass joint planning, capacity building, surveillance integration, and stakeholder engagement, fostering collaboration among government agencies, academia, and communities. Outputs such as joint reports, standardized indicators, and policy briefs serve as benchmarks for measuring progress and coordinating efforts. Outcomes reflect improved outbreak detection, reduced duplication, and enhanced trust, while impact is measured through reduced morbidity and mortality, strengthened resilience, and sustainable OH systems. A feedback loop from outcomes to inputs ensures continuous learning and improvement. The framework emphasizes participatory evaluation scheduling to promote ownership and commitment among implementers, reinforcing M&E as a driver of strategic refinement and transformative change.

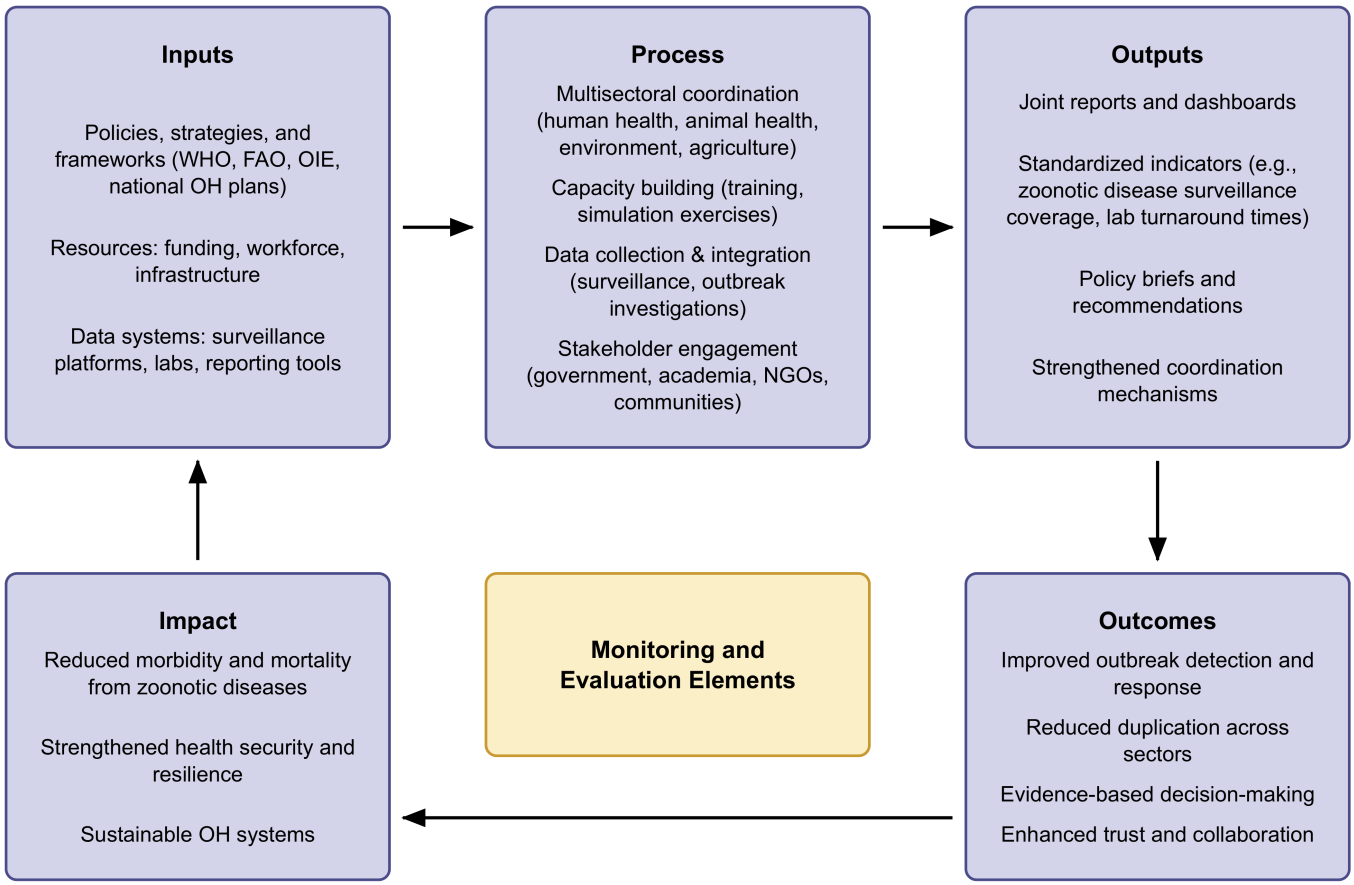



**Figure 3:** Core components of the monitoring and evaluation framework for One Health implementation.

## Conclusion

The One Health approach is a strategic model that promotes integrated action across sectors and disciplines to address health risks at the human-animal-environment interface. It recognizes the interconnectedness of ecosystems and the need for collaborative governance to prevent, detect, and respond to emerging and re-emerging threats. As part of the Global Health Security Agenda (GHSA), OH implementation requires effective coordination, communication, and cooperation across all levels of government and society. This study proposes a context-specific operational framework for OH in Tanzania, designed to bridge the gaps in multisector

collaboration, coordination, and communication. Grounded in empirical evidence and outbreak scenarios, the framework builds on existing governance structures while introducing mechanisms to institutionalize OH principles. It emphasizes the foundational competencies of Coordination, Communication, Collaboration, and Capacity Building (4Cs) and promotes inclusive participation, strategic planning, and sustainable financing. By aligning with international standards and national policies, the framework offers a practical roadmap for operationalizing OH in Tanzania. Its successful implementation will strengthen early detection, preparedness, and response to health threats, while fostering resilience, equity, and sustainability across sectors and communities.

To ensure effective implementation of the proposed operational OH framework, several actions are recommended. First, awareness creation and capacity building must be prioritized. This includes advocacy targeting policymakers and decision-makers, training programs for OH implementers, and the provision of adequate resources to support technical and soft skill development. Second, governance structures should be strengthened across sectors and disciplines to harmonize OH strategies and policies. This involves integrating OH activities into sectoral plans, conducting joint risk assessments and after-action reviews, and establishing OH coordinators and technical working groups to guide implementation. Third, sustainable financing is essential. The government should allocate domestic resources for OH interventions, establish clear budget lines in annual plans, and invest in digital surveillance systems, predictive research, and public awareness campaigns. Strategic resource mobilization from external partners should complement domestic efforts. Fourth, policy and communication tools must be developed. A national OH policy and communication strategy will formalize multisector coordination and facilitate risk communication among stakeholders, including communities and civil society. Fifth, community empowerment is critical. Marginalized groups must be included in surveillance, prevention, and response efforts, with respect for indigenous knowledge systems and cultural practices. Sixth, monitoring and evaluation mechanisms should be embedded in the framework. A robust M&E plan with measurable indicators will guide implementation, ensure accountability, and enable adaptive management. It is recommended that the proposed operational framework be tested and its performance systematically evaluated during future outbreak responses in Tanzania and extended to broader contexts beyond. Finally, public-private partnerships should be leveraged to enhance coordination, share resources, and promote crosscutting interventions. Through these actions, Tanzania can advance toward a resilient, inclusive, and sustainable OH system capable of addressing health threats at their source.

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