

COMMENT

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Strengthening One Health implementation in Tanzania through a synthesis of multisectoral evidence and recommendations

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Abstract

The One Health approach, an integrated, unifying framework recognising the interdependence of human, animal, and ecosystem health, provides a cornerstone for global health security and sustainable development. Formally endorsed in 2021 by the Quadripartite United Nations agencies, it is currently being implemented across 160 countries globally, including at least 21 African countries. In Tanzania, implementation is guided by two successive national strategic plans and coordinated through the One Health Section of the Prime Minister's Office. To advance this agenda, the first Tanzania One Health Conference (TOHC) was convened in Arusha from 4 to 6 November 2024, bringing together 320 participants from government, academia, private institutions, international organisations, and civil society. This report synthesises the principal findings from five keynote addresses, three high-level panel discussions, and 112 presentations across five sub-themes. These include Disease Surveillance, Systems and Technology; One Health Evidence-Based Advocacy, Equity and Social Inclusion; and One Health Approach to Biosecurity and Biosafety Practices. Additionally, other themes addressed Climate Change, Biodiversity and Pandemic Preparedness, as well as Food and Feed Safety, Security and Nutrition. Thematic analysis across these sub-themes identified eight cross-cutting recommendations addressing governance and accountability, disease surveillance, sustainable financing, investment strategy, education and advocacy, research and evidence generation, policy-research coordination, and climate and biodiversity integration. The conference substantially achieved its four stated aims and committed to establishing a regular national One Health symposium as a platform for ongoing accountability and knowledge exchange.

Keywords One health, Multisectoral collaboration, Tanzania



1 Background

One Health facilitates collaboration among multiple sectors working at the human, animal, and environmental interface to prepare, prevent, and respond to public health events. Formally endorsed in 2021 by the Quadripartite - comprising the Food and Agriculture Organization (FAO), the World Organization for Animal Health (WOAH), founded as OIE, the United Nations Environment Programme (UNEP), and the World Health Organization (WHO) - it serves as a cornerstone of global health security. Scientifically, the rationale is compelling: approximately 60% of known human infectious diseases originate in animals, and 75% of newly emerging infectious diseases are zoonotic in origin. These epidemiological realities cannot be addressed through siloed human, animal, or environmental health systems alone, making the integrated One Health framework essential [1, 2].

Implementation of the One Health approach complements the International Health Regulations (IHR) 2005 and the Global Health Security, particularly in addressing health threats that hinder sustainable development [2]. The approach is currently being assessed or implemented across 160 countries and territories globally [3], with at least 21 African countries having institutionalised it through established national platforms or multisectoral coordination mechanisms [4]. In East Africa, Tanzania, Kenya, Uganda, Ethiopia, Rwanda, and Somalia are actively implementing the approach. Several of these countries are doing so through the Capacitating One Health in Eastern and Southern Africa (COHESA) initiative [5].

In Tanzania, the One Health approach was officially adopted in 2018 under the coordination of the Prime Minister's Office through the One Health Desk, which was subsequently advanced to the One Health Section [6, 7]. Since its inception, several initiatives have been undertaken, including the development of the first National One Health Strategic Plan 2015–2020, which has been reviewed to a second National One Health Strategic Plan 2022–2027. The other initiatives include the One Health Coordination and Implementation Guidelines 2024, and the establishment of One Health Rapid Response Teams in 10 districts across five regions: Arusha, Manyara, Kagera, Songwe, and Mbeya [6–8].

Implementation experience under the two successive national strategic plans has generated important lessons. The 2015–2020 plan established foundational coordination structures, including the One Health Desk, and initiated cross-sectoral data-sharing mechanisms, but assessments identified persistent gaps in dedicated financing, workforce capacity, and measurable performance accountability [6, 7]. The current 2022–2027 plan addresses these gaps through the creation of the One Health Section, the establishment of One Health Technical Working Groups across the six strategic pillars, and the establishment of rapid response teams; however, structural dependence on donor financing and incomplete integration across sector ministries remain ongoing constraints [6–8].

To advance this implementation gap, the Prime Minister's Office, through the One Health Section, organised the first Tanzania One Health Conference (TOHC), held from 4 to 6 November 2024 at the Arusha International Convention Centre, Arusha. The conference aimed to increase awareness and advocacy regarding multisectoral collaboration in solving public health challenges, facilitate collaborative discussions, and create a platform for sharing research findings and policies to shape One Health

practices and address shared challenges. This report presents key insights from the TOHC, highlighting conference themes and sub-themes addressed, objectives, and key recommendations.

2 Methods

This report was developed through a structured synthesis of the contents presented at the first TOHC, held from 4 to 6 November 2024 in Arusha, Tanzania.

2.1 Conference organisation and participation

The TOHC was organised by the One Health Section of the Prime Minister's Office in collaboration with government institutions, with technical and logistical support from the COHESA project, FAO, the One Health Society, and the USAID Breakthrough ACTION project. A national and international call for abstracts was issued approximately three months prior to the conference, with submissions reviewed and selected by the Scientific Committee based on scientific quality and relevance to the five sub-themes. Keynote speakers and panelists were invited by the organising committee based on their recognised expertise across the One Health domains. A total of 320 participants drawn from government ministries, academic and research institutions, international organisations, and civil society attended the conference. Pre-conference engagement activities included sub-theme working group sessions and preparatory coordination meetings convened by the organising committee to align session contents with the conference objectives.

2.2 Data sources

The primary data for this synthesis comprised: (i) five keynote addresses delivered by invited speakers; (ii) three panel discussions facilitated during the conference; and (iii) 112 abstracts accepted for oral ($n=88$) or poster ($n=24$) presentation across five sub-themes.

2.3 Analysis approach

Key messages from keynote addresses, panel discussions, and abstract presentations were extracted and synthesised by the organising committee through a structured review of session notes, panel summaries, and the TOHC 2024 Abstract Book. Themes and policy-relevant statements were identified across all three sources through iterative discussion among committee members until consensus was reached. Abstract content was systematically reviewed by sub-theme to identify dominant issues, which are summarised in the principal findings' column (Table 1).

2.4 Synthesis process

Themes from keynote addresses, panel discussions, and abstract presentations were triangulated to develop eight cross-cutting recommendations. Abstracts were grouped by sub-theme using the conference's pre-established categorisation framework. The organising committee synthesised recommendations during the conference, drawing on content from all sessions over the three days of the conference.

Table 1 Number of presentations by sub-theme and format at TOHC, 2024

Sub-theme	Oral	Poster	Total (%)	Principal findings
Disease Surveillance, Systems and Technology	44	12	56 (50.0)	Presentations identified antimicrobial resistance (AMR), zoonotic diseases, and digital surveillance tools as priority areas, with fragmented data systems and limited interoperability across human, animal, and environmental health sectors as the dominant barriers to effective early warning and response.
One Health Evidence-Based Advocacy, Equity and Social Inclusion	25	5	30 (26.8)	Evidence highlighted gaps in One Health governance, financing, and workforce capacity across Eastern and Southern Africa, with community engagement, equity, and multisectoral coordination identified as essential enablers of sustainable implementation.
One Health Approach to Biosecurity and Biosafety Practices	6	4	10 (8.9)	Presentations documented progress in national biosafety and biosecurity frameworks while identifying persistent gaps in workforce training, AMR stewardship, and multisectoral legal and regulatory infrastructure.
Climate Change, Biodiversity and Pandemic Preparedness	7	2	9 (8.0)	Studies demonstrated accelerating human-wildlife-livestock interface pressures and biodiversity loss as drivers of zoonotic disease emergence, with calls for integrated ecosystem health monitoring and climate-resilient One Health planning.
Food and Feed Safety, Security and Nutrition	6	1	7 (6.3)	Research revealed critical food safety risks including mycotoxin contamination, zoonotic pathogen transmission through raw milk, and poor food handling practices, alongside inadequate dietary diversity particularly among women and rural populations, pointing to the need for integrated food systems approaches.
Total	88	24	112 (100.0)	

2.5 Validation

Draft recommendations were presented to all conference participants during a dedicated validation session convened on 6 November 2024, immediately before the closing ceremony. Participants reviewed each of the eight draft recommendations, with discussion facilitated by the organising committee. Several recommendations were refined in response to participant feedback: the governance recommendation (Recommendation 1) was strengthened to explicitly include the establishment of key performance indicators, and the research and evidence recommendation (Recommendation 6) was revised to add mention of a digital repository following input from academic participants. No recommendations were rejected. No new recommendations were added at the validation stage. The key insight from the session was that participants placed particular weight on the sustainability of financing mechanisms and the importance of community-level engagement as prerequisites for the other recommendations to be actionable. The finalised recommendations were formally adopted at the closing ceremony on 6 November 2024.

3 Main findings

3.1 Conference participation and presented abstracts

The conference brought together 320 participants from government, academia, international organisations, and the private sector, who attended 21 sessions, including five keynote addresses, three panel discussions, and 112 presentations (88 oral, 24 poster) across five sub-themes (Table 1). Disease surveillance, systems, and technology was the predominant theme, representing half of all presentations ($n = 56$, 50.0%), while food

and feed safety, security, and nutrition was the least represented, accounting for only 7 (6.3%).

3.2 Insights from keynote addresses and panel findings

3.2.1 Governance, accountability, and financing

A recurring cross-cutting theme across keynote addresses and the high-level governance panel was the gap between One Health policy and operational accountability. Prof. Sarah Cleaveland (University of Glasgow) argued that effective One Health implementation depends on sustained cross-sectoral collaboration and long-term investment in local capacity and identified fragmented governance and the absence of dedicated multisectoral funding as the principal structural barriers to translating policy into action. The high-level panel comprising senior representatives from the Prime Minister's Office, Ministry of Health, Ministry of Livestock and Fisheries, WHO, FAO, and Amref Health Africa reached consensus that Tanzania's existing One Health governance structures, while well-established, lack the performance measurement frameworks needed to translate coordination into demonstrable health outcomes. Panelists identified structural dependence on donor financing as a systemic vulnerability, noting that domestic budget allocations for One Health activities remain limited and inconsistent across sector ministries.

3.2.2 Equity, social inclusion, and community engagement

Prof. *Emeritus* Japhet Killewo (Muhimbili University of Health and Allied Sciences (MUHAS); African One Health University Network (AFROHUN) Tanzania) examined the intersection of equity and social inclusion within the One Health framework, arguing that technical solutions frequently fail to reach the most vulnerable populations because the social determinants shaping disease dynamics at the human-animal-environment interface remain understudied. He called for a reorientation of research priorities toward inquiry that positions communities as co-creators of One Health strategies rather than passive beneficiaries.

3.2.3 Disease surveillance, systems, and technology

Prof. Eron Karimuribo (Sokoine University of Agriculture) examined systemic constraints on effective disease surveillance, identifying siloed institutional cultures and fragmented data collection as barriers to timely detection and reporting findings consistent with his co-authored work on comparative surveillance systems [9–11]. The surveillance panel, drawing on expertise from the Tanzania Wildlife Research Institute, Sokoine University of Agriculture, the Catholic University of Health and Allied Sciences, and FAO, found that adoption of available digital health tools remains constrained by workforce training gaps and weak infrastructure, resulting in continued underutilisation of real-time data for outbreak detection and response.

3.2.4 Biosafety and biosecurity

Dr. Zachariah Ephraim Makondo (Tanzania Veterinary Laboratory Agency) outlined Tanzania's progress in strengthening national biosafety and biosecurity systems, including the development of national guidelines and the establishment of a One Health Biosafety and Biosecurity Technical Working Group. He identified workforce capacity as

equally critical as infrastructure investment, highlighting ongoing training initiatives in partnership with the Tanzania Biological Safety Association, Africa CDC, and the International Federation of Biosafety Associations (IFBA).

3.2.5 Food safety, security, and nutrition

Prof. Joyce Kinabo (Sokoine University of Agriculture) examined systemic weaknesses across Tanzania's food value chain, emphasising the need for integrated food safety systems operating from household to national level. She identified a particular evidence gap in the characterisation of toxin profiles and nutrient contents of locally consumed indigenous foods, and called for systematic risk assessment to inform national food safety policy.

3.2.6 Climate change, biodiversity, and pandemic preparedness

Prof. Linus Munishi (Nelson Mandela African Institution of Science and Technology) presented evidence on the interconnections between climate change, biodiversity loss, and pandemic risk, illustrating how environmental disruption amplifies infectious disease risk including through the invasive tree *Prosopis juliflora*, which enhances transmission capacity of the malaria-vector *Anopheles* mosquitoes as reported in Mali [12]. The climate panel, comprising representatives from the International Livestock Research Institute, Sokoine University of Agriculture, Nelson Mandela African Institution of Science and Technology, and FAO, found that accelerating biodiversity loss and climate vulnerability in Tanzania are creating measurable downstream risks for disease emergence and food security, and identified a critical gap between available evidence and policy action attributable to the absence of coordinated long-term research funding.

4 Conference recommendations

Synthesising the keynote addresses, panel discussions, and presented evidence, eight recommendations emerged as the most critical for advancing the One Health Approach in Tanzania. In each recommendation, the bracketed note highlights the keynote speaker or panel as the primary source, whereas Supplementary Table S1 maps the complete evidence base, including abstracts.

Specific actions on joint surveillance, food safety, biosafety and biosecurity, and climate change are detailed in Table 2.

1. Strengthen implementation and accountability within established policies and governance structures. Existing One Health coordination structures must be matched by performance measurement frameworks. This requires establishing key performance indicators and regular review mechanisms to track progress of One Health interventions across sector ministries. *[Grounded in the governance keynote by Prof. Cleaveland and the high-level governance panel, which identified the absence of performance measurement frameworks as the principal structural gap in Tanzania's One Health coordination (see Supplementary Table S1).]*
2. Enhance disease surveillance, early warning, and response systems. Sectoral data fragmentation remains the primary barrier to effective One Health surveillance. Building integrated data-sharing capacity across human, animal, and environmental health sectors — supported by digital tools and community-based surveillance networks — is essential for timely detection and response. *[Derived from the*

Table 2 Priority actions across four One Health thematic areas arising from the first Tanzania One Health Conference, 2024

SN	Specific actions
Enhance Joint Surveillance and Early Warning Systems	
1	Build capacity on data sharing across human, animal, and environmental health sectors to improve country disease surveillance and early warning
2	Empower local professionals and community members on disease surveillance, enhancing local response capabilities and informing national and subnational early warning systems
Advocate for Food and Feed Safety	
1	Establish a dedicated technical working group focused on evidence-based strategies to enhance food safety, ensuring input from local communities on their priorities for health and safety in food production
2	Create a clear framework for direct engagement of local government authorities, non-governmental organisations, civil societies, and communities to advocate for food and feed safety
Improve Biosafety and Biosecurity Practices	
1	Promote biosafety protocols in One Health programs, showcasing international best practices and standards
2	Integrate basic concepts of biosafety and biosecurity into training systems across all levels in Tanzania
Integrate Climate Change Adaptation and Biodiversity Conservation into One Health Initiatives	
1	Encourage biodiversity conservation efforts as a preventive measure against zoonotic disease outbreaks, recognizing the link between ecosystem health and human health
2	Develop climate-resilient health infrastructure and community programs to address the impacts of climate change on health, including training healthcare workers on climate-related health risks and implementing early warning systems for extreme weather events
3	Provide evidence on linkages between climate change and health impacts, triangulating infectious diseases, non-communicable diseases, and food security
4	Establish a monitoring system for tracking climate change impacts on health, biodiversity, and ecosystem changes
Additional Cross-Cutting Recommendations	
1	Establish a One Health Accountability Framework with clear key performance indicators and regular review mechanisms to track progress of One Health initiatives across sector ministries
2	Launch a One Health Fund through a targeted campaign attracting domestic and international seed funding to reduce structural dependence on project-based donor financing
3	Develop a One Health investment prospectus highlighting priority projects and funding needs to enable donors to identify and support specific initiatives aligned with their priorities
4	Equip stakeholders at all levels — from primary schools to universities and professional sectors — with One Health education and advocacy skills through a dedicated national programme
5	Establish a digital repository for One Health research findings and best practices, and foster collaborative research networks between Tanzanian institutions and international partners

surveillance keynote by Prof. Karimuribo and the disease surveillance panel, which documented the impact of siloed data systems and workforce training gaps on effective outbreak response.]

- Secure sustainable financing through a dedicated One Health Fund. Political commitment must be matched by financial investment. A targeted campaign to attract seed funding from domestic and international sources will secure long-term resources for priority interventions, reducing structural dependence on project-based donor financing. *[Informed by the high-level governance panel, which identified donor dependency and the absence of domestic budget allocations as systemic vulnerabilities in Tanzania's One Health financing architecture.]*
- Develop a One Health investment strategy. A well-documented investment prospectus highlighting key projects and funding priorities will enable domestic and international donors to identify and support specific initiatives, supporting the transition from short-term project cycles to sustainable programme financing. *[Informed by the*

high-level governance panel discussions on structural financing gaps and the need to attract targeted domestic and international investment.]

5. Launch a One Health Education and Advocacy Programme. Evidence from the conference indicates knowledge gaps on One Health concepts, food safety, climate change, and biodiversity across professionals, communities, and schools. An extensive education programme is crucial to build literacy, foster community engagement, and ensure social inclusion. *[Grounded in the equity and social inclusion keynote by Prof. Killewo, who highlighted the inadequacy of technical solutions in reaching vulnerable populations without accompanying community engagement and advocacy.]*
6. Enhance research and evidence-based approaches. Local research evidence must directly inform policy and practice. This requires establishing a digital repository for research findings, case studies, and One Health best practices, and fostering collaborative research networks between Tanzanian institutions and international partners. *[Derived from the Karimuribo keynote and the disease surveillance panel, which advocated for data sharing and collaborative analysis as prerequisites for effective surveillance, and called for a national One Health data-sharing platform with interoperability standards (see Supplementary Table S1).]*
7. Enhance coordination among policy-making, research, and training institutions. Strengthening formal collaboration between sector ministries and research institutions is vital to ensure interventions are evidence-based. Training institutions must be leveraged as hubs for continuous, cross-sectoral capacity building. *[Grounded in the equity and social inclusion keynote by Prof. Killewo, who called for a paradigm shift toward inquiry that positions communities as co-creators of One Health strategies, and consistent with COHESA assessment findings that coordination between research, training, and policy institutions is uniformly lacking (see Supplementary Table S1).]*
8. Integrate climate change adaptation and biodiversity conservation into One Health initiatives. Accelerating biodiversity loss and climate vulnerability require explicit integration into national One Health planning, supported by longitudinal evidence on linkages between climate change, ecosystem health, infectious diseases, and food security. *[Grounded in the climate change and biodiversity keynote by Prof. Munishi and the climate panel, which documented measurable downstream risks from biodiversity loss and identified a gap between available evidence and policy action.]*

5 Limitations

Findings from this report reflect the perspectives of 320 self-selected attendees, who may not fully represent all stakeholders in Tanzania's One Health ecosystem, particularly community health workers, rural practitioners, and private sector actors. Additionally, demographic disaggregation of participants by professional background, sex, or geographic origin was not possible, as systematic registration data of this nature were not collected during the conference. Recommendations were synthesised by the organising committee and, while validated by keynote speakers and panellists, may not capture perspectives from smaller sessions or informal discussions. The report is further limited to a single point in time, with long-term implementation outcomes yet to be assessed. Finally, the concentration of presentations on disease surveillance (50%) may reflect research funding priorities rather than the relative importance of different One Health domains. Beyond these methodological limitations, the report acknowledges that

implementation of the recommendations will face structural and operational constraints inherent to multisectoral programming, including coordination inefficiencies, unclear accountability across sector ministries, and process bottlenecks that can arise in joint governance mechanisms. These operational constraints are distinct from the conference scope limitations noted above and are likely to affect the pace and completeness of implementation regardless of political commitment. Notwithstanding these limitations, this first conference represents an important milestone in Tanzania's One Health journey and a foundation for ongoing implementation monitoring.

6 Conclusion

The first Tanzania One Health Conference marked a significant step in advancing the integration of human, animal, and environmental health sectors in Tanzania. Assessed against its stated aims, the conference successfully facilitated collaborative discussions among multisectoral stakeholders, created a platform for sharing research findings through 112 scientific presentations, fostered stakeholder dialogue through high-level panel discussions, and generated eight cross-cutting recommendations with specific actions to guide future implementation. In this respect, the primary conference aims were substantially achieved. However, challenges remain. While Tanzania has made meaningful progress in establishing One Health coordination structures and strategic plans, the path to a fully operationalised One Health Approach requires focused action on sustainable financing, measurable accountability, and community-level engagement. The marked imbalance in research attention with surveillance studies dominating and food safety, climate change, and biodiversity underrepresented suggests that research investment does not yet mirror the full spectrum of One Health priorities.

Individual sector ministries and institutions can, however, contribute meaningfully even in the absence of fully functional joint mechanisms — for example, by establishing internal One Health accountability indicators, ring-fencing budget lines for cross-sectoral activities, and integrating One Health concepts into existing training curricula — ensuring that progress is not contingent on the pace of formal collaborative processes. Despite these challenges, Tanzania's political commitment, demonstrated by the Prime Minister's official opening of the conference, provides a strong foundation for progress. Sustaining this momentum will require regular convening, evidence generation, and accountability mechanisms. To this end, the conference committed to establishing a regular national One Health symposium as a dedicated platform for knowledge exchange, progress monitoring, and cross-sectoral accountability. The conference demonstrated a concrete institutional commitment to translating conference recommendations into measurable health outcomes for people, animals, and ecosystems.

Abbreviations

AMR	Antimicrobial resistance
AFROHUN	African One Health University Network
COHESA	Capacitating One Health in Southern and Eastern Africa
FAO	Food and Agriculture Organization
IHR	International Health Regulations
MUHAS	Muhimbili University of Health and Allied Sciences
PMO	Prime Minister's Office
TOHC	Tanzania One Health Conference
UNEP	United Nations Environment Programme
WHO	World Health Organization
WOAH	World Organization for Animal Health

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12982-026-02309-y>.

Supplementary Material 1.

Acknowledgements

The authors express sincere gratitude to the organizing committee and all speakers of the TOHC. Special thanks to the Capacitating One Health in Eastern and Southern Africa (COHESA) project, the Food and Agriculture Organization (FAO), the One Health Society, and the USAID Breakthrough ACTION project (now defunct) for their financial and in-kind support that made the conference possible.

Author contributions

SM & MNM conceived the idea and wrote the original draft. AC, TN, MS, SIC, HM, MM, VS, Mm, AH, EK, HM, CM, JS, SM, MNM, GS and NO critically reviewed the manuscript. All authors read and approved the final manuscript.

Funding

Not applicable.

Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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Received: 12 November 2025 / Accepted: 2 June 2026

Published online: 18 June 2026

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