

Appendix 1. Relevant materials and useful One Health Initiatives

Name OH initiative	Type of initiative	Coverage	Country(ies)	1° field	2° field	3° field	Others (list if any)
One Health Rapid Response Team (OHRRT)	Organization & Implementation	National	Tanzania	PH	AH	EH	Welfare, AMR
One Health Coordination Desk (OHCD)	Coordination	National	Tanzania	PH	AH	EH	Welfare, AMR
Zoonotic Disease Unit (ZDU)	Coordination, Organization & Implementation	National	Kenya	PH	AH	EH	AMR, welfare
Southern African Centre for Infectious Disease Surveillance (SACIDS) Foundation for One Health	Multipurpose	Regional	Southern & East Africa	PH	AH	EH	AMR
One Health Central and Eastern Africa (OHCEA) (linked with OHW) (Cameroon, DRC (Congo), Ethiopia, Kenya, Uganda, Rwanda, Tanzania, Senegal).	Capacity development, organization	Regional	East & Central Africa	AH	PH	EH	Welfare, AMR
Africa One Health University Network (AFROHUN), Formerly OHCEA (linked with OHWNG)	Capacity development, organization, research	Continental	East & Central Africa	AH	PH	EH	Welfare, AMR
RESPOND Project	Capacity development	Regional	Congo, Uganda	AH	PH	EH	Welfare,
One Health Systems Mapping and Analysis Resource Toolkit (OH-SMART)	Tool	Global	World	PH	AH	AMR	EH
One Health Workforce (OHW) (Comprised of OHCEA & SOHUN - Southeast Asia One Health University Network)	Capacity development, Research	Global	East & Central Africa	AH	PH	EH	Welfare, AMR
One Health Workforce - Next Generation (OHWNG)	Capacity development, organization, Research	Global	East & Central Africa	AH	PH	EH	Welfare, AMR
One Health Regional Network (HORN) for the Horn of Africa	Capacity building, Research	Regional	Kenya, Ethiopia, Djibouti, Eritrea & Somalia	AH	PH	Social Science	Welfare
One Health Development Initiative (OHDi)	capacity development, Research	Nigeria	Nigeria	AH	PH	EH	AMR

Africa Centres for Disease Control and Prevention (Africa CDC)	Multipurpose	Continental	All African countries	PH	AH	EH	AMR
Afrique One Alliance. African Science Partnership for Intervention Research Excellence (Afrique One-ASPIRE). One Health initiative - African Research Consortium on Ecosystem and population health	Multipurpose	Continental	14 African countries	PH	AH	AMR	EH
One Health National Network for enhanced Research in Infectious Diseases (NRN-Biomed)	NA	Global	NA	PH	AH		
Cysticercosis Working Group in Eastern and Southern Africa (CWGESA)	Research, implementation	Regional	East & Southern Africa	PH	AH	EH	
Southern African Development Transboundary Animal Diseases (SADC TADs)	Organization, Coordination	Regional	East & Southern Africa	PH	AH	EH	TADs
Training Health Researchers into Vocational Excellence (THRIVE)	Capacity development	Global	NA	PH			
Consortium for Advanced Research Training in Africa (CARTA)		Continental	NA	PH			
Ecole inter-Etats des Sciences et Medecine Veterinaires (EISMV)	Capacity development	Regional	West & Central Africa	PH	AH	EH	AMR
Jimma University One Health Students' Innovation Club (OHSIC)	Capacity development	National	Ethiopia	PH	AH	EH	AMR
Mekelle University Students One Health Innovation Club (SOHIC)	Capacity development	National	Ethiopia	PH	AH	EH	AMR
Makerere University Student One Health Innovation Club (SOHIC)	Capacity development	National	Uganda	PH	AH	EH	AMR
Universite des Montagnes One Health Students' Club	Capacity development	National	Cameroon	PH	AH	EH	AMR

Moi University One Health Students' Club.	Capacity development	National	Kenya	PH	AH	EH	AMR
Muhimbili University of Health and Allied Sciences One Health Students' Club.	Capacity development	National	Tanzania	PH	AH	EH	AMR
Sokoine University of Agriculture One Health Students' Club.	Capacity development	National	Tanzania	AH	PH	EH	AMR
University of Rwanda One Health Students' Club.	Capacity development	National	Rwanda	PH	AH	EH	AMR
University of Addis Ababa	Capacity development	National	Ethiopia	PH	AH	EH	AMR
University of Buea, Faculty of Health Sciences, and Faculty of Agriculture and Veterinary sciences	Capacity development	National	Cameroon	PH	AH	EH	AMR
University of Kinshasa, the school of Public Health	Capacity development	National	Democratic Republic of Congo	PH	AH	EH	AMR
University of Lubumbashi, the Faculty of Veterinary Medicine	Capacity development	National	Democratic Republic of Congo	PH	AH	EH	AMR
University of Nairobi, Faculty of Veterinary Medicine and School of Public Health	Capacity development	National	Kenya	PH	AH	EH	AMR
Stellenbosch University, Medical School	Capacity development	National	South Africa	PH	AH	EH	AMR
University of Ibadan, Nigeria	Capacity development, coordination & research	National	Nigeria	AH	PH	EH	AMR
University Nangui Abrogoua	Capacity development	National	Ivory Coast	PH	AH	EH	AMR
University of Pretoria, Faculty of Veterinary Science	Capacity development	National	South Africa	PH	AH	EH	AMR, welfare, wildlife
South Africa Regional Global Disease Detection Center	Capacity development, research	Regional	South Africa	PH	AH	EH	AMR
PREDICT consortium-One Health Institute	Capacity development, research	Global	Tanzania	PH	AH	EH	
African Field Epidemiology Network (AFENET) & FELTP	Capacity development & research	Continental	All African countries	PH	AH	EH	Welfare,

University of Zambia, Schools of Medicine and Veterinary Medicine		National	Zambia	AH	PH	EH	AMR, Welfare
Central Veterinary Research Institute	Research, implementation	National	Zambia	AH	PH	EH	AMR
The Centre for Environmental Stewardship (CES)	Capacity development and research	National	Kenya	EH			
Centre Suisse de Recherches Scientifiques en Directorate of Animal Science	Research & Capacity development	National	Ivory Coast	AH	EH	PH	Risk analysis, food safety
Institute of Agricultural Research of Mozambique - Ministry of Agriculture	Implementation	National	Mozambique	AH	AMR	EH	Welfare, PH
Eduardo Mondlane University	Capacity development and research	National	Mozambique	AH	PH	EH	AMR, Welfare
Ifakara Health Institute (IHI)	Capacity development and research	National	Tanzania	PH	AMR	EH	AH
Institut de Recherche en Elevage pour le Development	Research & Capacity development	National	Chad	PH	AH		
National Health Institute - Ministry of Health (NHI)	Multipurpose	National	Mozambique	PH	AH		
National Institute of Biomedical Research (NIBR)	Research & Capacity development	National	Democratic Republic of Congo	PH	AH		
National Institute for Communicable Diseases, National Laboratory Services (NICD NLS)	Research & Capacity development	National	South Africa	PH	AH	EH	AMR
National Institute for Fisheries Inspection (INIP)	Research & Capacity development	National	Mozambique	EH	AH	PH	Food safety
National Institute for Nature Conservation (NINC)	Research & Capacity development	National	Democratic Republic of Congo	EH	PH	AH	Welfare,
Naguchi Memorial Institute of Medical Research (NMIMR)	Research & Capacity development	National	Ghana	PH	AH	EH	Welfare,
Tanzania Wildlife Research Institute (TAWIRI)	Research & Capacity development	National	Tanzania	EH	AH	PH	Ecology
The Tanzania Veterinary Laboratory Agency, Central Veterinary Laboratory (TVLA)	Research, implementation & Capacity development	National	Tanzania	AH	EH	AMR	PH

The Central Veterinary Laboratory in Kinshasa	Research & Capacity development	National	Democratic Republic of Congo	AH	EH	AMR	PH
National Institute for Medical Research (NIMR)	Research & Capacity development	National	Tanzania	PH	AH	AMR	EH
Tropical Diseases Research Centre (TDRC)	Research & Capacity development	National	Zambia	PH	AH	EH	Welfare,
International Centre for Insect Physiology and Ecology (ICIPE)	Research & Capacity development	Regional	Kenya, Tanzania	EH	AH	PH	
Zoonotic and Emerging Diseases Group	Research & Capacity development	Regional	East Africa	AH	PH	EH	AMR
Kenya Medical Research Institute (KEMRI)	Research & Capacity development	National	Kenya	PH	AH	EH	
One Health Resource Centre	Implementation	National	Kenya	PH	AH		
Touch Foundation	Organization	National	Tanzania	PH			
National One Health Steering Committee (MoH, MoLF, MoCT, MoFTCC (zoonosis))	Coordination	National	Ethiopia	PH	AH	EH	AMR
MoH, MoLF, MoCT, MoFTCC (zoonosis)	Implementation	National	Ethiopia	PH	AH	EH	AMR
One Health Desk, ILRI	Research & Capacity development	Global	East Africa	AH	PH	EH	AMR
National Public Health Institute/ One Health Desk	Multipurpose	National	Liberia	PH	AH	EH	
National Directorate of Veterinary Services	Multipurpose	National	Mali	AH	PH	EH	Welfare,
University of Free State, ARC-OVR, GDARD joint initiative	Research & Capacity development	National	South Africa	PH	AH	EH	Welfare,
One Health Innovative student's club	Capacity development	National	Uganda	PH	AH	EH	AMR
Global Alliance for Rabies Control (GARC)	Implementation, Research, organization & coordination	Global	World	AH	PH	EH	
Mission Rabies (MR)	Implementation, Research, organization & coordination	Global	World	AH	PH	EH	Welfare
Mbwa wa Africa	Implementation, Research, organization & coordination	National	Tanzania	AH	PH	EH	Welfare

Global One Health Initiative, Ohio State University	Research & Capacity development	Global	World	AH	PH	EH	AMR
OH Institute, University of California Davis	Research & Capacity development	Global	World	AH	PH	EH	AMR
EcoHealth Alliance	Research & Capacity development	Global	World	EH	AH	PH	AMR
Rwanda Institute for Conservation Agriculture (RICA)	Research & Capacity development	National	Rwanda	PH	AH	EH	Welfare,
African Institute for One Health Research and Diagnostics	Research, implementation & Capacity development	National	Nigeria	AH	PH	EH	
University of Global Health Equity	Research & Capacity development	National	Rwanda	PH	AH	EH	AMR
University of Ilorin Students' One Health Initiative (UNILOSOHI)	Capacity development	National	Nigeria	PH	AH	EH	AMR
University of Edinburgh MSc One Health programme (with scholarship)	Research & Capacity development	Global	World	AH	PH	EH	AMR
Transdisciplinary Consultants	Implementation	National	Kenya	AH	PH	EH	Welfare, AMR
Action Plan Guide towards slowing down rising AMR trends and their attendant impact. (Global initiative)	Coordination, implementation	National	Nigeria	PH	AH	EH	Welfare,
Global Antibiotics Research and Development Partnership (GARDP)	Coordination, Organization & Implementation	Global	World	PH	AH	AMR	EH
National Action Plans (NAP) on AMR and National Policy on AMR	Tool, coordination & organization	Global	World	PH	AH	EH	AMR
Centre for Disease Dynamics Economics and Policy (CDDEP)	Organization, implementation, research	Global	World	AMR	PH	AH	EH
Antibiotic Guardian: South Africa	organization, coordination, implementation	National	South Africa	AMR	PH	AH	EH
Development of National AMR surveillance plan (NAMRSP). Prioritization of micro-organisms for reporting and linked to National Reference laboratory with	Coordination, implementation	National	Ethiopia	AMR	PH	AH	EH

surveillance sentinel sites							
Training program in Epidemiology and Public Health Intervention Network (TEPHINET)	Capacity development, research	Global	World	PH	AH	AMR	EH
Finnish Science and Technology cooperation with Europe Africa Asia and LAC Region (FinCEAL)	Capacity development, research	Regional	World	PH	AH	EH	
Surveillance for AMR and antibiotics consumption in South Africa	Coordination, implementation & organization	National	South Africa	AMR	PH	AH	EH
African innovators tackle AMR	Tool (grant)	Global	Africa	AMR	PH	AH	EH
Emergency Centre for Transboundary Animal Diseases (ECTAD): One Health, zoonosis and AMR themes	Multipurpose	Global	World	AH	AMR	PH	
Global One Health paradigm: Challenges and opportunities for tackling infectious diseases of human-animal-environment interface in low resource setting	Organization, coordination	Global	World	PH	AH	EH	AMR
GHP: Promotion of increased international collaboration especially research in infectious diseases and AMR	Organization, coordination	Global		PH	AH	EH	AMR
Global Antibiotics Research Partnership (GARP)	Multipurpose	Global	Kenya, South Africa, Mozambique, Tanzania, Uganda, Namibia, Nigeria, Seychelles, Zimbabwe	AMR	PH	AH	EH
World Alliance Against Antibiotics Resistance (WAAAR): A major player in global drive to protect human health.	Multipurpose	Global	World	AMR	PH	AH	EH

One Health - One health approaches for health, disaster risk reduction	Coordination & organization	Regional	NA	PH	AH	EH	AMR
Students' One Health Innovation Club (SOHIC-CHS)	Capacity development	National	Nigeria	PH	AH	EH	AMR
Ecohealth (ILRI) - Effective management of of elimination of livestock zoonotic and food-borne diseases that matter to the poor	Implementation, Research, organization & coordination	National	Kenya	PH	AH	EH	
Ecohealth - Identification of Anthrax hotspots and associated ecological factors predicting infections and exposure risk in Kenya	Implementation, Research, organization & coordination	National	Kenya	AH	PH	EH	
Ecohealth (ILRI) - Active surveillance to determine the prevalence of Rift Valley Fever, Brucellosis and Q-fever, and their co-infections in human, ;livestock and wildlife	Implementation, Research, organization & coordination	National	Kenya	AH	PH	EH	Wildlife
Climate change and Animal health in Africa	Research, organization	Continental	Continental	EH	AH	PH	Wildlife
African Livestock Productivity and Health Advancement (ALPHA) Initiative	Implementation	Continental	Nigeria, Ethiopia, Uganda	AH	Food security	Animal production	Welfare,
Livestock production and Animal health management system in communal farming areas at the wildlife-livestock interface in South Africa	Capacity development & research	National	South Africa	PH	AH	EH	Welfare,
Ecohealth (ILRI): Approaches linking human and environmental health in Kenya	Capacity development & research	National	Kenya	PH	AH	EH	Welfare,
ILRI/BMZ One Health Research, Education, Outreach and Awareness Centre (OHRECA)	Coordination, organization, capacity development & Implementation	Continental	All African countries	PH	AH	Food safety	AMR

The One Health Units for Humans, Environment, Animals and Livelihoods (HEALS) project	Capacity development & implementation	Regional	Ethiopia, Somalia, Kenya	AH	PH	EH	AMR, Welfare
SELIP							
Health of Ethiopian Animals for Rural Development (HEARD)	Capacity development & implementation	National	Ethiopia	AH	Food safety	EH	PH
Wildlife Conservation Society	Coordination, implementation, research	Global	World	EH	AH	PH	Welfare, wildlife
Conservation through Public Health in Uganda	Coordination, implementation	National	Uganda	EH	PH	AH	Welfare,
One Health: Connecting Humans, Animals and the Environment	Capacity development	Global	World	PH	AH	AMR	EH
Specialized Master in Integrated Management of Health Risks in the Global South (IManHR)	Capacity development & implementation	Global	All African countries	PH	AH	EH	AMR
Taking a Multisectoral, One Health Approach: A Tripartite Guide to Addressing Zoonotic Diseases in Countries	Coordination & organization	Global	World	PH	AH	EH	AMR
One Health Global Network (OHGN)	Organization, research & capacity development	Global	World	PH	AH	AMR	Food safety
Global Risk Forum Davos One Health	Organization, research & capacity development	Global	World	PH	AH	Food safety	AMR
Environmental Health Perspectives: Fall in fish catch threatens human health	Research	Continental	Africa	PH	AH	EH	
Madagascar Health and Environmental Research (MAHERY)	Research and capacity development	National	Madagascar	PH	EH	AH	Animal production
Environmental Health Perspectives: Estimated effects of future atmospheric	Research	Regional	North Africa	EH	PH		

CO2 concentration on protein intake							
Geohealth: Potential rise in Iron deficiency due to future anthropogenic CO2 emission	Research	Continental	Africa	EH	PH		
WASH (Water Sanitation and Hygiene): Freshwater conservation, improved livestock farming and restoration efforts		National	South Africa	PH	AH		interdisciplinary
One Health profile of a community at the wildlife-domestic Animal interface, Mpumalanga, South Africa	Research & Capacity development	National	South Africa	AH	PH	EH	AMR
A One Health approach to transfrontier conservation - The Limpopo TFCA		Regional	Southern Africa	AH	PH	EH	Land use and policy
One Health Zoonotic Disease Prioritization (OHZDP)	Tool, Capacity development	Global	World	PH	AH	Zoonoses	
Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) Disease Prioritization tool	Tool, Capacity development	Global	World	PH	AH	AMR	
Network for Evaluation of One Health (NEOH)	Tool, capacity development	Global	World	PH	AH	AMR	EH
AVENIR Health: One Health Tool	Tool	Regional	East, West and Southern Africa	PH			
AWF (African Wildlife Foundation): Conservation and Environmental protection	Organization, research & capacity development	Continental	Africa	EH	AH	PH	Conservation
ONE HEALTH: Basics of multisectoral collaboration at the Human - Animal - Environment interface	Capacity development	Global	World	PH	AH	EH	AMR
Pan African Tsetse and Trypanosomiasis Eradication Campaign	Organization, coordination, implementation	Continental	Africa	PH	AH	EH	

Coordinating Office for the Control of Trypanosomiasis in Uganda	implementation, coordination	National	Uganda	AH	PH	EH	
One Health Training Manual	Organization, capacity development	National	Tanzania	PH	AH	EH	Wildlife, AMR
One Health Commission	Capacity development, organization	Global	World	PH/AH	EH	AMR	Food safety
One Health Strategic Plan	Multipurpose	Continental	NA	PH	AH	EH	Wildlife
Global Health at the Human-Animal-Ecosystem Interface	Capacity development	Global	World	Global Health	Zoonoses	EID	AMR, PH
Swiss Tropical and Public Health Institute	Capacity development & research	Regional	West & Central Africa	PH	AH	EH	
One Health Antibiotic Stewardship/AMR	Capacity development	Global	World	AMR	AH	PH	EH
One Health Research Foundation	Capacity development & research	Global	RUSVM, St. Kitts & Neves & tropical countries globally	AH	PH	EH	AMR
One Health Foundation	Implementation	Global	NA	AH	PH	Animal welfare	
One Health Social Sciences (OHSS) Webinar	Capacity development & tool	Global	World	PH	AH	EH	Wildlife, AMR
One Health capacity building in sub-Saharan Africa	Research	Continental	All African countries	AH	PH	EH	AMR
One Welfare	Organization, Coordination, Implementation	Global	World	Animal Welfare	Human well being	EH	
One Health Platform	Organization, capacity development	Global	World	PH	AH	AMAR (Agents & resistance)	Science Policy interface

Note that details of these initiatives are available in the database link provided. It should be understood that the field of One Health, One Medicine, Conservation Health and Global Health and their variants are constantly evolving, hence the list provided in this table is not exclusive

Appendix 2: Definition of Concepts and Key Search Items

Term and acronym	Definition
One medicine	The concept whereby human and animal healthcare advances hand in hand with veterinarians, physicians and researchers collaborating to ensure that all humans and animals benefit from sustainable and equal medical progress but not at the expense of an animal's life ^a .
Zoonosis	Any disease or infection that is naturally transmissible from vertebrate animals to humans ^b . (anthropozoonosis human-animal, zooanthroponosis animal-human). It may be direct or indirect transmission
Human-Animal-environment interface	Complex and dynamic interactions involving human and non-human species as well as the environment. They can include the actual geographical location or virtual space where such interactions occur ^c .
Antimicrobial resistance (AMR)	Antimicrobial resistance is the ability of microorganisms such as bacteria, fungi or protozoans to grow despite exposure to antimicrobial substances designed to inhibit their growth ^d .
Global health (GH)	A study, research, and practice that places a priority on improving health and achieving health equity for all people worldwide. They are health issues that transcend national boundaries and governments and call for actions on the global forces that determine the health of people ^e .
Surveillance	The process of systematically collecting, consolidating, analyzing, and evaluating pertinent data, as well as disseminating results to relevant actors ^f .
One Health**	This is described as either a narrow approach primarily combining public health and veterinary medicine or as a wide approach as in the widespread "umbrella" depiction including both scientific fields, core concepts, and interdisciplinary research areas ^g .
Ecohealth	Synonymous with biodiversity, it is an approach that emphasizes the need to protect all living creatures, implying that parasites, unicellular organisms, and possibly viruses have a value and should be protected ^g .
Planetary health	The goal or process of achieving the highest attainable standard of health, wellbeing, and equity worldwide through judicious attention to the Human —political, economic, and social— systems that shape the future of humanity and the Earth's natural systems. It aims at defining the safe environmental limits within which humanity can flourish ^h .
International health	Also called geographic medicine, international medicine, or global health, it is a field of health care, usually with a public health emphasis, dealing with health across regional or national boundaries ⁱ .
Environment health	The science and practice of preventing human injury and illness while promoting well-being through the identification and evaluation of environmental sources and hazardous agents. It focuses on limiting exposures to hazardous physical, chemical, and biological agents in air, water, soil, food, and other environmental media or settings that may adversely affect human health ^j .
Conservation medicine	Also known as ecological health or conservation health. It works together with other disciplines in the field of disease and conservation to create healthier ecosystems, recognise and treat diseases that cross the human-animal (wildlife and domestic) barrier, prevent outbreaks of these diseases and better understand how our natural environment is inter-dependent ^k .

Public health	The medical branch that aims at protecting the safety and improving the health of communities through education, policy making and research for disease and injury prevention. It promotes the health of people and the communities where they live, learn, work and play ^l .
Tropical medicine	An interdisciplinary branch of medicine that deals with health issues that occur uniquely, are more widespread, or are more difficult to control in tropical and subtropical regions ^m .
Reductionism	Analyzing and describing a complex and/or dynamic (changing) phenomenon in terms of one (or a few) simple and/or static indicators, while interactions are ignored. It leads to erroneous inferences and omissions. One example is binary thinking, whereby the answer to a problem is limited (reduced) to just two alternatives when, in fact, more than two alternatives exist: the phrase 'it is either black or white' ignores red, green, blue and many other colors ⁿ .
Interdisciplinarity	The process by which many fields of knowledge are integrated and new knowledge is created to solve a specific problem –which may have a suboptimal or self-defeating solution if a single discipline is considered. It differs from multidisciplinary, in which several fields may participate but no integration and no new knowledge is created. While interdisciplinarity investigates the problem before the solution is created, multidisciplinary (as well as reductionism) chooses the solution before the nature of the problem is identified ⁿ .
Brain storming	An educational strategy used to both demonstrate knowledge gaps in any one field, later addressed by the dialogue generated by a group of people trained in several fields. It aims at constructing, deconstructing, and reconstructing knowledge by, first, revealing the limitations of unidisciplinary reductionism and, second, fostering novel (and problem-specific) solutions that include but exceed any one field.

^a Humanimal Trust. One Medicine. Available at: <http://www.humanimaltrust.org.uk/what-is-one-medicine/>. Accessed 27 April 2020; ^b World Health Organization (2020). Zoonosis. Available at: <https://www.who.int/topics/zoonoses/en/>. Accessed 27 April 2020; ^c Authors' definition; ^d Nature. Antimicrobial resistance. Available at: <https://www.nature.com/subjects/antimicrobial-resistance>. Accessed 27 April 2020; ^e Koplan JP, Bond TC, Merson MH, Reddy KS, Rodriguez MH, Sewankambo NK, et al. Towards a common definition of global health. *Lancet*. 2009;373:1993–1995; & Kickbush I. The need for a European strategy on global health. *Scand J Public Health*. 2006;34:561–565; ^f Heymann DL. (2008). *Control of communicable diseases manual*, 19th edition. Washington, DC: American Public Health Association; ^g Lerner H, Berg C. A Comparison of Three Holistic Approaches to Health: One Health, EcoHealth, and Planetary Health, *Frontiers in Veterinary Science*, 2017; doi: 10.3389/fvets.2017.00163; ^h Horton R, Lo S. Planetary health: a new science for exceptional action. *The Lancet*, 2015; 386: 1921 – 1922, [http://dx.doi.org/10.1016/S0140-6736\(15\)61038-8](http://dx.doi.org/10.1016/S0140-6736(15)61038-8); ⁱ Wikipedia. International Health. Available at: https://en.wikipedia.org/wiki/International_health. Accessed 29 April 2020; ^j National Environmental Health Association (2020). Definitions of Environmental Health. Available at: <https://www.neha.org/about-neha/definitions-environmental-health>. Accessed 29 April 2020; ^k World Extreme Medicine Academy (2020). Conservation Medicine. Available at: <https://worldextrememedicine.com/blog/2018/06/what-is-conservation-medicine/>. Accessed 29 April 2020; ^l American Public Health Association & University of Pittsburgh Graduate School of Public Health (2020). Public Health. Available at: <https://www.apha.org/what-is-public-health> & <https://www.publichealth.pitt.edu/careers/what-is-public-health>. Accessed 29 April 2020; ^m Wikipedia. Tropical Medicine. Available at: https://en.wikipedia.org/wiki/Tropical_medicine. Accessed 29 April 2020; ⁿ Hittner JB et al. The Third Cognitive Revolution: The consequences and possibilities for biomedical research *EMBO Rep* (2019)20:e47647. Doi:10.15252/embr.201847647

Appendix 3. Specific Strengths, weaknesses, opportunities and threats (SWOT) in One Health in Sub-Saharan Africa

Strengths	Weaknesses
- Stakeholders have varied levels of responsibilities and interest	- Lack of multi-sectoral working mechanisms to respond to disease outbreaks and weak preparedness and prevention plans
- Existing national and subnational zoonotic disease committees in some countries	- Poor information sharing and communication across the relevant sectors

- Availability of disaster and emergency committees	- Poor coordination mechanism inter-sectorally
- Existence of basic infrastructure and resources for research	- Very low involvement of environmental sector in One Health initiatives
- Proper channels for co-ordination and dissemination of information	- Lack of skilled professionals/experts in government workforce on the One Health approach and the integration of sectoral work
- There is power of resource mobilization	- Bureaucratic barriers among the different sectors
- Legislation to co-ordinate and command/enforce	- Lack of One Health policy and communication guidelines or strategy in many African countries. For example, Uganda has a National One Health Risk Communication Strategy
- Functioning systems at each administrative level	- Each institution conducts research in isolation and does not regularly report back
- Existence of research information sharing systems	- Insufficient multi-disciplinary research experts
- Availability of experts from the different sectors	- National research agendas do not address One Health issues
- Vertical Integrated surveillance systems (national & subnational) are in place. Some also have horizontal surveillance systems (cutting across disciplines of epidemiology and the laboratories)	- There are huge disparities and inconsistencies in the structures, platforms, mandates and institutions across SSA countries
- Existence of National task force committees in various sectors to respond to Public Health events including zoonotic diseases	- Majority of the existing platforms are not institutionalized within the government system with dedicated budget and depend largely on donor funds
- Some countries have institutionalized One Health platforms for national coordination & or implementation	- Lack of institutionalized memorandum of understanding to operationalize One Health, hence the sectors hold back from sharing across sectors.
- Several institutions and countries have medical and veterinary programmes at training institutions and governmental levels	- Lack of adequate training in areas of One Health approach and the benefits thereof.
- Some Ministries and Departments within the public, animal & environmental health have specific fund budgeted annually to support One Health issues like zoonoses, AMR, joint outbreak investigation.	- Many of the national and subnational One Health platforms are active and coordinated only during reported outbreaks
	- Noticed sectoral or discipline-specific preservation and over-protection
	- Lack of home-grown One Health initiatives across countries
	- Data collected by individual departments or sectors are most times not shared across sectors, hence integrated risk analysis is difficult
	- The strength and numbers of animal and environmental health facilities often does not match those of the public health thereby entrenching disparities
	- Lack of adequately skilled human resources in many countries (many posts remained vacant) hence the current staff are overstretched and with advanced age
	- Misconceptions leading to narrowing of the One Health approach. It is often confused as a distinct field or for zoonoses instead of broadly, notification instead of collaboration

Appendix 3. Specific Strengths, weaknesses, opportunities and threats (SWOT) in One Health in Sub-Saharan Africa (continued)

Opportunities	Threats
- Presence of emerging and re-emerging zoonotic diseases (avian influenza, Ebola)	- Outputs of One Health research are not is not used to inform appropriate policies
- Inclusion of One Health approach issues within the government sectors and University training curricula	- Several training institutions still largely operate in their traditional single line discipline training methods and not incorporating One Health approach
- Existence of potential development partners and local support	- Improper plans for surveillance, preparedness and response
- Activities of multi-sectoral co-ordination	- Inadequate support by policy makers
- Availability of surveillance system in related ministries	- Reporting platforms and systems across sectors need to be similar or interoperable

- Availability of contingency plans	- Absence of comprehensive national One Health strategic plans in most countries
- Presence of political will and stability	- Challenge in acquiring sufficient government funding
- The recognized need for multi-sectoral collaboration	- Limited laboratory based diagnostic capacity which will result in poor detection of outbreaks/causative agents on time
- Baseline information on One Health are existing in different collaborating Institutions but need consolidation or joint evaluation	- Lack of clearly defined legislation on the engagement of public-private partnership pertinent to One Health
- Existence of external funding agencies	- Poor economy and global economic crisis
- Interest of development partners and the changing government system in adopting new innovations or technologies	- Lack of empirical and validated population level data
- Existence of different forums for policy briefing	- Lack of political good will
- Workers are often keen to work together, however this requires guidelines for the same, for example, some Ministries cannot share information except approved by the higher authorities	- No involvement of governmental departments and broad stakeholders in trans-disciplinary research activities (mainly done by non-governmental organization and research institutes)
- Other departments have proved to work collaboratively, and examples exist across SSA	- Insufficient co-ordination units, and insufficient funds to support the Coordination units
- Collaborative One Health education/research are happening and many externally-funded nationally implemented projects and funders are supporting/displaying the concept of One Health	- Lack of centralized verifiable data base for existing surveillance monitoring and response system related to One Health in relevant government ministries
- The field is opening up and nowadays multiple disciplines are working in line ministries and parastatals not traditionally theirs, e.g. veterinarians and environmentalist are in current human surveillance system	- No inclusion of One Health-based courses in the curriculum of human medicine, veterinary medicine and other related disciplines at the University
- National documents for health issues (NAPHS, OHSP, NAP for AMR, Surveillance guidelines for PZDs, Surveillance and stewardship of Antimicrobials, Disease control strategies, and country programming documents) as well as evaluative tools/reports (JEE of IHR, SET, PVS, ATLASS, Bridging workshop reports and Gap analysis) are developed or adopting One Health approach	- Lack of similar or comparable guidelines across sector, e.g. Standard treatment guidelines are lacking for the veterinary sector in most countries, biomedical waste guideline for veterinary hospitals/clinics are mostly unavailable, most medical doctors largely consider clinical approach than population medicine approach
	- Lack of guidelines for the use of pesticides, antimicrobials, and inclusion chemicals/preservatives in food systems
	- Lack of adequate involvement of environmental/crop agriculture departments, parastatals and ministries
	- External funded projects are time bound and not easy to institutionalize
	- Duplication of roles and efforts hinder the implementation of One Health initiatives and the participation of ministries

Adapted from Lee & Brumme, (2013); URT, (2015); Onyango et al., (2019)

Appendix 4: Sample relationship between One Health related organizations, Kenya

		Livestock	Public Health	Environment	Social Development	Other
One Health Stakeholders	Public sector	Ministry of Agriculture, Livestock , Fisheries and Irrigation - State Department of Livestock- DVS , DLP and SAGAS (MALF&I)	Ministry of Health(- MoH)	Ministry of Environment and Forestry (ME&F)		Tegemeo Institute of Agricultural Policy & Development, Egerton University
		Directorate of Veterinary Services (DVS)	Directorate of Veterinary Services (DVS)	National Environment Management Authority (NEMA)		Kenya Bureau of Standards (KEBS)
		Kenya Agricultural and Livestock Research organization (KALRO)	County Governments	Ministry of Lands and Physical Planning		
		Kenya Dairy Board (KDB)	Pharmacy and Poisons Board of Kenya (PPBK)	Kenya Plant Health Inspectorate Service -AMR issues (KEPHIS)		
		Kenya Veterinary Board (KVB)	Kenya Plant Health Inspectorate Service -AMR issues (KEPHIS)			
		Kenya Veterinary Medicine Directorate				
		County Governments				
		Kenya Wildlife Service (KWS)				
	Private sector					
		Kenya Poultry Breeders Association (KPBA)				
		Kenya Poultry Farmers Association (KPFA)				
		Association of Kenya feed manufacturers (AKEFEMA)				
		Kenya Livestock Marketing Council (KLMC)				
		Kenya Livestock Producers Association (KLPA)				
	International	World Organization for Animal Health (OIE)	Centres for Diseases Control and Prevention (CDC Kenya)			
		Food and Agriculture Organization of the United Nations (FAO)	OHCEA			
		One Health central and Eastern Africa (OHCEA)	World health Organization (WHO)			
		IGAD - ICPALD	Africa Canfers for Diseases Control and Prevention (ACDC)			
			FAO			
		Donors (USAID, UKAid, EU and World Bank)	Donors (USAID, UKAid, EU and World Bank)	Donors (USAID, UKAid, EU and World Bank)	Donors (USAID, UKAid, EU and World Bank)	
	NGOs		World Vision	World Vision	World Vision	
	Research / Academia	Colleges (Agriculture and Veterinary Sciences) - multiples	Medical school- (FELTP) - multiples			
		International Livestock Research Institute (ILRI).	Kenya Medical Research Institute (KEMRI)			
		KALRO				

NB: DLP = Directorate of Livestock Production, SAGAs = Semi-Autonomous Government Agencies, IGAD – ICPALD = Intergovernmental Authority on Development – IGAD Centre for Pastoral Areas and Livestock Development, USAID = United States Agency for International Development, UKAid = United Kingdom Aid Direct, EU = European Union.

Supplementary material. (Sample questionnaire) Evaluation of the One Health Framework in Africa based on stakeholders' responsibilities and likely impact on overall One Health inputs and outputs.

Dear colleagues, the following stakeholders have been identified in the overall One Health implementation in Africa. To ensure correct stakeholder mapping using a semi-quantitative process, we appeal that you kindly fill this template. The outcome of the exercise will be published as an open access document for the use of all participants.

Question 1: Kindly rank from 1=Lowest and 5=Highest

No.	Stakeholder	Likely impact on One Health (High/Moderate/Low)	Interest score (1-5)	Influence score (1-5)
1.	Associations of animal/animal product Producers, Traders and Processors			
2.	National research funding bodies			
3.	Department of Wildlife (Management and Research)			
4.	Development partners (donors, consultants, collaborators etc)			
5.	Veterinary field Officers working in holding grounds, livestock markets and quarantine station			
6.	Medical health care staff			
7.	Public Financial Institutions			
8.	Private Financial Institutions			
9.	General Public			
10.	Government Boards			
11.	Law enforcers (police, military, customs)			
12.	Local governments			
13.	Livestock farmers			
14.	Local NGOs, CBOs, FBOs			
15.	Meat inspectors			
16.	Media (print, electronic)			
17.	Ministry of Health			
18.	Ministry of Livestock and Fisheries			
19.	Ministry of Agriculture			
20.	Other Government Ministries (Ministry of Trade)			
21.	Politicians/Policy makers			
22.	Poultry hatcheries and breeder farms			
23.	Commercial layers and broilers			
24.	Professional and Paraprofessional Associations			
25.	Public and private veterinary laboratories			
26.	Ranches (dairy and beef cattle farms)			
27.	Regional economic communities			
28.	Small ruminants (sheep and goat) and pigs			
29.	Regulatory bodies i.e. (Vet, Medical, Pharmacy, Others)			

30.	Research institutions (International, National, private, public)			
31.	Public and private human Laboratories			
32.	Training institutions (public, private)			
33.	Input providers. Veterinary and medical pharmaceuticals, biological, reagents, chemicals and other inputs dealers (a) Veterinary pharmaceuticals (b) Medical pharmaceuticals (c) Biological, vaccine & reagents (d) Chemicals (e) Feed & other inputs			
34.				
35.	Others (list below and score)			
36.				

Important definitions

1. Association of animal/animal product producers, traders and processors:

These are groups of people with a common goal and they deal in the business of capturing, slaughtering and sales of animals. They constitute themselves into a group for easy administration.

2. Government Boards:

This is a body with variable number of members constituted by the ruling government and charged mainly with supervisory roles over an agency or institution.

3. NGO (non-governmental organisations), CBO (Community Based Organisation), FBO (Faith Based Organisation):

NGOs are organisations with a defined memorandum and a mission statement. They are registered with the government of the country where they are established. They may be affiliated to an INGO (International Non-governmental organisations). CBO and FBO are sub-sets of NGO and are community based.

Question 2: Please provide a short response in a narrative to the two questions below:

1)	What do you consider the weakest link in your country leading to a successful implementation of One Health approaches? (comment box, max 50 words):	
2)	If you had 50,000 USD how would you best invest them towards One Health implementation in your country? (comment box, max 200 words)	

Question 3: List the ministries/institutions involved in OH activities & One Health Policy and implementation by institutional category and area of interest that you know.

		Livestock	Public Health	Environment	Social Development	Other
One Health Stakeholders	Public sector					
	Private sector					
	International					
	NGOs					
	Research / Academia					

Question 4: Influence spheres on One Health

No.	Institution	Mean number of other stakeholders influenced (n)	One Health interest Score (0 – 10)	One Health Policy Power Score (0 – 10)
1.	National Livestock Marketing Council (LMC)			
2.	National Livestock Producers Association (LPA)			
3.	Ministry of Agriculture and Forestry			
4.	Ministry of Livestock and Fisheries			
5.	Ministry of Environment (MoE)			
6.	National Environment Management Authority (NEMA)			
7.	Ministry of Lands and Physical Planning (MLPP)			
8.	Ministry of Health (MoH)			
9.	Agricultural Universities/Faculties/Colleges			
10.	Medical Universities/Faculties/Colleges			
11.	Directorate responsible for medicine control			
12.	National Medical Research Institute			
13.	National Plant Health Inspectorate Service			
14.	National Poultry Farmers Association (PFA)			
15.	National Poultry Breeders Association (PBA)			
16.	National Association of Feed Manufacturers (FEMA)			
17.	African Union-IBAR			
18.	Regional Livestock Development Agencies/Organization			
19.	Africa Centers for Diseases Control and Prevention(ACDC)			
20.	National Medical Board			
21.	National Veterinary Board (KVB)			
22.	Ministry for Policy and Planning			
23.	National Bureau of Standards (BS)			
24.	Agricultural and Livestock Research Institute (KALRI)			
25.	Dairy Board (DB)			
26.	Livestock Meat Board			
27.	Pharmacy Board			
28.	FELTP/ISAVET (in-service epidemiology training)			

29.	State/Province/County Authorities			
30.	Local Government/District Authorities			
31.	World Organization for Animal Health (OIE)			
32.	Donors (e.g. USAID, UKAid, EU, World Bank, others)			
33.	International Livestock Research Institute (ILRI)			
34.	Wildlife Management Institution			
35.	Wildlife Research Institute/Service			
36.	Food and Agriculture organization (FAO)			
37.	International Livestock Research Institute			
38.	Director of Veterinary Services (DVS)			
39.	Centers for Diseases Control and Prevention (CDC Kenya)			
40.	OHCEA: One Health Central and Eastern Africa			
41.	World Health Organization (WHO)			
42.	World Organization for Animal Health (OIE)			
43.	One Health Eastern and Central Africa (OHCEA)			
44.	<i>Others (List below)</i>			
45.				