



ONE HEALTH POLICY CONTEXT OF ETHIOPIA, SOMALIA AND KENYA

**One Health Units for Humans, Environment, Animals and Livelihoods
(HEAL) Project**

**Report prepared by Dr. Diana Onyango, Micol Fascendini, Dr. Barbara
Wieland, Dr. Davis Ikiror, Dr. Jason Sircely and Dr. Samuel Tefera**

December 2019

ACKNOWLEDGMENTS

This report is one of the outputs of the One Health Units for Humans, Environment, Animals and Livelihoods (HEAL) Project being implemented in a consortium of VSF-Suisse, ILRI and CCM in Kenya, Ethiopia and Somalia. The consortium would like to appreciate the main donor Swiss Agency for Development and Cooperation (SDC) and other co-funding donors the Italian Agency for Development Cooperation (AICS), the CGIAR Research Program on Livestock, the European Union (EU) and the United States Agency for International Development (USAID). The HEAL Project team would like to appreciate the input received from the technical experts who reviewed and contributed to the report as well as to the organization representatives of the HEAL consortium from VSF-Suisse, ILRI and CCM.

EXECUTIVE SUMMARY

Pastoralists are one of the most researched yet least understood groups in the world. Despite decades of empirical research, many policymakers, government staff, NGO personnel, and the broader public do not fully understand or appreciate the rationale and dynamics of pastoral livelihood systems. This poor understanding has often resulted in inappropriate policies and development interventions, which might have undermined the pastoral institutions and their strategies for responding to environmental variability, particularly in arid and semi-arid environments. The rationale for the HEAL project is underpinned by the very fact that opportunities for better engaging with governments on the provision of appropriate basic service for pastoral communities exist. Nonetheless, the process of building capacity and enabling environment for appropriate service provision is long and complex in any community, and is particularly difficult among pastoral people, given their levels of poverty and a policy environment that does not fully support the dynamics of their livelihood systems. To support this initiative, one of the main activities to be implemented in the inception phase of the HEAL project is to map the One Health policy context and needs assessment at the national level for the 3 countries of interest, Ethiopia, Kenya and Somalia. The key areas of review are:

1. The major zoonotic disease threats in the country
2. Status and Threats to the Natural Ecosystem in the country
3. Establishment of the OH systems in the country – history and current situation
4. Existing national policies and strategies related to OH
5. OH initiatives in the country
6. Gaps and needs in the establishment/institutionalization of OH in the countries

This study will provide evidence to support the coordinated efforts to establish commitments around the One Health approach through refining the concept of One Health Units (OHUs), aligning it to the policy priorities of the three countries and facilitating the implementation of the concept by integrating One Health Units into local and regional policies related to human, livestock and environmental health service delivery. Ethiopia and Kenya have established One Health strategic plans which are in various stages of implementation by the government structures with extensive support from non-governmental organizations (NGOs) through national and regional initiatives. Somalia does not have in place a One Health Strategy but there are NGO supported initiatives that are supporting One Health approach institutionalization in the government structures despite the challenging political environment. The review has identified policy gaps and needs to be addressed in the region as summarized under the following thematic areas:

1. Governance and management – There is a general low political goodwill to support One Health approaches shown through the non-existence of specific OH government policies. Kenya and Ethiopia do have National One Health Strategies in place though there is still a challenge in acquiring sufficient government funding to implement the strategies thus there is a huge reliance on donor funding and external support.
2. Networks and partnerships – Overall in the 3 countries, there is a lacking multi-sectoral working mechanism in the response to disease outbreaks and other One Health-related hazards. This is primarily due to poor information sharing and communication across the key relevant sectors. In Somalia, the added challenge of having three administrative zones of Somalia (Puntland, Somaliland and South Central) poorly collaborating in political issues further exacerbates the poor coordination mechanisms for multisectoral communication and response to any disaster. In general, in the 3 countries, there is very low to zero involvement of the environmental sector in relevant national One Health initiatives.

3. One health capacity development – There are efforts in Kenya and Ethiopia towards capacity development of government employed professionals in the humans, animals and environment sectors and enhancement of the curriculum in the tertiary education level with a common OH curriculum across all key disciplines. This is totally lacking in Somalia as the strategies developed to support human resource improvement has not been implemented.
4. Surveillance, preparedness and response – There are efforts seen in the 3 countries to establish disease surveillance, early warning, preparedness and response systems from the national to the lowest administrative level though there is poor inter-sectoral information sharing. This hinders the quick implementation of effective joint response mechanisms.
5. Communication and advocacy – Overall poor communication and coordination across sectors primarily due to lacking strategies and guidelines for multi-sectoral collaboration. There are existing communication and exchange platforms for the One Health stakeholders but only at the national or county/regional level in Kenya and Ethiopia.
6. Operational research – There are existing transdisciplinary research activities providing evidence to foster multidisciplinary approaches in responding to emerging global and national health challenges and influence policy though these are mainly implemented by non-governmental organizations and research institutions.
7. Monitoring and evaluation – A lacking centralized verifiable data source for existing surveillance, monitoring and response systems and any other information related to One Health in the relevant government ministries hinders the proper evaluation of institutionalization of One Health approach.

TABLE OF CONTENTS

Acknowledgments.....	2
Executive summary.....	3
Acronyms	6
Global Steps towards One Health.....	8
Ethiopia	11
Introduction	11
Zoonotic Diseases in Ethiopia	11
Status and Threats to Natural Ecosystem in Ethiopia.....	12
Establishment of One Health System in Ethiopia	13
National One Health Strategic Plan (2018 -2022).....	14
Other National Policies and Strategies	15
One Health Initiatives in Ethiopia	17
National Gaps in One Health.....	18
Somalia.....	20
Introduction	20
Zoonotic Diseases in Somalia	20
Status and Threats to Natural Ecosystem in Somalia	21
One Health System in Somalia	22
One Health Initiatives in Somalia	23
Gaps in One Health Implementation in Somalia.....	24
KENYA.....	25
Introduction	25
Zoonotic Diseases in Kenya.....	25
Status and Threats to Natural Ecosystem in Kenya	26
Establishment of One Health System in Kenya.....	27
Establishment of the Zoonotic Disease Unit.....	28
Adherence to International Standards	29
National Strategic Plan for the Implementation of One Health in Kenya (2012 – 2017)	29
Other National Policies and Strategies	30
One Health Initiatives in Kenya.....	31
National Gaps in One Health.....	33
Summary of the gaps and needs on one health in the HOA.....	35
References	38

ACRONYMS

AHRI	Armauer Hansen Research Institute
AMR	Antimicrobial Resistance
ASALs	Arid and Semi-Arid lands
AU-IBAR	Africa Union–Inter Africa Bureau for Animal Resources
CDC	United States Center for Disease Control and Prevention
CCM	Comitato Collaborazione Medica
COHUs	County One Health Units
DGHP	Division of Global Health Protection
DPPH	Department of Preventive and Promotive Health
DVS	Department of Veterinary Services
EPHI	Ethiopian Public Health Institute
EPT	Emerging Pandemic Threats
EWCA	Ethiopian Wild Life Conservation Authority
FAO	Food and Agriculture Organization
FELTP	Field Epidemiology and Laboratory Training Program
GDP	Gross Domestic Product
GHSA	Global Health Security Agenda
GIS	Global Implementation Solutions
GTP II	The Second Growth and Transformation Plan
HDA	Health Development Army
HEWs	Health Extension Workers
HORN	One Health Regional Network for The Horn of Africa
HSTP	Health Sector Transformation Plan
ICT	Information and Communications Technology
IGAD	Intergovernmental Authority on Development
IHR	International Health Regulations
ILRI	International Livestock Research Institute
JEE	Joint External Evaluation
JOHI	Jijiga One Health Initiative
KEMRI	Kenya Medical Research Institute
KHP	Kenya Health Policy
KHSSP	Kenya Health Sector Strategic and Investment Plan
KWS	Kenya Wildlife Service
MALF	Ministry of Agriculture, Livestock and Fisheries
MERS-CoV	Middle East respiratory syndrome-coronavirus
MoCT	Ministry of Culture and Tourism (Ethiopia)
MoEFCC	Ministry of Environment, Forest and Climate Change (Ethiopia)
MoH	Ministry of Health (Ethiopia)
MOLD	Ministry of Livestock Development (Kenya)
MoLF	Ministry of Livestock and Fisheries (Ethiopia)
MOPHS	Ministry of Public Health and Sanitation (Kenya)
MOPIC	Ministry of Planning and International Cooperation (Somalia)
NDMA	National Disaster Management Authority (Kenya)
NGOs	Non-governmental Organization
NHSC	National Health Security Council (Ethiopia)

NIT	National Influenza Taskforce (Kenya)
NOHSC	National One Health Steering Committee (Ethiopia)
NVI	National Veterinary Institute (Ethiopia)
OH	One Health
OHCEA	One Health Central and East African University Network
OIE	World Organization of Animal Health
PHEICs	Public Health Emergencies of International Concern
PPR	Peste des Petits Ruminants
ROHTF	Regional One Health taskforces
RVF	Rift Valley Fever
SDC	Swiss Agency for Development and Cooperation
SNDP	Somalia National Development Plan
SOHTWG	Somalia One Health Technical Working Group
SOPs	Standard Operating Procedures
TWGs	Technical Working Groups
USAID	United States Agency for International Development
VEEU	Veterinary Epidemiology and Economics Unit
VSF	Vétérinaires sans Frontières
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
ZDU	Zoonotic Disease Unit
ZED	Zoonotic and Emerging Diseases research group
ZTWG	Zoonoses Technical Working Group

GLOBAL STEPS TOWARDS ONE HEALTH

The world human population is projected to increase to 8 billion by 2025; most of this growth will mainly be in low and middle-income countries in Asia, Africa and Latin America (UN, 2017). This growth will contribute significantly to increased encroachment of human activities into natural forests and previously untouched ecosystems, thus putting pressure on land use, as well as exacerbate the negative effects of climate change on ecosystems that contribute to alterations in the distribution of disease-transmitting vectors. Human encroachment into rangelands changing the land use to agricultural and the land cover species from natural pastures to crops has contributed significantly to rangeland degradation and thus weakening the traditional rangeland management practices (Abate & Angassa, 2016). This increase in population will also lead to a proportionally increased demand for animal protein and an associated increase in unregulated trade in domestic animals, change in livestock production systems, illegal harvesting and consumption of wild animals. All these stated factors are associated with the increased occurrence or emergence of zoonotic diseases.

The increasing interactions between humans and animals within the environment and numerous factors exacerbating the emergence, re-emergence and spread of infectious diseases necessitate a multi-sectoral and multidisciplinary collaboration and coordination on prevention, early detection and effective response mechanisms. In addition to zoonoses, other growing global threats to human health and socioeconomic wellbeing include Antimicrobial Resistance (AMR) and public health events of epidemic and pandemic potential.

Due to the complexity and close interaction of public health and environment issues, One Health is closely linked to the ecological health with the underlying premise that the health and well-being of humans and livestock cannot be sustained if the planet is polluted, suffering from social or political instability with ever-diminishing resources. The World Health Organization (WHO) declared in 2017 at the sixth ministerial conference on Environment and Health that “environmental factors that could be avoided and/or eliminated cause 1.4 million deaths per year” and that “public authority shares the common responsibility for safeguarding the global environment and for promoting and protecting human health for all environmental hazards across generation and in all policies” (Destoumieux-Garzón et al., 2018). Initiatives under the One Health framework need to be implemented in a manner that promotes sustainable ecosystems integrating human, animal, and environment; and social stability as this encourages and promotes the interdependence, coexistence, and evolution of all living creatures and their ever-changing environment.

The One Health (OH) approach in managing endemic and emerging zoonotic disease outbreaks is based on the recognition of the fact that coordinated and collaborative efforts among experts in the human, animal and environment sectors will optimize the prevention and control of these diseases. It has also been adopted as the core driver to make the world safer from infectious diseases by the Global Health Security Agenda (GHSA) which is an alliance of over 60 governments and international partners. The GHSA was launched in February 2014 with the aims of advocating for a world safe and secure from infectious disease threats; bringing together nations from all over the world to make new, concrete commitments, and elevating global health security as a national leaders-level priority. This agenda is the basis on which major institutional donors such as the World Bank and USAID support various country governments to institutionalize One Health systems to improve on disease outbreaks response.

The WHO developed the International Health Regulations (IHR) in 2005 which provides a framework for the coordination of public health emergencies and improving the capacity of countries to assess and manage acute public health risks. The guidelines require for the establishment of human-animal

coordinated response mechanisms at all levels thus necessitating the inclusion of veterinary professionals and wildlife experts in the national and sub-national public health emergency management committees thus reinforcing the One Health approach in disease outbreaks response. In 2008, WHO adopted 20 key indicators for monitoring IHR core capacity at the national level, including two indicators specific to OH; an established mechanism for coordinating all relevant sectors in the implementation of IHR and establishing a system for surveillance of zoonoses and potential zoonoses.

The World Organization of Animal Health (OIE) advocates for improved governance of zoonotic diseases by its member countries and this is supported by improving collaboration between the public and animal health sectors at global, regional and national levels. In 2010, a tripartite agreement between the Food and Agriculture Organization (FAO), OIE, and WHO created the global early warning system for the prediction, prevention, and control of disease threats including zoonoses. In 2017, the 3 organizations enlarged their scope of collaboration to cover the following areas:

- the reinforcement of national services in human health, animal health and food safety;
- the strengthening and modernization of early warning and surveillance/monitoring systems;
- the foresight, preparedness and response to emerging, re-emerging and neglected infectious diseases;
- the encouragement and the promotion of coordinated research and development to achieve a common understanding of the highest priority zoonotic diseases;
- the challenge that represents food safety requiring a multi-sector approach in the context of reinforcing food security.

Early detection and institution of fast control actions are key in ensuring the emerging and re-emerging zoonotic diseases from animal sources are prevented from infecting the human population. To ensure protection to the human population is in place and maintained, countries need to institutionalize and operationalize systems and structures for effective national human-animal disease surveillance and the establishment of coordinated response mechanisms at all levels.

The United Nations Environment Programme (UN Environment) is the authoritative advocate for the global environment taking lead in setting the global environmental agenda and promoting the coherent implementation of the environmental dimension of sustainable development within the United Nations system and its member countries. The UN Environment through the Environmental, social and economic sustainability framework defines the minimum safeguard standards for the organization and its implementing/executing partners anticipating and managing associated environmental, social and economic issues in a holistic manner. In the 2019 fourth session of the United Nations Environment Assembly, attended by the world's Ministers of the Environment, representatives of international organizations and stakeholders, a ministerial declaration was made that declared the commitment of the countries and participants in promoting sustainable, prosperous and inclusive societies with sustainable consumption and production patterns that prevent and address environmental challenges with innovative solutions. The declaration states the members' commitment to scale-up efforts to overcome common environmental and health challenges through fostering sustainable and efficient resource management; ensuring the access and use of environmental data; engaging civil society, citizens, private sector and academia. This will be done by actions such as improving national resource management strategies with an integrated life-cycle approach to protect human health and the environment from harmful effects of chemicals and waste; and promoting sustainable food systems by implementing sustainable agricultural practices, improving value generation and addressing food security, environmental health and human well-being in an integrated manner.

Zoonotic infections, new and emerging diseases are increasingly becoming major health burdens globally thus there is a need for countries and regions to adopt and strengthen the One Health agenda as the key capacity of the global health security agenda.

This report is an overview of the One Health policy context in the countries HEAL project is being implemented in Ethiopia, Somalia and Kenya. The key areas of review are:

1. The major zoonotic disease threats in the country
2. Status and Threats to the Natural Ecosystem in the country
3. Establishment of the OH systems in the country – history and current situation
4. Existing national policies and strategies related to OH
5. OH initiatives in the country
6. Gaps and needs in the establishment/institutionalization of OH in the countries

ETHIOPIA

Introduction

Ethiopia faces risks of emerging pandemic threats and other global threats such as AMR, endemic zoonotic diseases, food safety issues and bio-security mainly due to a growing population, rich biodiversity and close interaction between humans and animals. The country is the 2nd most populous country in Africa and the 13th in the world with a population of 94.4 million people and has a growth rate of 2.6% (FDRE, 2017). The Ethiopian government has in the recent decades invested in strengthening the animal and human health systems. These, however, have been functioning independently with no formal coordination especially during disease outbreaks when cross-sectoral collaboration and action to prevent and/or control is required.

Ethiopia is one of the 17 GHSA phase1 countries that have committed themselves to accelerate progress towards making the world safe from emerging health threats. A Joint External Evaluation (JEE) conducted by WHO in 2016 based on the GHSA International Health Regulations 2005 (IHR) on Ethiopia's public and animal health systems showed that there was a strong political commitment by the GoE, to improve the capacity of these ministries particularly in the identified gaps of communication and collaboration; there was an absence of formal or legal linkages, structures or policies for collaboration between them and with other sectors, such as wildlife and agriculture. There have been ad hoc cross-sectoral collaboration initiatives in the management of infectious disease threats which, however, were limited to the lifespan and scope of the threat and disbanded once the outbreak was contained or reduced.

Zoonotic Diseases in Ethiopia

Ethiopia has the second highest burden of zoonotic diseases in Africa (Grace et al., 2012) with reported existence of several animal diseases caused by bacteria, viruses, protozoa and parasites. In September 2015, the CDC through the GHSA supported the Ethiopian government in prioritizing the zoonotic disease based on the severity in humans, the proportion of human diseases attributed to animal exposure, the impact of animal disease at the household level, the availability of intervention methods, and the existence of inter-sectoral collaboration. The identified tier-one zoonotic diseases are rabies, echinococcosis, anthrax, brucellosis, and leptospirosis (Pieracci et al., 2016) and these are to be tackled in the first five years as from 2017. Tier two diseases identified are Q fever, salmonellosis, Bovine Tuberculosis, leishmaniasis, cysticercosis/taeniasis, toxoplasmosis, and listeriosis. The list of prioritized zoonotic diseases is to be updated by the end of 2019.

In 2017, the Ministry of Health, Ministry of Agriculture and Livestock Resources, Ministry of Culture and Tourism and Ministry of Environment, Forest and Climate Change Implementation Plan being members of rabies and anthrax Technical Working Groups, have jointly developed strategies for the 2 prioritized diseases. These are the National Rabies Control and Elimination Strategy (2018 – 2030) and the National Anthrax Prevention and Control Strategic Plan (2018 – 2030). The strategies focus on a collaborative and coordinated One Health approach in the control of the zoonotic diseases particularly by strengthening surveillance and reporting systems, improving outbreak investigation and response, prevention and control, strengthening diagnostic laboratory capacity and improving risk communication.

Zoonotic diseases with pandemic potential such as HPAI, MERS-CoV, Rift Valley Fever have not been registered in Ethiopia though these still pose a potential threat both to the public and animal populations due to the imminent risk factors the country is exposed to.

Status and Threats to Natural Ecosystem in Ethiopia

Ethiopia has diverse ecosystems from high altitude highlands to arid lowlands. The country's vegetation coverage includes natural high forests, woodlands, plantations and bamboo forests over an estimated 35.13 million hectares (Getahun, 2018). There are 9 defined ecosystems in the country namely afro-alpine and sub- afro-alpine, montane grassland, dry evergreen montane forest grassland, moist evergreen montane forest, acacia Commiphora woodland, Combretum Terminalia woodland, lowland semi-evergreen forest, desert and semi-desert scrubland and aquatic and wetland ecosystems (FDRE, 2014). These are further classified into 6 major ecological zones (Dejene, 2003):

- a. Arid Zone – mainly pastoral areas covering 53.5 million ha/31.5% percent of the country
- b. Semi-arid – covering 4 million ha/3.5% of the country
- c. Sub-moist – occupying 22.2 million ha/19.7% of the country
- d. Moist – covering 28 million ha/25% of the country and is where agriculture is mainly practiced
- e. Sub-humid and Humid – occupying 21.9 million ha/19.5% of the country which is ideal for annual and perennial crops
- f. Per-humid – covers 1 million ha/1% of the country which is suited for perennial crops and forests.

The ecosystem provides socioeconomic benefits and several important ecological services to animals and humans such as food, water, shelter, energy sources, flood and disease control, regulating the climate variability, medicinal substances from the natural fauna, recreational and cultural benefits as well as income from the sale of timber.

The major threats to the country's biodiversity include:

- change of land use leading to habitat conversion to farming and grazing activities
- unsustainable utilization of biodiversity resources due to the high demand for forest products resulting in deforestation; this is aggravated by the high demand for raw materials for construction and charcoal, fuelwood
- overgrowth of invasive species
- replacement of local fauna varieties and animal breeds
- climate change and pollution contributed heavily by the ever-increasing population in rural and urban areas thus increasing the pressure on natural resources
- construction of reservoirs for irrigation and electrification
- other indirect causes such as poverty, and lack of awareness

All these have led to declining numbers of wild plants and animals including endemic species, as well as farmers' varieties and indigenous animal breeds.

Ethiopia has instituted several biodiversity conservation and sustainable utilization activities which have contributed significantly to improvements in natural resource management. These are (FDRE, 2014):

- a. Establishment of Protected areas to conserve and sustainably utilize the country's biodiversity. These are conservancies, national parks, coffee forests, biosphere reserves and wildlife sanctuaries
- b. Control of invasive species by creating awareness on their negative effects and their clearance. The invasive species are mainly *Prosopis juliflora* and *Eichhornia crassipes*
- c. Rehabilitation and restoration of degraded rangelands by application of forest management plans to carry out reseedling and tree planting

- d. Sustainable biodiversity management by developing management plans for protected areas, forest management and proper land-use practices
- e. Working with local communities around parks in promoting ecotourism and the use of non-timber forest products.
- f. Institutionalizing and implementing land use ownership certification and legal frameworks on forest development and conservation. Nations wide project such as The Reduced Emissions from Deforestation and Forest Degradation Project (REDD+) launched in 2011 is an integral part of a wider green economic growth; a component of the country's Climate Resilient Green Economy Strategy.

In general, Ethiopia is taking various measures to mainstream biodiversity into sectoral and cross-sectoral plans and programmes. This has been through the policies and strategies in place aimed at supporting sustainable natural resource management, biodiversity conservation and sustainable development. This includes the Climate Resilient Green Economy Strategy which aims at mainstreaming biodiversity into agriculture, forest, power and transport; re-establishment and restructuring of the Ethiopian Biodiversity Institute; establishment of Regional Biodiversity Units, Biodiversity Centers and the exclusive Ministry of Environment and Forest.

Establishment of One Health System in Ethiopia

Ethiopia is a member country committed to the GHSA thus to contribute to this and other international and national commitments, the government with support from international partners established the National One Health Steering Committee (NOHSC) in 2017. NOHSC is comprised of representatives of core Government Ministries namely: Ministry of Health (MoH), Ministry of Livestock and Fisheries (MoLF), Ministry of Culture and Tourism (MoCT)/Ethiopian Wildlife Conservation Authority and the Ministry of Environment, Forest and Climate Change (MoEFCC). NOHSC mandate is to facilitate multi-sectoral coordination and collaboration among OH stakeholders at national and sub-national levels and strive towards the establishment of a sustainable institutionalized OH platform in the country. To achieve this, the NOHSC has established disease-specific technical working groups (TWGs) that provide expert forums for tackling zoonotic diseases, enhance mutual accountability and collaboration among the sectors, promote greater efficiencies in the management of zoonotic diseases and other health threats using OH approach. So far the rabies TWG and the anthrax TWG have developed strategies for the elimination and control of the 2 priority zoonotic diseases.

In 2017, the government through the NOHSC, TWGs and other animal and human health actors jointly developed the National One Health Strategic Plan (2018-2022) which proposes specific collaborative actions among relevant institutions. NOHSC is tasked with the following key functions:

- overall management and implementation of the National One Health Strategic Plan
- establishment of regional levels OH technical working groups to play the same role in managing the implementation of the strategic plan in respective geographies
- ensuring active participation of line ministries (MoH/EPHI, MoLF, MoCT/EWCA and MoEFCC); major bilateral, multi-lateral and donor agencies; international NGO, CSO, research institutions and private sector involved in One Health agenda at national and sub-national levels.
- assigning different institutions as sector leads to initiate, undertake and report on specific activities under each pillar and strategic objectives, depending on the institutional mandate

After the endorsement and launch of this strategic plan, detailed implementation or operational plans will be prepared and shared among the partners and members of the NOHSC. The NOHSC has commenced

the establishment of the Regional One Health taskforces (ROHTF) in 2019 and these have already been established in Tigray, Amhara, SNNP, Somalia and Oromiya Regional States. This has been led by the USAID funded Human Resources for Health 2030 project and facilitated by NGO partners of the NOHSC. The ROHTF membership is drawn from the different sectors including Health, Environment, Animal health, Education, Academia, OHCEA & OH Workforce, representatives from private practitioners.

National One Health Strategic Plan (2018 -2022)

The National One Health strategy is the roadmap for Ethiopia to achieve the intended long-term goal of *“negligible risks and impacts of endemic, emerging and re-emerging health threats at the animal-environment-human interface”*. The mission of the plan is *“to establish sustainable one health coordination mechanism at all levels for multi-disciplinary and multi-sectoral engagement in the prevention, detection and response to endemic, emerging and re-emerging health threats at the human, animal and environment interface”*.

The country aims to achieve this goal through the following key pillars and objectives

a. Pillar One: Coordination and Collaboration

- To ensure effective and functional One Health coordination mechanism at all levels by 2022 (includes the establishment of regional TWGs)
- To mainstream One Health activities in all relevant government sectors by 2020
- Develop and implement monitoring and evaluation system for OH at national and sub-national levels

b. Pillar Two: Preparedness and Response

- Establish and strengthen multi-sectoral and multidisciplinary capacities at all levels for timely detection, and rapid response to emerging and re-emerging priority threats at the human-animal-environment interface by 2021
- Develop multi-sectoral prevention and control strategies for priority emerging and re-emerging zoonotic diseases
- Implement and promote multi-sectoral prevention and control strategies and preparedness and response plans for priority emerging and re-emerging zoonotic diseases using One Health approach

c. Pillar Three: Surveillance and Reporting

- Establish and strengthen integrated multi-sectoral surveillance systems by 2022
- Operationalize regular sharing and use of surveillance data and information across sectors by the year 2020

d. Pillar Four: Policy, Advocacy and Communication

- Improve enabling policy environment across all collaborating sectors for the implementation of one health by the year 2022
- Secure high-level buy-in and support for one health across all sectors
- Improve knowledge, attitude, behaviour and practice of community on health threats or risks at human, animal, and environment interface

e. Pillar 5: Research and Capacity Building

- Conduct joint research projects on prioritized zoonotic diseases and other health threats at the animal-human-environment interface by 2020
- Improve policy on disease prevention, detection and response using one health in line with research findings by 2022
- Improve human resource and infrastructure capacity for health research by 2022

The pillars and objectives of the strategic plan are aligned to key international frameworks and regulations such as the WHO-OIE operational framework for Good governance at the human-animal interface which highlights the extensive benefits that can be achieved from developing national strategies with activities targeting joint capacity-building for the human and animal health sectors (OIE-WHO, 2014). These are clearly spelled out in the National Strategy such as the development of multi-sectoral disease prevention and control strategies, joint research and disease surveillance activities, creation of effective risk communication platforms. The strategy is also in line with the IHR on the development of public health capacities (WHO, 2016); as well as with the OIE Performance of Veterinary Services (PVS) Pathway on issues of strengthening veterinary service capacity (OIE, 2013).

The funding strategy for the plan calls for support from external sources such as institutional and/or international donors. NGOs working in the relevant sector can also incorporate the activities highlighted in the plan to their programmes and thus contribute towards the achievement of the overall goal for a systematic institutionalization of OH in the country. The coordination of the activities is overseen by the NOHSC and this role trickles down to the RTWG being created in the regional government structures.

Other National Policies and Strategies

There are various pertinent national policies and strategies which incorporate the key strategies in the OH approach and are relevant in supporting the institutionalization of the same in Ethiopia. These are summarized in table 1 below.

Table 1 Ethiopian National Policies and Strategies Relevant to One Health

Policy Document	Relevance to One Health
The Second Growth and Transformation Plan (GTP II) (2016-2020)	The commitments made in the GTP II serves as an opportunity to increase support and partnership with public sectors
Health Sector Transformation Plan (HSTP)	HSTP recognizes the strategic relevance of multi-sectoral collaboration and the importance of non-state actors such as the Health Extension Workers (HEWs) and the Health Development Army (HDA) who are key in improving community participation and engagement.
Livestock Master Plan (2016-2020)	LMP details the objectives of GTP II for the livestock sector. These include controlling zoonotic diseases, thus ensuring the safety of animal products and human health. It also guides on the establishment of One Health forum at federal and regional levels through the improvement of advanced animal health systems. The LMP suggests strategies to improve the national capacity of early detection and response to animal diseases/threats.
National Anthrax Prevention and Control Strategic Plan (2018-2030)	The plan was developed jointly by the Ministry of Health (through Ethiopian Public Health Institute (EPHI)), the Ministry of Livestock and Fisheries (through the Veterinary Public Health Directorate, Epidemiology Directorates, Disease Prevention and Control Directorate, National Animal Health Investigation and Diagnostic

	Center (NAHDIC) and National Veterinary Institute (NVI)), and Ministry of Culture and Tourism (through Ethiopian Wild Life Conservation Authority (EWCA)) and development partners. It details strategies for the prevention and control of anthrax in humans and animals in Ethiopia using a combination of strengthened surveillance and reporting systems; improved outbreak investigation and response; prevention and control mechanisms; strengthen diagnostic laboratory capacity and risk communication.
Strategy for the Prevention and Containment of Antimicrobial Resistance for Ethiopia (2015-2020)	The strategy highlights the need for multisectoral coordination for the prevention and containment of AMR from the ever-increasing range of infectious threats caused by bacteria, parasites, viruses, and fungi in humans, animals, agriculture, and the environment. Two of its five strategic objectives are (i) to strengthen the knowledge and evidence on antimicrobial use and resistance through OH surveillance and research and (ii) to establish national alliances and partnerships, management and governance arrangements, and resource mobilizations for the prevention and containment of AMR at all levels.
National Rabies Control and Elimination Strategy (2018-2030)	This was developed jointly by the Ministry of Health (through Ethiopian Public Health Institute (EPHI)), the Ministry of Livestock and Fisheries (through the Veterinary Public Health Directorate, Epidemiology Directorates, Disease Prevention and Control Directorate, National Animal Health Investigation and Diagnostic Center (NAHDIC) and National Veterinary Institute (NVI)), and Ministry of Culture and Tourism (through Ethiopian Wild Life Conservation Authority (EWCA)) and development partners. It prioritizes the execution of multi-sectoral activities, projects and programs aimed at the prevention and control of rabies in domestic dogs and humans in Ethiopia. The rabies strategy details the establishment of regional multi-sectoral rabies technical working groups (TWG) using a OH approach
Environment Policy of Ethiopia	This addresses the formulation and implementation of environmental strategies and laws essential for a building climate-resilient green economy
National Policy and Strategy on Disaster Risk Management	The strategy addresses the approaches in reducing disaster risks and potential damage caused by natural and human-induced disasters through a comprehensive and coordinated disaster risk management system in the context of sustainable development.
Ethiopian Public Health Institute (EPHI) Strategic Plan (2015/16-20/21)	The institute prioritizes the study of zoonotic diseases and emphasizes on OH approach as a mechanism to implement the strategy. The plan indicates the need for development, institutionalization and implementation of OH approach for strengthening cross-sectoral collaboration and partnership on public health research
Armauer Hansen Research Institute (AHRI) Strategic Plan (2016 -2020)	The institute applies OH approach in research and capacity building of human and animal health professionals. The main zoonotic research portfolio includes Bovine Tuberculosis, Brucellosis and this is done in close collaboration with other sectors (e.g. wildlife, environment,

	MoLF). The strategic plan emphasizes OH approaches in integrated human-animal research, surveillance and health delivery systems
Strategy for Revitalizing the Health Extension Program in Pastoralist Areas (2017)	The strategy aims at strengthening the community-based health workforce (namely the Health Extension Workers) to increase the coverage of family health services (such as childhood immunization, antenatal care and institutional delivery) among pastoral communities. In particular, the strategy seeks to increase community engagement, improve service delivery modality and enhance integration with other sectors, features that are perfectly in line with the OH approach.
Pastoral Development Policy and Strategy Framework (draft)	This is a draft policy document that focuses on catchment development, resettlement, livestock resources development; expansion of social and economic services and infrastructure, NRM, maintaining good governance and increased efficiency and ability to implement and disseminate best experiences to pastoralists. Improve the standard and coverage of health services to match the national average.
Sustainable Development and Poverty Reduction Program	It proposes voluntary sedentarisation of pastoralists and the development of reliable river courses to support irrigation to improve water supply, pasture and social services. It suggests a mobile service provision including health and education.

OH in Ethiopia is becoming increasingly recognized in various government strategies and plans thus there are various opportunities for other stakeholders in the different sectors to create linkages and synergies in their programs with the government under the OH approach.

One Health Initiatives in Ethiopia

There have been various multi-stakeholder OH Initiatives created in the country through collaborations between government and other institutions such as universities/research institutions, NGOs and donor organizations. Some of these initiatives were created to respond to a certain threat and disbanded soon after the threat was contained or abated such as the Multi-Disciplinary Team to Identify the Cause of Unknown Liver Diseases (ULD) and the National Coordination Committee for the Highly Pathogenic Avian Influenza. The second phase of the Emerging Threats Program (EPT-2) funded by USAID is also being implemented in Ethiopia running from 2014 to 2019. The initiative has three overarching purposes: the prevention of new zoonotic disease emergence, the early detection of new threats when they do emerge, and their timely and effective response.

The research initiatives being implemented in the country under the OH banner include:

- Jigjiga One Health Initiative (JOHI) is funded by the Swiss Agency for Development and Cooperation (SDC) and run by Jigjiga University, the Armauer Hansen Research Institute (AHRI—MOH) and the Swiss Tropical and Public Health Institute in Basel. It aims at building the capacity of Jigjiga University to become a center of excellence for OH studies and create innovative integrated health systems for the improvement of health and wellbeing of pastoral communities
- The Ohio Global One Health Initiative by the Ohio State University Health Sciences focuses on improving the capacity of pre-service health professionals in Ethiopia and established the African regional office in Addis Ababa in 2017.

- One Health Central and East African (OHCEA) University Network is a network of 21 public health and veterinary universities from 8 countries in the East, Central and West Africa regions. In Ethiopia, 3 universities, Jimma, Mekelle and Addis Ababa are members of this network that aims at cultivating the culture of multi-sectoral collaboration through field attachment, experimental learning, training and research.
- One Health Regional Network For the Horn Of Africa (HORN) is a multidisciplinary, international partnership led by the University of Liverpool in partnership with Liverpool School of Tropical Medicine, United Kingdom; University of Nairobi, and International Livestock Research Institute, Kenya; University of Addis Ababa, and the International Livestock Research Institute, Ethiopia; IGAD Sheikh Technical Veterinary School, Somaliland; Hamelmalo Agricultural College, Eritrea; and other national and international organizations and NGO's. The project is funded by the Biotechnology and Biological Sciences Research Council Fund and aims at improving the research capacities of individuals and institutions particularly on human and animal health issues and create a One Health Regional Network for knowledge and information sharing.

The Antimicrobial Resistance Prevention and Containment Advisory Committee has a multi-sectoral representation and international organizations such as USAID, WHO, CDC and FAO working on advocacy and awareness on AMR as well as on the development of the country's AMR strategy.

The National Health Security Council (NHSC) was initiated by the Ministry of Health as a multi-sectoral coordination mechanism to coordinate and respond to all kinds of public health threats from zoonotic diseases, radiations or chemicals. Their roles closely resemble those of the NOHSC thus there could be a duplication of efforts with no clarity on coordination between the 2 bodies. The council membership is from the health sector only which does not represent well the OH approach in tackling the public health threats. The NHSC is yet to be formally endorsed by the council of ministers.

National Gaps in One Health

There are various gaps, needs and challenges in institutionalizing OH in Ethiopia which are potential areas of support from donors and NGOs as listed below

1. A lack of clarity on the status of the National Health Security Council (NHSC) which seems to be a replica of NOHSC. The duplication of roles and efforts could hinder the implementation of OH initiatives and the effective participation of ministries. The NHSC does not have a multi-sectoral representation thus could be a potential threat to having the health actors participate fully in the NOHSC activities as they will be running a parallel outfit. This is highly probable as an endorsed inter-sectoral collaboration MOU clarifying the mandates and responsibilities of the different ministries among the sectors in NOHSC does not exist.
2. Poor integration among sectors, particularly on the issues of information sharing and communication between the animal and human health sectors.
3. Limited competencies and subject matter expertise in the government workforce at a sub-national level on the OH approach and the integration of sectoral work. The JEE conducted in 2016 pointed out the weak capacity of sector offices. There is a lot of reliance on support/technical assistance from international organizations and external experts. This contributes to weak implementation of international health regulations for humans and animals in the relevant sectors
4. A lack of a formal communication and information exchange system between the various national initiatives particularly on disease surveillance and reporting channels. Currently, communication is informal, not structured and not trackable or stored for reference.

5. There is no formal or specific budget to implement One Health plans/activities in the government systems resulting in poor implementation of the pertinent policies and strategies by the respective government authorities. Most of the OH initiatives and activities are funded by donors, yet the future funding environment is uncertain
6. Despite the existence of various OH initiatives in the country, formal joint mechanisms or plan of action in cases of zoonotic disease outbreaks is lacking. This could lead to poor coordination of the response mechanisms in outbreak situations.
7. Absence of accessible and quality data on disease surveillance particularly from a centralized verifiable source. This is coupled with a lack of data sharing mechanisms and reporting formats.
8. Limited laboratory-based diagnostic capacity especially at a regional level which contributes to poor detection of outbreaks' causative agents in a timely manner.
9. Gap or lack of clear legislation on the engagement of public-private partnership pertinent to OH
10. The sustainability of various OH initiatives is wanting due to poor support from the government structures through funding, inter-sectoral guiding agreements and personnel capacity.
11. The high cost of acquisition and maintenance of the ICT infrastructure needed in the different levels of government due to rapid technological changes

SOMALIA

Introduction

Somalia is characterized by a complex political, security and development environment, an epicentre of regional conflict and displacement that has been plagued with poverty, famine and recurring violence. In 2012 the country established the Federal Government which unfortunately led to a further division of the country politically, which challenged the establishment and building of institutions. It is estimated that 55% of the country's population lives in rural areas and 45% in urban centres (Maxwell et al., 2014). Livestock rearing is the main source of livelihood in the pastoral and agro-pastoral communities employing over 70% of the population and contributes an estimated 60% of GDP. There have been reported outbreaks of major livestock diseases such as Rift Valley Fever (RVF) and Peste des Petits ruminants (PPR) which not only negatively affect the export trade but also adversely affected the income and livelihoods of pastoralist families (Mariner, 2018; Njue et al., 2018).

In the human health sector, the challenges faced in the country include poor nutritional status; lack of potable water and safe sanitation; low immunization rates; high disease burden; inadequate institutional capacity and financing; absence of balanced, motivated, well-distributed and well-managed health workforce; and limited and unequal access to essential health services (FGoS, 2017). These are exacerbated by the high poverty rates in the country and contributed to the country having the lowest health status in the world. The disease burden in the country that is attributed to communicable diseases is 69.0%, which to noncommunicable diseases is 19.1% and to injuries 11.9%. The health workforce ratio to the population is 0.4 physicians and 1.1 nurses and midwives per 10 000 population (WHO, 2015).

In October 2016, a JEE of the IHR capacities in the Republic of Somalia was carried out using the World Health Organization (WHO) IHR JEE tool. Some of the key findings that were found to severely negatively impact the implementation of IHR are:

- The lack of a legal background that supports the planning and implementation of public health capacities.
- The governmental finance, staffing, and institutional development capacity for IHR implementation and sustainability are very limited.
- The country's organizational and political systems are complex leaving the public health-related activities to rely on external support.
- The security situation in Somalia limits access to, and provision of public health services relevant to IHR implementation in several parts of the country.

Despite these limitations and gaps, the Somali authorities have demonstrated a strong commitment to global health security and core national capacities required by the IHR by requesting for the JEE. If this commitment is maintained and recommendations made are improved, this will strengthen the country's capacity to prevent, detect and rapidly respond to public health threats.

Zoonotic Diseases in Somalia

Statistics on the zoonotic disease burden in Somalia are scanty. The notable reported zoonotic disease outbreak in Somalia is Rift Valley Fever. There are emerging zoonotic diseases that are increasingly becoming a threat in the Country such as Avian Influenza and the Middle East respiratory syndrome-coronavirus (MERS-CoV). Other zoonotic diseases documented as prevalent in the country are Brucellosis, Toxoplasmosis, Anthrax, Zoonotic trypanosomiasis, Dengue fever, rabies and cutaneous leishmaniasis which have been found to be commonly affecting the poor rural and marginalized communities (WHO, 2019).

Status and Threats to Natural Ecosystem in Somalia

Somalia topography ranges from hilly in the north, where the land rises to between 900 and 2,100 meters above sea level, to flats in the central and southern regions and a coastline that extends 2,720 kilometres along the Gulf Aden and the Indian Ocean (Labate and Bettinger, 2018). The country is characterized by a warm and arid climate across most parts with rains and winds that are highly variable in places at certain times of the year. The various ecosystems found in Somali are included mainly the Ethiopian xeric grassland and shrublands ecosystem found in the northern part of Somali which is a maritime semi-desert covered with shrubs, small bushes and grass clumps and shallow watercourses; Somali Acacia-Commiphora Bushlands and Thickets in the northern, northeastern and north-central constitutes of scattered Acacia trees and patches of grass and the Hobyo grasslands and shrublands ecosystem dominated by scattered scrubs, grass clumps, and coastal sand dunes along the Indian Ocean coastline (Sawe, 2019):

The livelihood of the communities in Somalia is based on livestock and agriculture thus they are highly vulnerable to the current and future impacts of climate change. Poor land-use practices such as deforestation and overgrazing have contributed to negative climatic impacts and other negative environmental effects which include soil erosion, desertification, increasing aridity, water scarcity, and land degradation (Somalia NAPA, 2013). Land degradation is a prominent environmental issue that has contributed heavily to poverty, poor health, low economy and decreasing ecological and human resilience (UNEP, 2011). Environmental issues weigh heavily on the country's economy and livelihoods of its people. Somalia's key poverty-environment linked challenges are related to (Beier and Stephansson, 2012):

- increased conflict and general instability thus resulting in further marginalization of vulnerable men and women;
- lack of secure tenure to land and other natural resources;
- vulnerability to natural disasters and resilience;
- polluted water and waste disposal especially along coastland destructive to health;
- unreliable access to food and water leading to malnutrition and famine;
- the low ability of particularly female-headed households to accumulate assets including land;
- access to forest produce for monetary income.

It is clear that there is a complex interaction between climate, conflict, development, security, policy and economic growth that is integral for peacebuilding, socioeconomic development, and alleviating the chronic humanitarian crises that have affected Somalia for many years. The United Nations Development Programme (UNDP) has been working closely with the Government of Somalia to navigate these complex interactions and to strengthen its national capacity so that it can engage in the Global Environmental Facility and implement programmes to protect its fragile and significantly degraded environmental resources. It is through this support that the Federal Government of Somalia formulated the National Adaptation Programme of Action (NAPA) to Climate Change in 2013 a blueprint to guide Somalia in implementing a comprehensive approach to climate change adaption.

The NAPA development was led by the Ministry of National Resources, Government of Federal Somalia in collaboration with the governments in Puntland and Somaliland. The development of the plan followed the guiding principles outlined in the guidelines of the Least Developed Countries (LDC) Expert Group (LEG) established under the United Nations Framework Convention on Climate Change (UNFCCC). The plan will focus on the following thematic areas:

- Sustainable Land Management

- Water Resources Management
- Disaster Management

According to the UNDP-UN Environment National Adaptation Plan Global Support Programme (NAP-GSP) report of May 2019, there have been significant strides in the implementation of the NAPA by the Somalia Federal Government. In February 2017 the government officially launched the NAPA implementation process which includes building a multi-disciplinary NAPA team; synthesizing available information (assessments, strategies, and consultations); carrying out participatory, rapid assessment of vulnerability and potential climate hazards and risks; identifying potential adaptation activities and developing project profiles which are then submitted to the UNFCCC. In November 2017 there have been consultations held with various stakeholders from the national and state levels to inform the progress of the NAPA implementation and submission of a Stocktaking Report with support from the NAP-GSP. In 2018 UNDP and the Government of Somalia collaborated in securing the Green Climate Fund (GCF) financing to start the NAPA process.

Since then, there have been some actions and projects implemented in Somalia as part of the NAPA implementation. These include:

- Somalia Water and Land Information Management (ongoing since 2001)** – which is funded by European Union, World Bank, the UK Department for International Development, and the US Agency for International Development and administered by the FAO. The project focuses on monitoring and preservation of water and land resources to support livelihoods throughout Somalia.
- Enhancing Climate Resilience of Vulnerable Communities and Ecosystems in Somalia (2014-2019)** - This project is funded by the Global Environment Facility (GEF) and administered by the UN Development Programme (UNDP), focuses on enhancing institutional frameworks for climate change adaptation, increasing the adaptive capacity of vulnerable farmers, and piloting ecosystem-based adaptation strategies.
- Reducing Vulnerability and Building Community Resilience to Climate Change Effects in Somaliland (2015-2017)** - funded by the German Federal Ministry of Economic Cooperation and Development and Kindernothilfe. The project focuses on training farmers and pastoralists in soil and water conservation practices.

There are other climate adaptation capacity building initiatives being implemented by a national NGO, Candlelight and funded by the GEF aimed at increasing the communities' knowledge on climate change and local climate hazard management. Other organizations supporting the NAPA implementation are multilateral, bilateral and regional organizations, including FAO, African Development Solutions (ADESO), and the Horn of Africa Organization for the Protection of Environment

One Health System in Somalia

In 2018, the Global Implementation Solutions (GIS), a Chicago-based non-profit organization, has facilitated and supported the Somali government to establish the Somalia One Health Technical Working Group (SOHTWG). The group through the support of GIS has participated in regional workshops on the Somalia Zoonotic Disease Prioritization Workshop and the Disease Control Guidelines and Contingency Plan Drafting Workshop, in Somalia and Kenya respectively. The workshop in Kenya was jointly held with the Kenya Zoonotic Disease Unit. The SOHTWG main goals or activities have been focused on integrating public health guidelines into the robust livestock plans as well as planning the joint implementation of

zoonotic disease outbreak investigation and surveillance as a unit. So far, they are in the process of developing the Brucellosis and Rift Valley Fever Contingency Plans.

The Somalia National Development Plan (SNDP) prepared for the years 2017-2019 indirectly talks of implementing One Health like activities. The SNDP points out key priority areas the government will focus on for development which includes increasing availability and accessibility of quality of basic health, improving health outcomes and stimulating the economy by improving livestock production. The strategies for development of the livestock sector in the SNDP include:

- a. Institutional Capacity Development of the Ministry headquarters, central laboratories, research and specialized institutions to enhance sector operations, activities and services and ensure their proper monitoring, evaluating and coordinating.
- b. Improving animal health service delivery and operations to strengthen the prevention and control of major livestock diseases. This will be done through continuous disease surveillance, vaccinations campaigns, treatment programs, effective early warning systems, emergency preparedness and emergency response to the outbreaks
- c. Promote the improved hygienic processing and value addition of milk and meat products thus improving the food security programs in the country.
- d. Improve Food Security and Safety by ensuring international food safety standards and OIE protocols for livestock products targeting both domestic and foreign markets are upheld thus contributing to the control of zoonotic and infectious diseases of animal origin.
- e. Improve Rangelands Management Systems for environmental conservation.

To improve the health sector, the SNDP talks of the “Health in all Policies” in which the sector will collaborate with other key sectors such as Livestock, Education, Agriculture, Gender, Water, Housing, Trade, Migration to address the key determinants of health and develop sustainable and collective action in addressing the challenges in the sector. The SNDP also points out that to improve the resilience of the most vulnerable communities to major risks and hazards such as extreme drought or disease outbreaks, there is a need for the development of multi-sectoral programmes led and coordinated by the Ministry of Planning and International Cooperation (MOPIC) at federal and regional state levels. Other coordination mechanisms such as the Somalia NGO Consortium will also be engaged by the different government ministries to build on the involvement of government with key nongovernment partners.

The Strategic Review of the Somali Health Sector conducted by the WHO in 2015 proposed various strategic priorities and actions for the reform of the sector which included:

- a. Improving the synergies and coordination between development partners and government structures in the disease surveillance and reporting; implementation of WASH, environment, food security, education and protection programs
- b. Establish multisectoral collaborations to strengthen health sector preparedness and capacities in responding to disease outbreaks

One Health Initiatives in Somalia

There are several NGOs implementing country-focused programs and projects using the One Health approach, though they may not be directly classified as such. Regional OH initiatives found in the other countries in the Horn of Africa are not operational in Somalia due to the general insecurity and the difficulty this poses in operating in the country.

The One Health Network for the Horn of Africa (HORN) project is in Somalia and is implemented through the IGAD Sheikh Technical Veterinary School in Somaliland and aims at improving the research capacities of individuals and institutions particularly on human and animal health issues and create a One Health Regional Network for knowledge and information sharing.

FAO through the GHSA is working at developing the national capacity to prevent zoonotic and non-zoonotic diseases by improving the early detection and control of diseases when they do emerge using a multi-sectoral OH approach and Emerging Pandemic Threats (EPT).

Gaps in One Health Implementation in Somalia

1. Very limited legislation, regulations, administrative requirements, and other governmental instruments supporting OH in the relevant sectors.
2. Limited coordination mechanisms for multisectoral communication and response in the three administrative zones of Somalia (Puntland, Somaliland and South Central), which mainly function to respond to public health events including emergencies at an ad hoc basis.
3. Formal policies governing zoonotic diseases are not yet functional though the country has initiated a joint venture between the human and animal health authorities.
4. Limited quality, coverage and utility to detect and respond to infectious disease outbreaks of the established indicator-based disease surveillance systems.
5. The non-existence of protocols for information sharing and notification of public health events of potential international concern internally and with international organizations such as OIE and WHO.
6. Poor institutional development and staff capacity in the livestock and human health sectors on disease surveillance, early response and reporting. There is a strategy of human resources improvement for health but this has not been implemented.

KENYA

Introduction

Kenya borders Ethiopia to the North, South Sudan to the Northwest and Uganda to the West, Tanzania to the South and Somalia and the Indian Ocean to the East and covers an area of 587,000 km². Over 80% of the country's landmass is under arid or semiarid land (ASAL). The country's population was estimated at 44,037,656 in 2013 based on the 2009 housing and population census; approximately 36% of this population live in ASAL areas, of which 4 million of these are nomadic pastoralists (GoK, 2010)

In 2012, Kenya adopted a new structure of governance leading to the devolution of all government services including health and veterinary services. The 2 ministries of Health and Public Health and Sanitation were merged into one Ministry of Health (MOH). The veterinary services and agriculture were merged under the Ministry of Agriculture, Livestock and Fisheries (MALF). The country has 2 distinct and inter-dependent levels of governance being the national level and the counties. The national offices' main responsibility is in policy formulation, regulations and standards, capacity development, management of disasters, coordination of development programs, regulation and quality control, disease control; provision of extension services, research and development, information management, monitoring and evaluation. The counties carry out functions such as running health facilities and pharmacies; ambulance services; promotion of primary health care; licensing and public health control, veterinary services, animal welfare and control, disease control.

Counties have also established various legislation on rangeland management particularly counties found in the arid and semi-arid lands (ASALs) of Kenya. In 2016, The Kenya Market Trust (KMT) and the Frontier Counties Development (FCDC) facilitated a workshop of County officials from the 7 ASAL Counties (Marsabit, Wajir, Isiolo, Samburu, Mandera, Garissa and Tana River) where the "The Shaba Declaration" was signed. One of the main outcomes was the need to fast track harmonization and completion of all their County Rangeland Management Bills which would result in uniformity in practice and adoption of similar rangeland management models and cross-county implementation. These bills also seek to increase the ability of communities to control grazing and other activities in their registered area. There are other county-specific legislation aimed at rangelands management such as The Grazing Control Act 2017 of Tana River County which is the only county so far that has enacted such an Act. It is an Act of the County Assembly aimed at providing for the establishment of a legislative and institutional framework for the management and orderly use of grazing resources; to minimize conflict and maximize peaceful coexistence between the various land users, through planning, identification and documentation of the areas according to the different types of land uses in the county; to control the influx, movement and conflict brought by graziers from other counties and for connected purposes. International Livestock Research Institute (ILRI) through the Accelerated Value Chain Development project (AVCD), supported the Policy dialogue on County Spatial Planning to support rangeland-based development in 8 counties in northern Kenya (Garissa, Lamu, Isiolo, Mandera, Marsabit, Tana River, Turkana and Wajir). The aim of the dialogue was to ensure the key issues of rangeland management and livestock mobility and production are considered during the County Spatial Planning process. So far this process has been completed by Lamu County.

Zoonotic Diseases in Kenya

A study conducted in 2016 to prioritize the zoonotic diseases in the country identified Viral hemorrhagic fevers (Crimean Congo hemorrhagic fever, Dengue, Rift Valley fever, yellow fever, Ebola, Marburg), Avian influenza and other pandemic influenza viruses, anthrax, trypanosomiasis, rabies, brucellosis and bovine tuberculosis as priority zoonotic diseases in Kenya. The criteria for the ranking included the transmission

potential and incidence, Outbreak potential, Socio-economic implication, Severity of disease or case fatality rate and Public health emergency of international concern.

Other important zoonotic diseases with high public health impacts include Leishmaniasis, Leptospirosis, hydatidosis, *Toxoplasma gondii*, campylobacter species and *Coxiella burnetti*. New and emerging zoonotic threats to Kenya include Ebola hemorrhagic fever and MERS CoV. There is also the emerging global concern of antimicrobial resistance that is driven in part by the transmission of drug-resistant pathogens from livestock to humans through the use of antimicrobials to maintain animal health and increase livestock productivity. This has been taken seriously in the country leading to the release of a government multisectoral strategy on combating AMR.

One notable zoonotic disease outbreak is that of RVF which naturally occurs in Kenya following heavy sustained rainfall leading to severe disease in animals and subsequent mild to fatal disease in humans. The most severe outbreak occurred in 2006-2007 which resulted in 700 suspected cases and 158 (22.6%) deaths (Nguku et al., 2010). Since then, outbreaks of lesser intensity have been reported in several parts of the country in 2018 and 2019 by the Department of Veterinary Services (OIE, WAHIS, 2019)

Status and Threats to Natural Ecosystem in Kenya

Kenya has a diverse ecosystem in its landscape and habitats which consists of forests, woodlands, shrublands, grasslands, deserts, wetlands, lakes and rivers, montane, afro-alpine and marine. The country has an estimated 467 inland lake and wetland habitats covering about 2.5% of the total area and over 35,000 species of flora and fauna (Okello and Kiringe, 2004). This rich diversity of plants, animals, aquatic and microbial organisms provides a wide range of ecosystem services which are important for increasing resilience in food security and nutrition, livelihoods, environmental health and sustainability of livestock production systems. There are various threats to the country's biodiversity which include (Okello and Kiringe, 2004; MEWNR, 2015)

- Habitat change through conversion to cropland, urban areas and other human-dominated landscapes due to increased human encroachment into protected areas. This also contributes to the loss, conversion and degradation of wildlife migration and dispersal corridors important for the protected area
- Overexploitation or unsustainable harvesting of economically valuable species as well as poaching for trophies and bushmeat for both illegal local and international markets
- Pollution of the water, land and air from external sources of a protected area that harm biodiversity directly or indirectly
- Invasion of the fauna by alien species, pests and disease pathogens.
- Poor land-use practices such as overgrazing, conversion to rainfed and irrigated agriculture, land subdivision and fencing.
- Direct and indirect danger to biodiversity arising from the nature and intensity of human-wildlife conflicts thus contributing to increased wildlife hunting
- Unsustainable use, demand and exploitation of natural resources (e.g. water, plant resources and minerals) by local communities surrounding the protected area
- Negative climate change impacts resulting in general environmental change such as shifts in climate and increasing intensity of human ecological footprints.

The Government of Kenya recognizes the importance of protecting the country's biodiversity and natural resources. This has been well covered in the government's current policies, legislation and institutional

structure which largely reflect the evolution of conservation awareness and responses since the creation of the modern state. Some of the relevant policies, laws and statutes are as stated below:

- The Constitution of Kenya 2010 which states that the forest coverage in the country should be at least 10 percent, there should be actions towards the protection and enhancement of biodiversity as well as indigenous knowledge.
- Kenya Vision 2030 which recognizes that the growth of Kenya's economy rests heavily on the productivity of its natural resources and charted the path towards sustainability
- The National Climate Change Response Strategy advocates for the participation of schools, women groups, youth groups and development authorities countrywide in water harvesting and tree planting as is clearly stipulated in the Forest Restoration and Conservation Programme
- The Wildlife Conservation and Management Act, 2013 has provisions for countering a wide range of biodiversity-related impacts.
- Environmental Management and Coordination Act (EMCA) established in 2000, alongside the overseeing regulatory, the National Environmental Management Authority (NEMA) whose main role is to supervise and coordinate all matters relating to the environment, and to serve as the principal instrument of Government in the implementation of environmental policy.
- National Environmental Action Plan (NEAP) was established for the institutionalization of cooperative governance and integrating environmental management through cross-sectoral policies, laws and the developmental process.
- Wetlands Conservation and Management Policy 2008,
- National Land Policy 2009
- Climate Change Act 2016 which provides for a regulatory framework for the enhanced response to climate change, mechanisms and measures to achieve low carbon climate development and connected purposes
- Revised Kenya National Biodiversity Strategy and Action Plan (2010) outlines actions for enhanced conservation and sustainable utilization of biodiversity and improved management of forest resources

Kenya is a signatory to many international conventions for environmental protection such as the Convention on International Trade in Endangered Species, The Law of The Sea, The Nagoya Protocol, The Ramsar Convention on Wetlands, the Convention on Migratory Species and the Kyoto Protocol.

Establishment of One Health System in Kenya

The establishment and creation of OH structures and systems in Kenya began in 2004 with the launch of the 2-year Field Epidemiology and Laboratory Training Program (FELTP) by the Ministry of Health supported by the United States Center for Disease Control and Prevention (CDC) and other partners. The FELTP programme initially admitted medical doctors and laboratory scientists working within government ministries but later on, as from 2006 veterinarians were also included as the recognition of the value of OH increased particularly in the government structures. The FELTP programme in Kenya has trained 169 medical and 19 veterinary epidemiologists by 2017 (Munyua et al., 2019). All the trained government officers return to their various positions at the national or county level to strengthen the collaboration between the human and animal health sectors such as by participating in joint disease surveillance and outbreak activities.

In 2006, Kenya established the multi-sectoral National Influenza Taskforce (NIT) in response to the avian influenza H5N1 threat/risk. This task force consisted of international organizations such as World Health

Organization (WHO), United States Centers for Disease Control and Prevention (CDC), International Livestock Research Institute (ILRI), United States Agency for International Development (USAID), Africa Union–Inter Africa Bureau for Animal Resources (AU-IBAR), Food and Agricultural Organization (FAO); as well as national institutions namely Kenya Wildlife Service (KWS), Kenya Medical Research Institute (KEMRI) Kenya military police, National Disaster Management Authority (NDMA) and local universities. Kenya was however not affected by an H5N1 outbreak then, but when a severe Rift Valley fever (RVF) was reported in the country in 2006-2007, the NIT was used to mount a coordinated response to the outbreak which resulted in a more effective management of the disease leading to lower morbidity and mortality in both humans and animals compared to a similar RVF outbreak in 1997-1998.

Establishment of the Zoonotic Disease Unit

The creation of the NIT in response to the emerging zoonotic threat emphasized the importance of having permanent government structures established with the main role of enhancing animal and human disease surveillance systems and improving outbreak investigations through a well-trained workforce in the One Health approach. Thus, the NIT was renamed the Zoonoses Technical Working Group (ZTWG) in 2010 and later to Zoonotic Disease Unit (ZDU) after the Ministry of Public Health and Sanitation (MOPHS) and Ministry of Livestock Development (MOLD) signed a memorandum of understanding in 2011 officially creating the ZDU. The ZDU staff includes two epidemiologists, one deployed from the MOH and the other from the Veterinary Epidemiology and Economics Unit (VEEU), MALF and office staff such as an administrative assistant and data manager. ZDU provides leadership on OH matters in the country under the guidance and leadership of the ZTWG which includes subject matter experts such as environmentalists, microbiologists, entomologists, social economists, and geospatial analysts who are engaged on ad hoc basis whenever required in responding to outbreaks, formulating prevention and control policies or designing studies on zoonotic disease. The ZDU planned to establish County One Health Units (COHUs) using the existing structures of the partnering ministries at the counties. These units will have the main role of coordinating OH efforts in the counties, coordinate regular stakeholder meetings for information sharing, link with ZDU to develop country-level policy and strategies for prevention and control strategies and liaise with ZDU to facilitate investigation and response during disease outbreaks.

Since then, the unit has received support from organizations such as CDC to strengthen and enhance their capacity in creating robust and productive public health scientific programs and research activities aimed at the discovery of new and emerging zoonotic pathogens. The OIE has also supported the ZDU and particularly the Department of Veterinary Services, in improving the performance of veterinary services by the introduction of a PVS evaluation tool with the special aim of improving the collaboration between the public health sectors and other relevant stakeholders at the animal-human-ecosystem interface. Since its establishment, the ZDU has developed the National Strategy for the Elimination of Dog-Mediated Human Rabies (2014-2030) and the National Strategic Plan for the Implementation of One Health in Kenya (2012 – 2017). The ZDU is currently in the process of finalizing the One Health strategic plan for 2019 to 2023 which will be launched later in 2019.

Other than the presence of the functional ZDU, other contributors of success towards the establishment of OH systems in Kenya include:

- The development of an OH workforce in the country particularly in the government structures. This is being done through the Field Epidemiology and Laboratory Training Program (FELTP) which is a division within the Department of Preventive and Promotive Health (DPPH) in the Ministry of Health (MOH) and runs in collaboration with the U.S. Centers for Disease Control and Prevention (CDC). It provides Masters level training in Applied Epidemiology and Public Health jointly to veterinarians and medical doctors working within government ministries in middle-level positions in their respective

ministries. The program began in 2004 and as of 2019, 300 medical doctors and 33 veterinarians have gone through the program attaining the Master's qualification, with many of the graduates actively serving in the public sector (KFELTP, 2019).

- The ZDU has actively developed and maintained close associations and collaboration with multilateral and bilateral agencies, partners, local and international research institutions and universities working on zoonosis in Kenya. The unit has also strongly advocated for and coordinated funding for key One Health projects with close monitoring and reporting through the quarterly Zoonotic Technical Working Group meetings. These have enhanced the coordination of OH activities in the country and information sharing.

Other multisectoral collaborations include the joint launch of the National Action Plan on Prevention and Containment of Antimicrobial Resistance (2017 -2022) and Communication Strategy on Prevention and Containment of Antimicrobial Resistance (2018-2022) in 2018 by the Ministries of Health and that of Livestock Development have the in response to the growing global AMR crisis.

A UK-Aid programme called The Fleming Fund was established to help low- and middle-income countries to fight antimicrobial resistance (AMR). Kenya is a beneficiary whereby The Fleming Fund has supported the country in various ways such as supporting the implementation of OIE PVS Pathway missions and training focusing on Veterinary Products and Communication from 2016 to 2019. In 2019, through its grant to FAO, the fund is supporting Kenya review its legislation relevant to AMR and a baseline review of antimicrobial use in agriculture, including data on the veterinary medicines supply chain. The fund is also supporting the communication of activities to raise awareness and understanding of AMR in the livestock and veterinary sectors.

Adherence to International Standards

In terms of maintaining international standards in the human and animal health service delivery in the country, Kenya has made meaningful strides in the implementation of IHR such as the appointment of a National IHR Focal Person in 2008, establishing a legal framework through the Public Health Act and orientation of stakeholders. IHR core capacity assessment conducted on the country in 2009 revealed that as much as the required legislation tools are in place, there is poor law enforcement. The IHR focal person was also not supported financially to carry out relevant activities. There was also very minimal intersectoral collaboration at the sub-national levels and guidelines for zoonotic, nuclear and chemical events were lacking.

OIE Performance of Veterinary Services (PVS) “One Health” Evaluation in November 2011 revealed more or less the same findings, such as the lack of multi-sectoral/multi-disciplinary rapid response to disease outbreaks and inadequate communication or collaboration between the key ministries despite the existence of a national policy, legislation and operational plan on surveillance and response to zoonotic events; core capacities; manuals/guidelines/SOPs for surveillance, investigation and control of zoonotic events and the zoonotic surveillance unit (though it is only at the National level).

National Strategic Plan for the Implementation of One Health in Kenya (2012 – 2017)

The OH strategy for Kenya was developed in conformity to various documents and instruments of governance in the country especially those related to the human and animal health sector. These include:

- a. The constitution of Kenya, 2010 which states that all citizens have a right to the highest attainable standard of health and provides for public participation.
- b. Kenya Vision 2030, which aims to achieve a healthy population by 2030 to steer economic development. It also provides for the creation of disease-free zones that will ensure a reduction

in the prevalence of identified zoonotic diseases in the country livestock population to meet international standards

- c. Kenya Health Policy (2013 – 2030) which prioritizes the elimination of communicable diseases including zoonoses.
- d. Kenya Health Sector Strategic and Investment Plan (2013 – 2017) which emphasizes the need for multi-sectoral collaboration in the implementation of health programs along with the tenets of OH.

The Strategic Plan focuses on the following objectives and strategies:

- 1. To establish structures and partnerships to promote OH approach in the country
 - a. Strategy 1: Institutionalization of OH
 - b. Strategy 2: Devolution of OH
 - c. Strategy 3: Advocacy for resources for OH program
 - d. Strategy 4: Enhance accountability in the implementation of OH
- 2. To strengthen surveillance, prevention, and control of zoonoses in both humans and animals
 - a. Strategy 1: Enhance preparedness, prevention and control of zoonotic outbreaks
 - b. Strategy 2: Strengthening Zoonoses surveillance
 - c. Strategy 3: Enhance the prevention and control of endemic zoonoses
- 3. To conduct applied research at the human-animal-ecosystem interface in order to better understand the mechanisms of zoonotic pathogen maintenance and transmission to humans
 - a. Strategy 1: Facilitate information exchange with the scientific community and stakeholders focused on OH
 - b. Strategy 2: Develop Zoonoses research agenda for Kenya

The plan aimed at achieving the following results by the end of its implementation:

- a. Greater compliance with WHO/IHR and OIE guidelines on Public Health Emergencies of International Concern (PHEICs)
- b. Developed risk maps and identified hotspots for zoonotic diseases
- c. Developed and implemented disease prevention and control strategies for zoonoses
- d. Established plan and capacity for early epidemic detection, diagnosis and rapid response
- e. Improved understanding of infection and transmission dynamics, ecology and other drivers of zoonoses and emerging infectious diseases
- f. A better understanding of socio-economic impacts of zoonotic diseases and their interventions to households and the government

A report on the implementation of the plan was not available at the time of this review.

The funding strategy for the OH plan calls for support from external sources such as institutional and/or international donors. NGOs working in the relevant sector can also incorporate the activities highlighted in the plan to their programmes and thus contribute towards the achievement of the overall goal for a systematic institutionalization of OH in the country.

Other National Policies and Strategies

There are various pertinent national policies and strategies which incorporate the key strategies in the OH approach and are relevant in supporting the institutionalizing the same in Kenya. These are summarized in table 2 below.

Table 2: Kenyan National Policies and Strategies relevant to OH

Policy Document	Relevance to One Health
Kenya Vision 2030	Kenya Vision 2030 is the country's blueprint for long-term development with 3 pillars: economic, social and political. Under the social pillar, the vision's goal for health is to "Provide an efficient and high-quality health care system with the best standards". This will be through reducing health inequities, improvements in infrastructure, service delivery, access to services and promotion of partnerships. The economic pillar addresses the livestock and wildlife sectors' goals of improving disease control efforts and securing wildlife migratory routes thus contributing to reducing wildlife-human interaction thereby reducing zoonoses transmission.
Kenya Health Policy (KHP) from 2013 to 2030	The KHP was formulated to attain the aspirations of vision 2030 with the main goal of attaining the highest possible health standards in a manner responsive to the population needs. Among the 6 policy objectives are the elimination of communicable conditions, control of noncommunicable conditions, control of risk factors and strengthening collaborations
Kenya Health Sector Strategic and Investment Plan (KHSSP) 2013-2017	The KHSSP is a 5-year strategic plan that has adopted the six policy objectives defined in KHP. The plan has identified communicable conditions targeted for elimination such as zoonotic neglected tropical diseases (NTDs). The plan prioritizes mechanisms for collaboration with all health-related sectors thus being aligned with the OH strategy.
National Livestock Policy (2019) <i>draft</i>	This is in line with the constitution (2010) and Kenya Vision 2030. The policy proposes to enhance consultation and cooperation in the delivery of animal health services. It highlights the government's position in creating partnerships with stakeholders to establish a collaborative platform with protocols and mechanisms for joint planning and response to zoonotic disease events. It provides for a suitable environment for early warning, preparedness and rapid response to zoonotic diseases.
The National Wildlife Conservation and Management Policy, 2012	This policy recognizes the importance of multi-sectoral collaboration in resource mobilization and implementation of wildlife conservation efforts. It stipulates the need for measures for wildlife disease surveillance and control as one of its strategies for wildlife conservation and management
Environmental Management and Co-ordination Act (Rev. 2012)	Provides the national coordinating structure for environmental policies, including environmental impact assessments. Rarely applied in pastoral contexts, but could be used to regulate new water points, for example, to prevent them from exacerbating rangeland degradation.

One Health Initiatives in Kenya

There have been several research activities particularly on zoonotic diseases carried out in the country from 2005 to date; some results of which were used in 2015 during the One Health Zoonotic Disease Prioritization workshop in Kenya, to identify zoonotic diseases that would benefit from integrated prevention and control programs using the One Health approach. These studies were conducted by the Kenya government Department of Veterinary Services (DVS) in collaboration with the Kenya Medical

Research Institute (KEMRI), Division of Global Health Protection (DGHP) of the CDC, Wellcome Trust, in collaboration with the ZDU focusing on diseases such as Q-fever, Brucellosis, Rift Valley fever, Rickettsia, Leptospirosis and Middle East respiratory syndrome coronavirus (Munyua et al., 2019).

CDC and KEMRI in collaboration with Washington State University have been conducting livestock syndromic surveillance in Western Kenya as of 2015 to measure the impact of livestock diseases on human health and socio-economic status at the household level. Results have shown that there is a strong association between cumulative human and animal illnesses.

The Institute of Infection and Global Health, University of Liverpool, and the International Livestock Research Institute (ILRI) have established the Zoonotic and Emerging Diseases research group (ZED group) based in ILRI Kenya. This group works in collaboration with the Kenyan government and various Universities in the country. The main goal of the ZED group is to provide evidence that an enhanced surveillance system can contribute to improving public health in a cost-effective manner by increasing awareness of zoonoses; improving diagnostic support; enhancing the recording, storage, analysis, interpretation and sharing of data; and bringing about closer integration between the human and animal health sectors. The group through their projects are also providing a platform for Kenyan public and animal health workers to get hands-on training and to become familiar with a multidisciplinary One Health approach to surveillance, creating a cadre of individuals with first-hand experience of this way of working. The projects include:

- **Zoonoses in Livestock in Kenya (ZooLink):** The goal of the ZooLink project was to enable Kenya to develop an effective national surveillance programme for zoonoses (infectious diseases acquired through contact with animals or their products). This was done by increasing awareness of zoonoses, supporting diagnostic capacities of the government laboratories, improving data analysis, interpretation, sharing and communication in the relevant government ministries, and supporting closer integration between the human and animal health sectors.
- **Pathogens and Disease ecology in bats:** This project aimed at examining the peri-domestic wildlife, bats and rodents, from around households for known and emerging zoonotic pathogens. It will provide information on human and animal exposure to zoonotic disease particularly on diseases transmitted by peridomestic wildlife thus allowing for a complete One Health approach in understanding the epidemiology of the zoonotic disease in households in western Kenya.
- **Urban Zoo project:** “Epidemiology, ecology and socio-economics of disease emergence in Nairobi.” This project is focused on the important question of pathogen emergence, and the role of urbanization in the emergence of zoonotic pathogens. The overall objective of the project is to understand the mechanisms leading to the introduction of pathogens into urban populations through livestock commodity value chains, and their subsequent spread.
- **People, Animals and their Zoonoses (PAZ) Project:** This project deals with zoonotic infections amongst livestock and the farmers who keep them in Western Kenya. The overall aim of the project is to understand the interactions between people and their domestic animals and the transmission of zoonoses between them. This is vital information that will guide the creation of evidence-based disease control policies that are required to protect both human and animal health.
- **The HORN project** seeks to improve the health and wealth of the people of the Horn of Africa (Kenya, Ethiopia, Eritrea and Somalia) by increasing the local capacity to undertake high-quality research in the interactions between people, animals and the environment – One Health. It is a multidisciplinary, international partnership of the following organizations: the University of Liverpool, and Liverpool School of Tropical Medicine, United Kingdom; University of Nairobi, and International Livestock

Research Institute, Kenya; University of Addis Ababa, and the International Livestock Research Institute, Ethiopia; IGAD Sheikh Technical Veterinary School, Somaliland; Hamelmalo Agricultural College, Eritrea; and other national and international organizations and NGO's. It aims at improving the research capacities of individuals and institutions particularly on human and animal health issues and creates a One Health Regional Network for knowledge and information sharing.

- **The partnership for a cross-disciplinary approach to the ecology of antimicrobial drug resistance in Kenya** project seeks to conduct in-depth research on antibacterial resistance in clinical and community settings to understand patterns of resistance, the transmission of bacteria and their resistance determinants and genome-based studies of resistance evolution.
- **The CGIAR AMR hub is an interdisciplinary research and development partnership**, led by ILRI, that aims to mitigate agriculture-associated AMR risks, with all its activities based on a One Health framework.

Some key regional initiatives in OH include the following:

- **The Ohio Global One Health Initiative** by the Ohio State University Health Sciences focuses on improving the capacity of pre-service health professionals in Kenya working with the University of Nairobi and KEMRI.
- **One Health Central and East African (OHCEA) University Network** is a network of 21 public health and veterinary universities from 8 countries in the east, central and west Africa regions. In Kenya, 2 universities, Moi University and the University of Nairobi are members of this network that aims at cultivating the culture of multi-sectoral collaboration through field attachment, experimental learning, training and research.

National Gaps in One Health

Although there has been progress on the implementation of OH in Kenya, a number of gaps and challenges exist. These include:

1. A lacking COHU structure at the county level to champion OH similar to the national level (ZDU) and act as OH focal points despite the plans to have them in the strategic plan. This challenge has been occasioned with the change of Kenya's governance structure from a central to a devolved system in 2012, thus necessitating a different approach in the implementation of One Health.
2. There are parallel animal and human health databases maintained at the government ministry offices which are not linkable thus this restricts data access.
3. Existing data on zoonotic diseases is limited or of low quality as these are not well captured by the surveillance systems in place.
4. Limited government budgetary allocation and funding for OH activities mainly due to other competing interests, e.g. containing the constant outbreaks of epidemic-prone diseases such as cholera, other infectious diseases and non-communicable diseases within the health sector; and the promotion of international trade in animals and animal products. This has contributed to the reliance on donors which then jeopardizes the sustainability of the established system.
5. Minimal involvement of the environmental sector and other players as the OH initiatives are concentrated on zoonoses and championed by the animal and human health sectors. This is partly due to a lack of clearly designated environment ministry representatives to the ZDU and other OH forums.

6. Inclusion of OH in the veterinary, medical and public health schools is still underway and slowly improving but there is a need to improve the capacity of the teaching staff and the quality of the curriculum.
7. The participatory surveillance in the animal health sector is weak thus the surveillance for zoonoses largely relies on the human health sector.
8. The participation of the private animal and human health practitioners is minimal with poor to no reporting from them on disease trends and occurrence.
9. Poor familiarity and information levels on OH concepts by the policymakers in national and county governments result in low prioritization and low funding of the initiatives.
10. In cases of zoonotic disease outbreaks, there is still a disjointed response by the Ministries of Health and of Livestock with the slow investigation and reactive efforts.
11. Cross-border initiatives have not been used and promoted to sensitize and champion OH.
12. Inadequate resource allocation in the Department of Veterinary Services for critical activities such as surveillance and reporting of animal diseases and laboratory diagnosis. There is a lot of reliance on external support for the funding gap.
13. There are few donor organizations and agencies supporting the government on the setting up and establishing disease surveillance systems.

SUMMARY OF THE GAPS AND NEEDS ON ONE HEALTH IN THE HOA

Studies conducted by the World Bank (2018) and by Queenan et al. (2017) have identified key components in the development and establishment of a One-Health Framework at a country level and these include

8. Governance and management - Political goodwill to support OH approaches shown through existing government policies and strategies coupled with sufficient government funding
9. Networks and partnerships – Forums for information sharing and knowledge exchange
10. One health capacity development – Capacity development of professionals in the humans, animals and environment sectors and enhancement of the curriculum in the tertiary education level with a common OH curriculum across all key disciplines
11. Surveillance, preparedness and response – established surveillance, early warning, preparedness and response systems from the national to the lowest administrative level, incorporating public awareness actions on health protection measures and risk mitigation in the face of crises
12. Communication and advocacy – Existing communication and exchange platforms for the OH stakeholders from national to grassroots level informed by OH research
13. Operational research – transdisciplinary research activities providing evidence to Foster multidisciplinary approaches in responding to emerging global and national health challenges and influence policy.
14. Monitoring and evaluation – Existing monitoring systems and structures based on the relevant government ministries

Using these components to assess the gaps and needs of the 3 countries in this study, Table 3 below shows the summary results.

Table 3: Summary of the Gaps in OH operationalization in Ethiopia, Kenya and Somalia

Components	Ethiopia	Kenya	Somalia
Governance and management	The main gap is the non-existence of a government policy to anchor OH specific strategies. This contributes to poor funding of OH related activities initiated by government offices and the establishment and procurement of infrastructure and equipment needed for surveillance. There is an over-reliance on donor support which is not sustainable for development. The gap in policy also contributes to the poor inter-sectoral engagement as there are no official guidelines on the same.	The lacking government policy on OH or to support OH activities leads to poor funding for the establishment and operationalization of the same from the national offices to the county level. There is a general over-reliance to donor support to implement the OH national strategies. The devolution of the government functions has also contributed to a slow establishment of the COHU.	There are limited legislation and administrative governmental structures supporting OH activities in the relevant sectors, as occurring for the policies and strategies of single sectors. There are also very few formal policies governing zoonotic diseases that are functional though the country. The general insecurity and unclear governance structures in the country are a major obstacle in the operationalization of OH through multi-sectoral coordination.
Networks and partnerships	There is still a challenge in multi-sectoral working mechanism particularly in the response to disease outbreaks due to poor information sharing and communication. This is due to the lack of formal joint mechanisms or plan of action. The different government-led health platforms and structures need to be well-coordinated to avoid duplication of roles. There is some involvement of the government agencies and sectors working on environmental issues.	Besides the human and animal health departments, there is generally poor participation from other key players in the OH approach, namely the environmental sector and the private animal and human health practitioners. Poor collaboration or working relationship with the environment sector ministry. They are also not involved in the ZDU. The OH policies and strategies have little if any mention of environmental health. In fact, most of the policies and strategies seem to equate OH with control of zoonoses only	Limited coordination mechanisms for multisectoral communication and response in the three administrative zones of Somalia (Puntland, Somaliland and South Central), which mainly function to respond to public health events including emergencies at an ad hoc basis. No engagement with the environment-related sector in any form.
One health capacity development	The government workforce has limited competencies and poor subject matter expertise leading to reliance on support/technical assistance from international organizations and external	The inclusion of OH in the veterinary, medical and public health schools is still underway and slowly improving, but there is a need to improve the capacity of	Poor institutional development and staff capacity in the livestock and human health sectors on disease surveillance, early response and reporting. There is a strategy of human resources

	experts. There is a need to strengthen the capacity of government staff on OH related skills.	the teaching staff and the quality of the curriculum.	improvement for health but this has not been implemented. Other key sectors government personnel should also be supported in capacity development.
Surveillance, preparedness and response	Lacking formal communication and information exchange system between the various national initiatives particularly on disease surveillance and reporting channels.	Weak participatory surveillance particularly with poor involvement of the private sector. There is still a challenge in implementing joint disease outbreak response by the Ministries of Health and of Livestock, resulting in slow investigation and reactive efforts.	Limited quality, coverage and utility to detect and respond to infectious disease outbreaks. This is coupled with lacking protocols for information sharing and notification of public health events of potential international concern internally and with international organizations such as OIE and WHO.
Communication and advocacy	General lack of information sharing and communication platforms or channels between the key sectors namely animal and human health sectors. The environmental sectors are not well represented or involved in OH activities.	Poor communication and information sharing across sectors due to the existence of parallel animal and human health databases maintained at the government ministry offices which are not linkable thus this restricts data access	Poor communication and coordination across sectors primarily due to lacking strategies and guidelines for multi-sectoral collaboration.
Operational research	Limited laboratory-based diagnostic capacity especially at a regional level which contributes to poor detection of outbreaks' causative agents in a timely manner.	The various OH research initiatives and activities are not well applied in championing for OH institutionalization or advocating for the development of OH policy in the country.	Due to general insecurity in the country, the regional cross-border initiatives are hindered from being implemented in the country limiting their capacity to inform the policymakers in prioritizing OH related activities and support its institutionalization.
Monitoring and evaluation	Absence of a centralized verifiable data source on disease surveillance and response actions to allow follow up by the relevant government offices	Limited or low-quality data on zoonotic diseases which cannot sufficiently support the monitoring and evaluation of established OH systems or activities	Complete lack of data source on disease surveillance to support any monitoring of the zoonotic disease outbreaks or threats

REFERENCES

- Abate, Teshome & Angassa, Ayana. (2016). Conversion of savanna rangelands to bush dominated landscapes in Borana, Southern Ethiopia. *Ecological Processes*. 5. 10.1186/s13717-016-0049-1.
- Alemneh Dejene, (2003). Integrated Natural Resources Management to Enhance Food Security: The Case for Community-Based Approaches in Ethiopia. Food and Agriculture Organization of the United Nations, Environment and Natural Resources Service Research, Extension and Training Division Rome, 2003
- Armauer Hansen Research Institute, Strategic Plan for Armauer Hansen Research Institute (2016)
- Beier Anja-Christina and Stephansson Eva, (2012) Environmental and Climate Change Policy Brief Somalia, Sida's Helpdesk for Environment and Climate Change
- Destoumieux-Garzón D et al., (2018) The One Health Concept: 10 Years Old and a Long Road Ahead. *Front. Vet. Sci.* 5:14. doi: 10.3389/fvets.2018.00014
- Ethiopian Food, Medicine and Healthcare Administration and Control Authority, Strategy for the Prevention and Containment of Antimicrobial Resistance for Ethiopia (2015)
- Ethiopian Public Health Institute, Strategic Plan for the EPHI (2015)
- The Federal Democratic Republic of Ethiopia, Ethiopia's Fifth National Report to the Convention on Biological Diversity Ethiopian Biodiversity Institute May 2014
- The Federal Democratic Republic of Ethiopia, National One Health Strategic Plan (2018 -2022)
- The Federal Democratic Republic of Ethiopia, Central Statistics Authority, Country Population Projection (2017)
- The Federal Democratic Republic of Ethiopia, Ethiopia National Anthrax Prevention and Control Strategy and Implementation Plan (2017)
- The Federal Democratic Republic of Ethiopia, Ministry of Health, Health Sector Transformation Plan (HSTP) (2015/16)
- The Federal Democratic Republic of Ethiopia, Ministry of Livestock and Fisheries, Livestock Master Plan (LMP) (2015/16)
- The Federal Democratic Republic of Ethiopia, National Policy and Strategy on Disaster Risk Management (1993)
- The Federal Democratic Republic of Ethiopia, National Rabies Control and Elimination Strategy (2017)
- The Federal Democratic Republic of Ethiopia, Second Growth and Transformation (GTP II) (2015/16)
- The Federal Democratic Republic of Ethiopia, The Environmental Policy of Ethiopia (1997)

The Federal Republic of Somalia (2017). The Somalia National Development Plan (SNDP) – Towards Recovery, Democracy and Prosperity 2017 – 2019.

The Federal Republic of Somalia, Ministry of National Resources National Adaptation Programme of Action on Climate Change (NAPA) April 2013

Getahun AA (2018) The Status of Ecosystem Resources in Ethiopia: Potentials, Challenges and Threats: Review Paper. *J Biodivers Endanger Species* 6: 208. DOI: 10.4172/2332-2543.1000208

Government of Kenya, Ministry of Health, Kenya Field Epidemiology and Laboratory Training Program (K-FELTP) Reports 2019

Government of Kenya, The 2009 Kenya Population and Housing Census, August 2010

Grace D et al., (2012). Mapping of poverty and likely zoonoses hotspots. Zoonoses Project 4. Report to the UK Department for International Development. Nairobi, Kenya: ILRI

International health regulations (2005) 3rd Edition World Health Organization 2016

Jeffrey Mariner. 2018. Rift Valley Fever Surveillance. FAO Animal Production and Health Manual No. 21. Rome. Food and Agriculture Organization of the United Nations (FAO).

Joint External Evaluation of IHR Core Capacities of the Republic of Somalia. Geneva: World Health Organization; 2017. Licence: CC BY-NC-SA 3.0 IGO.

Maxwell D. et al., (2014). Lessons Learned from the Somalia Famine and the Greater Horn of Africa Crisis 2011–2012: Desk Review of Literature. Feinstein International Center, Tufts University: Medford, USA.

Ministerial Declaration of the 2019 United Nations Environment Assembly

Ministry of Environment Natural Resources and Regional Development Authorities (MEWNR), Kenya (2015). Kenya Biodiversity Atlas

Munyua et al. (2019) Successes and challenges of the One Health approach in Kenya over the last decade. *BMC Public Health* 2019, 19 (Suppl 3):465 <https://doi.org/10.1186/s12889-019-6772-7>

Munyua P, et al. (2016) Prioritization of Zoonotic Diseases in Kenya, 2015. *PLoS ONE* 11(8): e0161576. <https://doi.org/10.1371/journal.pone.0161576>

Mwatondo, A. et al., (2017). Catalysts for implementation of One Health in Kenya. *The Pan African medical journal*, 28(Suppl 1), 1. doi:10.11604/pamj.supp.2017.28.1.13275

National Adaptation Plans in focus: Lessons from Somalia, May 2019, UNDP-UN Environment National Adaptation Plan Global Support Programme (NAP-GSP)

Nguku PM. Et al., (2010) An investigation of a major outbreak of Rift Valley fever in Kenya: 2006-2007. *Am J Trop Med Hyg.* 2010;83(2 Suppl):5-13. Epub 2010/08/13.

Njue et al. (2018) Seroprevalence study to determine the effectiveness of Peste de Petits Ruminants vaccination in Somalia. *Pastoralism: Research, Policy and Practice* 8:17 <https://doi.org/10.1186/s13570-018-0122-8>

OIE Tool for the Evaluation of Performance of Veterinary Services Sixth Edition, 2013

OIE, World Animal Health Information Database (WAHIS Interface), 2019

Okello, M.M., and Kiringe, J.W. (2004). Threats to biodiversity and their implications in protected and adjacent dispersal areas of Kenya.

Operational Framework for Strengthening Human, Animal, and Environmental Public Health Systems at their Interface. World Bank Eco Health Alliance. International Bank for Reconstruction and Development/The World Bank, 2018

Pieracci, E.G. et al., (2016). Prioritizing zoonotic diseases in Ethiopia using a one health approach. *One health*, 2016 Dec;2:131-135. doi: 10.1016/j.onehlt.2016.09.001.

Queenan, K. et al. (2017) Roadmap to a One Health Agenda 2030. *CAB Reviews Perspectives in Agriculture Veterinary Science Nutrition and Natural Resources*. 2017 12, No. 014.

Sawe, Benjamin Elisha. "Ecological Regions Of Somalia." WorldAtlas, Aug. 2, 2019, worldatlas.com/articles/ecological-regions-of-somalia.html.

Strategic Review of the Somali health sector: Challenges and Prioritized actions. Report of the WHO mission to Somalia, September 2015

The Food and Agriculture Organization of the United Nations (FAO) and the Commission on Genetic Resources for Food and Agriculture, 2013, The State of Kenya's Biodiversity for Food and Agriculture

The FAO, the OIE and WHO (2010): Sharing responsibilities and coordinating global activities to address health risks at the animal-human–ecosystems interfaces. A Tripartite Concept Note

Umberto Labate and Keith Bettinger, (2018) The Bedrocks of Peace and Prosperity UNDP National Adaptation Plan Global Support Program (NAP-GSP)

United Nations, Department of Economic and Social Affairs, Population Division (2017). World Population Prospects: The 2017 Revision.

World Health Organization (WHO), Eastern Mediterranean Regional Office (EMRO), Weekly Epidemiological Monitor Volume 12; Issue no 01; 06 January 2019

WHO-OIE Operational Framework for Good governance at the human-animal interface: Bridging WHO and OIE tools for the assessment of national capacities. OIE-WHO 2014

World Health Organization, Global Health Security Agenda Joint External Evaluation for Ethiopia (2016)

World Health Organization. Regional Office for the Eastern Mediterranean Somalia health profile 2015

Zoonotic Disease Unit: National One Health Strategic Plan 2012 – 2017. Nairobi: Ministry of Health and Ministry of Agriculture, Livestock and Fisheries; 2012