

BHUTAN ONE HEALTH

HUMAN

ANIMAL

ENVIRONMENT

Bhutan One Health Strategic Plan 2018- 2023

2nd Edition, 2019

Bhutan One Health Strategic Plan 2018- 2023

2nd Edition, 2019

Executive summary

The infectious diseases particularly emerging and re-emerging diseases of zoonotic origin have been a major driver for the adoption of an One Health approach to zoonotic disease management. The concept of One Health approach was officially launched in September 2004, at the 'One World, One Health: Building Interdisciplinary Bridges to Health in a Globalized World' conference in New York. Consequently, efforts have been made to embed One Health within existing global institutions, initially as part of pandemic influenza preparedness since 2005. The three major international organizations: Food and Agriculture Organization of the United Nations (FAO), World Organization for Animal Health (OIE), and World Health Organization (WHO) have also provided strong leadership in endorsing the One Health concept.

In Bhutan, an emergence of highly pathogenic avian influenza (HPAI) caused by H5N1 virus in the region in 2003 provided an opportunity among the relevant stakeholders to work together to develop the National Influenza Pandemic Preparedness and Response Plan (NIPPP), which was based on One Health concept. Furthermore, the first outbreak of H5N1 in poultry in February 2010 has brought animal and human animal health authorities together along with other relevant stakeholders to combat the disease in poultry, and prevent its transmission to humans. Similarly, public health and animal health officials have work together on some zoonotic diseases and conducted joint investigation during outbreaks. However, there was no strategic framework to formalize and sustain the One Health approach to prevention and control of zoonotic diseases in the country. The need to institutionalize One Health concept in Bhutan was recommended in the National One Health Symposium held in Phuentsholing in November 2013 and South Asia Regional One Health Symposium held in Paro in December 2013. Therefore, this strategic framework and action plan was prepared involving key stakeholders from the Ministry of Health (Department of Public Health), Ministry of Agriculture and Forests (Department of Livestock and Bhutan Agriculture and Food Regulatory Authority) and allied institutes in the country in April 2014 with a vision that "The health and wellbeing of humans and animals including ecosystem are protected and improved through One Health approach".

The framework comprises of seven components: 1) Institutional setup and networking; 2) Disease surveillance systems; 3) Disease outbreak preparedness and responses; 4) Capacity building; 5) Collaborative research; 6) Communication and advocacy; 7) Engagement of wildlife and environment, each of which covers objectives and strategy with action plan for the implementation. In order to implement the One Health concept, a logical framework plan and timeline has also been developed. Thus, this one health strategic plan outlines collaborative mechanisms amongst relevant stakeholders to prevent and control high-impact infectious diseases of zoonotic origin in the country in line with One Health approach.

Acknowledgements

The following officials have contributed towards developing Bhutan One Health Strategic Plan:

1. Dr. Sithar Dorjee, Director, Khesar Gyalpo University of Medical Sciences of Bhutan, Thimphu.
2. Mr. Rinzin Kinga Jamtsho, Program Officer, Zoonotic and Avian Influenza Program, Department of Public Health, Ministry of Health, Thimphu.
3. Dr. Tenzin, Principal Livestock Health Officer, National Centre for Animal Health, Department of Livestock, Thimphu.
4. Dr. Sonam Wangchuk, Specialist/Head, Royal Centre for Disease Control, Department of Public Health, Ministry of Health, Thimphu.
5. Dr. Karma Rinzin, Chief Veterinary Officer, Department of Livestock, Thimphu.
6. Dr. Kinzang Dukpa, Program Director, National Centre for Animal Health, Department of Livestock, Thimphu.
7. Dr Kinley Penjor, Sr Food Regulatory and Quarantine Officer, Bhutan Agriculture & Food Regulatory Authority, Thimphu, Bhutan
8. Dr Chendu Dorji, Sr. Veterinary Officer, Regional Livestock Development Center, Tshemasham, Chukha
9. Dr Kinley Penjor, Senior Medical Officer, Vector Borne Diseases Control, Gelephu
10. Dr Tandin Zangpo, Medical Officer, Department of Public Health, Thimphu
11. Dr RB Gurung, Offtg Program Director, NCAH, Serbithang
12. Dr Chador Wangdi, Chief, Quality Control & Quarantine Division, BAFRA, Thimphu

CONTENTS

EXECUTIVE SUMMARY	I
ACKNOWLEDGEMENTS	II
ACRONYMS AND ABBREVIATIONS	IV
1. INTRODUCTION	1
1.1. DRIVERS FOR ONE HEALTH APPROACH	1
1.2. INTERNATIONAL ONE HEALTH INITIATIVES	1
1.3. REGIONAL ONE HEALTH INITIATIVES	2
1.4. COUNTRY SITUATION	3
2. VISION STATEMENT	4
3. OBJECTIVES	4
4. SCOPE	5
5. POLICIES AND LEGISLATIONS	5
6. BHUTAN ONE HEALTH STRATEGIC PLAN FRAMEWORK	5
7. THE KEY STRATEGIES OF BHUTAN ONE HEALTH FRAMEWORK	6
STRATEGY 1: ESTABLISH INSTITUTIONAL SETUP AND NETWORKING AMONGST RELEVANT STAKEHOLDERS	6
STRATEGY 2: STRENGTHEN DISEASE SURVEILLANCE SYSTEMS AND INFORMATION SHARING MECHANISM ON PRIORITIZED ZOOBOTIC, FOODBORNE DISEASES AND AMR	13
STRATEGY 3: STRENGTHEN JOINT DISEASE OUTBREAK PREPAREDNESS AND RESPONSE	14
STRATEGY 4: BUILD INSTITUTIONAL CAPACITY INCLUDING HUMAN RESOURCE IN RELEVANT STAKEHOLDERS	15
STRATEGY 5: CONDUCT COLLABORATIVE RESEARCH ON PRIORITIZED ZOOBOTIC, FOODBORNE DISEASES AND AMR	15
STRATEGY 6: STRENGTHEN COMMUNICATION AND ADVOCACY ON ONE HEALTH INITIATIVE TO PREVENT AND CONTROL ZOOBOTIC AND FOODBORNE DISEASES	16
STRATEGY 7: ESTABLISH SURVEILLANCE ON WILDLIFE AND ENVIRONMENT AND INFORMATION SHARING MECHANISM	17

8. SUSTAINABLE FUND MOBILIZATION FOR ESTABLISHMENT OF ONE HEALTH SECRETARIAT AND IMPLEMENTATION OF ONE HEALTH ACTIVITIES	18
9. LOGFRAME MATRIX OF STRATEGIC PLAN	20
STRATEGY 1: ESTABLISH INSTITUTIONAL SETUP AND NETWORKING AMONGST RELEVANT STAKEHOLDERS	21
STRATEGY 2: STRENGTHEN DISEASE SURVEILLANCE SYSTEMS AND INFORMATION SHARING MECHANISM ON PRIORITIZED ZONOTIC, FOODBORNE DISEASES AND AMR	24
STRATEGY 3: STRENGTHEN JOINT DISEASE OUTBREAK PREPAREDNESS, AND RESPONSE ON PRIORITIZED ZONOTIC, FOODBORNE DISEASES AND AMR	26
STRATEGY 4: BUILD INSTITUTIONAL CAPACITY INCLUDING HUMAN RESOURCE IN RELEVANT STAKEHOLDERS	28
STRATEGY 5: CONDUCT COLLABORATIVE RESEARCH ON PRIORITIZED ZONOTIC, FOODBORNE DISEASES AND AMR	30
STRATEGY 6: STRENGTHEN COMMUNICATION AND ADVOCACY ON ONE HEALTH INITIATIVE AND ZONOTIC AND FOODBORNE DISEASES	33
STRATEGY 7: ESTABLISH SURVEILLANCE ON WILDLIFE AND ENVIRONMENT AND INFORMATION SHARING MECHANISM AMONG RELEVANT STAKEHOLDERS	34
11. REFERENCES	35
ANNEXURE II	36

Acronyms and Abbreviations

ASEAN	Association of Southeast Asian Nations
BAFRA	Bhutan Agriculture and Food Regulatory Authority
USCDC	United States Center for Disease Control and Prevention
CDD	Communicable Disease Division
CNR	College of Natural Resources
CTZD	Centre for Tropical and Zoonotic Diseases
DAS	Department of Animal Sciences
DDM	Department of Disaster Management
DMS	Department of Medical Services
DoFPS	Department of Forests and Park Services
DOL	Department of Livestock
DoPH	Department of Public Health
EID	Emerging infectious disease
FAO	Food and Agriculture Organization of the United Nations
GF-TADS	Global Framework for Progressive Control of Transboundary Animal Diseases
HCDD	Health Care & Diagnostic Division
HPAI	Highly pathogenic avian influenza
HPD	Health Promotion Division
HPED	Highly Pathogenic Emerging Disease
ICS	Information and Communication Service
IMA	Inter-Ministerial Agreement
IMCAPI	Inter-Ministerial Conference on Avian and Pandemic Influenza
IMCOH	Inter-Ministerial Committee for One Health
LEC	Livestock Extension Centre
M&E	Monitoring and evaluation
MoAF	Ministry of Agriculture and Forests
MoH	Ministry of Health
MoU	Memorandum of Understanding
WCD	Wildlife Conservation Division
NCAH	National Centre for Animal Health
NEC	National Environment Commission

NGO NIPPP	Non-governmental organization National Influenza Pandemic Preparedness and Response Plan
NITM	National Institute of Traditional Medicine
OH	One Health
OIE	World Organization for Animal Health
RCDC	Royal Center for Disease Control
RAHC	Regional Animal Health Centres
RGoB	Royal Government of Bhutan
RIHS	Royal Institute of Health Sciences
RNR	Renewable Natural Resources
RSC	Regional Steering Committee
RUB	Royal University of Bhutan
SAARC	South Asian Association for Regional Cooperation
SARS	Severe acute respiratory syndrome
SOP	Standard operating procedure
TADS	Transboundary Animal Diseases
TWG	Technical working group
KG-UMSB	Khesar Gyalpo University of Medical Sciences of Bhutan
UN	United Nations
UNICEF	United Nations Children’s Fund
UNSIC	United Nations System Influenza Coordination
UWICE	Ugyen Wangchuk Institute of Conservation and Environment
WHO	World Health Organization
WWF	World Wildlife Fund

1. Introduction

1.1. Drivers for One Health approach

One Health means “the collaborative efforts of multiple disciplines working locally, nationally and globally to attain optimal health for people, animals and our environment”. The concept of ‘One Medicine’ was coined in 1984 by Calvin Schwabe, the ‘Father of veterinary epidemiology’, who argued that ‘the critical needs of man include combating of diseases, ensuring enough food, adequate environmental quality and a society in which humane values prevail’ (Cardiff et al., 2008, Lee and Brumme, 2013). Later, this core idea got additional impetus in the wake of the high proportion of zoonoses (estimated to be 60–70%) amongst the diseases that emerged in the past 30 years (Woolhouse and Gowtage-Sequeria, 2005, Jones et al., 2008). The emerging and re-emerging zoonoses including human immunodeficiency virus, severe acute respiratory syndrome (SARS), West Nile virus, Nipah virus, Ebola, dengue haemorrhagic fever, and most notably, highly pathogenic avian influenza (HPAI) have caused substantial morbidity and mortality to the human and animal populations, adverse effect on economies and livelihood systems of many countries in the world, and presented immense challenges for public health and animal health authorities. Therefore, One Health approach was considered to be one of the best approaches towards prevention and control of emerging and re-emerging infectious diseases.

1.2. International One Health initiatives

The concept of One Health approach was officially launched in September 2004, at the ‘One World, One Health: Building Interdisciplinary Bridges to Health in a Globalized World’ conference convened by the Wildlife Conservation Society in New York (The Rockefeller University, 2004). The conference called for improved collective action across the three sectors (human health, animal health and wildlife sectors) and also put forth the Manhattan Principles urging world leaders, the global health community, and institutions of science to make holistic approach for prevention of disease emergence and control. Consequently, One Health approach (OHA) was embedded within the existing global institutions initially as part of preparedness for pandemic influenza. Subsequently, the three major international organizations: Food and Agriculture Organization of the United Nations (FAO), World Organization for Animal Health (OIE), and World Health Organization (WHO) have also provided strong leadership in endorsing the One Health concept and promoting inter-agency and inter-sectoral collaboration.

The One Health approach was mainstreamed into global thinking at the 3rd Inter-Ministerial Conference on Avian and Pandemic Influenza (IMCAPI) held in New Delhi in December 2007. The three international organizations collaborated with the United Nations Children’s Fund (UNICEF), the United Nations System for Influenza Coordination (UNSIC), and the World Bank at the 4th IMCAPI held in Sharm-el-Sheikh, Egypt in October 2008 where the theme was “The Vision for the Future”. An expert technical consultation was then held in Winnipeg, Canada in March 2009 to define the best practices for implementation of the One Health approach.

The One Health concept was formally endorsed during the 7th International Ministerial Conference on Animal and Human Pandemic Influenza held in Hanoi, Vietnam in April 2010 (IMCAPI Hanoi 2010), resulting in the Hanoi Declaration, which emphasized not only the need to continue the control of HPAI and H1N1 infection in humans, but also the importance of extending the lessons learned from

H5N1 to other emerging diseases. Following this meeting, the WHO-FAO-OIE prepared a tripartite concept note “Contributing to One World, One Health- A Strategic Framework for Reducing Risks of Infectious Diseases at the Animal-Human-Ecosystems Interface” (Anonymous, 2008) that sets a strategic direction for FAO-OIE-WHO to propose together a long term basis for the international collaboration aimed at coordinating global activities to address health risks at the human-animal-ecosystems interface.

To consolidate the Hanoi declaration further at the international level, the U.S. Centers for Disease Control and Prevention (CDC) in collaboration with OIE, FAO and WHO, hosted One Health meeting at Stone Mountain, Georgia, USA in May 2010 with the theme “One Health: a policy perspective – taking stock and shaping an implementation road map” (Rubin, 2013). This meeting developed specific strategies and country-level actions that governments and the health communities can use to globally advance the strategic framework by engaging a range of stakeholders to implement sustainable One Health approach in their country from vision to reality. Six global areas of action (i) One Health global network, (ii) proof of concept to demonstrate the added value of the One Health approach, (iii) country level needs assessment, (iv) capacity building (v) planning and methods and (vi) training were identified and working groups were set up to develop a plan for advocacy. The 1st International One Health Congress was held in Melbourne, Australia in February 2011, and featured a large programme of scientific presentations and plenary sessions that extensively examined broad issues from the One Health perspective such as disease emergence, international trade, food safety and security, and science policy. In November 2011 a “High Level Technical Meeting” was held in Mexico City to address health risks at the human-animal-ecosystems interface. This meeting looked at ways of ensuring the alignment of the technical outcomes with the broader political processes, including translating the Tripartite Concept Note into national languages.

1.3. Regional One Health Initiatives

To address endemic, emerging and re-emerging zoonoses in the South-East Asia region, WHO’s Western Pacific Region and South-East Asia region developed the Asia Pacific Strategy for Emerging Diseases (APSED) in 2005. Consequently, a regional mechanism in Asia Pacific to support collaboration between animal and human health sectors has progressed through the Highly Pathogenic Emerging Disease (HPED) program in Asia, which was launched in December 2009. The program was funded by European Aid and implemented by the OIE, WHO and FAO in close consultation with the Association of Southeast Asian Nations (ASEAN) and South Asian Association for Regional Cooperation (SAARC) secretariats. The objective is to strengthen the institutional capacities of ASEAN and SAARC and their secretariats to control HPEDs and to improve epidemic and pandemic preparedness in the region. It provides funding to strengthen animal health and human health services and to encourage regional integration and cooperation by contributing to control epidemics, epizootics and zoonoses. This has led to existing coordination mechanisms, namely the Regional Steering Committee (RSC) for Asia and the Pacific of the Global Framework for Progressive Control of Transboundary Animal Diseases (GF-TADs). FAO and OIE have also established Regional Animal Health Centres (RAHCs) that operate directly within the framework of the GF-TADs to provide member countries with technical support and evaluate national and regional projects.

In 2009, a European Commission evaluation mission identified an urgent lack of capacity in the entire Asia region of applied epidemiology skills in human and animal health. Consequently, the World Bank approved the Massey University, New Zealand, a two-phase program to develop capacity to strengthen

the response to outbreaks of major human and animal infectious diseases in three sub-regions of Asia (South Asia, Central Asia and East Asia) in 2010. This was endorsed by the seven governments taking part in the South Asia program and Phase 1 was implemented from June 2010–September 2011 under which 68 public health and animal health officials received master degree program from Massey University, New Zealand. Phase 2 was implemented from March 2012 to December 2013 in which seven countries in South Asia implemented various Collaborative Investigation Projects (CIPs) on prioritized zoonotic diseases including epidemiological capacity building. The project culminated with South Asia Regional One Health Symposium held at Paro, Bhutan in 2013 (<http://www.hubnet.asia/sites/south-asia-regional-one-health-symposium>) which brought together over 125 participants from seven countries of the South Asia region (Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka), development partners (Massey University, World Bank, and the European Union) and other international agencies. The symposium passed Paro South Asia Regional One Health Resolutions urging the countries to continue their efforts to strengthen the one health approach across the region. In addition annual national one health workshops and conference also passed resolutions to operationalize and strengthen one health programme in Bhutan.

1.4. Country Situation

Situational analysis

Bhutan is a landlocked country of 38,394 square kilometers, situated in Himalaya bordered by India in the west, south and east, and China (Tibet) in the north. The entire country is mountainous with flat land limited to southern borders. It has a forest cover of 72 percent with rich biodiversity. The population is largely rural, with 69 percent living in villages, and depends on subsistence agriculture and livestock rearing for livelihood. This results close interaction with domestic and wild animals. Moreover, Bhutan has a fragile ecosystem and it is vulnerable to the impacts of global warming and climate change, and also susceptible to natural disasters such as floods and earthquakes. As Bhutan is located in the South Asia region, which is identified as one of the global hotspots for emerging and re-emerging infectious diseases and having long porous international borders, the country faces serious public health threats from emerging and re-emerging infectious diseases, including antibiotic resistance and cancers associated with environmental factors. To mitigate the risk of emerging pathogens at human-animal-ecosystem interface, the One Health approach has been developed and recognized as a holistic and important approach by the country. The One Health approach is now increasingly becoming established in many countries including in neighboring countries like Bangladesh because it provides a strategy that increases the effectiveness and efficiency of interventions for controlling diseases at the population level.

Zoonotic risks in Bhutan

Bhutan faces significant risk from zoonotic diseases due to: (i) increasing demand for livestock products, (ii) growing number of intensive livestock and poultry farms, (iii) ease and increasing movements of animal or animal products both within the country and through imports, and (iv) increasing movement of humans. This has presented a significant challenge in terms of the technical capacity, budgetary requirements and other resources for prevention and control of zoonoses. Owing to increasing incidence of emerging and re-emerging diseases globally, there is a need to create more awareness and advocacy on zoonoses and other public health risks among the policy makers, stakeholders and the general public.

In Bhutan, although some amounts of understanding and collaborative activities have been initiated there is a need to strengthen it further for sustainable collaboration among relevant agencies for the

control of prioritized zoonotic diseases. In recent years, Bhutan has experienced series of zoonotic diseases outbreaks such as HPAI, anthrax and rabies, and it is highly likely that because of frequent interactions between animals and humans there is high risk of emergence of novel pathogens also which might have pandemic potential in future. Such risk can be tackled effectively through One Health approach, including other common zoonotic diseases like trichinellosis, and echinococcosis. The One Health approach is important particularly for a complex HPAI and similar zoonoses that require a combination of animal and public health sector surveillance, including communication strategies to reduce the public health threat more effectively. This has been experienced during the recent outbreaks of H5N1 virus in the poultry. A One Health approach can further improve cross-sectoral understanding of the problems confronting animal disease control authorities and enables a more holistic approach to involving local authorities and communities in the control programs.

Similarly, There is also growing concerns of foodborne illnesses, environmental contamination from pesticides, herbicides, human and veterinary drugs, and toxic chemicals, and antimicrobial resistance. However, there is an inadequate surveillance and coordination mechanism in place to mitigate the risk and address these concerns through a multi-sectoral collaborative approach.

Challenges

Currently, the strategies for control of zoonoses like the surveillance systems and response measures of zoonoses are weak or non-existent (other than HPAI, rabies and anthrax) due to lack of or weak collaboration between the key stakeholders including foodborne and environmentally acquired diseases (e.g. from chemical contamination and industrial wastes). In addition, awareness among general public, veterinarians and public health officials on zoonotic and other public health events are relatively poor. As a result, zoonotic and other public health events may have been grossly under reported. This is further aggravated due to lack of proper diagnostic capacity both in the veterinary and public health laboratories, and clear defined roles and responsibilities, and formal collaborative mechanism amongst the key stakeholders. A major challenge in implementing the One Health approach in Bhutan is the lack of clear-cut guidelines and strategies, weak institutional linkages among different ministries and agencies responsible for human health, animal health and the protection of environment. However, One Health strategy for HPAI preparedness plan has been developed jointly by the Ministry of Agriculture and Forests, and the Ministry of Health in response to emergence of HPAI in the region and this needs to be expanded and institutionalized to cover all zoonotic diseases as well as other important public health events.

This One Health strategic plan framework is aimed to provide guidance for implementing the One Health approach in the country to address emerging, re-emerging and high impact zoonotic diseases at the human–animal– ecosystem interface.

2. Vision Statement

The health and wellbeing of humans and animals including ecosystem are protected and improved through One Health approach.

3. Objectives

1. To institutionalize One Health initiative involving relevant stakeholders
2. To strengthen surveillance system for prioritized zoonoses, foodborne diseases and AMR

3. To strengthen joint outbreak investigation and response for prioritized zoonoses and foodborne diseases including AMR issues
4. To promote collaborative research activities for prioritized zoonotic, food-borne diseases and AMR

4. Scope

The institutional arrangement and functions outlined in this document is for implementation of the overall activities listed in the Bhutan One Health Strategic plan but not limited to those activities.

5. Policies and Legislations

The One Health strategy plan has been developed in consistent with and within the provisions of the following but not limited to existing policies and legislations:

- Biosafety Act of Bhutan 2015
- Biosecurity policy of the Kingdom of Bhutan 2010
- Health Policy of Bhutan 2011
- Livestock Act of Bhutan 2001
- Medicine Act of Bhutan 2003
- Food Act of Bhutan 2005
- Forest and Nature Conservation Act 1995
- Water Act of Bhutan, 2011
- Biodiversity Act of Bhutan 2003
- Disaster Management Act of Bhutan 2013
- National Environment Protection Act 2007

In addition, the relevant secondary and tertiary legislations of these policies and legislations have also been complied with.

6. Bhutan One Health Strategic plan Framework

Bhutan One Health concepts can be operationalize and implemented towards prevention, early warning and control of emerging, re-emerging, and high impact zoonotic diseases at the human–animal–ecosystem interface through seven main strategies as follows:

Strategy 1: Establish institutional setup and networking amongst relevant stakeholders

Strategy 2: Strengthen Disease surveillance systems and information sharing mechanism on prioritized zoonotic, foodborne diseases and AMR

Strategy 3: Strengthen joint disease outbreak preparedness, and response on prioritized zoonotic, foodborne diseases and AMR

Strategy 4: Build Institutional capacity including human resource in relevant stakeholders

Strategy 5: Conduct collaborative research on prioritized zoonotic, foodborne diseases and AMR

Strategy 6: Strengthen Communication and advocacy on One health initiative to prevent and control zoonotic and foodborne diseases

Strategy 7: Establish surveillance on Wildlife and environment and information sharing mechanism among relevant stakeholders

7. The Key strategies of Bhutan One Health Framework

Strategy 1: Establish Institutional setup and networking amongst relevant stakeholders

Objective: To ensure that the institutional mechanisms, technical coordination and policy framework are in place to operationalize One Health initiatives in Bhutan.

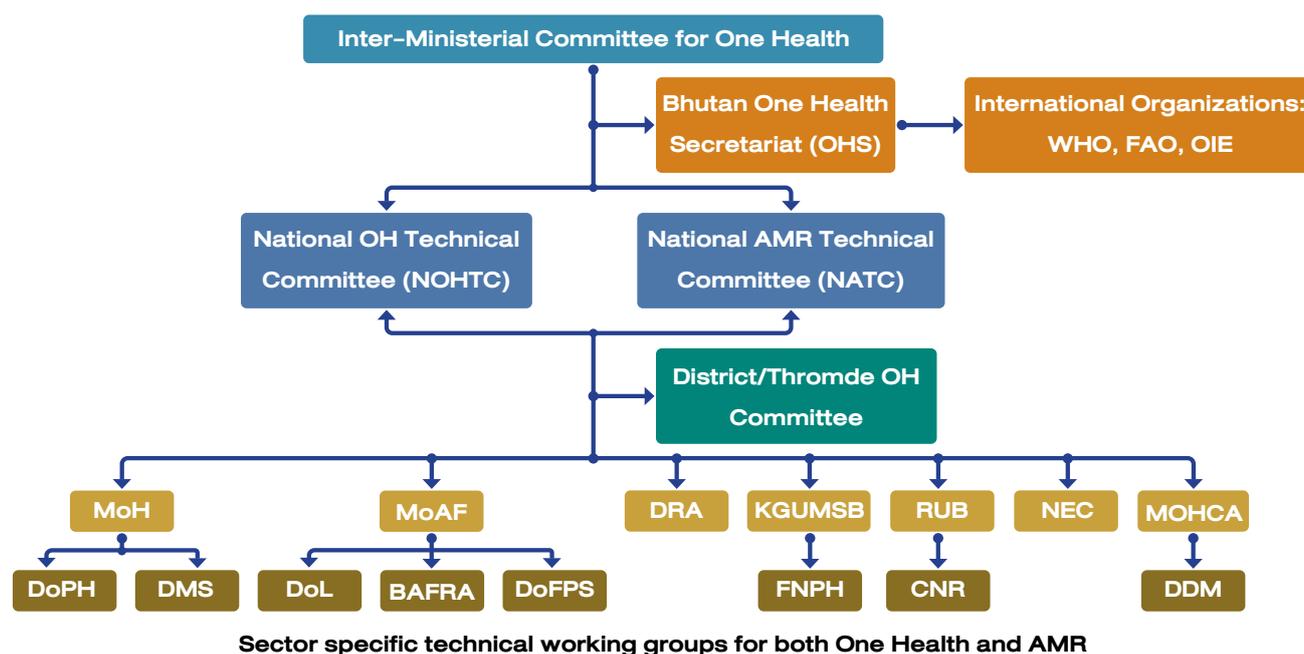
Rationale

Currently, the different stakeholders work in isolation without any formal coordination mechanism for the surveillance, prevention and control of zoonoses and other public health events. Therefore, there is limited real-time information sharing and coordinated approach to tackle these diseases. There is a huge opportunity to pool the available resources and technical expertise within the existing institutes for a coordinated and effective preparedness and response measures. Therefore, there is a need to formalize institutional framework and linkages for the implementation of One Health activities in a collaborative and coordinated manner from policy makers to field staff levels.

The four key sectors, Ministry of Health, Ministry of Agriculture and Forests, Royal University of Bhutan, and the Khesar Gyalpo University of Medical Sciences of Bhutan will be responsible to spearhead the One Health initiatives in Bhutan. Other relevant stakeholders include the Department of Disaster Management (DDM) and National Environment Commission (NEC). The Inter-ministerial Committee for One Health (IMCOH) will be the highest policy and decision making body for the implementation of the One Health Strategic plan and National AMR Action plan (NAAP). The National One Health Technical Committee (NOHTC) and National AMR Technical Committee (NATC) will be constituted by experts from different sectors to advise and provide technical recommendations on the implementation of One Health Strategy and NAAP. The OH Secretariat will function as the secretariat for Inter-ministerial Committee for One Health (IMCOH) and coordinate One Health activities.

This institutional arrangement will serve as an overall One Health working organization among relevant stakeholders under a One Health approach (Figure 1). This arrangement will be reviewed from time to time when strategic plan is updated.

Institutional arrangement for One Health in Bhutan



The Inter-Ministerial Committee for One Health (IMCOH)

The IMCOH is responsible to make policy decisions and guide respective agencies on One Health activities based on the recommendations provided by the National One Health Technical Committee (NOHTC) and National AMR Technical Committee (NATC).

Members:

1. Secretary, Ministry of Health (MoH)
2. Secretary, Ministry of Agriculture and Forests (MoAF)
3. Head, Department of Disaster Management (DDM)
4. Head, Department of Public Health (DoPH)
5. Head, Department of Medical Services (DMS)
6. Head, Department of Livestock (DoL)
7. Head, Bhutan Agriculture and Food Regulatory Authority (BAFRA)
8. Drug Controller, Drug Regulatory Authority
9. Head, Department of Forests and Park Services (DoFPS)
10. Head, Khesar Gyalpo University of Medical Sciences of Bhutan (KGUMSB)
11. Head, Royal University of Bhutan (RUB)
12. Representative, National Environment Commission (NEC)
13. Head of OHS (Member Secretary)
14. Co-opt members as and when required

Terms of Reference for IMCOH

1. Make policy decisions for the implementation of One Health Strategy and NAAP;
2. Approve the recommendations submitted by the National One Health Technical Committee and National AMR Technical Committee;
3. Mobilize resources for implementation of One Health activities as recommended by NOHTC TWG and NATC;
4. Carry out high-level advocacy;
5. Accord approval of One Health Strategic plan and NAAP and including any amendments; and
6. Review and approve any other issues related to One Health and AMR.

Meetings and Procedures

The IMCOH will meet once annually and as and when required. The IMCOH will be chaired by the Secretaries of MoH and MoAF on rotational basis.

One Health Secretariat (OHS)

The One Health Secretariat will be responsible for day to day coordination and implementation of One Health activities including AMR, and communication between the stakeholders. The OHS will consist of Two (2) full-time officials, one each deputed as an Officer on Special Assignment from MoH and MoAF as per the existing RCSC norms. One administrative and accounts assistant will be recruited on contract basis. The One Health Secretariat will be located at Royal Centre for Disease Control (RCDC), Serbithang as they have good infrastructure and they are one of the key stakeholders of OH.

Mandates of the One Health Secretariat

- The OH secretariat will function as the secretariat for Inter-ministerial Committee for One Health (IMCOH);
- Facilitate mainstreaming and institutionalizing One Health Program in Bhutan;
- Coordinate and drive development of national OH agenda;
- Coordinate and drive implementation of OH activities;
- Coordinate and organize meetings, conferences and workshops;
- Mobilize fund for implementation of OH activities;
- Promote collaborative research and capacity building on One Health activities;
- Coordinate and liaise with national, regional and international OH network and organization;
- Develop and maintain One Health webpage for information sharing;
- Monitor and evaluate implementation of OH activities; and
- Publish one health activity progress reports.

In addition, the permanent staff of OH Secretariat will be supported by the core focal officers, designated one each from the following agencies:

1. Zoonotic Disease Control Program, DoPH, MoH
2. National AMR Focal Officer, DMS
3. Representative, RCDC
4. Head, AHD, DoL
5. Representative, NCAH, DoL

6. Livestock Section, BAFRA
7. Representative, KGUMSB

The focal officers from these agencies will be responsible for providing advisory, technical, and coordination support to the full-time permanent One Health staff.

An alternative model for OHS

Permanent office will be set up at the RCDC with basic office facilities. The designated core focal officers will serve as the staff of the OHS and work one afternoon of a week day to carry out functions of OHS. The head of the OHS will be designated by IMCOH on rotational basis annually. The Head of OHS will serve as the member secretary for IMCOH. An administrative assistant will be recruited on contract basis and the payment will be met through project budget.

National One Health Technical Committee

The National One Health Technical Committee (NOHTC) will function as a technical advisory committee for the One Health activities. The National One Health Technical Committee will comprise of experts from different sectors to advise and provide technical recommendations to IMCOH.

Members:

1. Head, CDD, DoPH, MoH
2. Program Officer, Zoonotic Disease Control Program, DoPH, MoH
3. Head, RCDC, DoPH
4. Head, NCAH, DoL, MoAF
5. Head, Animal Health Division, DoL, MoAF
6. Representative, WCD, DoFPS, MoAF
7. Representative, KGUMSB
8. Representative, BAFRA, MoAF
9. Representative, College of Natural Resources, RUB
10. Representative, NEC
11. Representative, Department of Disaster Management, MoHCA
12. Representative, One Health Secretariat
13. Co-opt members (The co-opt members will be identified based on the required expertise for the meeting).

Terms of Reference for National One Health Technical Committee

1. Review and provide technical recommendations to IMCOH on policy, priorities and other One Health activities;
2. Review, assess, develop and provide technical recommendations related to public health events requiring One Health response;
3. Review and provide guidance for prioritization and development of One Health research agenda;

4. Assess research findings and provide technical recommendations for development of policies and strategies for implementation of research findings;
5. Identify and strengthen collaboration between relevant sectors related to One Health;
6. Review and endorse the recommendations of the OHS; and
7. Carry out any specific tasks assigned by IMCOH;

Meeting and Procedures

- The Chair of the NOHTC will be elected on rotational basis among the members on annual basis.
- The committee will meet bi-annually, and as and when required.

National AMR Technical Committee (NATC)

The NATC will function as a technical advisory committee for the AMR.

Members:

1. Chairperson, National Medicine Committee (NMC)
2. Chairperson, National Veterinary Medicine Committee (NVMC)
3. Focal person, AMSU, JDWNRH
4. AMR Focal for Human Health
5. AMR Focal for Animal Health
6. Representative, Microbiology Unit, JDWNRH
7. Livestock section representative, BAFRA
8. Representative, DRA
9. Epidemiologist, RCDC
10. Representative, Microbiology Unit, RCDC
11. Representative, AHD, DoL
12. Representative, Microbiology, NCAH
13. Representative, One Health Secretariat
14. Co-opt members as and when required

Terms of References for National AMR Technical Committee:

1. Provide Technical advice to the IMCOH on the matters related to AMR;
2. Review and provide technical recommendations related to AMR containment;
3. Review and assess the surveillance findings on AMR and AMU in humans and animals that has been generated through the Fleming Fund Country Grant and the Fleming Fellowship Scheme (FFS) and other relevant information;
4. Review, assess and provide guidance on the implementation of NAAP including Fleming fund grant;

5. Prepares a set of recommendations regarding priorities for future surveillance;
6. Review and assess research findings and provide technical recommendations for development of policies and strategies for implementation of research findings. Identify and strengthen collaboration between relevant sectors related AMR; and
7. Carry out any specific tasks assigned by IMCOH.

Meeting Procedures:

The committee will meet quarterly (during the Fleming Fund Grant Project) and thereafter bi-annually, and as and when required

District ONE HEALTH Committee

The District One Health Committee (DoHC) will be responsible for the implementation of One Health activities at the district level and shall comprise of the following members:

1. Dzongda (Chair)
2. District Livestock Officer (Member Secretary) on rotational basis with DHO
3. District Veterinary Officer (Member)
4. Animal Health Section, RLDC (Member)
5. District Health Officer (Member)
6. Chief Medical Officer/Medical Superintendent (Member)
7. Officer Incharge, BAFRA District Office or Entry Point Office (Member)
8. Superintendent of Police/OC, RBP (Member)
9. Thromde Environment Officer (Member)
10. Thromde representative (Member) –S/Jongkhar and Thimphu
11. Co-opt members as per need

Meeting and Procedures

- The District One Health Committee will meet once-annually, and as and when required.

Terms of Reference for the district level One Health Committee

1. Coordinate implementation of One Health activities including AMR in the district;
2. Serves as the district contact point for coordination and information sharing with One Health secretariat at national level;
3. Provides directives and guidance on implementation of district level sector specific One Health activities;
4. Make decisions and coordinate implementation of prevention & control measures related to public health events that require One Health approaches;
5. Identify and facilitate conduct of operational research requiring One Health approach in the district;
6. Review and monitor the progress of One Health activities carried out in the district; and
7. Mobilize resources and community support for implementation of One Health activities.

Thromde ONE HEALTH Committee (Phuntsholing & Gelephu)

The Thromde One Health Committee (TOHC) will be responsible for the implementation of One Health activities at Thromde level.

1. Drungpa (Chair)
2. Veterinary Officer, TVH-SL (Member Secretary)
3. District Livestock Officer (Member)
4. Animal Health Section, RLDC
5. District Health Officer (Member)
6. Thromde Environment Officer (Member)
7. Chief Medical Officer/Medical Superintendent (Member)
8. BAFRA (Member)
9. Superintendent of Police /OC, RBP (Member)
10. Representative, Thromde Administration (Member)
11. Thromde Tshogpa (Member)
12. Co-opt members as per the need

Meetings and Procedures

The Thromde One Health Committee will meet once-annually, and as and when required.

Terms of Reference for the Thromde level One Health Committee

1. Coordinate implementation of One Health activities including AMR in the Thromde;
2. Serves as the district contact point for coordination and information sharing with One Health secretariat at national level;
3. Provides directives and guidance on implementation of Thromde level sector specific One Health activities;
4. Make decisions and coordinate implementation of prevention & control measures related to public health events that require One Health approaches;
5. Identify and facilitate conduct of operational research requiring One Health approach in the Thromde;
6. Review and monitor the progress of One Health activities carried out in the Thromde; and
7. Mobilize resources and community support for implementation of One Health activities.

Outputs:

- 1.1. Memorandum of Understanding (MoU) signed between the key stakeholders.
- 1.2. Timely and effective implementation of One Health strategic plan ensured.
- 1.3. Planning, monitoring and evaluation mechanisms for One Health activities in place.

Strategy 2: Strengthen Disease surveillance systems and information sharing mechanism on prioritized zoonotic, foodborne diseases and AMR

Objective: To develop surveillance system for early warning, and information sharing to prevent and control prioritized zoonotic, foodborne disease and AMR.

Rationale:

Different sectors have functional surveillance systems in place. However, the sharing of surveillance information across the sector is not formalized and coordinated. Wildlife surveillance and livestock surveillance will serve as early warning for emerging, re-emerging and high impact infectious diseases in humans. In addition, surveillance of high-risk occupation groups (such as meat handlers, livestock farmers, etc.) for prioritized zoonotic diseases will help in early detection of novel or emerging infectious diseases of animal origin. Real time sharing of data collected by relevant sectors can assist the coordination of field activities and timely response to outbreaks.

New diseases emerge when specific animal reservoir hosts, microbial agents and high-risk populations come together in specific geographic areas and ecosystems. The One Health approach will use risk-based strategies in combination with the outcome of health impact assessment to target surveillance for EIDs. Surveillance capacity may need to be strengthened, especially applying participatory processes that involve community members. Event-based surveillance will also help generate reports on disease occurrence generated by community members and communicated to the appropriate authorities in real time through HOTLINES. This can be used to mitigate the spread.

In the long run, the aim is to establish a platform for sharing information from all sectors. The Bhutan ONE HEALTH HUB will be operationalized for this purpose.

Outputs:

- 2.1. Surveillance system for prioritized zoonotic disease established.
- 2.2. Standard operating procedures (SOPs) for surveillance and outbreak investigation developed.
- 2.3. Surveillance capacities in all relevant sectors at all levels strengthened.
- 2.4. Information sharing mechanism established.
- 2.5. Appropriate laboratory diagnostic facilities in all sectors to support surveillance and research activities strengthened.
- 2.6. High-risk areas and disease hotspots mapped.

Stakeholders:

- MoAF (DoL, DoFPS, BAFRA, ICS) – for animal and foodborne diseases including wildlife diseases.
- MoH (DoPH, DMS) for human diseases.
- National Environment Commission for environmental impact assessment and contamination.

Strategy 3: Strengthen joint disease outbreak preparedness and response

Objective: To strengthen disease outbreak preparedness and response capabilities and coordination among relevant stakeholders.

Rationale

Currently, there is limited coordination among the stakeholders in responding to occurrence of zoonotic diseases (except for HPAI and influenza pandemics), thus lacking a holistic approach to disease control measures. This leads to increased cost and time for disease control, and often the responses and outbreak management are not effective and efficient. Therefore, there is a need to strengthen coordination in preparedness and response mechanisms to respond more rapidly and efficiently to outbreaks of diseases. The framework adopted for the National Influenza Pandemic Preparedness Plan (NIPPP) need to be expanded to include other zoonoses and priority diseases identified under One Health framework. In addition, in majority of disease outbreak situations, no health impact assessment, its impact on socio-economy and wildlife conservation are conducted. In order to develop evidence-based and best optimal disease control policy options that is based on systematic disease control policy and economic evaluation, data on adverse impact of disease outbreaks on health, socio-economy should be assessed and generated.

Outputs:

- 3.1. Disease outbreak control and prevention strategies for prioritized zoonotic disease developed and communicated to the stakeholders.
- 3.2. SOPs and contingency plans for management of disease outbreaks developed.
- 3.3. Capacity for field response to disease outbreaks strengthened.
- 3.4. Simulation exercise on preparedness, response and management of priority diseases conducted as and when required.
- 3.5. Adequate stock of essential diagnostic kits, equipment, drugs and other logistics kept ready.
- 3.6. Impact of disease outbreaks on health, socio-economy, wildlife conservation and environment are assessed for any major outbreaks.

Stakeholders:

- MoAF (DoL, DoFPS, BAFRA, ICS) – for animal and foodborne diseases including wildlife diseases.
- MoH (DoPH, DMS) for human diseases.
- National Environment Commission for environmental contamination.
- Department of Disaster Management to provide logistical support.

For all outbreaks of zoonotic diseases and other public health events, a coordinated response should be implemented with the involvement of all the relevant stakeholders as outlined in this strategic document and as specified in the respective disease control guidelines/programs.

Strategy 4: Build Institutional capacity including human resource in relevant stakeholders

Objective: To develop multi-sectoral capacity to prevent, response, control and mitigate the impacts of infectious diseases.

Rationale

The existing capacity to prevent, response, mitigate and control diseases is variable across the various sectors under the one-health umbrella. There is a need to streamline and harmonize capacity building across all sectors to strengthen the required human resources in terms of knowledge and technical capability to manage and respond effectively to infectious diseases. This will strengthen capacities of the stakeholders in relation to knowledge on animal, human and environment interface.

Outputs:

- 4.1. Capacity gaps assessed and human resources mapped.
- 4.2. Plans and modalities for cross-sectoral capacity building developed.
- 4.3. Existing laboratory facilities and resources capacity identified and shared amongst relevant sectors to minimize duplication of activities in each sector.
- 4.4. A common laboratory with advanced facilities like virus isolation, molecular sequencing, and bioinformatics instituted and run by scientists from all relevant sectors.
- 4.5. Monitoring and evaluation of the trainings conducted.

Stakeholders:

All sectors identified above.

Strategy 5: Conduct collaborative research on prioritized zoonotic, foodborne diseases and AMR

Objective: To conduct and facilitate collaborative research on diseases prioritized under the One Health framework for developing evidence-based prevention, control programs and informed policy decisions.

Rationale

Currently, only limited numbers of joint researches have been conducted amongst the relevant stakeholders. In addition, most researches lack consultation and coordination amongst stakeholders. This is because there is no formal institutional framework or mechanisms to facilitate joint researches. At the same time, there is also limited research capacity. Examples of limited research jointly conducted by the Ministry of Health and Ministry of Agriculture and Forests include rabies, leptospirosis, pandemic influenza H1N1 2009 virus and anthrax. There is huge opportunity for joint researches to be carried in important diseases of One Health importance such as tuberculosis, rabies, scrub typhus, human hydatidosis, etc.

To develop holistic and cost-effective disease prevention and control programs, a well-coordinated joint research is essential. The information obtained will bridge the gaps related to the disease spread and epidemiology, identify risk factors, and develop evidence-based control programs. Currently research at the animal-human-ecosystem interface is neglected and there is no baseline information to prioritize list of diseases that require One Health approach.

Outputs:

- 5.1 Collaborative researches under One Health approach at national, regional and international levels institutionalized.
- 5.2 Collaborative research areas identified and prioritized.
- 5.3 Research capacity strengthened.
- 5.4 Results of researches are published and appropriate advocacy and communication messages disseminated to stakeholders.

Stakeholders:

- MoAF (DoL, DoFPS, BAFRA, ICS)
- MoH (DoPH, DMS)
- UMSB (RIHS, NITM)
- RUB (CNR)
- National Environment Commission

Strategy 6: Strengthen communication and advocacy on One health initiative to prevent and control zoonotic and foodborne diseases

Objective: To advocate and create awareness on One Health approach at all spectrum of the society for enhancing knowledge and behavior change for prevention and control of diseases identified under One Health framework.

Rationale

The results of collaborative Investigation Project titled “Evaluation of the effectiveness of One Health approach to zoonoses management in Bhutan” conducted in 2013 and implemented under One Health project showed that 78% of the respondents from health and livestock sectors were not aware of One Health terminology (unpublished). This indicates that even the key stakeholders are not aware of the One Health approaches. Recognizing the benefits of One Health approach to control diseases of significant public health threat and socio-economic impact, there is strong need to educate and create awareness on One Health initiatives and approach to all societies of Bhutan.

The One Health framework will create strong inter-sectoral linkages amongst the stakeholders to ensure the harmonization of advocacy, communication and approaches across all sectors. Through One Health framework, relevant stakeholders shall collaborate closely in the development and implementation of strategic communication for behaviour and social changes.

Outputs:

- 6.1. Communication and advocacy modalities for One Health approach institutionalized.
- 6.2. One Health collaborative communication and advocacy materials developed.
- 6.3. Appropriate communication and advocacy messages disseminated to targeted communities in real time basis.
- 6.4. Knowledge and skills on communication and advocacy strengthened.

Stakeholders:

- MoAF (Information and Communication Services, DoL, BAFRA)
- MoH (Health Promotion Division, DoPH, DMS)
- UMSB (RIHS, NITM)

- RUB (CNR)
- National Environment Commission
- Media
- Ministry of Education
- UN agencies (UNICEF, UNFPA, FAO, WHO), OIE and non-governmental agencies

Strategy 7: Establish surveillance on Wildlife and environment and information sharing mechanism

Objective: To institutionalize the collaborative mechanisms amongst wildlife, environment human health and animal health authorities, and developing strategies for prevention and control of zoonotic diseases of wildlife origin including environmental related diseases

Rationale

Bhutan has large forest cover (72%) and is considered one of the ten hotspots of the biological diversity in the world. Bhutan has one of the strongest wildlife and nature conservation policy. There is also strong interaction at human-livestock-wildlife interface and this presents potential for emergence and spread of novel infectious diseases between humans and animals. Currently, there is no wildlife disease surveillance program being implemented in Bhutan. Therefore, the role of wildlife in the maintenance and spread of diseases is least understood. However, it has been shown that 72% of the newly emerging zoonotic diseases originate in wildlife (Woolhouse and Gowtage-Sequeria, 2005, Jones et al., 2008). Disease surveillance and management in human-animal-ecosystem interface is one of the key components of the One Health approach.

In addition, environmental related diseases in humans and animals have also not been studied in Bhutan.

Outputs:

- 7.1 Agreement for the collaborative wildlife disease surveillance formalized between wildlife, public health and animal health authorities.
- 7.2 Wildlife and ecological variables of zoonotic diseases outbreaks described and mapped.
- 7.3 Understanding among stakeholders regarding importance of wildlife and ecological issues for prevention and control of zoonotic diseases enhanced.
- 7.4 An early warning system for novel, emerging and re-emerging diseases established.

Stakeholders:

- MoAF (Wildlife conservation division, UWICE, DoL)
- MoH (DoPH)
- NEC
- WWF, Bhutan
- RUB (CNR)

8. Sustainable fund mobilization for establishment of One Health Secretariat and implementation of One Health activities

One health is a novel concept and many developed and developing countries are adopting this approach to minimize the devastating socio-economic impact caused by such diseases. International organizations like FAO, OIE and WHO are sharing information and coordinating global activities to address health risk at the animal-human-ecosystem interfaces. The one health initiative has implication on GNH since animal and human health has direct impact on socio-economic development in the country. Therefore, the government should set priority and take ownership to provide political and financial support for the “one health initiative”. Although the current manpower and institutional set up to implement most of One Health exists, the successful implementations of all activities identified require financial support.

All relevant stakeholders should individually and collectively explore funding support from RGoB and other international and non-governmental agencies for the implementation of One Health activities. While the major portion of the total budget cost is to be met through fund mobilization from donor agencies, the government has approved to support in allocating at least 1% of the budget from each of the concerned agencies for one health activities.

The Fleming Fund Country Grant that the Department of Health and Social Care of the United Kingdom has agreed to fund the establishment and initial operationalization of One Health Secretariat in Bhutan. In addition, the WHO will provide some fund to carry out some of the activities as recommended by the Joint External Evaluation Team. However, once the One Health Secretariat is established government’s financial support is essential for long term sustainability of One Health programmes in Bhutan.

Fund mobilization model

There are five potential source of fund broadly categorised from government and non-governmental organizations. The five categories are: i) Royal government of Bhutan ii) Projects/Grants iii) International organizations iv) Universities v) Technical collaborators (Figure 1 and Table 1). One health implementation agencies at different levels shall on annual basis propose budget based on their annual work plan.

Fund from Royal Government of Bhutan

The RGoG funding shall be sourced for implementation of activities at both central and local government levels. Departments and agencies at central government level shall keep provision of fund for implementation of activities at national levels. The Department of Livestock shall keep provision of fund for any activities to be implemented under animal sector. The Department of Public Health and Department of Medical Services shall keep provision of fund for any activities to be implemented under human sector. The two main agencies at national level to propose fund are Zoonosis Disease Control Program under Department of Public Health and National Centre for Animal Health under Department of Livestock. Bhutan Agriculture and Food Regulatory Authority shall keep provision of fund required for implementation of activities under food sector. Similarly, implementing agencies at local government levels (Thromde, district and geogs) shall also keep provision of fund for implementation of activities at local levels.

The RGoB contribution for implementation of OH activities shall remain within 1% of annual budget from concerned agencies as approved by the cabinet.

Grants and Projects

Fleming Fund Country Grant shall fund establishment and governance of OH Secretariat. Fleming Fund Grant shall also fund for all AMR related activities with focus on resistance and usage. However, the grant will fund until last quarter of 2020. The continuity of AMR activities through Fleming fund will depend on successful second grant after the close of Country grant. While AMR is covered under Fleming Fund, concerned agencies under each ministry shall write grant/projects to secure fund for implementation of activities under zoonoses and food borne events.

Fund through international organization

The concerned agencies shall propose fund from WHO, OIE and FAO for implementation of OH activities. The agencies shall align national zoonotic disease control activities with that of regional and global roadmap. Classic examples of zoonotic disease control plan with OH approach are HPAI and rabies. Both the international organizations for human and animal sector (WHO and OIE) had been supporting activities at country and region level. The concerned agencies shall continue to secure fund from WHO and OIE for rabies, HPAI and other diseases as well.

Universities

The universities shall play important role in human resource capacity building through conducting training on OH activities. The universities shall also incorporate OH curriculum into the ongoing academic courses.

Technical collaborations

Agencies under Department of Public Health and Department of Livestock have been implementing various technical collaborations for zoonotic as well as non-zoonoses. Such agencies shall increase the level of technical collaborations on zoonoses and secure fund in terms of finance as well as kind.

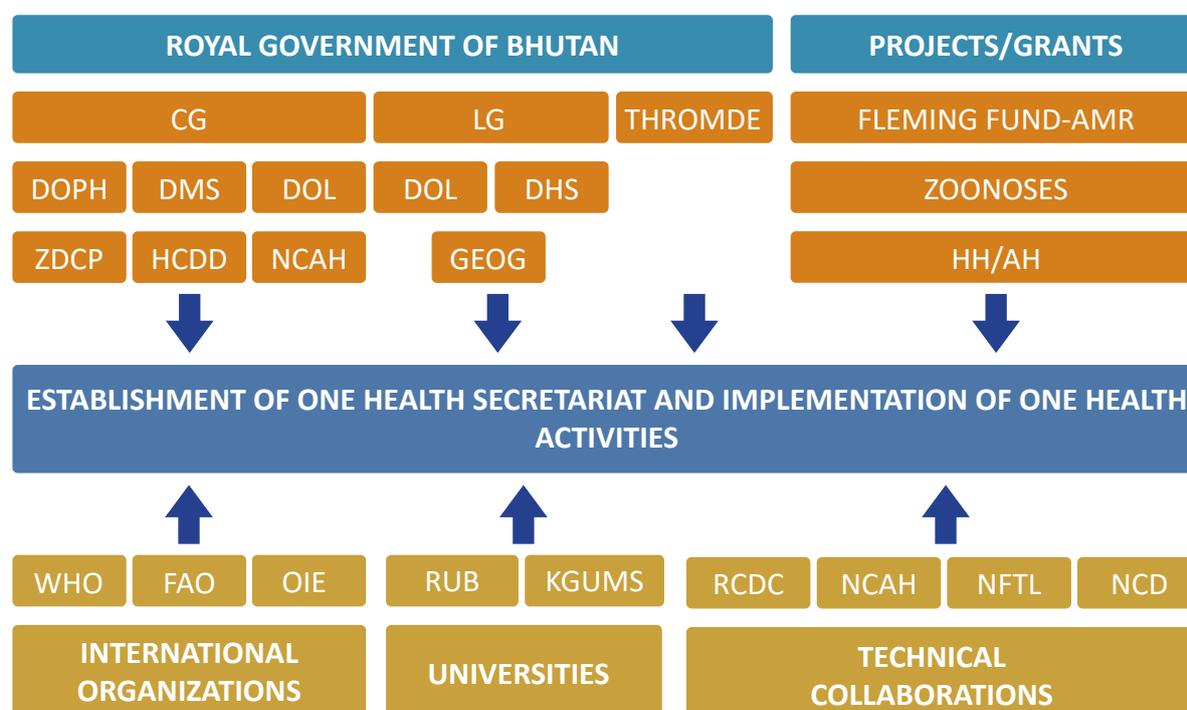


Figure 1: Sustainable fund mobilization

Table1: Major areas of fund requirement

Sl no	Areas of fund requirement	Nu in M	Fund source
1	OH Secretariat		
	Establishment and governance	33,528,848	Fleming fund
	Operation cost		RGoB (post Fleming project)
	Maintenance cost		RGoB
2	AMR and AMU surveillance: humans	14,260,000	Fleming fund
3	AMR and AMU surveillance: food animals	8,390,400	Fleming fund
4	Payroll - OH Secretariat (3 staff)		RGoB
5	Fund for mobility (1 car)		RGoB/Donors
6	Meeting/Workshop/Seminar/Conference		
	Annual OH conference	1.2 million	RGoB
	Seminar/Workshop/ conferences	0.2 million	Donors
	Meeting: TWG/IMCOH	0.5 million	RGoB
7	HR capacity building		
	In-country training		RGoB/Uni
	Ex-country training		/Donors
8	Laboratory capacity building		
	Common laboratory (BSL 2 and 3)		RGoB/Donors
	Bioinformatics and database		RGoB/Donors
9	Priority disease activity implementation		
	Surveillance (AMR zoonoses)		RGoB/Donors
	Simulation exercise		RGoB
	Disease outbreak containment		RGoB
	Public education and awareness		RGoB
	One Health Info Hub development		RGoB/Donors
	Laboratory diagnostics/consumables		RGoB
	Laboratory equipment		RGoB/Donors
	Research: national and international		RGoB/Donors

9. Logframe matrix of strategic plan

For effective and transparent implementation of Bhutan One Health Strategy, a constant monitoring and evaluation system will be put in place. The monitoring and evaluation system will define the performance indicators for evaluation based on the logical framework matrix, timeframe and action plan.

Strategy 1: Establish institutional setup and networking amongst relevant stakeholders

Activities	Objectively Verifiable Indicators	Means of verification	Assumption	Implementing agency	Cost in Nu	Cost in USD	
Output 1.1.	Details of structures and terms of reference (ToR) for committees at each level are in place.						
Activity 1.1.1	Develop and printing of Bhutan One Health Strategic Plan	Framework document	Document	Commitment of stakeholders	One Health Secretariat	50,000	714
Activity 1.1.2	Develop SOP's for formal coordination between relevant stakeholders for zoonosis at all level (national and district)	SOPs	Document	Resources are available	One Health Secretariat	50,000	
Activity 1.1.3	Sensitize key stakeholders on institutional set up and SOP's at national and district level	Number of persons sensitized	Meeting minutes/ report	Resources are available	One Health Secretariat	77,000	
Output 1.2	Institutional arrangements are in place to enable coordination on the One Health approach in Bhutan.						
Activity 1.2.1	Establish and operationalize one health secretariat	Directory	Executive order	Approval by Govt.	MoAF & MoH	521,000	
Activity 1.2.2	Establish functional inter-ministerial committee for One Health (IMCOH)	Directory	Executive order	High level commitment	Secretariat & Key stakeholders		
Activity 1.2.3	Conduct inter-ministerial committee for One Health (IMCOH) meeting annually	Minutes	Minutes and recommendation	High level commitment	One Health Secretariat	175,000	
Activity 1.2.4	Establish functional National One Health Technical Committee	Directory	Executive order	Availability of experts	Respective ministries	2,717,500	
Activity 1.2.5	Conduct National One Health Technical Committee meeting annually	Minutes	Minutes and recommendation	Availability of experts	One Health Secretariat		

Activities	Objectively Verifiable Indicators	Means of verification	Assumption	Implementing agency	Cost in Nu	Cost in USD
Activity 1.2.6	Form OH expert Team within respective key stakeholders	Directory	Executive order	Availability of experts	MoAF, MoH, RUB, UMSB	306,500
Activity 1.2.7	Establish functional District/Thromde One Health Committee	Directory	Executive order	High level commitment	DHO/DLO	
Activity 1.2.8	Conduct District/Thromde One Health Committee annually	Minutes	Minutes and recommendation	High level commitment	DHO/DLO	100,000
Output 1.3	Memorandum of Understanding (MoU) signed between the key stakeholders					
Activity 1.3.1	Develop and sign MoU	MoU document	Signed MoU	Commitment from stakeholders	MoAF, MoH, RUB, UMSB, NEC	20,000
1.3.2	Advocate for inclusion trans-boundary animal disease and public health issues in the existing border harmonization meetings between Indian (states sharing border) and Bhutan	Minutes	Minutes and recommendation	High level commitment from both countries	One Health Secretariat	
Output 1.4	Planning, monitoring and evaluation mechanisms for One Health activities in place.					
Activity 1.4.1	Develop work-plan annual work-plan by key implementing stakeholders based on BOHSP	Document	Approved work plan	Available resources	Secretariat in consultation with Key stakeholders	
Activity 1.4.2	Review work-plan implementation at respective stakeholders biannually	Document	M & E reports	Available resources	Secretariat in consultation with key stakeholders	115,900

Activities	Objectively Verifiable Indicators	Means of verification	Assumption	Implementing agency	Cost in Nu	Cost in USD
Output 1.5	Communication and information exchange mechanisms formalized.					
Activity1.5.1	Develop SOP for information exchange.	SOP available	Document	Available resources	MoAF, MoH	
Activity 1.5.2	Sensitize stakeholders on SOP on information exchange.	Number of stakeholders sensitized	Minutes/ report	Available resources	Secretariat	
1.5.3	Conduct consultative meetings with relevant stakeholders (private sector, farmers group, etc) for introducing new AH policies and new disease control plan	Minutes	Minutes/ report	Available resources	MoAF	500000
1.5.4	Develop Bhutan One Health Web page	Website hosted	Functional webpage	Available resources	Secretariat	100,000

Strategy 2: Strengthen Disease surveillance systems and information sharing mechanism on prioritized zoonotic, foodborne diseases and AMR

Activity code	Activities	Time Line/Budget				Lead Agency	Implementing Partners
		2018-19	2019-20	2020-21	2021-22		
Activity 2.1.1.1	Conduct workshop to revisit the prioritized zoonotic diseases		X			ZDCP	MoAF
Activity 2.1.1.2	Conduct a workshop to prioritize food commodity based on food safety risk		X			BAFRA	
Activity 2.2.1	Conduct workshop to develop joint guidelines and SOPs for prioritized zoonotic disease surveillance		X			OHS	
Activity 2.2.2	Conduct a workshop to develop joint guidelines and SOPs for prioritized food commodity based on food safety risk assessment		X			BAFRA	RCDC
Activity 2.2.3	Print guidelines and SOP's		X			OHS	
Activity 2.3.1	Develop modules for training on surveillance on prioritized zoonotic diseases		X	X		OHS	
Activity 2.3.2	Conduct training for relevant field staff at regional or Dzongkhag level (DOL/BAFRA/DOFPS/DMS) on prioritized zoonotic diseases surveillance		X	X	X	OHS	
Activity 2.3.3	Conduct training to field staff (Vet, Paravet) on food borne diseases surveillance/inspection		X	X	X	BAFRA	
Activity 2.4.1	Develop and integrate joint real time web based and SMS information system for zoonotic and foodborne events (Can be club with activity 1.5.4)		X	X		OHS	

Activity code	Activities	Time Line/Budget					Lead Agency	Implementing Partners
		2018-19	2019-20	2020-21	2021-22	2022-23		
Activity 2.4.2	Sensitize and TOT on integrate joint real time web based and SMS information system for zoonotic and foodborne events			X			OHS	
Activity 2.4.3	Training of field staff from all relevant stakeholders on integrated joint real time web based and SMS information system for zoonotic and foodborne events by TOT			X	X	X	OHS	
Activity 2.5.1	Map availability laboratories facilities in relevant stakeholders	X				X	OHS	
Activity 2.5.2	Ident and procure laboratory equipment and consumables in 20 Dzongkhags for zoonotic and foodborne disease detection	X	X	X	X	X	OHS	
Activity 2.6.1	Map out high risk areas for zoonotic and foodborne disease hotspots			X			NCAH and RCDC	
Activity 2.6.2	Carry out surveillance on priority zoonotic diseases at human-animal-wildlife interface	X	X	X	X	X	NCAH, RCDC and NCD	
Activity 2.6.3	Carry out risk based surveillance and testing of residue of food of animal origin	X	X	X	X	X	BAFRA	
Activity 2.6.4	Compute and analyze surveillance data and disseminate information	X	X	X	X	X	NCAH, RCDC, NCD and BAFRA	

Strategy 3: Strengthen joint disease outbreak preparedness, and response on prioritized zoonotic, foodborne diseases and AMR

Activity code	Activities	Time Line/Budget					Lead Agency	Implementing Partners
		2018-19	2019-20	2020-21	2021-22	2022-23		
Activity 3.1.1	Develop strategy for prevention and control of prioritized zoonotic diseases	X	X				ZDCP	
Activity 3.1.2	Sensitize stakeholders on the strategy for prevention and control of prioritized zoonotic diseases		X	X	X	X	ZDCP	
Activity 3.1.3	Draft regulation of public health emergency under the purview of Bhutan health act			X			IHR	
Activity 3.1.4	Designate FPs from each stakeholders for responding to deliberate introduction of biological or chemical threats	X					MoH and MoAF	
Activity 3.1.5	Review the Bhutan Health bill to ensure requirements of the public health emergency measures are captured	X					NOHTC	
Activity 3.1.6	Conduct an awareness program to relevant stakeholders (BAFRA, Private sector/importers) on safety of food of animal origin	X	X	X	X	X	BAFRA	
Activity 3.2.1	Review and develop contingency plan for disease outbreak management for priority diseases at national and district level	X	X	X	X	X	NCAH, RCDC,ZDCP	

Activity code	Activities	Time Line/Budget					Lead Agency	Implementing Partners
		2018-19	2019-20	2020-21	2021-22	2022-23		
Activity 3.2.2	Develop guidelines and SOPs on outbreak investigation and response to deliberate introduction of biological or chemical threats		X				DoPH and DOL	
Activity 3.3.1.	Develop training module for joint field outbreak investigation and response	X					DoPH and DOL	
Activity 3.3.2	Establish in-country joint field epidemiology training program (FETP)		X				KGUMSB, CNR	OHS
Activity 3.3.3	Conduct ToT on joint field outbreak investigation and response		X				OHS	KGUMSB, CNR
Activity 3.3.4	Conduct key stakeholder training on the joint field outbreak investigation and response by ToT		X				OHS	KGUMSB, CNR
Activity 3.4.1	Develop guideline and SOP's for simulation		X	X			OHS	
Activity 3.4.2	Conduct biennial joint simulation exercise for disease outbreak management			X	X	X	OHS	
Activity 3.5.1	Procurement of disease outbreak investigation and response equipment and kits (PPE, Sampling equipment etc.)		X	X	X	X	OHS	
Activity 3.6.1	Conduct disease outbreak assessment		X	X	X	X	OHS	

Strategy 4: Build Institutional capacity including human resource in relevant stakeholders

Activity code	Activities	Time Line/Budget					Lead Agency	Implementing Partners
		2018-19	2019-20	2020-21	2021-22	2022-23		
Activity 4.1.1	Map relevant experts from stakeholders	X		X			OHS	
Activity 4.1.2	Assess existing HR capacity amongst stakeholders and develop plan for skill based capacity building	X	X				OHS	
Activity 4.2.1	Develop a curriculum for One Health Program (Short course to be given for students pursuing Diploma/BSc course) and FETP-V training module	X	X				KGUMSB and CNR	DoL, DoPH, RCDC, BAFRA
Activity 4.2.2	Conduct FETP Training program for Animal, Human health and wildlife (cohorts of 20 trainees)		X	X	X	X	KGUMS and CNR	
Activity 4.2.3	Conduct a joint Training on bio-security and bio-safety for BAFRA, Health, DOL and Wildlife		X	X	X	X	RCDC, NFTL and NCAH	
Activity 4.2.4	Conduct training on food safety from BAFRA, Health & Livestock	X	X	X	X	X	BARFA	
Activity 4.3.1	Assess existing laboratory capacity and resources amongst key stakeholders	X					OHS	
Activity 4.3.2	Develop MoU for laboratory resource sharing at national level		X				RCDC, NFTL, NCD and NCAH	

Activity code	Activities	Time Line/Budget				Lead Agency	Implementing Partners
		2018-19	2019-20	2020-21	2021-22		
Activity 4.4.1	Set up tissue culture, virus isolation, and bioinformatics in laboratory of all key stakeholders		X	X		RCDC and NCAH	
Activity 4.4.2	Training of laboratory staff of health and veterinary (tissue culture, virus isolation, and bioinformatics)	X	X	X	X	NCAH and RCDC	
Activity 4.4.3	Conduct a joint training on diagnosis of high impact zoonotic diseases for laboratory personnel		X		X	RCDC, NFTL, NCD and NCAH	
Activity 4.5.1	Conduct post training evaluation of trained laboratory personnel on laboratory diagnosis		X	X	X	RCDC, NCD, NFTL and NCAH	
Activity 4.5.2	Conduct evaluation of trained FETP & review curriculum			X		OHS	

Strategy 5: Conduct collaborative research on prioritized zoonotic, foodborne diseases and AMR

Activity code	Activities	Time Line/Budget					Lead Agency	Implementing Partners
		2018-19	2019-20	2020-21	2021-22	2022-23		
Activity 5.1.1	Modelling the environmental suitability, genotype analysis and risk of Bacillus anthracis infection in livestock, wildlife and human infection in Bhutan	X	X	X			NCAH	NIID, Japan, RCDC
Activity 5.1.2	Understanding bat ecology and surveillance of bat pathogens in Bhutan		X	X	X	X	NCAH	NIID, Japan, RCDC, NCD, CNR
Activity 5.1.3	Sero prevalence of Crimean-Congo Hemorrhagic Fever virus (CCHFV) in livestock and human in Bhutan			X	X		NCAH	RCDC, NIID
Activity 5.1.4	Evaluation of Rabies Virus Neutralizing Antibody titre in humans and dogs post vaccination (establish cell culture facilities for rabies at NCAH)		X	X		X	NCAH	RCDC, NIID
Activity 5.1.5	Determine ticks species distribution in different agro-ecological zone, tick borne diseases and KAP of livestock farmers on ticks and tick borne diseases in Bhutan	X	X	X	X	X	NCAH; University of Calgary (Master student project)	RCDC, University of Calgary
Activity 5.1.6	Surveillance of rodent borne pathogens in Bhutan	X	X	X			RCDC	NCAH
Activity 5.1.7	Surveillance of AMR in bacterial pathogens (salmonella, E. coli, Klebsella, Enterococcus, Campylobacter) in chicken from Thimphu, Kanglung, Chukha)		X	X	X			

Activity code	Activities	Time Line/Budget					Lead Agency	Implementing Partners
		2018-19	2019-20	2020-21	2021-22	2022-23		
Activity 5.1.8	Surveillance of AMR in GLASS priority pathogens and national priority pathogens (Clostridium difficile, Pseudomonas aeruginosa)		X	X	X			
Activity 5.2.1	Sero-prevalence study of brucellosis in animals and human in Bhutan	X	X	X	X		NCAH	RCDC
Activity 5.2.2	Knowledge, attitude and practices (KAP) study to determine the raw milk consumption patterns in Bhutan (structure questionnaire at milk selling outlet and at the community level)		X	X			BAFRA	NCAH, RCDC
Activity 5.2.3	Conduct surveillance of important bacterial pathogens in meat (salmonella, E coli)							
Activity 5.2.4	Study on HPAI Risk factors outbreaks in Bhutan			X	X		RLDC	NCAH
Activity 5.2.5	A study on leptospirosis risk factors and disease profiling in Bhutan				X	X	NCAH	RCDC
Activity 5.2.6	Piloting Integrated dog bite case management (IBCM) and evaluation of the plan		X	X	X	X	NCAH, ZDCP	Hospitals; RNR centres
Activity 5.2.7	Prevalence of bovine TB in humans in Bhutan							
Activity 5.2.8	Ecology, economic burden and genotypic characterization of Echinococcosis in Human, Animal & Food			X	X	X	NCAH	
Activity 5.2.9	Impact of free roaming dogs in wildlife animals			X	X		DoL	NCAH

Activity code	Activities	Time Line/Budget					Lead Agency	Implementing Partners
		2018-19	2019-20	2020-21	2021-22	2022-23		
Activity 5.2.10	Milk Adulteration survey in imported and milk sale outlets in Bhutan						BAFRA	
Activity 5.2.11	Conduct pesticides residues surveillance in imported vegetables and fruits						BAFRA	
Activity 5.2.12	Conduct enhanced surveillance towards elimination of dog-mediated rabies in human by 2023		X	X	X	X	NCAH, RCDC, DoPH	WHO, OIE, FAO
Activity 5.3.1	Training on research methodology		X					
Activity 5.3.2	Strengthening of research facility		X					
Activity 5.4.1	Publication of research findings		X	X	X	X		
Activity 5.4.2	Dissemination of research findings		X	X	X	X		
Activity 5.4.3	Conduct OH conferences/seminars		X	X	X	X		

Strategy 6: Strengthen Communication and advocacy on One health initiative and zoonotic and foodborne diseases

Activity code	Activities	Time Line/Budget					Lead Agency	Implementing Partners
		2018-19	2019-20	2020-21	2021-22	2022-23		
Activity 6.1.1	Develop communication guidelines and SOPs for risk communication	X	X				OHS	
Activity 6.1.2	Develop TORs for media focal person at national and local level		X				OHS	
Activity 6.1.3	Optimize the help line numbers (1244 DoL, 112 MOH, 155 BAFRA) on risk communication or develop universal helpline	X	X	X	X	X	MOH, BAFRA, DoL	
Activity 6.1.4	Develop, pre-test and finalize information communication and education materials for policy makers and general public on specific notifiable zoonotic diseases.	X	X	X	X	X	MoH, MOAF	
Activity 6.2.1	Conduct awareness campaign on OH	X	X	X	X	X	MOH, MOAF	
Activity 6.3.1	Conduct training of trainers to focal points (60) on risk communication		X				MOH, MOAF	
Activity 6.3.2	Training of animal health and human health workers in the districts by focal points on risk communication		X	X			OHS	

Strategy 7: Establish surveillance on Wildlife and environment and information sharing mechanism among relevant stakeholders

Activity code	Activities	Time Line/Budget				Lead Agency	Implementing Partners
		2018-19	2019-20	2020-21	2021-22		
Activity 7.1.1	Develop collaborative wildlife disease surveillance system		X	X		NCD	NCAH
Activity 7.2.1	Identify key indicators for zoonoses at wildlife-human-animal interface		X	X		NCD	NCAH
Activity 7.2.2	Survey and mapping of identified indicators/variables			X	X	NCD	NCAH
Activity 7.3.1	Training of relevant stakeholders on wildlife and ecological issues		X	X		NCD	NCAH
Activity 7.3.2	Conduct awareness campaigns on importance of wildlife and ecological issues			X	X	NCD	NCAH
Activity 7.4.1	Screening of wildlife against OH priority diseases			X	X	NCD	NCAH
Activity 7.4.2	Early warning system developed			X	X	NCD	NCAH

11. References

Anonymous, 2008: Contributing to One World, One Health: A Strategic Framework for Reducing Risks of Infectious Diseases at the Animal–Human–Ecosystems Interface. Available at: [http:// www.oie.int/fileadmin/Home/eng/Publications_%26_Documentation/docs/pdf/bulletin/ Bull_2009-2-ENG.pdf](http://www.oie.int/fileadmin/Home/eng/Publications_%26_Documentation/docs/pdf/bulletin/Bull_2009-2-ENG.pdf) (Accessed on 7 April 2014).

Anonymous, 2012: Strategic framework for one health approach to infectious diseases in Bangladesh, 2012.

Cardiff, R. D., J. M. Ward and S. W. Barthold, 2008: ‘One medicine---one pathology’: are veterinary and human pathology prepared? *Lab. Invest.*, 88, 18-26.

Jones, K. E., N. G. Patel, M. A. Levy, A. Storeygard, D. Balk, J. L. Gittleman and P. Daszak, 2008: Global trends in emerging infectious diseases. *Nature*, 451, 990-993.

Lee, K. and Z. L. Brumme, 2013: Operationalizing the One Health approach: the global governance challenges. *Health Policy Plan.*, 28, 778-785.

Rubin, C. S., 2013: Operationalizing One Health: Stone Mountain and beyond. *Curr. Top. Microbiol. Immunol.*, 366, 173-183.

The Rockefeller University, 2004: One World, One Health: Building Interdisciplinary Bridges to Health in a Globalized World. Available at: [http://www.oneworldonehealth.org/sept2004/ owoh_sept04.html](http://www.oneworldonehealth.org/sept2004/owoh_sept04.html). Accessed on 7 April 2014).

WHO, 2011: The control of neglected zoonotic diseases

Woolhouse, M. E. and S. Gowtage-Sequeria, 2005: Host range and emerging and reemerging pathogens. *Emerg. Infect. Dis.*, 11, 1842-1847.

Annexure II

Key meetings supporting the One Health approach:

2001

- » Meeting of Society for Tropical Veterinary Medicine and the Wildlife Disease Association issues joint Pilanesberg Resolution sent to 30 international donor agencies calling on them to recognize animal health sciences as essential to the design and implementation of livestock and wildlife-based projects in low-income countries for the purpose of preventing disease transmission.

2004

- » Wildlife Conservation Society convenes 'One World, One Health: Building Interdisciplinary Bridges to Health in a Globalized World' conference, which launches concept and Manhattan Principles.
- » OIE/FAO Global Framework for Progressive Control of Transboundary Animal Diseases (GF-TADs) formed to empower regional alliances in the fight against transboundary animal diseases (TADs), to provide for capacity building and to assist in establishing programmes for the specific control of certain TADs based on regional priorities.

2005

- » FAO/OIE Network of Expertise on Animal Influenzas (OFFLU) is formed to provide early recognition and characterization of emerging influenza viral strains in animal populations, and effective management of known infections, thereby better managing the risk to human health and promoting global food security, animal health and welfare, and other community benefits derived from domestic animals and wildlife'.
- » International Ministerial Conferences on Avian and Pandemic Influenza held in Washington, DC.

2006

- » FAO/OIE Crisis Management Centre (CMC-AH) created to 'respond rapidly to transboundary animal disease and emerging infectious disease crises.'

2007

- » American Medical Association adopts resolution supporting One Health Initiative that promotes partnership between human and veterinary medicine.
- » American Veterinary Medical Association convenes the One Health Initiative Task Force, which becomes the One Health Commission headed by Roger Mahr in 2009, and adopts a resolution akin to the AMA on One Health.
- » FAO/OIE/WHO GLEWS created 'to improve the early warning and response capacity to animal disease threats of the three sister organizations for the benefit of the international community'.
- » One Health approach is recommended for pandemic preparedness

2008

- » WMA approves resolution by AMA to establish a dialogue on One Health with the WVA.
- » FAO/OIE/WHO/UNICEF/UNSIC/World Bank publish 'Contributing to One World, One Health: a strategic framework for reducing risks of infectious diseases at the animal–human–ecosystems interface' during the IMCAPI held in Sharmel-Sheikh, Egypt.

2009

- » Public Health Agency of Canada hosts expert consultation in Winnipeg, Canada, on 'One World, One Health: From Ideas to Action' to identify country-level recommended actions to advance the framework globally One Health Commission formed by AVMA, in partnership with the Institute of Medicine and National Research Council, 'to raise awareness of the importance of transcending institutional and disciplinary boundaries to improve health outcomes for all species'.
- » One Health Approach to Influenza conference held in Washington DC convened by US Department of Homeland Security and National Institutes of Health.
- » One Health Initiative formed by four medical and veterinary professionals, led by Laura Kahn, 'to increase communication and collaboration between human, animal, and ecosystem health professionals'.
- » One Health office established at CDC, USA
- » USAID establishes the Emerging Pandemic Threats Program

2010

- » One Health Initiative Task Force publishes final report, One Health: A New Professional Imperative.
- » FAO/OIE/WHO publish 'The FAO-OIE-WHO Collaboration: Sharing responsibilities and coordinating global activities at the animal-human-ecosystems interfaces, A Tripartite Concept Note' at IMCAPI held in Hanoi, Vietnam.
- » World Bank report, People, Pathogens and Our Planet, towards a One Health Approach for Controlling Zoonotic Diseases puts forward a framework for the funding and implementation of One Health.
- » Scientific Planning Committee (CDC, OIE, FAO, WHO, EU and Princeton University) holds expert consultation in Stone Mountain, USA, to define specific actions to implement the One Health approach.
- » Wildlife Trust launches One Health Alliance of South Asia (OHASA) as a collaborative group of scientists and government agencies focused on the spread of emerging diseases among wildlife and human populations.
- » The European Union reaffirms its commitment to operate under a One Health umbrella
- » The United Nation and the World Bank recommend adoption of One Health approaches

2011

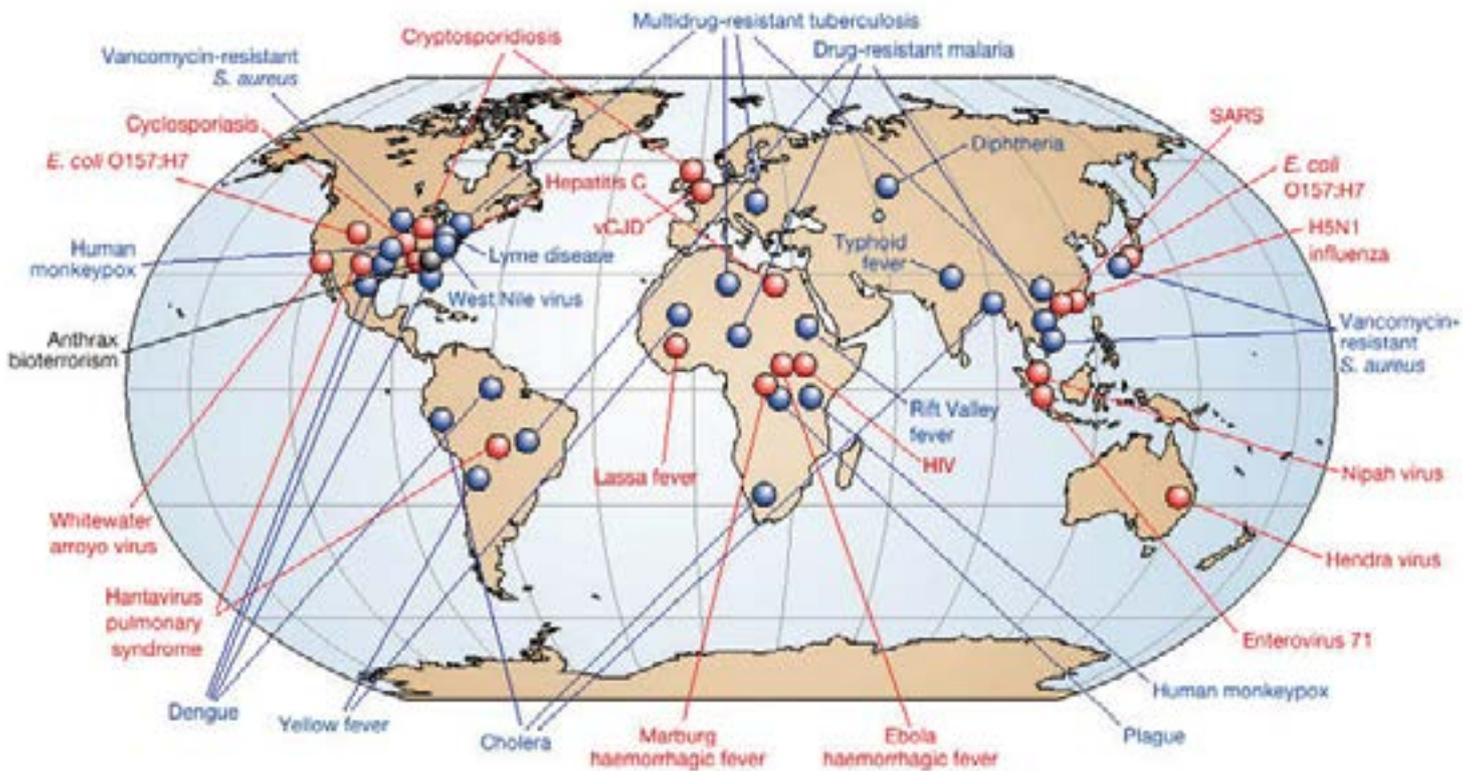
- » American Association for the Advancement of Science conference session entitled 'One Health: From Ideas to Implementation, Rhetoric to Reality'.
- » The 1st International One Health Congress held in Melbourne, Australia.
- » Expert Meeting on One Health Governance and Global Network held in Atlanta, USA.
- » High Level Technical Meeting to Address Health Risks at the Human-Animal-Ecosystems Interface, Mexico City.
- » The first One Health Conference was held in Africa

2012

- » The Global Risk Forum sponsored the first One Health Summit in Davos, Switzerland

2013

- » The 2nd International One Health Congress was held in conjunction with the Prince Mahidol Award conference
- » South Asia Regional One Health Symposium held in Paro, Bhutan



For more information please contact:

**Department of Public Health
Ministry of Health
Telephone No: +975-2-328095**

**Department of Livestock
Ministry of Agriculture and Forests
Telephone No: +975-2-322418**

