



Strategic Framework for the Application of a One Health Approach in Bangladesh (2017 – 2021)

Final Version



August 2017

Government of the People's Republic of Bangladesh

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List of abbreviations

AHIF	Avian and Human Influenza Facility
AMR	Antimicrobial Resistance
ASEAN	Association of Southeast Asian Nations
BAPA	Bangladesh Poribesh Andolon
BAU	Bangladesh Agricultural University
BLRI	Bangladesh Livestock Research Institute
CVASU	Chittagong Veterinary and Animal Sciences University
DAE	Department of Agriculture Extension
DGHS	Directorate General of Health Services
DLS	Department of Livestock Services
DoF	Department of Fisheries
EOC	Emergency Operations Center
EPT	Emerging Pandemic Threats
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FETPB	Field Epidemiology Training Program, Bangladesh
FETPv	Field Epidemiology Training Program for Veterinarians
GHSA	Global Health Security Agenda
HPAI	Highly Pathogenic Avian Influenza
icddr,b	International Centre for Diarrhoeal Disease Research, Bangladesh
ICT	Information and Communications Technology
IEDCR	Institute of Epidemiology, Disease Control and Research
IHR	International Health Regulations
IMSCOH	Inter-Ministerial Steering Committee for One Health
LSHTM	London School of Hygiene and Tropical Medicine
MoA	Ministry of Agriculture
MoEF	Ministry of the Environment and Forests
MoFL	Ministry of Fisheries and Livestock
MoHFW	Ministry of Health and Family Welfare
NIPSOM	National Institute of Preventive and Social Medicine
OH	One Health
OHASA	The One Health Alliance of South Asia
OH P4P	One Health Planning for Performance
OHS	One Health Secretariat
OIE	World Organization for Animal Health
OHITF	One Health Initiative Task Force
P & R	Preparedness and Response Project of USAID
RVC	Royal Veterinary College
SAARC	South Asian Association for Regional Cooperation
SARS	Severe Acute Respiratory Syndrome
SAU	Sher-e-Bangla Agricultural University
SOP	Standard Operating Procedure
SWOT	Strength, Weakness, Opportunity and Threat
UNICEF	United Nations Children's Fund
UNSIC	United Nations System for Influenza Coordinator
USAID	United States Agency for International Development
US CDC	United States Centers for Disease Control & Prevention

WHO	World Health Organization
WILD	Wildlife Investigation in Livestock Disease and Public Health
ZELS	Zoonoses and Emerging Livestock Systems
ZDRIC	Zoonotic Diseases Research & Information Center

Executive Summary

This strategic framework provides direction for the strengthening of a One Health approach to preventing and controlling emerging and high-impact infectious diseases and conditions. Recognizing the need for a formal and institutionalized mechanism to ensure its sustainability, the Strategic Framework and Action Plan for a One Health approach to infectious diseases in Bangladesh, was developed in 2012 and subsequently endorsed by the Ministry of Health and Family Welfare (MoHFW), Ministry of Fisheries and Livestock (MoFL) and Ministry of Environment and Forests (MoEF).

At the interministerial meeting on One Health held during June 2016, a review and revision of the One Health strategy was recommended. Accordingly, a literature review was performed using both online and offline available resource material. Some small group brainstorming sessions were organized for initial review and conceptualization of the revised document. A multi-stakeholders workshop involving stakeholders from the Government, UN agencies, universities, research organizations and NGOs was conducted on 24 May 2017 with 64 participants to identify the achievements, strengths, weaknesses, opportunities and threats regarding One Health activity in Bangladesh. In addition, three in-depth interview sessions were conducted with key stakeholders who were not present at the workshop. As per the recommendations of the workshop and interviews, the draft revised Strategic Framework and Action Plan was prepared. A second workshop was organized to validate the draft strategic document to confirm its compatibility with the policies and administrative requirements of the Government of Bangladesh. Based on the observations from the validation workshop, the document was further refined.

The following is the vision that guides the One Health approach in Bangladesh:

“The consequences of emerging and high impact diseases and conditions are minimized through institutionalizing the One Health approach by contributing to food security, food safety, and a healthy population in thriving ecosystems”

The agreed upon framework comprises the following seven components:

Component 1: Institutional Governance and Programme Management

Component 2: Coordinated Surveillance

Component 3: Coordinated Outbreak Investigation and Response

Component 4: Transdisciplinary Research

Component 5: Networking and Partnerships

Component 6: Strategic Communication and Advocacy

Component 7: Capacity Building

An action plan is added to the framework that describes how to move forward in the process adopting all the recommendations reflecting the results of the SWOT analysis.

Purpose and Context of Review

Over the years, the One Health agenda transformed into the One Health Movement in Bangladesh. Since its inception in 2008, the One Health Initiative led by a “community of practice” called One Health Bangladesh, was able to mobilize its various stakeholders, including relevant government ministries, in the pursuit of a safer country from the threats of emerging and re-emerging infectious and zoonotic diseases. Recognizing the need for a formal and institutionalized mechanism to ensure its sustainability, the “Strategic Framework and Action Plan for One Health Approach to Infectious Diseases in Bangladesh” was developed in 2012 and subsequently endorsed by the Ministry of Health and Family Welfare (MoHFW), Ministry of Fisheries and Livestock (MoFL) and Ministry of Environment and Forests (MoEF).

The framework had a five-year lifespan, and the plan was to review it in its entirety at the end of 2016. After approval of the framework, a number of achievements were made by the stakeholders and new opportunities and challenges have emerged in the changing environmental interface of One Health in Bangladesh. At the interministerial meeting on One Health held in June 2016 a review and revision of the One Health strategy was recommended to make necessary revisions to the document. In response, Preparedness and Response (P&R) project of USAID took the initiative to document the achievements, weaknesses, opportunities and threats of One Health activities in order to review and update the One Health Strategic Framework and Action Plan.

On 9th May 2017, a multisectoral One Health Planning for Performance (OH P4P) workshop was organized to measure the progress of National One Health Platforms (NOHPs), organizational performance and capacity over time in Bangladesh. During the workshop, a review of the One Health Strategic Framework was identified as the highest priority activity for the development of the National One Health Platform for Bangladesh to be used to guide the One Health Secretariat and Steering Committee in effectively coordinating the institutionalization of One Health and other One Health related activities in the country.

Scope of the Document

This document provides support to understand achievements, weaknesses, opportunities and threats for the One Health approach to controlling zoonotic and emerging infectious diseases and conditions in the country under the One Health Strategic Framework and Action Plan of 2012. This, in turn, provides additional information to update the One Health Strategic framework.

Methodology of Review

A literature review was performed using both online and offline available resource material. These included documents on One Health approaches globally, regionally and in Bangladesh. In addition,, champions of the One Health movement in Bangladesh were contacted to share their experiences and comments. Recommendations from the One Health Planning for Performance (OH P4P) workshop held on 9 May 2017 further guided the review. A multi-stakeholders workshop was conducted on 24 May 2017 with 64 participations to identify the achievements, strengths, weaknesses, opportunities and threats regarding One Health activity in Bangladesh. Three in-depth interview sessions were conducted with Dr Md Ainul Haque, Director General of Department of Livestock Services (DLS); Professor Stephen Luby, Director of Research, Center for Innovation in Global Health and Professor of Medicine (Infectious Diseases), Stanford University, USA and Dr Jonathan Epstein, Vice President of Science and Outreach, EcoHealth Alliance, USA. As per the recommendations of the workshop and interviews, the draft revised Strategic Framework and Action Plan was prepared. A second workshop was held to validate the draft strategic document and confirm its compatibility with the policies and administrative requirements of the Government of Bangladesh. .

Chapter I: Introduction

One Health promotes the communication and collaboration among physicians, veterinarians, wildlife experts and environmental health professionals in order to improve the health and well-being of all species. One Health is a concept that aims to bring together human, animal, and environmental health [1].

One Health is defined by the One Health Commission as “the collaborative effort of multiple disciplines to obtain optimal health for people, animals, and our environment” [2]. In another definition, the One Health Initiative Task Force (OHITF) defines One Health as “the promotion, improvement, and defence for the health and well-being of all species by enhancing cooperation and collaboration between physicians, veterinarians, and other scientific health professionals and by promoting strengths in leadership and management to achieve these goals”

Researchers including Louis Pasteur and Robert Koch and physicians such as William Osler and Rudolph Virchow demonstrated the collaborative links between animal and human health. More recently, Calvin Schwabe revived the concept of One Medicine [1]. As the traditional boundaries between medical and veterinary practice continue to pervade society there is a need for the practical application of one health [3].

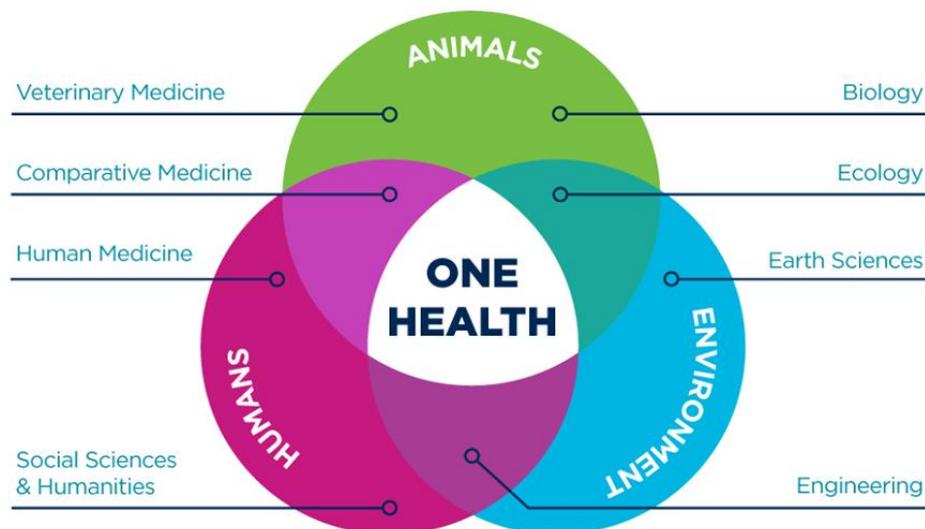


Figure 1 Diagram of one health concept (credit: EcoHealth Alliance)

The One Health approach can play a significant role in the prevention and control of zoonotic diseases . Approximately 75% of new emerging human infectious diseases are defined as zoonotic, meaning

that they may be naturally transmitted from vertebrate animals to humans[4]. Of the 1,461 infectious diseases recognized to occur in humans by the National Academy of Sciences, Institute of Medicine, approximately 60% are caused by multi-host pathogens, characterized by their movement across various species. New and re-emerging zoonoses have evolved throughout the last three decades partly as a consequence of the increasing interdependence of humans on animals and their products and our close association with companion animals. Zoonoses should therefore be considered the one of the most critical risk factors to human health and well-being, with regard to infectious diseases. Examining the health effects across species, in order to fully understand the public health and economic impact of these diseases and to help implement effective treatment and preventive programs is essential [5].

Initially, zoonoses comprised the primary focus of One Health movement but recently the scope has broadened to include other aspects of public health such as antimicrobial resistance, food safety and security as well as non-communicable diseases.

Chapter II: One Health in South Asia

In South Asia, some countries have made significant progress in institutionalizing the One Health concept and mechanism for One Health governance. However, policies for managing endemic diseases in the region are largely ad hoc [6]. Zoonotic disease research is also largely ad hoc, and a large proportion of the research focuses on the development of vaccines, therapeutics, and diagnostic tests rather than evidence for policy formulation and implementation[7]. There is a need for policy-relevant research, generating evidence of zoonotic disease impacts, and of the effectiveness and economic value of One Health (OH) approaches[8], in addition to stakeholder perspectives to formulate sustainable policies for zoonotic disease control. Ideally, OH research should involve the integrated analysis and interpretation of data on human and animal health and their environments such that the research 'leads to insights that would not be visible without inter-sectoral collaboration, such as impacts of multi-host infections on humans, animal and ecosystem health and economics'. Truly transdisciplinary research, the hallmark of OH or EcoHealth approaches, involves multidisciplinary teams addressing OH research questions within a common conceptual framework [9]. The investment in people through education and training is essential to build a workforce trained in effective multidisciplinary collaboration to formulate and implement sustainable endemic zoonotic disease control policies and to build capacity for detecting and managing emerging zoonotic diseases [2]. In addition to strengthening technical expertise for research and policy formulation, studying within a collaborative framework builds relationships and respect for the roles and expertise of

professionals in different sectors that are an essential component of collaboration. A range of OH research and training programmes have been implemented in the South Asian region since the outbreak of zoonotic diseases with a pandemic potential in the early 2000s, such as Highly Pathogenic Avian Influenza (HPAI) H5N1 and Severe Acute Respiratory Syndrome (SARS). Following the initial outbreaks of HPAI H5N1, the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO), and the World Organisation for Animal Health (OIE) established a tri-partite relationship in the South Asian Association for Regional Cooperation (SAARC) and Association of Southeast Asian Nations (ASEAN) countries under the Asia Pacific Strategy for Emerging Diseases, funded by the European Union. The tri-partite defined collaborative mechanisms for disease surveillance and outbreak management. While there have been many challenges to integrating the activities of the three-large international organisations in the region, the tri-partite has facilitated inter-sectoral relationships and awareness of OH approaches through annual regional meetings on multi-sectoral collaboration for the prevention and control of zoonoses since 2010. Each of the three organisations individually contributes to strengthening OH in the region. The WHO South East Asian Regional Office is supporting the development of a regionally integrated rabies control programme. Changes to the WHO's International Health Regulations (IHR) are a driver for the human health sector to report on zoonotic diseases. FAO's Regional Support Unit for SAARC is the only sub-regional institution and coordination mechanism in South Asia dealing with animal health, and OH components are incorporated where possible. OIE supports the strengthening of veterinary services, predominantly through the Performance of Veterinary Services tool (www.oie.int/support-to-OIE-members/pvs-evaluations/oie-pvs-tool/).

Massey University implemented a regional One Health capacity building programme to strengthen epidemiology and health risk management skills through an integrated One Health Master's education and applied epidemiology training programme, funded by the Avian and Human Influenza Facility (AHIF), and administered by the World Bank from 2010 to 2013 (www.onehealthnet.work.asia/node/313). Under this programme, an One HealthHub was established for six countries, led by the two government institutions responsible for human and animal health in each country, providing a networking and communication platform for individuals from the government, non-governmental organizations, universities, professional bodies, and international organisations working in OH-related areas. The OH Network South Asia was established in Hubnet, a web-based communication and collaborative system developed by Massey University, with a current membership of 249 professionals working in OH-related areas in South Asia.

A national OH symposium was supported in each country, culminating with a regional OH symposium (Paro, Bhutan December 2013) during which nine regional resolutions were formulated to strengthen One Health in the region (www.onehealthnetwork.asia/node/492). The One Health Alliance of South Asia (OHASA) has been established as a regional network of scientists and policy-makers that support using a One Health perspective to address zoonotic diseases. The One Health perspective emphasizes that the health of humans, animals, and ecosystems are inter-connected and therefore require experts from various scientific fields to work together to address global health challenges. OHASA brings together scientific experts and policy makers from ministries of Health, Agriculture, and Environment, as well as NGOs and universities from across South Asia to discuss and develop best practices, based on the best available science, for monitoring and controlling infectious diseases that can spread beyond national boundaries.

The United States Agency for International Development (USAID) initiated the Emerging Pandemic Threats (EPT) program in 2009 with the goal of strengthening capacities in developing countries to prevent, detect, and control infectious diseases. PREDICT, a surveillance and virus discovery component of the EPT program, focused on building capacity to identify potential zoonotic viral threats at high-risk wildlife-human pathogen transmission interfaces where diseases are most likely to emerge. PREDICT partners locate their research in geographic "hotspots" and focus on wildlife that are most likely to carry zoonotic diseases - animals such as bats, rodents, and nonhuman primates.

Chapter III: One Health in Bangladesh

With over 156 million inhabitants and a population density of 1,203 people per square kilometer, Bangladesh is one of the most densely populated countries in the world [10]. Approximately 43.6% of the country's labour force is in agriculture and an estimated 25% of Bangladesh's population is directly involved in livestock raising practices, coming into contact with millions of poultry, cattle, sheep, goats, pigs and other animals daily[11]. Interaction between humans and poultry or other livestock reservoirs is intense and frequent in both rural and urban communities [3]. It is common for households to purchase poultry in live bird markets with slaughtering occurring at the market or in the household, exposing humans, other animals, and the environment to poultry, blood and offal[10]. In rural communities, the slaughter of cattle is often a communal activity, involving upwards of 10 participants, and butchering waste is often disposed in open areas, increasing the risk of anthrax or other disease exposure to humans and scavenging wildlife [12].

In addition to human contact with domestic animals and livestock, opportunities for transmission from wild animals to humans occur through direct and indirect contact, as demonstrated by Nipah transmission through human consumption of raw date palm sap contaminated by fruit bats [13]. Despite high populations of both humans and animals, Bangladesh has limited medical and veterinary health infrastructure. Bangladesh is a low-income country; with 31.5% of the population at or below the national poverty line, and there are significant financial barriers to health services [7]. Other barriers to health delivery services include a shortage of trained health workers, gaps in service provision, drug and commodity stock-outs, and gaps in knowledge about what health services are available. Veterinary services in Bangladesh are limited throughout the nation and farmers are often unaware of diseases and reluctant to use medicinal products [4]. Poultry raisers who are aware of diseases have reported going to nearby drug shops to try to treat illnesses because most sub-district government livestock authorities offer services primarily for cattle health [6].

Located on the low-lying Ganges delta, Bangladesh's already stressed environment is susceptible to erosion, flooding, cyclones, and severe monsoons. The high density of and interaction between human and livestock coupled with the fragile and flood-prone ecosystem increases Bangladesh's risk for zoonotic diseases, emerging and re-emerging infectious diseases and pandemics. The depletion of natural high forests all over Bangladesh is alarming and remains as an ongoing process. Annual forest loss in Bangladesh is estimated to be about 0.015million hectare area (Mha). Depletion of forests has far-reaching consequences for humans, animals and wildlife, ranging from habitat loss to climate change. Deforestation associated landscape changes further enhances the interface between wildlife, domestic animals, and humans, thereby facilitating additional zoonotic disease emergence and spill over.

Development of a One Health agenda in Bangladesh

Multi-sectoral committees were formed at all tiers of the government to manage HPAI (H5N1) in the early 2005s under the framework of the Avian Influenza and Pandemic Influenza Preparedness and Response Plan, which involved the veterinary, public health, and wildlife sectors working together. Subsequently, the human and animal health sectors have continued to collaborate in controlling anthrax outbreaks, progressive implementation of a rabies control strategy, and containment of antimicrobial resistance. "One Health Bangladesh" is the major professional One Health network in Bangladesh, inaugurated in 2008, with representatives from 12 national and international organizations. The National Coordination Committee, formed under this organisation, arranges monthly meetings and an annual international One Health (OH) conference in Bangladesh.

One Health Bangladesh has co-hosted nine conferences since its establishment and now has nearly 400 members — including physicians, veterinarians, agriculturists, environmentalists, wildlife experts, ecologists, anthropologists, economists, allied scientists, practitioners, and activists. One Health Bangladesh is also a member of OHS. Partners report a “new professional culture is emerging” in the country that acknowledges the value of cross-sectoral collaboration. The OH Hub, Bangladesh, established in 2013, with focal points from the Institute of Epidemiology Disease Control and Research and the Department of Livestock Services and a membership of 44, is integrated with and supports One Health Bangladesh .

Bangladesh developed the Strategic Framework for One Health Approach to Infectious Diseases in 2012 which was later endorsed by the Ministry of Health & Family Welfare (MoHFW), the Ministry of Fisheries and Livestock (MoFL), and the Ministry of Environment and Forests (MoEF), with the support of FAO, WHO, and the United Nations Children’s Fund (UNICEF). The Strategic Framework ‘provides direction for prevention, early warning and control of emerging, re-emerging, and high impact infectious diseases at the human animal ecosystem interface in Bangladesh’. The Framework identified nine components for undertaking various activities involving relevant stakeholders.

Significant progress has been made in implementing this strategy, with the establishment of an Inter-Ministerial Steering Committee and an One Health Secretariat in June 2016. The Secretary of Health is the initial chair of the Steering Committee which will rotate every 3 years. The OH Secretariat, initially comprises one officer each seconded from the health, livestock, and forestry sectors, will be located at the Institute of Epidemiology, Disease Control and Research (IEDCR), with support from the USAID Preparedness and Response project (P&R), FAO and US CDC. The Terms of References of One Health Platforms were approved at the first meeting of the Interministerial Steering Committee on One Health and the secretariat has started functioning from IEDCR.

The major milestones in the development of One Health as an institutionalized agenda in Bangladesh were in large part made possible by several highly dedicated individuals who capitalized on disease outbreaks and health crises as opportunities to collaborate across sectors and institutions. From the inception, Professor Nitish C. Debnath, founder Vice Chancellor of CVASU, Professor Mahmudur Rahman, the then Director of IEDCR, and Professor Stephen Luby, the then Country Director of the US Centers for Disease Control and Prevention (CDC) in Bangladesh and Director of icddr,b’s Centre for Communicable Diseases (CCD), have been steadfast in their efforts to bring stakeholders together from various institutions and professional backgrounds for conferences, dialogues, workshops and partnerships.

During the outbreak of Nipah Virus (NiV) in January 2005, IEDCR, International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b) and US CDC agreed to a collaborative outbreak investigation, setting the stage for a mutually beneficial and trusting relationship. Following the joint 2005 NiV investigation, icddr,b and IEDCR continued to collaborate on outbreak investigations and surveillance,.

In 2007, at the outbreak of Highly Pathogenic Avian Influenza (HPAI) in Bangladesh, public health experts, veterinarians, as well as professionals from the wildlife and agricultural sectors partnered together under the framework of Avian Influenza and Pandemic Influenza Preparedness and Response Plan. One Health leaders realized that this partnership is needed to address not only the threat of avian influenza, but other emerging global infectious diseases as well. This realization was the driver for the One Health agenda and movement in Bangladesh.

In March 2008, after months of dialogue and discussions with stakeholders from key ministries and other institutions, universities, the Bangladesh Poribesh Andolon (BAPA) environmental movement, the One Health champions invited international colleagues to convene with national stakeholders at a conference in Chittagong, Bangladesh. There, the consortium adopted a constitution and a vision statement under the Chittagong Declaration and One Health Bangladesh was established as a small professional body under the auspices of IEDCR, the MoHFW, MoFL, Chittagong Veterinary and Animal Sciences University (CVASU), and icddr,b. In early 2012, FAO, WHO, OIE, UNICEF, the United Nations System for Influenza Coordination (UNSIC) and the World Bank endorsed One Health Bangladesh by supporting the development of a Strategic Framework and Action Plan. The framework was designed to establish and foster ownership of the strategy at high levels of the government and in all participating sectors, and to ensure cross-cultural communication across the human and animal domains, research and program divide, and government and non-governmental divide. The framework was developed by officials from MoHFW, MoFL, and MoEF, as well as representatives from the Directorate General of Health Services (DGHS), IEDCR, the National Institute of Preventive and Social Medicine (NIPSOM), US CDC, icddr,b, Department of Livestock Services (DLS), Forest Department, Department of Fisheries, Bangladesh Livestock Research Institute (BLRI), CVASU, Bangbadhu Shiekh Mujibur Rahman Agricultural University, EcoHealth Alliance, the EU, FAO, WHO, UNICEF, and BAPA. The framework was finalized in September 2012 at a two-day validation workshop.

As of 2015, the MoFL, MoHFW, and MoEF have endorsed the One Health Strategic Framework and Action Plan 2012. Other ministries, including the Ministry of Agriculture (MoA), the Ministry of Food

and Disaster Management, the Ministry of Local Government, Ministry of Interior, and the Ministry of Education are in discussions with One Health Bangladesh. As outlined in the Framework, regulatory and quality control bodies are being established to facilitate coordination and cooperation among partners. An Inter-Ministerial Steering Committee for One Health (IMSCOH) has been established. . In 2014, One Health Bangladesh held a high-level policy consultation meeting to discuss the One Health Secretariat, which to serve as a formal mechanism of collaboration and ownership between institutions. The Secretariat will also provide further opportunity for monitoring and assessment of the impact of One

Health initiatives. The consortium agreed the control body will be located at IEDCR; financial support and resources for the Secretariat will be provided by Global Health Security Agenda (GHS) and FAO.

In the past six years, One Health outputs have been met through research, training and capacity building, disease surveillance and policy development. One Health initiatives and activities have largely been built off one another and are tailored to the health priorities of the country. In 2006, while setting up Nipah surveillance systems, Professors Rahman and Luby replicated a pneumococcal surveillance project they had supervised, which worked to build the capacity of Bangladeshi government workers. In 2013, the MoHFW and MoFL endorsed a FAO, OIE and WHO-supported project in Bangladesh to link animal health epidemiology and laboratory information with human health epidemiology and laboratory information. This four-way linking of information will facilitate a



Figure 2: Summary milestones and key events in development of One Health movement in Bangladesh

standard, integrated qualitative risk assessment to better address H5N1.

A multitude of other programs and initiatives have been launched or conducted under the One Health umbrella. Beginning in October 2014, a two-year One Health Epidemiology Fellowship Program, funded by the EU, is being delivered to postgraduates from human, animal and wildlife health sectors, through a collaboration between Massey University of New Zealand and IEDCR, where the program is housed. In September 2012, FAO delivered an 11-day Wildlife Investigation in Livestock Disease and Public Health (WILD) introductory training course with 30 field-level participants, 10 each from human health, wildlife and livestock professional backgrounds. In 2013, the MoHFW partnered with the US CDC to launch a two-year, full-time postgraduate Field Epidemiology Training Program Bangladesh (FETP,B), modelled after the US CDC's Epidemic Intelligence Service. The program provides public health practitioners with multidisciplinary, in-service competency-based training to build their epidemiologic expertise in detecting outbreaks. One Health is also being introduced in graduate-level curriculums in Bangladesh; the University Grants Commission of Bangladesh officially approved a One Health Institute at CVASU in May 2015. The important timeline of the key milestones achievement for One Health movement in Bangladesh is presented in the infographic [1].

Chapter IV: Review of One Health Strategic Framework

The Strategic Framework for a One Health approach to Infectious Diseases in Bangladesh developed in 2012 is considered as a major milestone of One Health Bangladesh's development. The framework was developed with multidisciplinary and multi-sectoral engagement through two key One Health workshops. The first workshop, "Envisioning One Health for Emerging Infectious Diseases and Beyond-Developing Country Level Strategy and Action plan for Bangladesh" was held from 30 January to 2 February 2012. The second workshop, "One Health for Infectious Diseases in Bangladesh-Validating the country level strategic framework and developing the action plan" was organized on 8 and 9 September 2012 in Dhaka. This framework was then endorsed by the Ministry of Health & Family Welfare (MoHFW), Ministry of Fisheries & Livestock (MoFL) & Ministry of Environment and Forests (MoEF). The strategic framework was considered as guidance to work under the One Health umbrella in Bangladesh. However, the framework adopted a project-based approach and had a five-year lifespan, and the plan was to review it in its entirety at the end of 2016. The strategy also needed to be revised since considerable achievements have been made by stakeholders and new opportunities and challenges have emerged in the changing environmental interface of One Health in Bangladesh. At the interministerial meeting on One Health held in June 2016 a review of the One Health strategy was recommended. . In response, Preparedness and Response (P&R) project of USAID took the

initiative to document the achievements, weaknesses and further challenges of One Health works in order to - to revise the strategy document.

The agreed upon framework for One Health was comprised of nine components:.

- Component 1: Institutional Governance and Programme Management
- Component 2: Coordinated Surveillance
- Component 3: Coordinated Outbreak Preparedness, Prevention and Response
- Component 4: Applied Research
- Component 5: Networks and Partnerships
- Component 6: Strategic Communication and Advocacy
- Component 7: Capacity Building
- Component 8: Behavioral, Social and Economic Aspects of Disease
- Component 9: Wildlife and Ecology

The strategy was based on a logical framework which guided the preparation of projects or initiatives to be implemented under a One Health approach, and an action plan.

A literature review was performed by using both online and offline data available in Bangladesh. The relevant documents and stakeholder's works were reviewed to prepare the revised One Health strategic framework. A multi-stakeholders workshop also conducted with 62 participants to identify the achievements, strengths, weaknesses and challenges regarding One Health activity in Bangladesh. Significant changes and additions were proposed.. Notably, during literature review and also during the stakeholders' workshop, it was agreed to reduce the number of components from 9 to 7, considering component 8: Behavioral, Social and Economic Aspects of Disease is cross-cutting and should be included in the development and implementation of all activities under the One Health approach. Additionally, as there was no specific component for other interfaces of health, component 9: Wildlife and Ecology has been taken out. However, the role of wildlife and ecology is not underestimated, rather considered intermingled across other components as an important stakeholder for One Health Bangladesh. Component 4: Applied Research has been renamed as Transdisciplinary Research. So, the revised framework includes seven components:

- Component 1: Institutional Governance and Programme Management
- Component 2: Coordinated Surveillance
- Component 3: Coordinated Outbreak Investigation and Response
- Component 4: Transdisciplinary Research

Component 5: Networking and Partnerships

Component 6: Strategic Communication and Advocacy

Component 7: Capacity Building

Strategic Framework for the Application of a One Health Approach in Bangladesh

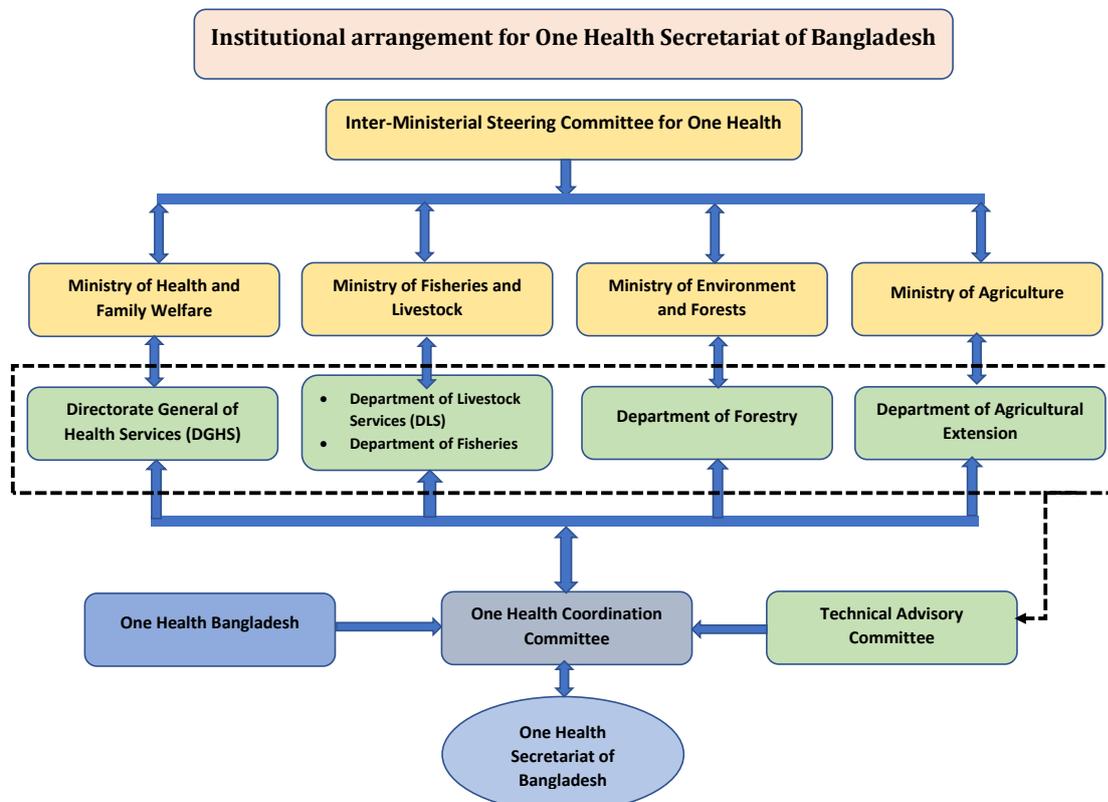
Outline of the Strategic Framework

Chapter V: Components of the One Health Strategic Framework

Component 1: Institutional Governance and Programme Management

Outcome: Sustained institutional arrangements for a One Health approach

The sustainable and effective outcome of a One Health approach could be achieved through a National One Health Platform. The National One Health platforms represent the ownership of government and relevant government agencies. The platform can act as the focal point to perform joint surveillance, joint outbreak investigations and advocacy. A number of inter-agency and inter-governmental mechanisms, including FAO-OIE-WHO tripartite, Global Health Security Agenda and Towards a Safer World Initiative (TASW), formed to tackle the risk of emerging and re-emerging diseases. Regional efforts such as formal inter-governmental mechanisms within ASEAN and SAARC countries have been established. At the national level, Indonesian National Committee for Avian Influenza Control and Pandemic Influenza Preparedness, Vietnam Partnership for Avian and Human influenza, Vietnam One Health Partnership for Zoonosis have been identified as leading the One Health National Platform. In Bangladesh, , the One Health Secretariat has been formed. .



Objective

To strengthen institutional arrangements, policy frameworks and management mechanisms in order to facilitate a One Health approach for the prevention, detection and response to high impact diseases and conditions at the human, animal and eco-system interface.

Achievements

- The “Strategic Framework for One Health Approach to Infectious Diseases in Bangladesh” (2012) by the three ministries: Ministry of Health and Family Welfare (MoHFW); Ministry of Fisheries and Livestock (MoFL); and Ministry of Environment and Forest (MoEF).
- Inter-ministerial steering committee (IMSC) was formed
- One Health Secretariat of Bangladesh was established
- A technical advisory committee was formed
- A coordination committee was formed
- The terms of reference for Inter-ministerial steering committee, technical advisory group and One Health secretariat was developed and approved.
- The provision of funds for the operation of the One Health Secretariat were incorporated into the seventh 5-year plan of MoHFW
- P&R conducted Planning 4 Performance in Bangladesh as part of a global initiative to assess and plan for future activities of One Health platforms

Identified Gaps

- Formation of Experts Advisory Group on One Health functioning/ action
- Institutional arrangement for outbreak response through One Health approach
- One Health implementation plan was in project mode
- Ministry of Agriculture yet to be included, as it was proposed in the institutional arrangements.

Opportunities

- Inclusion of plan for One Health approach to 5-year government strategic plan/sector plan/livestock policy
- Inclusion of Department of Fisheries (DoF) & Department of Agriculture Extension (DAE)
- Adding issues beyond infectious diseases such as ;Antimicrobial Resistance (AMR), pesticides

Challenges

- Routine exchange of information

- Update of line agency and sector policies to facilitate implementation of the One Health approach
- Mechanism for budget allocation and transfer to One Health Secretariat
- Sustained funding from both Government of Bangladesh and development partners
- Horizontal coordination and communication as opposed to vertical structures of the government

Strategic Issues

- Re-organization of technical advisory group to Expert Advisory Group (including independent experts)
- Institutional arrangement for routine data sharing among the relevant departments
- Inclusion of plan for One Health approach to 5-year govt strategic plan/sector plan/livestock policy
- Role of Department of Fisheries (DoF) & Department of Agriculture Extension (DAE) to be defined
- Second officers from the Departments of Fisheries (DoF) & Agriculture Extension (DAE) to the One Health Secretariat (OHS).

Component 2: Coordinated Surveillance

Outcome: Coordinated surveillance for priority zoonotic diseases and conditions

A key goal of the evolving One Health paradigm includes surveillance of infectious diseases in domestic and wild animals to anticipate emergence of new zoonoses and protect humans (Day et al., 2012). Cross sectoral collaboration and coordinated surveillance between sectors is essential for the early warning, prevention and control of emerging, re-emerging and high impact infectious diseases. Rapid and real-time data sharing mechanisms should be developed to prevent and respond to emerging threats. Combined active surveillance activities can provide improved information about the disease situation in specific time and place both in human and animal populations. Currently, however, most surveillance data are passively obtained by individual sectors and not routinely shared. As such, mechanisms to share information and incident reports are very important and should be established under the One Health approach. Information sharing must be based on a clear understanding of how the information is to be used and by whom, particularly outside the project framework. Institutional arrangements should therefore also cover the management of surveillance information.

Objective

To establish coordinated surveillance of priority zoonotic diseases and conditions including antimicrobial resistance (AMR)

Achievements

- Joint Live Bird Market (LBM) surveillance for avian influenza
- Information sharing during major outbreaks (AI , Anthrax) in human and animals
- Human anthrax surveillance data shared publicly through website.
- Passive surveillance is in place for animal health and data shared through annual report by DLS
- Impact on humans from Japanese Encephalitis pig vaccination assessed
- Sharing of information from wildlife surveillance conducted by EcoHealth Alliance with government, human and animal health partners

Identified Gaps

- Formal mechanism of coordinated or joint surveillance system does not exist
- Uneven epidemiology and laboratory capacity within and across the sectors (human, animal and forestry)
- Routine information sharing of priority zoonotic diseases and conditions during outbreaks and peace time are not done

- Inter-operable antimicrobial resistance surveillance needed
- Platform arrangement to share surveillance data needed
- Strengthening network for sample submission and result sharing
- Mapping of high-risk areas of priority zoonotic diseases and conditions needed

Opportunities

- Coordinated surveillance planned in the roadmap of Global Health Security Agenda
- DLS, BLRI and IEDCR cooperative agreement from US-CDC initiated
- Initiation of joint anthrax surveillance by IEDCR and DLS
- AMR surveillance conducted by multiple institutions, universities and departments (e.g. IEDCR, BLRI, DLS, Drug administration)
- National strategy and action plan for antimicrobial resistance containment 2017-2022
- National strategy and action plan for rabies control in Bangladesh.
- Food-borne illness surveillance platform for leptospirosis (opportunity to integrate)
- Global Health Security Agenda roadmap for Bangladesh

Challenges

- Donor dependent
- Uncertainty of funding
- Different priorities of each partner
- Synchronization of the budgetary allocation of the partners
- Frequent turnover of trained staff members

Strategic Issues

- One Health surveillance strategy and framework
- Identification of priority zoonotic diseases
- Maps of high-risk areas in terms of disease, risk, threats and hot-spots
- Coordinated AMR surveillance with data sharing
- Platform arrangement to share surveillance data

Component 3: Coordinated Outbreak Investigation and Response

Outcome: Coordinated outbreak investigation and response for priority zoonotic diseases and conditions through one health approach

Coordination is essential for outbreak preparedness and response, particularly at the operational level. The mechanisms and modalities used in the One Health approach must be appropriate to the specific disease response being implemented. For some diseases of high prevalence, such as rabies, in the early part of a control programme there is not the same level of urgency as there is with a disease that is sporadic but that has high impact when it occurs, like anthrax. This means that the modality and the stress on outbreak response must be in balance with the urgency of disease control measures to prevent a disease from becoming established. However, under the One Health approach, the response to an endemic disease incident should involve both human and animal health sectors, and if appropriate, the environmental sector as well. One aspect of a response strategy where collaboration can be particularly valuable is in the management of equipment, logistics and supplies, which is often very challenging.

Objective

To strengthen outbreak detection, investigation and response capabilities and coordination within a One Health framework.

Achievements

- A number of joint outbreak investigations and responses were conducted e.g. avian influenza, anthrax, Nipah and leptospirosis
- A simulation exercise with One Health approach for outbreak investigation and response was conducted
- Disease specific (Influenza) outbreak control and prevention strategy was developed
- Multi-hazard public health emergency contingency plans were developed

Identified Gaps

- One Health focused priority zoonotic diseases outbreak investigation and response strategy/plans need to be developed
- Contingency plans and Standard Operating Procedures (SOPs) for priority zoonotic diseases outbreak investigation and response are needed

- Emergency Operations Center (EOC) activation/deactivation/de-escalation threshold settings and trigger point settings for outbreak investigation and response are needed
- Joint risk analyses for priority zoonotic diseases and conditions need to be developed
- There is inadequate inter-departmental coordination for joint outbreak investigation and response

Opportunities

- EOC strengthening plan of IEDCR under GHSA
- Establishing EOC in relevant One Health stakeholder organization
- Linking with the national disaster management systems
- Maintaining collaboration with partners like icddr, US-CDC, FAO, WHO, EcoHealth Alliance and OIE
- Recommendations/ priority action areas of the Joint External Evaluation (JEE) mission to Bangladesh
- Mapping of hot spots for priority diseases (animal/human) across Bangladesh
- Identifying specific high risk human-animal interfaces across Bangladesh
- Opportunities to deploy trained epidemiologists (e.g. FETPs) in all tiers of the health, animal and wildlife departments
- Implementation of an epidemiology road map to ensure availability of trained epidemiologists in different tiers of human, animal, wildlife and environmental sectors

Challenges

- Separate budgetary allocations for coordinated outbreak response
- There is limited access to emergency funds and mechanisms of disbursement during outbreak investigation and response
- There is a lack of adequate resources and logistics supports for outbreak investigation and response
- Mechanism of regular availability of supplies for sustainability
- There is a lack of coordination among different stakeholders

Strategic Issue

- Development of One Health focused outbreak investigation and response strategic plan and SOPs
- Contingency plans and SOPs for outbreak investigation and response
- Comprehensive simulation exercise for outbreak investigation and response through one health approach
- Roster of multidisciplinary and multisectoral outbreak investigation teams
- Emergency Operations Center (EOC) activation/deactivation/de-escalation threshold settings

- Joint risk analysis
- Effective networking and coordination among laboratories of interest

Component 4: Transdisciplinary Research

Outcome: Transdisciplinary research provides key evidence to facilitate prevention and control of disease or conditions at human-animal and ecosystem interface

Evidence-based research and information generating are key factors in controlling zoonotic diseases. Effective control is hampered by significant gaps in knowledge of prevalence, disease burden and ecology of diseases. Research related to effective use of prevention measures such as vaccination and context-appropriate behaviour change interventions are also crucial for both economic and control aspects. Important gaps exist concerning the interfaces between the agent, the environment and the host.. In addition, understanding social and economic factors that influence disease occurrence, including behaviors, beliefs and interactions among cultures,, is essential to design context-appropriate interventions to prevent and control zoonotic diseases. Therefore, transdisciplinary research that includes epidemiological, veterinary and social science, including anthropological research, is crucial without duplication of the work in a coordinated manner.

Objective:

To conduct transdisciplinary research for generating evidence of disease and conditions at the human, animal and ecosystem interface and to develop context-appropriate interventions that enable stakeholders to address control and prevention considering the cultural, social and economic factors that influence disease incidence, impact and uptake of interventions.

Achievements

- Many multidisciplinary collaborative research projects have been and are being conducted at the human-animal and ecosystem interface including :
 - Royal Veterinary College (RVC), CVASU, London School of Hygiene and Tropical Medicine (LSHTM), Chatham House, DLS, BLRI, FAO, and IEDCR
 - Research has been conducted by major stakeholders including IEDCR, DLS, BLRI, Forest Department, CVASU, Sher-e-Bangla Agricultural University (SAU), Bangladesh Agriculture University (BAU), icddr, EcoHealth Alliance, US-CDC, FAO, WHO, Massey University, Relief International etc.
- Policy decisions and intervention based on Nipah encephalitis research results have occurred
- There is increased interest among the national and international stakeholders on One Health research

Identified Gaps

- There is a lack of identification of priority research areas
- There is not a coordinated One Health transdisciplinary research strategy

- Research outcomes have not been translated into practice and policies
- There is limited publication in peer reviewed journals
- There is a limited legal framework between national and international organizations which hampers collaborative research
- There is a lack of knowledge on the status of diseases of One Health concern
- There is a lack of human resources and physical capacities for One Health transdisciplinary research

Opportunities

- One Health is one of the technical areas of the Global Health Security Agenda and the Joint External Evaluation (JEE)
- There is political commitment of member states in high-level meeting of 71st UN General Assembly on One Health approach for mitigating antimicrobial resistance.
- There is a growing recognition of One health approach among the national and global community to address diseases or conditions of global threats

Challenges

- There are different interests and priorities among stakeholders
- Collaboration and communication among different stakeholders is not coordinated
- There may be a conflict of ownership in conducting transdisciplinary research
- There is a lack of fund availability for needed research

Strategic Issue

- List of priority research areas focusing diseases and conditions at human, animal and ecosystem interface
- Development of One Health transdisciplinary research strategy
- Facilitating and coordinating of One Health transdisciplinary research
- Utilization of research findings in decision making and problem solving
- Advocacy for translating research outcomes in practice and policy

Component 5: Networking and Partnerships

Outcome: Building one health community of practices through sharing opportunities and experiences

Networking and partnerships must be pursued at all levels to ensure the effective engagement of local stakeholders and the identification of expertise for implementation of a One Health programme. Many international networks offer policy, advocacy and technical support. Linkages to these networks should be established, especially to those with local representation. At the national and local levels, networking and engagement are important in providing the necessary footholds for projects in local administrations and communities. It is therefore necessary to identify community organizations in project areas and to analyse their roles and influence in disease control issues. A participatory approach will be most productive in facilitating communities' role as project stakeholders. Establishing partnerships usually requires time, effort and capacity building, as local officials are seldom familiar with partnership methodologies. One of the core principles and direction of One Health is about building relationships, network and effective collaboration with different discipline to achieve optimum health outcomes.

Objective

To foster collaboration among government and other key stakeholders in preventing and controlling infectious diseases, health threats and conditions at the community, subnational, national, regional and global levels.

Achievements

- There is a functional network and partnership among key national and international stakeholders through research and other One Health activities
- Cross-learning platforms are in place for sharing One Health experiences at national and international levels
- Bangladesh has heled to facilitate development processes of One Health strategies for other countries
- There is 4-way linking and interconnectivity among human and animal health epidemiology and laboratory partners
- One Health Bangladesh as a national network contributing to global and regional networking

Identified Gaps

- There is reluctance in commitment and continued response among stakeholders with the existing networks
- Mapping of key stakeholders and collaborators needs to be conducted

- There is limited sharing of opportunities across community and network
- There is insufficient documentation/ publications
- There is limited professional benefit sharing among the stakeholders
- The networks function in a project-based capacity

Opportunities

- There is technological advancement for improved networking e.g interactive web platforms
- One Health Network for South Asia could be further utilized
- **Information and Communications Technology** ICT penetration and development in grass-root level
- There are several existing national and international networks
- Globalized communication creates pre-sensitized opportunities across incidence/issues
- The concept and importance of One Health is accepted and supported by the government and other stakeholders

Challenges

- Mainstream One Health financing and putting into the Operational Plan
- Stakeholders' engagement and ownership from national to local level
- Evidence generation and information sharing among the stakeholders

Strategic Issues

- In-built sustainability and resource mobilization plan of all initiatives by stakeholders
- Stakeholders mapping and sensitization of the stakeholders at all level
- Exploring the opportunity to build new partners and networks at national and global level
- Utilization of Information and Communications Technology (ICT) infrastructure and facilities, i.e: a2i (Access to Information) program of government within and among stakeholders
- Promoting One Health Bangladesh as a national network
- In-built mechanism of need-based capacity building to strengthen partnerships and networks
- Regular One Health Newsletter/ periodical to share evidence and success stories
- Strong cross learning and cost sharing platform

Component 6: Strategic Communication and Advocacy

Outcome: Strategic communication and advocacy for enabling and empowering individuals and communities to act to mitigate risk and protect their health, livelihoods and ecosystems

Within the One Health framework, partners coordinate closely in the development and implementation of strategic communication – for behavior and social change. – and advocacy. Creating strong inter-sectoral linkages from the outset helps to prevent the distortion of messages between sectors and ensures the harmonization of messages and approaches across all sectors. A strategic communication approach uses information from multidisciplinary analyses of issues related to disease prevention and control at the community level, including economic, anthropological and socio-cultural factors.

Objective

To facilitate processes that enable individuals and communities to develop the knowledge, attitudes and skills to use information in assessing their own situations and to take action for protecting their health, livelihoods and ecosystems against diseases and conditions.

Achievements

- One Health conferences involve national and international stakeholders and experts
- There are frequent One Health meetings and seminars among key stakeholders and members of One Health Bangladesh
- There is a One Health Bangladesh website (www.onehealthbangladesh.org)
- An e-newsletter has been published
- One Health outreach has expanded through membership of One Health Bangladesh

Identified Gaps

- Communication strategy for One Health with specific attention to priority zoonotic diseases and conditions needs to be developed
- Communication and advocacy materials for the policy makers and key stakeholders are needed
- There is weak coordination regarding sharing of information among different stakeholders including government and non-government organizations
- There is a lack of awareness and behavior change communication capacity among different stakeholders on the One Health Concept

Opportunities

- There is a strong formalized One Health platform in Bangladesh
- One Health Bangladesh is a professional and civil society forum
- One Health approach is a strategy supported by the International Health Regulations (2005)

Challenges

- There is a lack of coordination within and across the human, animal, agricultural, fishery, food and environmental sectors
- There is a lack of awareness and communication capacity among the different stakeholders on the One Health Concept
- There are incoordinated messaging which results in competing responses by multiple stakeholders

Strategic Issue

- Development of communication strategy for One Health with specific attention to priority zoonotic diseases and conditions
- Development of communication and advocacy materials for policy makers and key stakeholders
- Advocacy for awareness, behavior change and communication capacity building among the key stakeholders on One Health Concept
- To cross-link or cross-reference the document with other governmental and global commitments, for example, GoB SBCC strategy on health, nutrition and population; the global accountability to affected population (AAP) agenda in emergency response; the International Health Regulations (IHR) in relation to risk communication capacity.

Component 7: Capacity Building

Outcome: Sustainable capacity building activities in all the components of One Health strategy

Capacity building in terms of workforce development, technical and operational capacity is crucial for a sustainable One Health movement. The strategic component required overall capacity development of existing staffing, resources and infrastructure as well as additional human resources when required. The plans to develop capacity are made within the individual technically orientated components, but the resources required can be budgeted for in this component rather than in the technical component. It is envisaged that this approach will help with project planning and coordination of resource allocation. For some disease control efforts, it is necessary to empower communities to take actions that have impact on disease emergence and reporting of outbreaks. This will strengthen capacities of the communities in relation to knowledge on animal, human and environment interface.

Objective

To develop One Health workforce, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.

Achievements

- There is a One Health fellowship program in collaboration Massey University, IEDCR and CVASU
- The FETP, B program includes both physicians and veterinarians in the advanced and frontline courses in collaboration with US-CDC
- The WILD Training on One Health was conducted in collaboration with FAO
- A 4-way linking training using simulation exercise was conducted with epidemiologists and laboratory personnel from human and animal health sectors
- The One Health Institute of CVASU and the Zoonotic Diseases Research & Information Center (ZDRIC), Sher-E-Bangla Agricultural University are active
- There are two PhD fellowships for Bangladesh under the Zoonoses and Emerging Livestock Systems (ZELS) project
- There are Masters in Epidemiology Programs at CVASU and Sylhet Agricultural University

Identified Gaps

- There are insufficient trained One Health staff in all sectors (not enough positions, limited qualified staff to fill open/available positions)
- There are limited field/applied epidemiology training opportunities in multiple sectors, particularly among veterinarians and wildlife

- There are limited career opportunities for One Health professionals
- There are limited In-service One Health training for field-based medical, veterinarian, and environmental officers
- There is no strategic assessment of training needs to prioritize One Health Workforce Training activities
- There is limited One Health concept in existing undergraduate and post graduate curriculum in human, animal and wildlife health sectors
- There is a lack of knowledge sharing and coordinated communication between stakeholders and One Health Sectors
- There is limited laboratory capacity, including workforce, infrastructure, and supplies

Opportunities

- There are multiple stakeholders and development partners that can be leveraged for technical and financial support
- There is availability of Government of Bangladesh funding by inclusion of One Health Secretariat/One Health related activities in the 2017-2021 Health Sector Plan.
- Outbreaks can be utilized as opportunities to improve collaborations between sectors

Challenges

- There is frequent staff and leadership turnover
 - Changing leadership and priorities can slow down movement and coordination
 - Trained staff move on to other positions and no trained staff in place
- There is uncertainty of future donor funds, complex reporting and compliance requirements
- Outbreaks and competing priorities take time away from coordinated and strategic activities
- Bureaucratic challenges exist—plan implementation approvals are required

Strategic Issues

- Development of human resources plan to build and maintain epidemiologic and laboratory capacity in human, animal and wildlife health sector
- Continuation and Enhancement of coordinated field epidemiology training for staff in One Health sectors e.g. Field Epidemiology Training Program for Veterinarians (FETPv)
- Short training on risk communication for human, animal and wildlife professionals
- Training for laboratory staff in targeted institutions and positions
- Coordination with universities to increase One Health training in undergraduate and graduate programs, through both introduction/continuation of new programs and addition of One Health components into existing curricula
- Increased collaboration and communication among stakeholders through regular electronic correspondence and website updates

Chapter VI: Conclusion

A One Health approach to combat the high impact infectious diseases like avian influenza, Nipah or conditions such as anti-microbial resistance is crucial to achieve optimum health outcomes of all species in a complex and fragile ecosystem. The One Health approach is very effective in a developing country like Bangladesh where the interface between human and animal is very distinct. The strategic framework developed in 2012 acted as a guideline to further the goal of One Health in Bangladesh. Since then, significant developments in all components has been made by i stakeholders. The revised framework focuses on the achievements, key strengths and weaknesses in upcoming years. Specific recommendations have been made for components according to the findings of the SWOT analyses and action strategies and plans have been drafted accordingly. Recommendations will act as a baseline for component-wise action plans for the revised strategic framework. A coordinated approach to achieve all components is necessary and will be adopted to safeguard human, animal and wildlife health in complex ecosystems.

. A validation workshop was conducted on 24 August 2017 to finalize the Draft Revised One Health Strategic Framework. After incorporating the reviews and recommendations from the validation workshop the final One Health Strategic Framework and Action Plan will be submitted to the One Health Secretariat. OHS will submit the revised Strategic Framework to the Inter-Ministerial Steering Committee for One Health for endorsement during September 2017. Meeting of the IMSOCH can be requested for the approval process.

Strategic Framework for the application of a One Health approach in Bangladesh

Action Plan

Component 1: Institutional governance and programme Management																						
Outcome: Sustained Institutional arrangements for One Health approach																						
Objective: To strengthen institutional arrangements, policy frameworks and management mechanisms in facilitating One Health approach for prevention, detection and response to high impact diseases and conditions at the animal, human and eco-system interface.										Indicators: 1) Functioning of One Health Secretariat as per terms of references 2) Inclusion of One Health activities in the operational plan of the sector wide program/ 5years plan of major stakeholders 3) Regular information and routine data sharing Means of verification: 1) Documented memorandum of arrangements for sustainable functioning of One Health Secretariat 2) Documented evidence of policy frameworks 3) Evidence of regular information and routine data sharing												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 1.1 Revision of structures and terms of reference necessary for the Government of Bangladesh to sustain One Health approach	1.1.1. Inclusion of Ministry of Agriculture in the Inter-ministerial Steering Committee																					Lead by: MoHFW, MoFL, MoEF, MoA Coordination by: One Health Secretariat Supported by: P & R/FAO/WHO

Component 1: Institutional governance and programme Management																						
Outcome: Sustained Institutional arrangements for One Health approach																						
Objective: To strengthen institutional arrangements, policy frameworks and management mechanisms in facilitating One Health approach for prevention, detection and response to high impact diseases and conditions at the animal, human and eco-system interface.										Indicators: 1) Functioning of One Health Secretariat as per terms of references 2) Inclusion of One Health activities in the operational plan of the sector wide program/ 5years plan of major stakeholders 3) Regular information and routine data sharing Means of verification: 1) Documented memorandum of arrangements for sustainable functioning of One Health Secretariat 2) Documented evidence of policy frameworks 3) Evidence of regular information and routine data sharing												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	1.1.2 Strengthening of One Health Secretariat through: <ul style="list-style-type: none"> • Inter- ministerial agreement with new ministries • Approval of the cabinet • Gazette notification 																					
Output 1.2 Legal arrangement for sustainability of One Health approach	1.2.1 Review of existing law that influences human health, animal health & environmental health and align them in spirit of one health approach																					Lead by: MoHFW, MoFL, MoEF, MoA Coordination by: One Health Secretariat

Component 1: Institutional governance and programme Management																						
Outcome: Sustained Institutional arrangements for One Health approach																						
Objective: To strengthen institutional arrangements, policy frameworks and management mechanisms in facilitating One Health approach for prevention, detection and response to high impact diseases and conditions at the animal, human and eco-system interface.										Indicators: 1) Functioning of One Health Secretariat as per terms of references 2) Inclusion of One Health activities in the operational plan of the sector wide program/ 5years plan of major stakeholders 3) Regular information and routine data sharing Means of verification: 1) Documented memorandum of arrangements for sustainable functioning of One Health Secretariat 2) Documented evidence of policy frameworks 3) Evidence of regular information and routine data sharing												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 1.3 Institutional arrangements are in place	1.3.1 Institutional arrangement will be as follows: <ul style="list-style-type: none"> • Interministerial steering committee • Technical advisory group will be renamed as technical advisory committee • Co-ordination committee for One Health Secretariat 																					Lead by: MoHFW, MoFL, MoEF, MoA Coordination by: One Health Secretariat Supported by: P & R/FAO/WHO

Component 1: Institutional governance and programme Management																						
Outcome: Sustained Institutional arrangements for One Health approach																						
Objective: To strengthen institutional arrangements, policy frameworks and management mechanisms in facilitating One Health approach for prevention, detection and response to high impact diseases and conditions at the animal, human and eco-system interface.										Indicators: 1) Functioning of One Health Secretariat as per terms of references 2) Inclusion of One Health activities in the operational plan of the sector wide program/ 5years plan of major stakeholders 3) Regular information and routine data sharing Means of verification: 1) Documented memorandum of arrangements for sustainable functioning of One Health Secretariat 2) Documented evidence of policy frameworks 3) Evidence of regular information and routine data sharing												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 1.4 Line agency and sector policies are updated to facilitate implementation of the One Health approach	1.4.1 Inclusion of One Health activities in the operational plan of the respective sector programs/ 5-year plan of major stakeholders																					Lead by: MoHFW, MoFL, MoEF, MoA Coordination by: One Health Secretariat Supported by: All relevant Agencies (e.g. DGHS, DLS, BFD, DoF, DAE)

Component 1: Institutional governance and programme Management																						
Outcome: Sustained Institutional arrangements for One Health approach																						
Objective: To strengthen institutional arrangements, policy frameworks and management mechanisms in facilitating One Health approach for prevention, detection and response to high impact diseases and conditions at the animal, human and eco-system interface.										Indicators: 1) Functioning of One Health Secretariat as per terms of references 2) Inclusion of One Health activities in the operational plan of the sector wide program/ 5years plan of major stakeholders 3) Regular information and routine data sharing Means of verification: 1) Documented memorandum of arrangements for sustainable functioning of One Health Secretariat 2) Documented evidence of policy frameworks 3) Evidence of regular information and routine data sharing												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 1.5 Selected existing activities are leveraged for the One Health approach	1.5.1 Identify existing activities that leverage one health approach <ul style="list-style-type: none"> Engage a national consultant Workshop involving multi sectoral experts Preparation of reports Mechanism for enhanced connectivity among the sectors 																					Lead by: One Health secretariat Supported by: UN Agencies, P & R

Component 1: Institutional governance and programme Management																						
Outcome: Sustained Institutional arrangements for One Health approach																						
Objective: To strengthen institutional arrangements, policy frameworks and management mechanisms in facilitating One Health approach for prevention, detection and response to high impact diseases and conditions at the animal, human and eco-system interface.										Indicators: 1) Functioning of One Health Secretariat as per terms of references 2) Inclusion of One Health activities in the operational plan of the sector wide program/ 5years plan of major stakeholders 3) Regular information and routine data sharing Means of verification: 1) Documented memorandum of arrangements for sustainable functioning of One Health Secretariat 2) Documented evidence of policy frameworks 3) Evidence of regular information and routine data sharing												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 1.6 Mechanisms to ensure collaborative planning and to monitor the overall performance of one health activities	1.6.1 Mechanism of collaborative planning & networking and monitoring developed through workshops, collaborative outbreak investigation, surveillance and data sharing																					Lead by: MoHFW, MoFL, MoEF, MoA Coordination by: One Health Secretariat Supported by: All relevant Agencies (e.g., DGHS, DLS, BFD, DoF, DAE) and partners
Output 1.7 Programs planned and managed according to the One Health Approach Strategic Framework	1.7.1 Identify and prioritize programs through Inter-sectoral meetings and workshops																					Lead by: MoHFW, MoFL, MoEF, MoA Supported by: All relevant Agencies (e.g., DGHS, DLS, BFD, DoF, DAE) and partners

Component 1: Institutional governance and programme Management																						
Outcome: Sustained Institutional arrangements for One Health approach																						
Objective: To strengthen institutional arrangements, policy frameworks and management mechanisms in facilitating One Health approach for prevention, detection and response to high impact diseases and conditions at the animal, human and eco-system interface.										Indicators: 1) Functioning of One Health Secretariat as per terms of references 2) Inclusion of One Health activities in the operational plan of the sector wide program/ 5years plan of major stakeholders 3) Regular information and routine data sharing Means of verification: 1) Documented memorandum of arrangements for sustainable functioning of One Health Secretariat 2) Documented evidence of policy frameworks 3) Evidence of regular information and routine data sharing												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 1.8 Inter-agencies co-ordination upto district level established	1.8.1. Formation of inter-agencies co-ordination committees upto district level 1.8.2 Development of TOR for the co-ordination committee of each tier through workshops																					Lead by: All relevant Agencies (e.g., DGHS, DLS, BFD, DoF, DAE) Coordination by: One Health Secretariat Supported by: P & R
Output 1.9 Inter-agencies communication and information exchange established	1.9.1. Communication mechanisms developed: <ul style="list-style-type: none"> Workshops twice a year Publication Routine web based data/information sharing 																					Lead by: MoHFW, MoFL, MoEF, MoA Supported by: All relevant Agencies (e.g., DGHS, DLS, BFD, DoF, DAE) and partners

Component 2: Coordinated surveillance																						
Outcome: Coordinated surveillance for priority zoonotic diseases and conditions																						
Objective: To establish coordinated surveillance of priority zoonotic diseases and conditions including antimicrobial resistance (AMR)										Indicators: Coordinated surveillance of priority zoonotic diseases and conditions including antimicrobial resistance (AMR)												
										Means of verification: 1) Reports showing coordinated surveillance activities 2) Surveillance data sharing platform(s)												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 2.1 One Health surveillance strategy and framework (including prioritize Disease, surveillance and data sharing)	2.1.1. Develop a One Health surveillance strategy and framework through a series of stakeholder’s workshops																					Lead by: IEDCR/DGHS, DLS, FD Coordinated by: One Health Secretariat
	2.1.2 Workshop on zoonotic disease prioritization including literature review																					Lead by: IEDCR/DGHS, DLS, FD Coordinated by: One Health Secretariat Supported by: P & R, US CDC

Component 2: Coordinated surveillance																							
Outcome: Coordinated surveillance for priority zoonotic diseases and conditions																							
Objective: To establish coordinated surveillance of priority zoonotic diseases and conditions including antimicrobial resistance (AMR)										Indicators: Coordinated surveillance of priority zoonotic diseases and conditions including antimicrobial resistance (AMR)													
										Means of verification: 1) Reports showing coordinated surveillance activities 2) Surveillance data sharing platform(s)													
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner	
		2017				2018				2019				2020				2021					
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
Output 2.2 Coordinated surveillance system with One Health approach	2.2.1 Develop plan of action for coordinated surveillance and data sharing for priority zoonotic diseases																						Lead by: IEDCR/DLS Coordinated by: One Health Secretariat Supported by: Developing partners
	2.2.2 Develop SOP for coordinated sample collection, shipment, storage and sharing																						Lead by: IEDCR/DLS Supported by: BLRI, CDIL, icddr,b
	2.2.3 Develop platform for data sharing among different sectors and dissemination of information for general population																						Lead by: DLS, DGHS, FD Coordinated by: One Health Secretariat

Component 2: Coordinated surveillance

Outcome: Coordinated surveillance for priority zoonotic diseases and conditions

Objective: To establish coordinated surveillance of priority zoonotic diseases and conditions including antimicrobial resistance (AMR)

Indicators: Coordinated surveillance of priority zoonotic diseases and conditions including antimicrobial resistance (AMR)

Means of verification: 1) Reports showing coordinated surveillance activities 2) Surveillance data sharing platform(s)

Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 2.3 Maps of high-risk areas for priority zoonotic diseases	2.3.1 Mapping of high risk areas																					Lead by: IEDCR, DLS, DGHS, FD Coordinated by: One Health Secretariat Supported by: UN agencies, US CDC, USAID, Agricultural and Veterinary Universities
Output 2.4 Coordinated AMR/drug abuse surveillance	2.4.1 Enlisting of AMR surveillance activities by different sectors/agencies																					Lead by: IEDCR, DLS, FD, Universities Coordinated by: One Health Secretariat

Component 2: Coordinated surveillance																							
Outcome: Coordinated surveillance for priority zoonotic diseases and conditions																							
Objective: To establish coordinated surveillance of priority zoonotic diseases and conditions including antimicrobial resistance (AMR)										Indicators: Coordinated surveillance of priority zoonotic diseases and conditions including antimicrobial resistance (AMR) Means of verification: 1) Reports showing coordinated surveillance activities 2) Surveillance data sharing platform(s)													
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner	
		2017				2018				2019				2020				2021					
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
	2.4.2 Coordinated plan involving DLS and Drug administration for prevention of steroid abuse in animals																					Lead by: IEDCR, DLS Coordinated by: One Health Secretariat Supported by: Drug Administration, UN agencies, US CDC, USAID	
	2.4.3 Coordinated AMR surveillance with data sharing																					Lead by: IEDCR, DLS, DGHS, FD Coordinated by: One Health Secretariat Supported by: UN agencies, US CDC, USAID, Agricultural and Veterinary Universities	

Component 2: Coordinated surveillance																							
Outcome: Coordinated surveillance for priority zoonotic diseases and conditions																							
Objective: To establish coordinated surveillance of priority zoonotic diseases and conditions including antimicrobial resistance (AMR)					Indicators: Coordinated surveillance of priority zoonotic diseases and conditions including antimicrobial resistance (AMR)																		
					Means of verification: 1) Reports showing coordinated surveillance activities 2) Surveillance data sharing platform(s)																		
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner	
		2017				2018				2019				2020				2021					
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
Output 2.6 Surveillance capacities strengthened to build sufficient capacity in each sector partner	2.6.1 Assess existing capacity for coordinated surveillance of each sector partner																						Lead by: IEDCR, DLS, FD Coordinated by: One Health Secretariat Supported by: Development partners, Icdcr,b, Universities
	2.6.2 Conduct the joint training																						Lead by: IEDCR, DLS, FD Coordinated by: One Health Secretariat Supported by: Development partners, Icdcr,b, Universities
Output 2.7 Diagnostic laboratory capacity and capability	2.7.1 Assess the existing laboratory capacity, capability and proficiency																						Lead by: DLS/IEDCR Supported by: BLRI, IPH, icddr,b, Universities

Component 2: Coordinated surveillance																										
Outcome: Coordinated surveillance for priority zoonotic diseases and conditions																										
Objective: To establish coordinated surveillance of priority zoonotic diseases and conditions including antimicrobial resistance (AMR)												Indicators: Coordinated surveillance of priority zoonotic diseases and conditions including antimicrobial resistance (AMR)														
												Means of verification: 1) Reports showing coordinated surveillance activities 2) Surveillance data sharing platform(s)														
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner				
		2017				2018				2019				2020				2021								
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
strengthened and fit for supporting the One Health approach to the selected disease(s)	2.7.2 Conduct joint training based on assessment findings																									Lead by: DLS/IEDCR Supported by: BLRI, IPH, icddr,b, Universities
Output 2.8 Application of participatory methods for detection and management of diseases at the community level	2.8.1 Identify the community																									Lead by: IEDCR/DGHS, DLS Supported by: Developing partners, Universities
	2.8.2 Develop an educational toolkit																									
	2.8.3 Conduct training of community workers and managers for application of participatory methods for disease detection and management																									

Component 3: Coordinated outbreak investigation and response																						
Outcome: Coordinated outbreak investigation and response for priority zoonotic diseases through one health approach																						
Objective: To strengthen outbreak detection, investigation and response capabilities and coordination within a One Health framework										Indicators: 1) A mechanism for coordinated response to outbreaks of zoonotic diseases by human, animal and wildlife sectors is established. 2) Strengthened capacity and coordination for outbreak investigation and response. Means of verification: 1) Documentation of joint approaches to outbreak investigations and response. 2) Documentation of coordination of outbreak investigation, response and report preparation. 3) Reduction of intervals from outbreak reporting to containment												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 3.1 Outbreak investigation and response strategy for priority zoonotic diseases and conditions developed	3.1.1 Develop joint disease outbreak investigation and response strategy																					Lead by: IEDCR/DGHS/DLS/FD Coordinated by: One Health Secretariat Supported by: WHO, FAO, US CDC
	3.1.2 Endorse the strategy by relevant partners																					
	3.1.3 Disseminate the strategy among relevant stakeholders																					
Output 3.2 Detailed SOPs and contingency plans for field-level	3.2.1 Develop contingency plans for responding to outbreaks using One Health approach																					Lead by: IEDCR/DGHS/DLS/FD Coordinated by: One Health Secretariat

Component 3: Coordinated outbreak investigation and response																						
Outcome: Coordinated outbreak investigation and response for priority zoonotic diseases through one health approach																						
Objective: To strengthen outbreak detection, investigation and response capabilities and coordination within a One Health framework					Indicators: 1) A mechanism for coordinated response to outbreaks of zoonotic diseases by human, animal and wildlife sectors is established. 2) Strengthened capacity and coordination for outbreak investigation and response. Means of verification: 1) Documentation of joint approaches to outbreak investigations and response. 2) Documentation of coordination of outbreak investigation, response and report preparation. 3) Reduction of intervals from outbreak reporting to containment																	
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
management of disease outbreaks	3.2.2 Develop SOPs for responding to outbreaks using One Health Approach																					Supported by: WHO, FAO, US CDC
	3.2.3 Endorse and disseminate contingency plans and SOPs																					
Output 3.3 Strengthened capacity for field	3.3.1 Develop training modules and manuals for Priority Communicable Diseases																					Lead by: IEDCR/DGHS/DLS/FD

Component 3: Coordinated outbreak investigation and response																						
Outcome: Coordinated outbreak investigation and response for priority zoonotic diseases through one health approach																						
Objective: To strengthen outbreak detection, investigation and response capabilities and coordination within a One Health framework										Indicators: 1) A mechanism for coordinated response to outbreaks of zoonotic diseases by human, animal and wildlife sectors is established. 2) Strengthened capacity and coordination for outbreak investigation and response. Means of verification: 1) Documentation of joint approaches to outbreak investigations and response. 2) Documentation of coordination of outbreak investigation, response and report preparation. 3) Reduction of intervals from outbreak reporting to containment												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
response to disease outbreaks	3.3.2 Conduct training of RRT comprising of human, animal and wildlife sectors 3.3.3 Strengthening existing EOC in IEDCR and establish EOC in other one health stakeholders organizations 3.3.4 Develop event based surveillance in One health stakeholder organizations																					Coordinated by: One Health Secretariat Supported by: WHO, FAO, US CDC

Component 3: Coordinated outbreak investigation and response																						
Outcome: Coordinated outbreak investigation and response for priority zoonotic diseases through one health approach																						
Objective: To strengthen outbreak detection, investigation and response capabilities and coordination within a One Health framework					Indicators: 1) A mechanism for coordinated response to outbreaks of zoonotic diseases by human, animal and wildlife sectors is established. 2) Strengthened capacity and coordination for outbreak investigation and response. Means of verification: 1) Documentation of joint approaches to outbreak investigations and response. 2) Documentation of coordination of outbreak investigation, response and report preparation. 3) Reduction of intervals from outbreak reporting to containment																	
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 3.4 Increased numbers of key officials in high-risk areas with understanding of outbreak response requirements	3.4 Advocate for increasing the number of key officials in high risk areas with understanding of outbreak response requirements																					Lead by: DLS, MOFL/DGHS, MOHFW
Output 3.5 Increased numbers of operatives undertaking risk analysis to support disease control	3.5 Advocate for increasing the epidemiologists at all levels for undertaking risk analysis to support disease control																					Lead by: IEDCR/DLS Supported by: Epidemiological Association of Bangladesh (EPAB)

Component 3: Coordinated outbreak investigation and response																						
Outcome: Coordinated outbreak investigation and response for priority zoonotic diseases through one health approach																						
Objective: To strengthen outbreak detection, investigation and response capabilities and coordination within a One Health framework					Indicators: 1) A mechanism for coordinated response to outbreaks of zoonotic diseases by human, animal and wildlife sectors is established. 2) Strengthened capacity and coordination for outbreak investigation and response. Means of verification: 1) Documentation of joint approaches to outbreak investigations and response. 2) Documentation of coordination of outbreak investigation, response and report preparation. 3) Reduction of intervals from outbreak reporting to containment																	
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 3.6 Disease outbreak response teams have outbreak investigation capability	3.6 Conduct desktop simulations to improve understanding and test capacity for disease control for priority diseases																					Lead by: IEDCR/DLS Supported by: icddr,b and other international partners
Output 3.7 Disease outbreak response teams have inbuilt outbreak investigation capability	3.7.1 Obtain standing order																					Lead by: DLS/IEDCR Supported by: DGHS
	3.7.2 Form stand by team																					
Output 3.8 Specified amount of response	3.8.1 Conduct assessment in partner institutes/organizations																					Lead by: IEDCR/DLS/Wildlife

Component 3: Coordinated outbreak investigation and response																						
Outcome: Coordinated outbreak investigation and response for priority zoonotic diseases through one health approach																						
Objective: To strengthen outbreak detection, investigation and response capabilities and coordination within a One Health framework					Indicators: 1) A mechanism for coordinated response to outbreaks of zoonotic diseases by human, animal and wildlife sectors is established. 2) Strengthened capacity and coordination for outbreak investigation and response. Means of verification: 1) Documentation of joint approaches to outbreak investigations and response. 2) Documentation of coordination of outbreak investigation, response and report preparation. 3) Reduction of intervals from outbreak reporting to containment																	
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
equipment available in storage and audited for readiness	3.8.2 Procure necessary equipment and logistics																					Supported by: UN agencies, development partners
	3.8.3 Conduct audit periodically																					

Component 4: Transdisciplinary Research																										
Outcome: Transdisciplinary research provides key evidence to facilitate prevention and control of disease or conditions at human-animal and ecosystem interface																										
Objective: To conduct transdisciplinary research for generating evidence and to develop interventions that enables stakeholders to address control and prevention of disease and conditions at human, animal and ecosystem interface										Indicators: 1) One Health transdisciplinary strategy developed 2) Numbers of transdisciplinary research undertaken 3) Results from transdisciplinary research to address control and prevention of disease and conditions at human, animal and ecosystem interface 4) Number of publication in peer reviewed journals																
Means of verification: 1) One Health transdisciplinary strategy document 2) Reports of research focusing one health 3) Evidence of research findings incorporated into prevention and control strategy 4) Increased number of publication in peer reviewed journals																										
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner				
		2017				2018				2019				2020				2021								
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
Output 4.1 Lists of priority research areas for diseases and conditions at human, animal and ecosystem interface	4.1.1 Conduct workshops to define priority research areas																									Lead by: IEDCR/DGHS/DLS/FD Supported by: All developing partners, relevant Universities

Component 4: Transdisciplinary Research																							
Outcome: Transdisciplinary research provides key evidence to facilitate prevention and control of disease or conditions at human-animal and ecosystem interface																							
Objective: To conduct transdisciplinary research for generating evidence and to develop interventions that enables stakeholders to address control and prevention of disease and conditions at human, animal and ecosystem interface												Indicators: 1) One Health transdisciplinary strategy developed 2) Numbers of transdisciplinary research undertaken 3) Results from transdisciplinary research to address control and prevention of disease and conditions at human, animal and ecosystem interface 4) Number of publication in peer reviewed journals Means of verification: 1) One Health transdisciplinary strategy document 2) Reports of research focusing one health 3) Evidence of research findings incorporated into prevention and control strategy 4) Increased number of publication in peer reviewed journals											
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner	
		2017				2018				2019				2020				2021					
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
Output 4.2 One Health transdisciplinary research strategy	4.2.1 Conduct series of workshops and consultative meetings for development of One health research strategy for transdisciplinary research																					Lead by: IEDCR/DGHS/DLS/FD Coordinated by: One Health Secretariat	
Output 4.3 Translation of research outcomes in	4.3.1 Advocacy meetings on utilization of research findings in practice and policy for policy makers																					Lead by: Research project dependent	

Component 4: Transdisciplinary Research																						
Outcome: Transdisciplinary research provides key evidence to facilitate prevention and control of disease or conditions at human-animal and ecosystem interface																						
Objective: To conduct transdisciplinary research for generating evidence and to develop interventions that enables stakeholders to address control and prevention of disease and conditions at human, animal and ecosystem interface										Indicators: 1) One Health transdisciplinary strategy developed 2) Numbers of transdisciplinary research undertaken 3) Results from transdisciplinary research to address control and prevention of disease and conditions at human, animal and ecosystem interface 4) Number of publication in peer reviewed journals Means of verification: 1) One Health transdisciplinary strategy document 2) Reports of research focusing one health 3) Evidence of research findings incorporated into prevention and control strategy 4) Increased number of publication in peer reviewed journals												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
practice and policy	4.3.2 Advocacy meetings on utilization of research findings in practice and policy for technical policy leaders																					Supported by: One Health Secretariat
Output 4.4 Enhanced national	4.4.1 Engage national scientists in conducting transdisciplinary research projects																					Lead by: One Health Secretariat

Component 4: Transdisciplinary Research																										
Outcome: Transdisciplinary research provides key evidence to facilitate prevention and control of disease or conditions at human-animal and ecosystem interface																										
Objective: To conduct transdisciplinary research for generating evidence and to develop interventions that enables stakeholders to address control and prevention of disease and conditions at human, animal and ecosystem interface											Indicators: 1) One Health transdisciplinary strategy developed 2) Numbers of transdisciplinary research undertaken 3) Results from transdisciplinary research to address control and prevention of disease and conditions at human, animal and ecosystem interface 4) Number of publication in peer reviewed journals															
Means of verification: 1) One Health transdisciplinary strategy document 2) Reports of research focusing one health 3) Evidence of research findings incorporated into prevention and control strategy 4) Increased number of publication in peer reviewed journals																										
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner				
		2017				2018				2019				2020				2021								
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
research capacity through research programs with well-defined and achievable targets	4.4.2 Identify training opportunities in research projects, including fellowship/trainee programs in collaborative research organizations, relevant One Health training and higher degree programs																									Supported by: All research partners
	4.4.3 Facilitate funding through resource planning workshop involving national and international agencies and enrolment of national scientists in these programs																									

Component 4: Transdisciplinary Research																							
Outcome: Transdisciplinary research provides key evidence to facilitate prevention and control of disease or conditions at human-animal and ecosystem interface																							
Objective: To conduct transdisciplinary research for generating evidence and to develop interventions that enables stakeholders to address control and prevention of disease and conditions at human, animal and ecosystem interface												Indicators: 1) One Health transdisciplinary strategy developed 2) Numbers of transdisciplinary research undertaken 3) Results from transdisciplinary research to address control and prevention of disease and conditions at human, animal and ecosystem interface 4) Number of publication in peer reviewed journals Means of verification: 1) One Health transdisciplinary strategy document 2) Reports of research focusing one health 3) Evidence of research findings incorporated into prevention and control strategy 4) Increased number of publication in peer reviewed journals											
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner	
		2017				2018				2019				2020				2021					
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
Output 4.5 Dissemination of transdisciplinary research findings among stakeholders	4.5.1 Dissemination workshops for senior managements and stakeholders																						Lead by: Research project dependent Supported by: One Health Secretariat/ One Health Bangladesh
	4.5.2 Scientific seminars																						
	4.5.3 One Health Bangladesh Conference																						
	4.5.4 One Health Journal																						

Component 5: Network and Partnership																										
Outcome: Building one health community of practices through sharing opportunities and experiences																										
Objective: To foster collaboration among government and other key stakeholders in preventing and controlling infectious diseases, health threats and conditions at the community, subnational, national, regional and global levels										Indicators: 1) Numbers of functioning networks, partnerships and collaborations established 2) Community, national and international engagement in One Health approach to control in addressing EIDs, health threats and conditions Means of verification: 1) Documents and publications showing existence of networks, partnerships and collaborations 2) Assessment at field level of functioning of networks 3) Participation in international network meetings																
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner				
		2017				2018				2019				2020				2021								
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
Output 5.1 Mapping of key stakeholders and collaborators	5.1.1 Identification of Stakeholders/Collaborators																									Lead by: One Health Secretariat
	5.1.2 Identification of focal point at different human health, animal health including fisheries, agriculture extension and environment																									Support by: IEDCR/DGHS/DLS/FD
Output 5.2 Networks at the	5.2.1 Identification of the high-Risk communities																									Lead by: One Health Secretariat

Component 5: Network and Partnership																							
Outcome: Building one health community of practices through sharing opportunities and experiences																							
Objective: To foster collaboration among government and other key stakeholders in preventing and controlling infectious diseases, health threats and conditions at the community, subnational, national, regional and global levels												Indicators: 1) Numbers of functioning networks, partnerships and collaborations established 2) Community, national and international engagement in One Health approach to control in addressing EIDs, health threats and conditions Means of verification: 1) Documents and publications showing existence of networks, partnerships and collaborations 2) Assessment at field level of functioning of networks 3) Participation in international network meetings											
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner	
		2017				2018				2019				2020				2021					
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
community level to facilitate implementation of the One Health approach to priority zoonotic diseases and conditions	5.2.2 Identification of community based organizations present there																					Support by: IEDCR/DGHS/DLS/FD	
	5.2.3 Advocacy/consultation/ community/ collaborative meeting to capacitate the community in identifying outbreaks																						
Output 5.3 Participatory	5.3.1 SOP/guideline for participatory activities																					Lead by: Respective departments	

Component 5: Network and Partnership																										
Outcome: Building one health community of practices through sharing opportunities and experiences																										
Objective: To foster collaboration among government and other key stakeholders in preventing and controlling infectious diseases, health threats and conditions at the community, subnational, national, regional and global levels										Indicators: 1) Numbers of functioning networks, partnerships and collaborations established 2) Community, national and international engagement in One Health approach to control in addressing EIDs, health threats and conditions Means of verification: 1) Documents and publications showing existence of networks, partnerships and collaborations 2) Assessment at field level of functioning of networks 3) Participation in international network meetings																
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner				
		2017				2018				2019				2020				2021								
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
approach to communication and feedback in communities	5.3.2 Training and resource allocation																									Support by: WHO, FAO, UNICEF, US CDC, EcoHealth Alliance
	5.3.3 Regular meetings with community																									
Output 5.4 Networks at the national level to facilitate implementation of the One Health approach to selected disease(s)	5.4.1 Identification of Stakeholders/Collaborators																									Lead by: One Health Secretariat
	5.4.2 Coordination meeting																									Support by: IEDCR/DGHS/DLS/FD

Component 5: Network and Partnership

Outcome: Building one health community of practices through sharing opportunities and experiences

Objective: To foster collaboration among government and other key stakeholders in preventing and controlling infectious diseases, health threats and conditions at the community, subnational, national, regional and global levels

Indicators: 1) Numbers of functioning networks, partnerships and collaborations established
2) Community, national and international engagement in One Health approach to control in addressing EIDs, health threats and conditions

Means of verification: 1) Documents and publications showing existence of networks, partnerships and collaborations 2) Assessment at field level of functioning of networks 3) Participation in international network meetings

Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 5.5 Working mechanisms for the operation and engagement of partnerships in disease control	5.5.1 Formation of multi sectoral working team with TOR outlined																					Lead by: One Health Secretariat Support by: IEDCR/DGHS/DLS/FD WHO, FAO, UNICEF, US CDC
	5.5.2 Formation of groups for specific activities viz. surveillance, lab, response etc.																					
	5.5.3 Terms of reference for working mechanism through workshop																					
	5.5.4 Resource/logistics mobilization																					

Component 5: Network and Partnership																										
Outcome: Building one health community of practices through sharing opportunities and experiences																										
Objective: To foster collaboration among government and other key stakeholders in preventing and controlling infectious diseases, health threats and conditions at the community, subnational, national, regional and global levels										Indicators: 1) Numbers of functioning networks, partnerships and collaborations established 2) Community, national and international engagement in One Health approach to control in addressing EIDs, health threats and conditions Means of verification: 1) Documents and publications showing existence of networks, partnerships and collaborations 2) Assessment at field level of functioning of networks 3) Participation in international network meetings																
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner				
		2017				2018				2019				2020				2021								
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
Output 5.6 Collaboration and exchange of materials and information within the country network and with international programs, agencies and institutions	5.6.1 Communicate with international laboratories and organizations to make memorandum of understanding/material transfer agreements																									Lead by: MoH, MoFL, MoFE, MoA Supported by: WHO, FAO, UNICEF, US CDC
	5.6.2 Sharing information among pertinent int. organization and programs.																									
Output 5.7 Bulletins, reports	5.7.1 Publication of One Health bulletin biannually																									Lead by: One Health Secretariat

Component 5: Network and Partnership

Outcome: Building one health community of practices through sharing opportunities and experiences

Objective: To foster collaboration among government and other key stakeholders in preventing and controlling infectious diseases, health threats and conditions at the community, subnational, national, regional and global levels

Indicators: 1) Numbers of functioning networks, partnerships and collaborations established
2) Community, national and international engagement in One Health approach to control in addressing EIDs, health threats and conditions

Means of verification: 1) Documents and publications showing existence of networks, partnerships and collaborations 2) Assessment at field level of functioning of networks 3) Participation in international network meetings

Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
and meetings to facilitate the two-way exchange of project information in the One Health context.	5.7.2 Event based reporting along with regular reporting to shear updates among the partners																					Support by: IEDCR/DGHS/DLS/FD WHO, FAO, UNICEF
	5.7.3 Quarterly meeting with partners at different levels																					

Component 6: Strategic communication and advocacy																						
Outcome: Strategic communication and advocacy for enabling and empowering individual and communities to act for mitigating risk and protect their health, livelihoods and ecosystems																						
Objective: To facilitate processes that enable individuals and communities to develop the knowledge, attitudes and skills to use information in assessing their own situations and to act for protecting their health, livelihoods and ecosystems against diseases and conditions.										Indicators: 1) Communication strategy document for priority zoonotic diseases developed 2) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 3) Number of materials and activities used for strategic communications and advocacy to support the One Health approach Means of verification: 1) Communication strategy document 2) Number of community focused One Health program 3) Communication materials												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 6.1: Comprehensive social and behaviour change communication strategy for priority zoonotic	6.1.1 Conduct national level inception workshop with multidisciplinary and multisectoral partners to develop one health communication strategy including action plan and budget, identify implementing body and delegate responsibility																					Lead by: MoHFW/DGHS (IEDCR & BHE), MoFL/DLS and MOEF

Component 6: Strategic communication and advocacy																						
Outcome: Strategic communication and advocacy for enabling and empowering individual and communities to act for mitigating risk and protect their health, livelihoods and ecosystems																						
Objective: To facilitate processes that enable individuals and communities to develop the knowledge, attitudes and skills to use information in assessing their own situations and to act for protecting their health, livelihoods and ecosystems against diseases and conditions.										Indicators: 1) Communication strategy document for priority zoonotic diseases developed 2) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 3) Number of materials and activities used for strategic communications and advocacy to support the One Health approach Means of verification: 1) Communication strategy document 2) Number of community focused One Health program 3) Communication materials												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
diseases and conditions	6.1.2 Literature review, formative research, establishing a baseline and develop a draft strategy (including action plan and budget)																					Lead by: MoHFW/DGHS (IEDCR & BHE), MoFL/DLS and MOEF, MoA

Component 6: Strategic communication and advocacy																						
Outcome: Strategic communication and advocacy for enabling and empowering individual and communities to act for mitigating risk and protect their health, livelihoods and ecosystems																						
Objective: To facilitate processes that enable individuals and communities to develop the knowledge, attitudes and skills to use information in assessing their own situations and to act for protecting their health, livelihoods and ecosystems against diseases and conditions.										Indicators: 1) Communication strategy document for priority zoonotic diseases developed 2) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 3) Number of materials and activities used for strategic communications and advocacy to support the One Health approach Means of verification: 1) Communication strategy document 2) Number of community focused One Health program 3) Communication materials												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	6.1.3 Conduct national level workshops with multi-disciplinary and multisectoral partners to share draft strategy including action plan & budget, and finalizing the strategy																					Supported by: UNICEF, FAO, WHO, ICDDR,B, educational institutes and other Research Organizations
	6.1.4. Securing funds to implement the action plan																					

Component 6: Strategic communication and advocacy																						
Outcome: Strategic communication and advocacy for enabling and empowering individual and communities to act for mitigating risk and protect their health, livelihoods and ecosystems																						
Objective: To facilitate processes that enable individuals and communities to develop the knowledge, attitudes and skills to use information in assessing their own situations and to act for protecting their health, livelihoods and ecosystems against diseases and conditions.										Indicators: 1) Communication strategy document for priority zoonotic diseases developed 2) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 3) Number of materials and activities used for strategic communications and advocacy to support the One Health approach Means of verification: 1) Communication strategy document 2) Number of community focused One Health program 3) Communication materials												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	6.1.5 Implementation of action plan with the need based support from National/International organizations/institutions																					
Output 6.2 Competencies of the different categories of implementers, including field workers, enhanced	6.2.1 Need Assessment of key stakeholders																					Lead by: MoHFW/DGHS (IEDCR & BHE), MoFL/DLS and MOEF, MoA
	6.2.2 Development of training packages, aids and materials for key stakeholders at different levels																					

Component 6: Strategic communication and advocacy																						
Outcome: Strategic communication and advocacy for enabling and empowering individual and communities to act for mitigating risk and protect their health, livelihoods and ecosystems																						
Objective: To facilitate processes that enable individuals and communities to develop the knowledge, attitudes and skills to use information in assessing their own situations and to act for protecting their health, livelihoods and ecosystems against diseases and conditions.										Indicators: 1) Communication strategy document for priority zoonotic diseases developed 2) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 3) Number of materials and activities used for strategic communications and advocacy to support the One Health approach Means of verification: 1) Communication strategy document 2) Number of community focused One Health program 3) Communication materials												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
according to needs assessment to enable effective implementation of the strategy and work plans.	6.2.3 Conduct training workshops for various stakeholders																					Supported by: UNICEF, FAO, WHO, icddr,b, educational institutes and other research Organizations
	6.2.4 Conduct capacity evaluations of stakeholders trained																					

Component 6: Strategic communication and advocacy																						
Outcome: Strategic communication and advocacy for enabling and empowering individual and communities to act for mitigating risk and protect their health, livelihoods and ecosystems																						
Objective: To facilitate processes that enable individuals and communities to develop the knowledge, attitudes and skills to use information in assessing their own situations and to act for protecting their health, livelihoods and ecosystems against diseases and conditions.										Indicators: 1) Communication strategy document for priority zoonotic diseases developed 2) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 3) Number of materials and activities used for strategic communications and advocacy to support the One Health approach Means of verification: 1) Communication strategy document 2) Number of community focused One Health program 3) Communication materials												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 6.3 Validated materials and training packages developed for orientation of key	6.3.1 Develop advocacy package including formats & strategies for political and opinion leaders at national and sub-national level																					Lead by: MoHFW/DGHS (IEDCR & BHE), MoFL/DLS, MoA and MOEF

Component 6: Strategic communication and advocacy																										
Outcome: Strategic communication and advocacy for enabling and empowering individual and communities to act for mitigating risk and protect their health, livelihoods and ecosystems																										
Objective: To facilitate processes that enable individuals and communities to develop the knowledge, attitudes and skills to use information in assessing their own situations and to act for protecting their health, livelihoods and ecosystems against diseases and conditions.										Indicators: 1) Communication strategy document for priority zoonotic diseases developed 2) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 3) Number of materials and activities used for strategic communications and advocacy to support the One Health approach Means of verification: 1) Communication strategy document 2) Number of community focused One Health program 3) Communication materials																
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		2017				2018				2019				2020				2021								
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4					
stakeholders, including policy makers.	6.3.2 Conduct advocacy meetings and workshops with political & opinion leaders at national and sub-national level to seek their commitment and support for One Health approach																									

Component 6: Strategic communication and advocacy																						
Outcome: Strategic communication and advocacy for enabling and empowering individual and communities to act for mitigating risk and protect their health, livelihoods and ecosystems																						
Objective: To facilitate processes that enable individuals and communities to develop the knowledge, attitudes and skills to use information in assessing their own situations and to act for protecting their health, livelihoods and ecosystems against diseases and conditions.										Indicators: 1) Communication strategy document for priority zoonotic diseases developed 2) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 3) Number of materials and activities used for strategic communications and advocacy to support the One Health approach Means of verification: 1) Communication strategy document 2) Number of community focused One Health program 3) Communication materials												
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		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	6.3.3 Develop and validate approaches, materials (through IEC Technical Committee) & tools for community engagement and empowerment;																					Supported by: MOEF/Dept of Forest, FAO, WHO (and UNICEF for pt.3 & 4)
	6.3.4 Dissemination of the materials																					

Component 6: Strategic communication and advocacy																						
Outcome: Strategic communication and advocacy for enabling and empowering individual and communities to act for mitigating risk and protect their health, livelihoods and ecosystems																						
Objective: To facilitate processes that enable individuals and communities to develop the knowledge, attitudes and skills to use information in assessing their own situations and to act for protecting their health, livelihoods and ecosystems against diseases and conditions.										Indicators: 1) Communication strategy document for priority zoonotic diseases developed 2) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 3) Number of materials and activities used for strategic communications and advocacy to support the One Health approach Means of verification: 1) Communication strategy document 2) Number of community focused One Health program 3) Communication materials												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	6.3.5 Document and disseminate evidence, success stories and good practices																					
Output 6.4 Procedures and plan in place from commencement	6.4.1 M&E framework developed																					Lead by: MoHFW/DGHS (IEDCR & BHE), MoFL/DLS, MOEF, MoA

Component 6: Strategic communication and advocacy																						
Outcome: Strategic communication and advocacy for enabling and empowering individual and communities to act for mitigating risk and protect their health, livelihoods and ecosystems																						
Objective: To facilitate processes that enable individuals and communities to develop the knowledge, attitudes and skills to use information in assessing their own situations and to act for protecting their health, livelihoods and ecosystems against diseases and conditions.										Indicators: 1) Communication strategy document for priority zoonotic diseases developed 2) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 3) Number of materials and activities used for strategic communications and advocacy to support the One Health approach Means of verification: 1) Communication strategy document 2) Number of community focused One Health program 3) Communication materials												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
to monitor and evaluate component activities.	6.4.2 Collaborations with International and national Institutions to technically guide and conduct research initiatives related strategic communication and advocacy																					Supported by: UNICEF, FAO, WHO, icddr,b, educational institutes and other research organizations

Component 6: Strategic communication and advocacy																						
Outcome: Strategic communication and advocacy for enabling and empowering individual and communities to act for mitigating risk and protect their health, livelihoods and ecosystems																						
Objective: To facilitate processes that enable individuals and communities to develop the knowledge, attitudes and skills to use information in assessing their own situations and to act for protecting their health, livelihoods and ecosystems against diseases and conditions.										Indicators: 1) Communication strategy document for priority zoonotic diseases developed 2) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 3) Number of materials and activities used for strategic communications and advocacy to support the One Health approach Means of verification: 1) Communication strategy document 2) Number of community focused One Health program 3) Communication materials												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	6.4.3 Periodic monitoring and evaluation of media, communication materials, packages and initiatives																					

Component 7: Capacity Building																							
Outcome: Sustainable capacity building activities in all the components of One Health strategy																							
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.										Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained Means of verification: 1) Functioning FETPv 2) Human resource plan document 3) Number of short training conducted													
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner	
		2017				2018				2019				2020				2021					
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
Output 7.1 Development of One Health human resources plan	7.1.1 Conduct One Health workforce needs assessment																						Lead by: IEDCR/DGHS/DLS/FD
	7.1.2 Workshops and consultative meeting to develop the human resource plan																						Supported by P & R, US CDC, WHO, FAO, UNICEF
	7.2.3 Review and measure progress on human resource plan																						Inter-ministerial steering committee for One Health

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.					Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained Means of verification: 1) Functioning FETPv 2) Human resource plan document 3) Number of short training conducted																	
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 7.2 Continuation and Expansion to other sectors of Field Epidemiology Training Program (e.g. FETPv)	7.2.1 One Health FETPv Steering Committee organized																					Lead by: MoFL/ DLS Coordinated by: One Health Secretariat
	7.2.2 Stakeholders workshops																					Lead by: DLS, IEDCR/DGHS, CVASU Supported by: US CDC, World Bank, FAO

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.										Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained Means of verification: 1) Functioning FETPv 2) Human resource plan document 3) Number of short training conducted												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	7.2.3 Course Curriculum development workshops, building off existing FETP resources																					Lead by: DLS, IEDCR/DGHS, CVASU Supported by: US CDC, World Bank, FAO
	7.2.4 Affiliation of the course with university leading to a degree																					Lead by: CVASU/DLS

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.					Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained																	
					Means of verification: 1) Functioning FETPv 2) Human resource plan document 3) Number of short training conducted																	
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	7.2.5 Enrollment of the fellows																					Lead by: DLS Collaborative partner: IEDCR/DGHS
	7.2.6 Implementation of FETPv program and monitoring/evaluation																					Lead by: DLS, IEDCR/DGHS, CVASU Supported by: US CDC, World Bank, FAO
Output 7.3 In-service and	7.3.1 Curriculum development																					Lead by: DLS/ IEDCR/DGHS, FD

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.					Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained Means of verification: 1) Functioning FETPv 2) Human resource plan document 3) Number of short training conducted																	
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
refresher training on risk communication for human, animal and wildlife professionals	7.3.2 Training conduction																					Supported by: US CDC, World Bank, FAO

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.										Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained Means of verification: 1) Functioning FETPv 2) Human resource plan document 3) Number of short training conducted												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
7.4 Strengthen Laboratory Workforce, Processes, and Infrastructure Capacity	7.4.1 Implement activities from human resources plan to provide coordinated basic laboratorian trainings,																					Lead by: Bangladesh Wildlife Center in Gazipur, IEDCR One Health Laboratory, BLRI/CDIL Supported by: CDC, ASM, icddr,b, FAO, USAID, WHO, CVASU-PRTC

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.										Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained Means of verification: 1) Functioning FETPv 2) Human resource plan document 3) Number of short training conducted												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	Activity 7.4.2: Develop/Strengthen a network of laboratories in Bangladesh working on One Health topics																					Lead by: IEDCR/DGHS, DLS support from ASM/CDC and FAO

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.										Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained Means of verification: 1) Functioning FETPv 2) Human resource plan document 3) Number of short training conducted												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	Activity 7.4.3: Assessment of laboratory capacity for diagnostic and biosafety capability (includes developing a plan, training assessors, conducting assessments, and compiling results)																					

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.										Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained Means of verification: 1) Functioning FETPv 2) Human resource plan document 3) Number of short training conducted												
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	Activity 7.4.4: Develop plan for filling gaps identified in the capacity assessments.																					Lead by: BLRI, CDIL/DLS, IEDCR/DGHS Supported by: US CDC, World Bank, FAO
	Activity 7.4.5: Develop and/or disseminate laboratory SOPs and guidelines																					Lead by: BLRI, CDIL/DLS, IEDCR/DGHS Supported by: US CDC, World Bank, FAO

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.					Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained Means of verification: 1) Functioning FETPv 2) Human resource plan document 3) Number of short training conducted																	
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	Activity 7.4.6: Develop a plan for a quality assurance/quality control system (for example further development of central reference laboratory capacity and clear systems for quality control)																					Lead by: IEDCR/DGHS, BLRI, CDIL/DLS Supported by: ASM/US CDC, World Bank, FAO
	Activity 7.4.7: Implement QA/QC plan																					

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.					Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained Means of verification: 1) Functioning FETPv 2) Human resource plan document 3) Number of short training conducted																	
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	Activity 7.4.8: Develop a plan to manage and share laboratory data across One Health Sectors																					
	Activity 7.4.9: Implement lab data sharing plan																					
7.5 Continuation and Creation of One Health Curricula and programs at	Activity 7.5.1: Set up curriculum review committee and receive permission to conduct review from relevant educational bodies and authorities																					Lead by: IEDCR/DGHS, DLS, FD, CVASU, Agriculture Universities

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.				Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained																		
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Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
the undergraduate and post-graduate level in Bangladesh Universities	Activity 7.5.2: Review of existing programs, courses, and curricula																					
	Activity 7.5.3: Incorporate expanded One Health topics into existing undergraduate program curriculum (MBBS, DVM, undergraduate public health, environmental science, etc.)																					CME, BMDC, BVC, Universities etc

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.					Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained Means of verification: 1) Functioning FETPv 2) Human resource plan document 3) Number of short training conducted																	
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	Activity 7.5.4: Develop new elective course with interested university on One Health for undergraduate or graduate programs																					Lead by: CVASU/IEDCR/NIPSOM/Agricultural universities

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.					Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained Means of verification: 1) Functioning FETPV 2) Human resource plan document 3) Number of short training conducted																	
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
	Activity 7.5.5: Coordinated activity with select universities and other partners for initiating new degree programs and scholarship programs (for example dual MPH/DVM or MBBS/MPH program, additional MPHs with One Health focus, etc).																					

Component 7: Capacity Building																						
Outcome: Sustainable capacity building activities in all the components of One Health strategy																						
Objective: To develop one health works force, technical and logistical capacity for enabling the government, partners and key stakeholders for prevention, detection and response to diseases and conditions at animal, human and eco-system interface.				Indicators: 1) Human resource development plan for one health. 2) Number of training participants in various programs 3) website developed and maintained Means of verification: 1) Functioning FETPV 2) Human resource plan document 3) Number of short training conducted																		
Expected Outputs	Activities/Tasks	2017–2021																				Responsible Partner
		2017				2018				2019				2020				2021				
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Output 7.6. Website and communication Platform for knowledge sharing	7.6.1: Conducting survey for data and information needs																					One Health Secretariat/PNR
	7.6.2: Develop website with document repository/library																					One Health Secretariat/PNR
	7.6.3: Update and Maintaining Website																					One Health Secretariat/PNR
	7.6.4: Quarterly e-newsletter																					One Health Secretariat/PNR

Chapter VII: References

1. Bidaisee S, Macpherson CN. Zoonoses and one health: a review of the literature. *Journal of parasitology research*. 2014;2014.
2. Gibbs EPJ. The evolution of One Health: a decade of progress and challenges for the future. *Veterinary Record*. 2014;174(4):85-91.
3. Mackenzie JS, Jeggo M, Daszak P, Richt JA. One Health: The human-animal-environment interfaces in emerging infectious diseases. 2013.
4. Graham JP, Leibler JH, Price LB, Otte JM, Pfeiffer DU, Tiensin T, et al. The animal-human interface and infectious disease in industrial food animal production: rethinking biosecurity and biocontainment. *Public health reports*. 2008;123(3):282-99.
5. Stewart C, Cowden J, McMenemy J, Reilly B. *Veterinary public health*. British Medical Journal Publishing Group; 2005.
6. Sekar N, Shah NK, Abbas SS, Kakkar M. Research options for controlling zoonotic disease in India, 2010–2015. *PloS one*. 2011;6(2):e17120.
7. Kakkar M, Venkataramanan V, Krishnan S, Chauhan RS, Abbas SS. Moving from rabies research to rabies control: lessons from India. *PLoS neglected tropical diseases*. 2012;6(8):e1748.
8. Leatherman S, Berwick D, Iles D, Lewin LS, Davidoff F, Nolan T, et al. The business case for quality: case studies and an analysis. *Health affairs*. 2003;22(2):17-30.
9. Vink W, McKenzie JS, Cogger N, Borman B, Muellner P. Building a foundation for 'One Health': an education strategy for enhancing and sustaining national and regional capacity in endemic and emerging zoonotic disease management. *One Health: The Human-Animal-Environment Interfaces in Emerging Infectious Diseases*: Springer; 2012. p. 185-205.
10. Rimi NA, Sultana R, Ishtiaq-Ahmed K, Khan SU, Sharker Y, Zaman RU, et al. Poultry slaughtering practices in rural communities of Bangladesh and risk of avian influenza transmission: a qualitative study. *Ecohealth*. 2014;11(1):83.
11. Sen BK. *Veterinary industry in Bangladesh: Present status and future potentials*. Dhaka University Journal of Marketing. 15:327-42.
12. Islam MS, Hossain MJ, Mikolon A, Parveen S, Khan MSU, Haider N, et al. Risk practices for animal and human anthrax in Bangladesh: an exploratory study. *Infection ecology & epidemiology*. 2013;3(1):21356.
13. Montgomery JM, Hossain MJ, Gurley E, Carroll D, Croisier A, Bertherat E, et al. Risk factors for Nipah virus encephalitis in Bangladesh. *Emerging infectious diseases*. 2008;14(10):1526.

Annex 1: List of Participants for Workshop for revision of strategic document 24 May 2017

Name	Title	Organization
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Annex 2: List of Participants for Workshop for validation of strategic document 24 August 2017

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VISION OF ONE HEATH STRATEGIC FRAMEWORK

The consequences of emerging and high impact diseases and conditions are minimized through institutionalizing the One Health approach by contributing to food security, food safety, and a healthy population in thriving ecosystems