Strategic framework for One Health approach to infectious diseases in Bangladesh

2012

Preface

The principles of One Health provide an effective approach for dealing with problems related to the human-animal-ecosystem interface. In this Strategic Framework, the approach is applied to emerging, re-emerging and high impact infectious diseases of humans and livestock. The One Health approach, whichrecognizes the interaction of environmental factors in determining disease outcomes, can also be applied beyond infectious diseases, asevidenced by this framework's inclusion of issues related to sustainable agriculture.

In Bangladesh, there are three main line ministries for the One Health approach to emerging, re-emerging and high impact infectious diseases: the Ministry of Health & Family Welfare, the Ministry of Fisheries & Livestock and the Ministry of Environment & Forests. Under these ministries there are agencies responsible for implementing One Health activities. These three ministries supported the development of the Strategic Framework for One Health approach to infectious diseases in Bangladesh through organizing and facilitating participation of theirofficials in 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 from30 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 8and 9September, 2012 in Dhaka. This Strategic Framework is a result of all partners' engagement and input to the consultation process and planning undertaken in the workshops.

During the first workshop there was strong demand for the application of a One Health approach to environmental degradation and other issues resulting from agricultural practices and pollution. This input is summarized in Annex 3 of this document. Although it was not possible to develop a full agricultural sustainability component under this Strategic Framework, the input provides the basis for its future development.

Considerable challenges exist to implementing a One Health approach in Bangladesh. Institutional arrangements for coordination and collaboration between the line agencies and operational departments need to be enhanced, and there is no working model elsewhere that can easily be transferred to the Bangladesh context. Overcomingsuch institutional constraints requires strong and selfless leadership and partners' commitment to implementation of the One Health approach. Sustained collaboration between donors and organizations responsible for implementing the One Health program is critical to its success.

Recognizing these challenges, Ministries involved have demonstrated full political commitment to the process and have pledged to continue to do so. The Framework has been validated by the officials of line ministries and agencies andincludes the necessary components, outputs and activities to reach the goal of conceptualizing and implementing One Health programs in the country. An Action Plan has also been prepared, which provides the vision for implementing planned activities in the next four years.

Maintaining sectoral independence and establishing joint operations or units is desirable for One Health approach. It is important to enhance the capacity of relevant departments to foster meaningful partnerships without surrendering individual authority.An incremental approach that includes existing initiatives will facilitate the trust-building process and the evolution of the One Health model.With the implementation of projects and activities are implemented, the governance structure proposed in the Strategic Framework will be institutionalized. This is supported by the experience at global level where there is recognition of the value in leveraging the inception of the One Health approach using existing activities.

Both the Strategic Framework and Action Plan have milestones and timelines as well as specific activities. The Strategic Framework currently has a five-year lifespan and it will be reviewed in its entirety at the end of 2016.The Strategic Framework will be used as the basis for developing future One Health programs in specific areas for the next program cycle.

Contents

Acronyms and Abbreviations

ADOHSC	Ad Hoc One Health Steering Committee
BAPA	Bangladesh PoribeshAndolon
BAU	Bangladesh Agriculture University
BRAC	Bangladesh Rehabilitation Assistance Committee
CDC	United States Centers for Disease Control and Prevention
CVASU	Chittagong Veterinary and Animal Sciences University
DF	Department of Forests
DLS	Department of Livestock Services
EID	emerging infectious disease
ERHIIDs	Emerging, re-emerging and high impactinfectious diseases
FAO	Food and Agriculture Organization of the United Nations
GoB	Government of Bangladesh
H5N1 HPAI	H5N1 serotype of highly pathogenic avian influenza
HACCP	hazard analysis and critical control points
HPAI	highly pathogenic avian influenza
ICDDR,B	International Centre for Diarrhoeal Disease Research, Bangladesh
IEDCR	Institute of Epidemiology, Disease Control and Research
IMA	Inter-Ministerial Agreement
IMCAPI	Inter-Ministerial Conference on Avian and Pandemic Influenza
IMSCOH	Inter-Ministerial Steering Committee for One Health
INGOs	international non-government organizations
M&E	monitoring and evaluation

MoA	Ministry of Agriculture
MoEF	Ministry of the Environment and Forests
MoFL	Ministry of Fisheries and Livestock
MoHFW	Ministry of Health and Family Welfare
NGO	non-governmental organization
OIE	World Organization for Animal Health
PCC	Project Coordination Committee
SOP	standard operating procedure
ToR	Terms of reference
UN	United Nations
UNICEF	United Nations Children's Fund
UNSIC	United Nations System Influenza Coordination
WHO	World Health Organization

Glossary of Terms

Community	A social, religious, occupational, or other group sharing common characteristics or interests and perceived or perceiving itself as distinct in some respect from the larger society within which it exists.
Emerging infectious disease	An infectious disease that is newly recognized in a population or has been known for some time but is rapidly increasing in incidence or geographic range.
Infectious disease	A disease caused by the entrance and growth of pathogens (such as bacteria, protozoans, fungi, or viruses) into a host organism.
Re-emerging infectious disease	A disease rapidly increasing in incidence or geographic range which had previously been present and was eradicated or controlled. Diseases considered to be re-emerging include avian influenza, West Nile virus, bovine tuberculosis in wildlife, and Lyme Disease.
Zoonotic disease	An infectious disease that is transmitted between animals and people (or vice versa).

Executive Summary

This strategic framework provides direction for the implementation of a One Health approach to preventing and controlling emerging, re-emerging and high -impact infectious diseases.

The principles of the One Health approach have been evolving at the global level since the initial One World One Health Symposium held in New York in 2004.One Health now features on many global agendas, particularly those focus on emerging infectious diseases following the global highly pathogenic avian influenza A (HPAI) emergency.

In Bangladesh, efforts to put ideas behind One Health into action started in 2008 with an establishment of a think-tank One Health Bangladesh. Following several rounds of discussion and planning, a workshop was held in Dhaka in January 2012 to develop the Strategic Framework for mainstreaming and implementing One Health Approach to disease prevention and control. The Strategic Framework and Action Plan were prepared in a collaborative manner by stakeholders from Government, UN agencies, universities, research organizations and NGOs.

The Strategic Framework for One Health approach to infectious diseases in Bangladesh, response to the need for a structured, coordinated and collaborative approach to One Health. The framework was validated at a second workshop in September, 2012 where its compatibility with the policy and administrative requirements of the Government of Bangladesh was confirmed.

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

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

The agreed frameworkcomprises nine components, each of which covers specific requirements and objectives for the implementation process:

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

A logical framework will guide the preparation of projects or initiatives to be implemented under a One Health approach, and an action plan (Annex 2) describes how to set up the necessary initial institutional arrangements and move forward in the process. These institutional arrangements are

the key to the One Health approach and further progress will not be possible without them. The first project operating fully under a One Health approach was started towards the end of 2012.

During the development of this framework, it was recognized that issues relating to human health and sustainable agriculture can also be addressed through a One Health approach. Work to develop a framework for sustainable agriculture has commenced and is outlined in Annex 3.

Section 1

Context and framework formation

Background and context

Background

The concept for the One Health approach emerged at “One World, One Health” symposium convened in New York in September 2004, atwhich the Manhattan Principles were formulated. These principles highlight the need to incorporate the broader interfaces between humans, animals and ecosystems in addressing pathogen transmission between animals and humans. Consequently, it was decided that an international, interdisciplinary and cross-sectoralapproach was necessary for prevention of disease emergence and for disease control.

The One Health approach was mainstreamedinto globalthinking at the 3rdInter-Ministerial Conference on Avian and Pandemic Influenza (IMCAPI) in New Delhi in December 2007.Itwas further developed with support from the Food and Agricultural Organization (FAO), World Organization for Animal Health (OIE), World Health Organization (WHO), World Bank, United Nations Children’s Fund (UNICEF) and United Nations System Influenza Coordination UNSIC ()at the 4th IMCAPI held in Sharmel-Sheikh, Egypt in October 2008 where the theme was “The Vision for the Future”. An expert technical consultation was then held in Winnipeg, Canada in March 2009 to define the best practices for the implementation of the One Health approach.

The most recent IMCAPI was held in Hanoi in April 2010, resulting in the Hanoi Declaration,whichemphasized the need to continue to control H5N1 HPAI and H1N1 infection in humans, but also the importance of extending the lessons from HPAI to other emerging diseases. FAO-OIE-WHOtripartite Concept Note on One Health, “Sharing responsibilities and coordinating global activities to address health risks at the animal-human-ecosystems interfaces” was presented and endorsed at this meeting.

To take the Hanoi declaration further at the international level, a further workshop on operationalizing One Health was held at Stone Mountain, Georgia, USA in May 2010 with the theme “One Health: a policy perspective – taking stock and shaping an implementation road map”. The meeting aimed to identify actions areas that would move the concept of One Health from vision to reality. Six global areas of action were identified, and workgroups set up to develop a plan for advocacy, a One Health global network, proof of concept to demonstrate the added value of the One Health approach, country level needs assessment, capacity building planning and methods and training.

The first international One Health Congress was held in Melbourne Australia in February 2011, and featureda large programme of scientific presentations and plenary sessions that extensively examined broad issues from the One Health perspective such as disease emergence, international trade, food safety and security, and science policy.

In November 2011 a “High Level Technical Meeting” was held in Mexico City to address health risks at the human-animal-ecosystems interfaces. The meeting looked at ways of ensuring that the alignment of the technical outcomes with the broader political processes, including translating the Tripartite Concept Note into national languages.

The development of this Strategic Framework for the application of the One Health approach in Bangladesh represents the continuing global effort to push the country’s mandateforward andprovides a platform to put the approach into action at a national level.

Context

Bangladesh isthe most densely populated country on earth other than small city states. Its livestock populations total millions of animals and there is increasing intensification of agriculture. Bangladesh's steadilyrisinghuman population puts pressure on an already stressed environment, which isvulnerable to the impacts of global warming and climate change, and is particularly susceptible to natural disasters such as floods and cyclones. At the same time, the country faces the public health threats of emerging and re-emerging diseases and antibiotic resistance.

As a signatory of implementation of International Health Regulations (2005) by WHO, Bangladesh needs to address a number of issues to maintain sustainable animal, human and eco-health, including proper waste disposal in laboratories and industries, hygienic animal slaughtering practices in wet markets, and monitoring of antibacterial resistance and residual effect. These challenges have a significant impact on food safety, food security and human resilience especially related to health. A large proportion of the population live in rural areas in close proximity to domestic and often wild animals, and are more exposed to these environmental challenges and emerging pathogens.

In recent years, diseases such as Nipah virus and Highly Pathogenic Avian Influenza have emerged. It is extremely likely that the high human and animal population densities, and the frequent interactions between animals and humans, will result in the emergence of other novel, potentially pandemic, diseases in the future.

Globally, the One Health concept has developed into an approach that helps to mitigate the risk of emerging pathogens becoming established in countries such as Bangladesh. It also provides a strategy that increases the effectiveness and efficiency of interventions for controlling disease at the population level. This strategic framework provides guidance for implementing the One Health approach to address emerging, re-emerging and high impact diseases at the human–animal–ecosystem interface.

In Bangladesh, issues that can be tackled through the One Health approach include Nipah virus disease, H5N1 HPAI, anthrax and rabies. For example, an outbreak of anthrax from August to October 2010 resulted in 607 human cases in 15 districts – a serious public health impact. While livestock losses were not extensive there were significant local impacts on the livestock economy and the livelihoods of vulnerable households. Successful anthrax control requires an innovative One Health approach that goes beyond current intersectoral cooperation at the outbreak stage. In particular, it requires much collaborative effort through strategic communication and education.
Nipah virus continues to be a threat in at-risk rural communities and it hasthe capability to transmit from human to human. Prevention and safe and effective management of human cases requires an integrated One Health approach, and potential infection of other animals at outbreak sites must be considered.

The complex HPAI situation also requires a combination of animal and public sector surveillance, including communication strategies to reduce the public health threat more effectively. While application of the One Health approach may have little impact on losses to the poultry sector, it enables better management of the potential risk to humans and, perhaps, the risk of new viruses entering poultry from populations of wild migratory birds. A One Health approach can improve cross-sectoral understanding of the problems confronting animal disease control authorities and enables a more holistic approach to involving communities in control programs.

A useful strategy is to leverage existing programs to institutionalize the One Health approach. At present there are structures at the national and local levels that have been developed and activated to promote matters related to Avian and Human Pandemic Influenza preparedness. These structures can be used as models for other disease programs under the One Healthapproach.

A major challenge in implementing the One Health approach in Bangladesh is weak linkage among different ministries and agencies responsible for human and animal health and the environment. An inter-ministerial and multiagency approach to policy making, surveillance, outbreak response, prevention and control could define steps towards institutionalizing an effective One Health collaboration within the Government of Bangladesh and partners.

The One Health approach can contribute to food safety and food security, and to the other national priorities encompassed in Health, Nutrition and Population Sector Programme based on the Sixth Five-Year Plan for the government of Bangladesh. The framework is also in line with priorities for the livestock sector set out in the National Livestock Development Policy, and with several of the health-related Millennium Development Goals to which the government is committed.

Development of the One Health Approach in Bangladesh

In December 2008, the national professional organization One Health Bangladesh was inaugurated under the auspices of the Institute of Epidemiology, Disease Control and Research (IEDCR) of the Ministry of Health and Family Welfare (MoHFW), Chittagong Veterinary and Animal Sciences University (CVASU) and the International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b). These institutions were joined later by the Department of Livestock Services (DLS) of the Ministry of Fisheries and Livestock (MoFL) and the Department of Forests (DF) of the Ministry of the Environment and Forests (MoEF). Other academic and research institutions such as Bangladesh Agriculture University (BAU) and Bangladesh PoribeshAndolon (BAPA) also joined.

By the end of 2012, One Health Bangladesh had attracted the interest of professionals, including physicians, veterinarians, agricultural scientists, environmental scientists, wildlife experts, ecologists, anthropologists, economists, university academics and activists

Six meetings, workshops and conferences on the One Health approach in Bangladesh were held between 2008 and 2011 to refinescope of the initiative, to further develop collaboration between national partners, and to propose ways of operationalizing the One Health concept. In addition, a network was established to promote One Health principles in veterinary education in South Asia.

These activities culminated in One Health Bangladesh requesting the support of United Nations (UN)agencies (FAO, WHO and UNICEF)to develop a strategic framework for the application of the One Health approach in Bangladesh. As a result FAO and UNICEF offered material support for conducting the workshop on“Envisioning One Health for Emerging Infectious Diseases and Beyond” (30 January to 2 February 2012)that led to the formulation of this Strategic Framework.

One Health Bangladesh will continue to build experience and advocate on issues of concern associated with emerging and re-emerging diseases. Although it is unlikely to have a formal role in the institutional structures proposed in this framework, some of its members are expected to participate in the Core Advisory Group. This group will advise the Inter-Ministerial Standing Committee for One Health (IMSCOH), the key governing body for One Health in Bangladesh.

Section 2
Strategic framework

Strategic Framework for a One Health Approach to emerging, re-emerging and high impactinfectious diseases in Bangladesh

Outline of the Strategic Framework

This Strategic Framework provides the platform forinitiatives for prevention, early warning and control emerging, re-emerging and high impact infectious diseases at the human–animal–ecosystem interface in Bangladesh. It alsooutlines the mechanism whereby diseases will be prioritized for action, butdoes not identify which diseases should be included in activities.

Although this documentfocuseson infectious diseases, there is also a need to develop a framework to include issues that relate to human health and sustainable agriculture. Annex 3 includes the outline of this second framework. Once this is developed and in place the potential of joining the two programme areasunder the same institutional arrangements must be explored.

A successful and sustainable One Health approach in Bangladesh will require:

- improving health outcomes for the people, animals and environment of Bangladesh.
- recognizingthe interplay between factors related to people, animals and the environment in determining disease outcomes.
- applying a multi-disciplinary focus on prediction, prevention and response to disease.
- promoting multi-sectoral collaboration and communication to engage partners and stakeholders, including communities.
- emphasizingequitable partnerships and recognition of the individuals, institutions and civil societies engaged.
- focusing on the importance of establishing the necessary institutional mechanisms to effectively deliver the outputs.
- incorporatingprocesses to correct capacity deficits for collaborating partners.
- recognizing that achieving success depends on long-term engagement and commitment.
- aframework that is adaptive and responsive to change.

In line with these attributes, the One Health approach in Bangladesh is based on a *vision*:

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

ThisStrategic Framework has three key **goals** to support this vision:

1. Establishing the necessary institutional arrangements to enable effective collaboration between sectors involved.
2. Developing necessary capacity and technical procedures to prevent and control targeted emerging infectious diseases.
3. Applying sound environmental principles when ecosystems with potential disease or health interfaces with humans and animals are involved in control strategies.

To achieve these goals, nine interlinked components were developedto organize and manage a comprehensiveimplementation of the One Health approach:

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 first five components are linked but are implemented independently while components 6 to 9 are cross-cutting and should be included in the development and implementation of all activities under the One Health approach.

The different sectors involved in One Health will have different levels of capacity for dealing with each of the components; capacity-building activities should therefore be tailored to the specific needs of each sector. To ensure capacity building is properly monitored and reported on it is included as component 7, in addition its inclusion in activities of several other components. Input from multiple disciplines will be necessary to implement the strategy and Action Plan. For instance, expertise in participatory research approaches will be needed as there will be a need to work closely with communities, especially in enhancing animal owners' engagement in disease control activities.

The One Health approach must be introduced gradually through initiatives that take advantage of existing resources. It will take time for the various line agencies to develop the necessary collaboration with and trust in each other. This makes it essential that ownership of the One Health strategy is established at high levels of government. In addition, project development and implementationshould be scheduled to enable all the participating sectors to contribute adequately at the appropriate level. Most components of a One Health project require stakeholder analysis to identify capacity gaps and ways of filling them. To avoid delays, efforts should be made to carry out and monitor appropriate capacity-building activities while other project/programme activities are being implemented.

The components

Component 1: Institutional governance and programme Management

Outcome: Institutional arrangements for facilitating the One Health approach

Objective: To ensure that the institutional arrangements, policy frameworks and management mechanisms are in place to facilitate a One Health Approach to prevent emergence, re-emergence and high impact diseases at the animal, human and eco-system interface, and ensure food safety and security.

This component createsthe foundation of an institutionalized One Health approach in Bangladesh and must be in place before any technical activities can take place. It will facilitatehigh-level agreement across ministries, enabling the operational levels and sectors involved in One Health projects to function together effectively.

The proposedinstitutional arrangementswill provide the umbrella agreement for all projects operating under a One Health approach for the foreseeable future. However, these arrangements must be reviewed regularly to decide whether they should be continued, adapted, orterminated.Approvals, review, and special funding will be managed by anInter-Ministerial Steering Committee for One Health (IMSCOH).

In the early stages of the establishment of the One Health approach, establishment of a One Health Secretariat may be required. The secretariatwould manage business matters such as preparing papers for the IMSCOH, communicating across the technical departments on coordination and collaboration arrangements, and organizing the meetings and workshops associated with the overall programme business.

Each project or cluster of project must have a project coordinationcommittee (PCC)responsible for project development, monitoring the technical outputs, and regular reporting to the IMSCOH. The presence of a PCC will allow the different departmental units engaged in One Health to maintain their independence while working together.

The government will appoint an expert advisory group to advise IMSCOH on the activities, needs and progress of One Health projects. The group may include *ex officio* members invited by the government, such as UN agencies and other international institutions interested in the projects and programme.

This component will also enable any review of the departmental policies for participation in One Health projects. Based on these reviews, overall policies will be developed to facilitate the establishment and growth of the One Health approach within the government framework.

Proposed institutional arrangements: To facilitate the transparent operation of the One Health approach, it is necessary to develop generic terms of reference for the PCCs. The PCC established for the first One Health project(s)could be expanded to coordinatedsubsequent projects. However, as stakeholderswill vary from project to project, PCCs will also need to be project-specific. PCCs will develop terms of reference (ToR) for technical working groups, outlining the tasks they are expected to undertake.

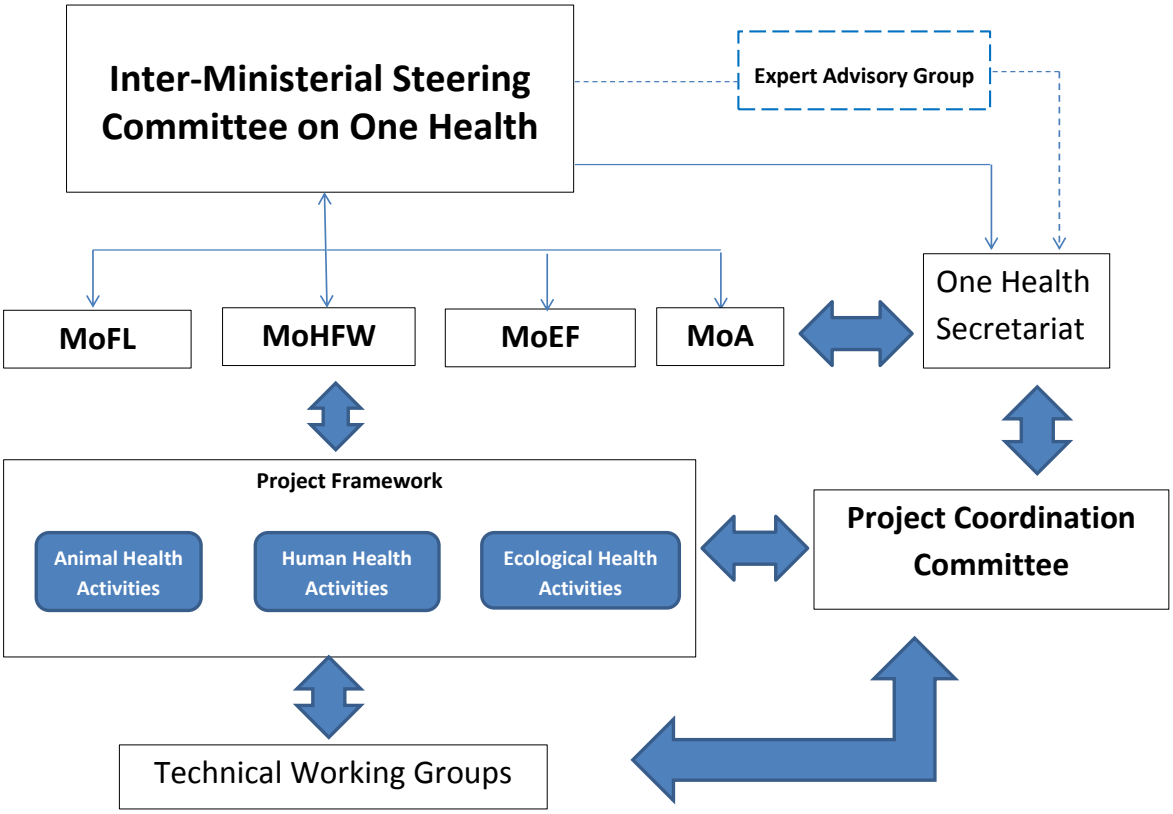

Figure 1: proposed institutional arrangements

To reduce discrepancies in project design and implementation, all projects operating under the One Health strategic framework should follow a standard template. This template will outline how to address the nine components of the framework, and define the administrative arrangements. The broad outcomes detailed in this template will be applicable to any project developed in the One Health framework.

Outputs:

1.1 Details of structures and terms of reference necessary for the Government of Bangladesh to endorse the One Health approach.
1.2 Institutional arrangements are in place to enable progress on the One Health approach in Bangladesh.
1.3 Line agency and sector policies are updated to facilitate implementation of the One Health approach.
1.4 Selected existing activities are leveraged for the One Health approach.
1.5 Mechanisms to ensure collaborative planning and to monitor the overall performance of projects/programs.
1.6 Projectsplanned and managed according to the One Health approach Strategic Framework.
1.7 One Health Core Advisory Group provides independent advice to IMSCOH.
1.8 Project implementation undertaken following the One Health approach.
1.9 Intra-project communications and information exchange established.

Component 2: Coordinatedsurveillance

Outcome: Coordinated surveillance for EIDs under the One Health approach

Objective: To undertakecoordinated One Health surveillance activities enhance national surveillance capacity for early warning, prevention and control of emerging, re-emerging and high impact infectious diseases.

Coordinated surveillance between sectors is essential for the early warning, prevention and control of emerging, re-emerging and high impact infectious diseases. Arrangements for sharing data collected among organizations in real time can also assist the coordination of field activities.

Combined active surveillance activities can provide a greater assurance about the disease situation in specific time and place both in human and animal populations. However, most surveillance dataarepassively obtained by individual sectors and are not routinely shared. As such, mechanisms to share information and incident reports are very important and are to be established under the One Health approach.

Information sharing must be based on 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.

In the long term,the aim is to establish a system where all sectors provide information to a central surveillance unit. This central unit would add value by compiling data from different sources and assist in coordinating the response, while actions at the field level would still remain the responsibility of the individual departments mandated to control the disease.

The development of a central surveillance unit might be a long term goal for Bangladesh. In the medium term, the focus will be on establishing mechanisms to gather and disseminate data. At a project level, joint units might be established to assist with cross-sectoral studies or epidemiological investigations.

New diseases emerge when specific animal reservoir hosts, microbial agents and high-risk populations come together in specific geographic areas and ecosystems. The One Health approach will use risk-based strategies to target surveillance for EIDs. Surveillance capacity may need to be built, especially when participatory processes that involve community members are applied. Surveillance personnel working long-term in the field can be trained in build local communities surveillance capacity. Reports of disease occurrence can then be generated by community members and communicated to the appropriate authorities in real time. The same system can also be used to mitigate the spread of disease and disseminate control measures at the community level.

Outputs:

2.1 Joint surveillance system for the One Health approach to emerging infectious diseases.
2.2 Standard operating procedures (SOPs) for surveillance and outbreak investigation.
2.3 Surveillance capacities strengthened to build sufficient capacity in each sector partner.
2.4 A platform arrangement to share passive surveillance data, including with third parties.
2.5 Strengthening network for sample submission and result sharing.
2.6 Diagnostic laboratory capacity and capability strengthened and fit for purpose in supporting the One Health approachto the selected disease(s).
2.7 Maps of high-risk areas and a strategy for increasing the sensitivity of disease surveillance activities.
2.8 Platform arrangement for reporting active surveillance and outbreak investigation data.

2.9 Application of participatory methods for detection and management of diseases at the community level (if appropriate).
2.10 Inclusion of a component for considering the environmental interface in projects with wildlife interface.

Component 3: Coordinated outbreak preparedness, prevention and response

Outcome: EID outbreak preparedness, prevention and response capabilities, capacity and coordination on One Health framework strengthened

Objective: To strengthen disease outbreak preparedness, prevention and response capabilities and coordination within a One Health framework.

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. Like surveillance, it is also an area where it is important not to overreach. 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 necessary the environment sector as well. One aspect of a response strategy where collaboration can be particularly valuable is in the management of equipment and supplies, the logistics for which are often very challenging.

Outputs:

3.1 Disease outbreak control and prevention strategies for selected diseases developed and communicated to stakeholders.
3.2 Detailed SOPs and contingency plans for field-level management of disease outbreaks.
3.3 Strengthened capacity for field response to disease outbreaks.
3.4 Increased numbers of key officials in high-risk areas with understanding of outbreak response requirements.
3.5 Increased numbers of operatives undertaking risk analysis to support disease control.
3.6 Desktop simulations conducted with outbreak experiences integrated into them.
3.7 Disease outbreak response teams have outbreak investigation capability.
3.8 Specified amount of response equipment available in storage and audited for readiness.

Component 4: Applied research

Outcome: Applied Research provides key evidence to facilitate disease control

Objective: To conduct research to generate evidence that enables stakeholders to address disease impacts appropriately according to One Health criteria.

For all diseases, effective control is hampered by significant gaps in knowledge. Some of these gaps relate to epidemiology, the spread of the disease agent and the risk factors for disease. Others relate to the effective use of prevention measures such as vaccines. Important gaps concern the interfaces between the agent, the environment and the host, or the social and cultural aspects of disease.

One of the challenges for any control programme is to identify the gaps, prioritize them and find the expertise and resources needed to undertake the necessary research. Research should focus on resolving practical issues related to disease control.

The research questions to be resolved are generally disease-specific, so the outputs for this component are limited to guiding the research approach.

Outputs:

4.1 Lists of priority research issues for the disease in question, resources required and impediments to conducting research.
4.2 Assessment of national capacity to conduct the necessary research, identifying resource gaps that constrain research.
4.3 Agreements with international partners for collaboration on main research questions.
4.4 Enhanced national research capacity through a research programme with well-defined and achievable targets.
4.5 Results of research published and available to stakeholders.
4.6 Evidence generated used in advocacy and communication materials, and disseminated to key stakeholders.

Component 5: Networks and partnerships

Outcome: Networks and partnerships lead to strengthening of disease prevention and control

Objective: To foster collaboration in preventing and controlling infectious diseases at the subnational, national, regional and global levels among the Government of Bangladesh and other key stakeholders/partners .

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 political or advocacy support and 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.

Outputs:

5.1 Mapping of key stakeholders and collaborators, indicating their likely contributions to the project.
5.2 Networks at the community level to facilitate implementation of the One Health approach to selected diseases.
5.3 Participatory approach to communication and feedback in communities.
5.4 Networks at the national level to facilitate implementation of the One Health approach to selected disease(s).
5.5 Working mechanisms for the operation and engagement of partnerships in disease control project(s).
5.6 Collaboration and exchange of materials and information within the country network and with international programs, agencies and institutions.
5.7 Bulletins, reports and meetings to facilitate the two-way exchange of project information in the One Health context.

Component 6: Strategic communication and advocacy

Outcome: Strategic communication and advocacy enables individuals and communities to 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 take action to protect their own health, livelihoods and ecosystems against infectious diseases.

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

The strategic communication approach will use information obtained by multi-disciplinary analysis of key issues related to disease prevention and control at the community level, including economic, anthropological and socio-cultural factors. Behavioral and social change communication will be used to engage communities to be continuously monitoring and assessing their situations and taking action to protect themselves, their livestock and their environment. It will also empower families and communities to make informed decisions about the disease in question, especially about actions that relate to diseases that are not constantly present. The concept and practice of prevention communication will be explored, particularly for measures that relate to sustainable agriculture, livelihoods, wildlife, and the environment where the threat is not fully materialized. Policy makers will be kept informed of the need to modify or enact legislation and policy to support the initiatives being implemented. This will be done using multidisciplinary approaches to ensure harmonization of efforts and outcomes.

Strategic Communication and Advocacy involves:

Behavior change: promoting key behaviors, including active surveillance of symptoms at the household /courtyard level, reporting to the appropriate authority and seeking services on a timely basis to increase understanding of how to protect families and communities from disease and socio-economic devastation as well as to create demand for quality services.

Social change: empowering communities to dialogue with service providers and promoting local level planning involving communities and civil society organizations largely linked to social norm change on how we respond to such emerging and re-emerging threats.

Advocacy: at national and sub-national levels towards establishing mechanisms for project implementation and better coordination of interventions among UN and partners at national, district and sub-district level to be led by government. Such coordination bodies will include representatives from NGOs and other civil society organizations. This should also allow for integration of key communication indicators into the overall monitoring of the framework.

Outputs:

6.1 A comprehensive social and behavior change strategy with an advocacy component based on a detailed analysis of the issues and constraints at community level for disease prevention and control; and an action plan with a complementary budget.

6.2 Competencies of the different categories of implementers, including field workers, enhanced according to needs assessment to enable effective implementation of the strategy and work plans.
6.3 Validated materials and training packages developed for orientation of key stakeholders, including policy makers.
6.4 Procedures and plan in place from commencement to monitor and evaluate component activities.

Component 7: Capacity Building

Outcome: Capacity-building activities implemented in all One Health components

Objective: To develop balanced, multidisciplinary capacity enabling the government, partners and key stakeholders to prevent, respond to, control and mitigate the impacts of infectious diseases.

The Strategic Framework seeks to address some of the identified gaps in capacity at the operational and technical level that constrain achievement of disease control objectives. One important aspect of capacity that must be developed is the overall understanding of and orientation to the One Health principle across all key implementing partners. The institutional governance system established also has a management capacity requirement that needs to be attended to in the process of project implementation. Technical and infrastructure capacity are an issue to be addressed in the development of One Health approach in Bangladesh.

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.

Outputs:

7.1 Detailed capacity needs assessment and map of resource requirements for One Health project(s).
7.2 Guidelines and materials produced to build key capacity requirements for the One Health approach.
7.3 One Health project design and implementation workshop(s) conducted.
7.4 Plans and modalities for cross-sectoral capacity building initiatives using partnership resources.
7.5 Technical capacity related to wildlife and ecology issues, laboratory and diagnostic response; disease intelligence, reporting and epidemiology; strategic communications and advocacy strengthened according to assessment.
7.6 Monitoring and evaluation indicators to assist delivery of capacity building.

Component 8: Behavioral, Social and Economic Aspects of Disease

Outcome: Behavioral, social and economic factors and their influence on disease incidence and impact defined

Objective: To determine the social and economic factors that influence disease incidence and impact.

While identifying the biological determinants of disease is often straightforward, the social and economic factors influencing disease occurrence can be very difficult to define, especially regarding interactions among culture, practices and livelihoods.

Communities' knowledge or belief systems can be very different from those of professional scientists or economists. For example, the perceived value of stray dogs in a community may affect a rabies control programme; and in-depth examination of socio-economic factors in rural smallholder households keeping poultry can improve understanding of the socio-economic drivers of avian influenza.

It is therefore essential that analysis of the disease situation include multidisciplinary examination of the interface between the humans and animals involved and the outcome of the disease. Where livestock are involved in the disease cycle, an understanding of animal husbandry practices and how these might be modified without economic burden can be important to disease control outcomes. Engagement with communities to understand the behavioral-socio-economic dimensions of disease is a fundamental requirement for success. The gender aspects of disease control options must also be included in strategic analysis.

One methodology that has proved useful in dealing with animal diseases is drawing up detailed descriptions of the market chains associated with the animals or products in question and analyzing these market chains from the perspective of disease control. The goal is to determine how to reduce the risks of transmitting the causative agent along the market chain, and where particular people are at high risk of exposure to the pathogen. Network analysis can sometimes pin-point the nodes in market chains that are responsible for disseminating the disease.
It is likely that in the early stages a project will require international guidance to determine how and where to investigate socio-economic factors. Later the Project Coordination Committee can engage local experts to gather the necessary field data and undertake analysis.

Outputs:

8.1 Details of behavioral and socio-economic factors that influence the disease control options for communities.
8.2 Evidence-based reports outlining the risk points for emergence and spread of diseases.
8.3 Economic and social impact analysis of specific disease(s).
8.4 Key findings packaged for use in other components, especially strategy, communications and advocacy.

Component 9: Wildlife and ecology

Outcome: Wildlife and ecology are integrated into the One Health approach

Objective: To ensure that the role of ecology and wildlife in infectious diseases is addressed and that agro-ecological changes as drivers of disease emergence are understood.

Wildlife play a role in the emergence of many novel diseases. Ecology and wildlife health must therefore be considered in the design and implementation of One Health projects. It is important that surveillance does not have a negative impact on wildlife and the ecosystem. Communities that live in the interface areas should be included where possible in the practical aspects of design and implementation of surveillance, or other aspects of the project. If the interface of concern is between livestock and wildlife then it is also important to develop a deep understanding of the farming and livelihood systems.

One of the challenges for the One Health approach is to gain a better understanding of the factors that interact to allow the emergence of new disease agents in domestic livestock and/or humans. Bangladesh is not expected to invest significant resources in gathering the complex data required to develop models for the likely emergence of new infectious diseases at the wildlife interface. However, there are opportunities for undertaking specific studies, for example by mapping the environments where Nipah virus crosses to humans and gathering data on the full range of environmental events that surround such incursions. There are similar opportunities for studying the movement of influenza viruses from wild birds to domestic poultry species.

Outputs:

9.1 Formal and informal agreements for the engagement of national, regional and global partners and organizations developed.
9.2 Wildlife and ecological variables of disease outbreaks described and mapped.
9.3 One Health plans with wildlife, ecological and environmental factors included.
9.4 Improved capacity and understanding among field operatives regarding wildlife and ecological issues.
9.5 Reports providing analytical insights for use in other components.
9.6 A strategy for correcting the imbalances that leads to emergence of pathogen(s) at the wildlife interface.
9.7 Intervention plan implemented at the field level.

Project design

Methodology

A standard design should be used for all projects in the One Health framework to ensure that all the components are addressed. Design should be systematic and undertaken in a collaborative atmosphere, where many of the key elements are represented in the initial project scoping meetings. Representatives from all the sectors involved in both the technical and the cross-cutting components should participate in project design. This will ensure common understanding of the direction and requirements for achieving outputs and outcomes. The coordination of the project design should be the mandate of the Project Coordination Committee.

Monitoring and evaluation

Each of the projects designed under the One Health Strategic Framework should have a comprehensive logistical framework that identifies key indicators for monitoring and evaluation (M&E) of project progress. Evaluation indicators should be limited in number and complexity to facilitate the generation of verifiable and credible data. Achievement of these indicators will imply good overall project performance.

Risk management

It is necessary in the project design to undertake an analysis of the major risks that are likely to constrain achievement of the project goals. This risk matrix should identify the risk factor, the likelihood of its occurrence, the impact of the factor should it occur and the measures to be taken to manage this risk.

Section 3
Action plan

Action plan

Annex 2 outlines an action plan for mainstreaming the One Health approach and implementing it in EID prevention and control programs in Bangladesh. This chapter focuses on how to obtain the high-level support and commitment needed to ensure the success of the approach.

An action plan is required to obtain Government of Bangladesh endorsement of the Strategic Framework for the One Health approach. The details of a suggested action plan to achieve this are set out below. Once the One Health approach is formally agreed upon between the sectoral partners, projects for implementation under its broad umbrella should be developed according to the process set out in Annex 2.

So far, development of the One Health approach has been the result of efforts by a small group of individuals and organizations. To continue the process, it is now necessary to have a more formal agreement through establishment of an Ad Hoc One Health Steering Committee (AHOHSC). This committee will be dissolved when the framework and action plan have been endorsed and are in place, but its members are likely to be appointed to the Core Advisory Group that will advise IMSCOH as the governing body for the One Health approach in Bangladesh.

The role of AHOHSC will be to move the strategic framework from being a concept to becoming an institutional agreement that guides the next phase of the process. The procedure for achieving this result is as follows:

- The key players will agree on the outline of the strategic framework.
- The strategic framework will be validated following consultation with government stakeholders and the signing of an Inter-Ministerial Agreement (IMA).
- AHOHSC will formalize the role of the Core Advisory Group (Some of the group's terms of reference will be developed under component 1).
- The Core Advisory Group will present a project or projects to IMSCOH for endorsement of implementation within the strategic framework. Before a project is presented to IMSCOH, the individual departments must confirm that a PCC is in place, and that the project document has been developed following the strategic framework template.

Membership of AHOHSC and the Core Advisory Group might include representatives from:

- The Ministry of Health and Family Welfare (Department of Health);
- The Ministry of Livestock and Fisheries (DLF);
- The Ministry of the Environment and Forests;
- WHO;
- FAO;
- UNICEF;
- icddr,b;
- CVASU.

It may not be possible for AHOHSC to validate the strategic framework within the government at the same time as the first One Health project is being developed. Therefore, no projects will be developed until AHOHSC has obtained government validation and the Core Advisory Group has been validated by the IMA. It may then take an additional three to six months to develop the first one or two projects.

Development of the first project(s) must incorporate the issues raised at the One Health planning workshops. Projects must have achievable objectives, take small steps to start with, take into consideration the implementation capacities of various partners, and have access to resources to support activities.

Each PCC should have two members from each of the departments involved in the project, and other operational stakeholders as necessary. UN agencies may be *ex officio* or full members, depending on the policy adopted by the Government of Bangladesh. To start with, it might be useful to include key members of the Core Advisory Group, but PCCs deal with implementation matters rather than overarching design issues, so they should function independently of the Core Advisory Group.

PCCs are likely to set up technical working groups to develop and oversee activities in important components such as surveillance and outbreak response, thereby reducing the pressure on PCCs, especially their chairpersons.Initially, each technical working group should focus on only one project,but gradually technical working groupsare likely to develop the expertise and capacity to manage an expanded portfolio of projects.

A timetable for the action plan to implement a One Health approach in Bangladesh is provided below:

Table 1: Timetable for Action Plan to implement a One Health approach in Bangladesh

Activity	Timeline
Validate the Strategic Framework	September 2012
Appoint Ad Hoc Committee to support implementation	March 2013
Select initial disease project(s) for One Health approach	March 2012
Draft Inter-Ministerial Agreement	June 2013
Appointment of Project steering committee(s) for selected Sustainable Agriculture project(s)	August 2013
Appoint Inter-Ministerial Standing Committee for One Health	September 2013
Appoint project steering committee(s) for selected EID project(s)	October 2013
Obtain funding for project(s) to be implemented with a One Health approach	October 2013
Develop project plan(s) for One Health approach to selected disease(s)	December 2013
Conduct workshop to further plan One Health approach to Sustainable Agriculture	January 2014
Develop Strategic Framework for Sustainable Agriculture	December 2014
Incorporate One Health approach to Sustainable Agriculture under the Inter-Ministerial Standing Committee for One Health	April 2015
Commence implementation of EID One Health project(s)	April 2015

Annexes

Annex 1: Logistical framework for the application of a One Health approach to EIDs in Bangladesh

The Strategic Framework for the application of the One Health approach to EIDs is designed to facilitate and guide projects or programs under a One Health approach. The matrix was developed during the workshop on "Envisioning One Health for emerging Infectious diseases and beyond-Developing country level strategy and action plan for Bangladesh" held from 30 January to 2 February 2012.

Component 1: Institutional governance and programme management			
Outcome: Institutional arrangements for facilitating the One Health approach			
Objective: To ensure that the institutional arrangements, policy frameworks and management mechanisms are in place to facilitate a One Health approach to prevent emergence, re-emergence and high impact diseases at the animal, human and eco-system interface, and ensure food safety and security	**Indicators:** 1) One Health approachto at least one disease functioning with effective collaboration among partners 2) Policy frameworks developed 3)Management mechanisms agreed and established **Means of verification**: 1) Documented memorandum of arrangement to establish processes 2) Documented evidence of policy frameworks developed 3) Project management outputs such as reports and meetings **Assumptions:** Institutional will and commitment to resolving constraints		
Expected outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 1.1 Details of structures and terms of reference necessary for the Government of Bangladesh to endorse the One Health approach	An ad hoc committee is sanctioned by July 2012 to implement the action Institutional structures developed by the Ad Hoc committee	Documented details of the ad hoc committee process and activities and report of structures	There is institutional agreements on the establishment of the ad hoc committee
Output 1.2 Institutional arrangements are in place to enable progress on the One Health approach in Bangladesh	IMA and IMSCHO established Plan for the operations of the institutional structures in place Terms of reference developed for various committees and other instruments of delivery	Official documents of agreement Notice of meeting of the Inter-Ministerial Steering Committee for One Health One HealthStrategic Framework is incorporated in national planning outcomes andsectoral plans.	Constraints on institutional arrangements are resolved

Component 1: Institutional governance and programme management			
Outcome: Institutional arrangements for facilitating the One Health approach			
Objective: To ensure that the institutional arrangements, policy frameworks and management mechanisms are in place to facilitate a One Health approach to prevent emergence, re-emergence and high impact diseases at the animal, human and eco-system interface, and ensure food safety and security	**Indicators:** 1) One Health approachto at least one disease functioning with effective collaboration among partners 2) Policy frameworks developed 3)Management mechanisms agreed and established **Means of verification**: 1) Documented memorandum of arrangement to establish processes 2) Documented evidence of policy frameworks developed 3) Project management outputs such as reports and meetings **Assumptions:** Institutional will and commitment to resolving constraints		
Expected outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 1.3 Line agency and sector policies are updated to facilitate implementation of the One Health approach	Policy issues related to personnel management in One Health projects modified to remove barriers to participation. Advocacy promoting and supporting the adjustment of policy frameworks	Personnel confident that career pathways are still open Personnel policy documents allow for flexible management of staff involved	Civil service regulations are sufficiently flexible to allow staff to participate in a new management structure
Output 1.4 Selected existing activities are leveraged for the One Health approach	List of priority diseases agreed Available resources catalogued Project(s)selected Project management mechanism agreed	Reports of meetings to determine priorities Documented evidence of project management mechanism	Existing projects agree to engage in One Health approach
Output 1.5 Mechanisms to ensure collaborative planning and to monitor the overall performance of projects/programs	PCC established and conducting meetings to plan and supervise activities	Decision of IMSCOH to establish operational Steering Committee Records of meetings M&E reports	Government regulation allows the establishment and functioning of cross ministry management function
Output 1.6 Projects planned and managed according to the One Health approach Strategic Framework	Project proposals have logistical framework Resource requirements and budgets determined Project management mechanisms agreed M&E indicators determined	Project documents Records of technical meetings related to project implementation	Resources for implementing project(s) are available

Component 1: Institutional governance and programme management			
Outcome: Institutional arrangements for facilitating the One Health approach			
Objective: To ensure that the institutional arrangements, policy frameworks and management mechanisms are in place to facilitate a One Health approach to prevent emergence, re-emergence and high impact diseases at the animal, human and eco-system interface, and ensure food safety and security	**Indicators:** 1) One Health approachto at least one disease functioning with effective collaboration among partners 2) Policy frameworks developed 3)Management mechanisms agreed and established **Means of verification**: 1) Documented memorandum of arrangement to establish processes 2) Documented evidence of policy frameworks developed 3) Project management outputs such as reports and meetings **Assumptions:** Institutional will and commitment to resolving constraints		
Expected outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 1.7 One Health Core Advisory Group provides independent advice to IMSCOH	Independent advisory group established	Records of meetings between Core Advisory Group and IMSCOH	It is agreed that the Core Advisory Group is part of institutional arrangements Independent people are available
Output 1.8 Project implementation undertaken following the One Health approach	Project activities undertaken according to logistical framework	Project records and reports Technical reports Field evaluations	Resources available for project implementation
Output 1.9Intra-project communications and information exchange established	Electronic forum in place (to be determined – Web-based information exchange) Annual workshops conducted	Reports of annual meetings of project(s) Evidence of project interaction via the electronic forum	

Component 2: Coordinated Surveillance			
Outcome: Coordinated surveillance for EIDs under One Health approach			
Objective: To undertake coordinated One Health surveillance activities enhance national surveillance capacity for early warning, prevention and control of emerging, re-emerging and high impact infectious diseases.	**Indicators:** Coordinated surveillance system for EIDs with contribution from and sharing among sector partners **Means of verification:** 1) Reports showing joint surveillance activities, 2) Pooling of data from different sectors. **Assumptions:** 1) Institutional arrangements in place, 2) Resources available to build necessary capacity across sectors.		
Expected outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 2.1 Joint surveillance system for the One Health approach to emerging infectious diseases	Workshop held for drafting joint surveillance needs for the One Health approach to selected disease(s)	Report of workshop, with draft joint surveillance plan	Partners are able to cooperate in designing suitable joint surveillance plan
Output 2.2 Standard operating procedures (SOPs) for surveillance and outbreak investigation	Workshops and meetings held to determine SOPs for surveillance and outbreak investigation	Workshop reports outlining agreed surveillance needs and approaches Documented SOPs	Output 2.1 is achieved Cross-sectoral cooperation for designing workable SOPs is possible
Output 2.3 Surveillance capacities strengthened to build sufficient capacity in each sector partner	Needs assessment carried out Training programs conducted	Before-and-after measures of capacity for sectors with gaps Documentation of the needs assessment and training	Resources for conducting the training are available Gaps in capacity are not so large that they constrain a One Health approach to surveillance
Output 2.4 A platform arrangement to share passive surveillance data, including with third parties	Sharing of surveillance data facilitates the One Health approach to EIDs	Documentation of the agreement for sharing surveillance data Reports from the mechanism for sharing surveillance data	No serious disagreements arise regarding the sharing of data across sectors or with third parties
Output 2.5 Strengthening network for sample submission and result sharing	Needs assessment carried out Material resources in place Training programme conducted Samples increased in number and quality	Documentation of needs assessment and training programs Evidence of material resource inputs Evidence of increased numbers and quality of samples submitted	Agreements reached on appropriate flow of samples from source to laboratory Resources are available

Component 2: Coordinated Surveillance			
Outcome: Coordinated surveillance for EIDs under One Health approach			
Objective: To undertake coordinated One Health surveillance activities enhance national surveillance capacity for early warning, prevention and control of emerging, re-emerging and high impact infectious diseases.	**Indicators:** Coordinated surveillance system for EIDs with contribution from and sharing among sector partners **Means of verification:** 1) Reports showing joint surveillance activities, 2) Pooling of data from different sectors. **Assumptions:** 1) Institutional arrangements in place, 2) Resources available to build necessary capacity across sectors.		
Expected outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 2.6 Diagnostic laboratory capacity and capability strengthened and fit for purpose in supporting the One Health approach to the selected disease(s)	Analysis of the diagnostic tree, with requirements and gaps identified Training and resources provided Reporting systems developed for sharing information	Report on analysis of the diagnostic tree and gaps Report on laboratory training Evidence of purchases of materials and equipment Reports generated by reporting system	Expectations concerning the development of diagnostic capacity are realistic There is agreement on the sharing of laboratory data Resources for meeting capacity and capability strengthening requirements are available
Output 2.7 Maps of high-risk areas and a strategy for increasing the sensitivity of disease surveillance activities	Joint risk maps in association with market chain analysis (if applicable) identify targets for surveillance Surveillance based on risk maps undertaken	Reports on market chain analysis with recommended targets Reports on joint mapping exercises Reports on surveillance from target sites	There is agreement on the usefulness of surveillance technique(s) Resources for conducting market chain analysis are available
Output 2.8 Platform arrangement for reporting active surveillance and outbreak investigation data	Procedures and mechanisms for shared use of surveillance and outbreak investigation data in place	Reports indicating shared use of active surveillance and outbreak investigation data	Agreements are reached on the procedures and mechanisms for share data
Output 2.9 Application of participatory methods for detection and management of diseases at the community level (if appropriate)	People trained in using participatory methods to increase the engagement of rural communities in disease control programs	Reports of use of participatory methods in disease surveillance	Participatory methods are suitable for use at the community level. Resources for training and operations are available

Component 2: Coordinated Surveillance			
Outcome: Coordinated surveillance for EIDs under One Health approach			
Objective: To undertake coordinated One Health surveillance activities enhance national surveillance capacity for early warning, prevention and control of emerging, re-emerging and high impact infectious diseases.	**Indicators:** Coordinated surveillance system for EIDs with contribution from and sharing among sector partners **Means of verification:** 1) Reports showing joint surveillance activities, 2) Pooling of data from different sectors. **Assumptions:** 1) Institutional arrangements in place, 2) Resources available to build necessary capacity across sectors.		
Expected outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 2.10 Inclusion of a component for considering the environmental interface in projects with wildlife interface	Wildlife expertise engaged in project design and involved in wildlife surveillance activities	Documented evidence of expert input(s) to project design and fieldwork Reports on fieldwork	Agreement reached across all disciplines on the requirements for activities at the wildlife interface

Component 3: Coordinated outbreak preparedness, prevention and response			
Outcome: EID outbreak preparedness, prevention and response capabilities, capacity and coordination on One Health framework strengthened			
Objective: To strengthen disease outbreak preparedness, prevention and response capabilities and coordination within a One Health framework.	**Indicators:** 1) Mechanisms in place for One Health approachto control of selected disease(s) 2) Strengthened capability, capacity and coordination of disease response in action **Means of verification:** 1)Documentation of joint approaches to strengthen control 2) Reduction of intervals from reporting to control of disease outbreaks 3)Documentation of coordination of outbreak preparedness and response **Assumptions:** 1)Possible to conduct assessments to measure improvement in control 2) Resources available at different levels to strengthen capability and capacity 3) Partners are able to develop the coordination mechanisms for One Health approach 3) Institutional arrangements in place. 4)Resources available to build necessary capacity across sectors		
Expected Outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 3.1 Disease outbreak control and prevention strategies for selected diseases developed and communicated to stakeholders	The project technical group formed to develop the disease control strategy Stakeholder assessment conducted Communication strategy developed	Documentation of disease control strategy with elements of preparedness, prevention and response Linkage of strategy to surveillance system designed Evidence of strategic communications materials and activities	Institutional arrangements in place to enable development of the joint strategies Technical group is available to work on the tasks
Output 3.2 Detailed SOPs and contingency plans for field-level management of disease outbreaks	Numbers of workshops and meetings to develop contingency plans for selected disease(s)	Manuals with details of plans for disease management at field level	Technical group is available to work on the tasks Partners able to cooperate to develop joint SOPs
Output 3.3 Strengthened capacity for field response to disease outbreaks	Needs assessment and gap analysis conducted Training programs implemented. Rapid response teams resourced in strategic locations	Documentation of needs assessment, gap analysis and training Evidence of increased numbers of rapid response teams in strategic locations	Resources available to train and equip rapid response teams and to increase capacity in general
Output 3.4 Increased numbers of key officials in high-risk areas with understanding of outbreak response requirements	Numbers of officials participating in outbreak response training workshops. Strategic communications and advocacy for key officials	Evidence of training of key officials in high risk areas Evidence of strategic communications and advocacy increasing engagement.	Key officials willing to engage in process and commit to their role in outbreak response Resources available for training
Output 3.5 Increased numbers of operatives undertaking risk analysis to support disease control	Numbers of training workshops conducted and operatives trained in risk analysis	Reports of training and evidence of numbers trained Training manuals used	Resources available for training and suitable candidates available for training

Component 3: Coordinated outbreak preparedness, prevention and response			
Outcome: EID outbreak preparedness, prevention and response capabilities, capacity and coordination on One Health framework strengthened			
Objective: To strengthen disease outbreak preparedness, prevention and response capabilities and coordination within a One Health framework.	**Indicators:** 1) Mechanisms in place for One Health approachto control of selected disease(s) 2) Strengthened capability, capacity and coordination of disease response in action **Means of verification:** 1)Documentation of joint approaches to strengthen control 2) Reduction of intervals from reporting to control of disease outbreaks 3)Documentation of coordination of outbreak preparedness and response **Assumptions:** 1)Possible to conduct assessments to measure improvement in control 2) Resources available at different levels to strengthen capability and capacity 3) Partners are able to develop the coordination mechanisms for One Health approach 3) Institutional arrangements in place. 4)Resources available to build necessary capacity across sectors		
Expected Outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 3.6 Desktop simulations conducted with outbreak experiences integrated into them	Number of desk top simulations and numbers of persons engaged Recommendations arising from post exercise evaluations	Reports of desk top simulations. Reports of changes to response preparation arising from desk top	Resources available to conduct simulations and partners and local officials are able to cooperate to conduct simulation exercises
Output 3.7 Disease outbreak response teams have outbreak investigation capability	Numbers of outbreak response teams with additional training Combined training with surveillance programme	Reports of training workshops Evidence of linkage of training to surveillance programme	Resources available for training Suitable staff available for training
Output 3.8 Specified amount of response equipment available in storage and audited for readiness	Numbers of equipment and resources available Storage facilities established Numbers of audits carried out	Reports of equipment and materials procurements Reports of inventory audits Details (and inspection) of storage facilities	Resources available to procure necessary materials and equipment Storage facilities available

Component 4: Applied Research			
Outcome: Applied Research provides key evidence to facilitate disease control			
Objective: To conduct research to generate evidence that enables stakeholders to address disease impacts appropriately according to One Health criteria.	**Indicators:** 1) Numbers of research projects undertaken 2) Percentage of research projects generating evidence that was utilized in disease control strategy **Means of verification:** 1) Research proposals funded 2) Research reports with conclusions 3)Evidence that research conclusions were incorporated into disease control strategy **Assumptions:** Funding and facilities available for research and key questions are amenable to investigations within budgets		
Expected outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 4.1 Lists of priority research issues for the disease in question, resources required and impediments to conducting research	Workshops to determine key diseases, resources required and impediments to conduct the research Agreements on research collaboration at national level	Documented evidence of the workshop outputs Documented evidence of agreements for collaboration	Institutional arrangements in place to enable cross-sectoral workshops and collaboration
Output 4.2 Assessment of national capacity to conduct the necessary research, identifying resource gaps that constrain research	Research capacity assessment conducted Gap analysis conducted linked to priority list	Documents produced by research capacity assessment and gap analysis	Resources to enable assessment and gap analysis
Output 4.3 Agreements with international partners for collaboration on main research questions	Number of collaborative research projects with international partners Number of and percentage of successfully completed collaborative research projects Increased national and donor support for research.	Research proposals and projects involving collaboration with international partners Government and international donor funding levels for research	International partners willing to collaborate and to secure funding for research projects
Output 4.4 Enhanced national research capacity through a research programme with well-defined and achievable targets	Number of national scientists engaged in research projects Number of national scientists enrolled for higher degrees Meetings to develop research programme	Report of research programme development Evidence of scientists under training.	Resources available to support national research scientists Suitable persons available for mentoring in research capacity development

Component 4: Applied Research			
Outcome: Applied Research provides key evidence to facilitate disease control			
Objective: To conduct research to generate evidence that enables stakeholders to address disease impacts appropriately according to One Health criteria.	**Indicators:** 1) Numbers of research projects undertaken 2) Percentage of research projects generating evidence that was utilized in disease control strategy **Means of verification:** 1) Research proposals funded 2) Research reports with conclusions 3)Evidence that research conclusions were incorporated into disease control strategy **Assumptions:** Funding and facilities available for research and key questions are amenable to investigations within budgets		
Expected outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 4.5 Results of research published and available to stakeholders	Number of publications in scientific journals and elsewhere Number of publications developed for stakeholder groups	Publications and other documents produced with research results	Research is successful and is of sufficient quality for publication in scientific journals
Output 4.6 Evidence generated used in advocacy and communication materials, and disseminated to key stakeholders	Number of materials produced for advocacy and strategic communications arising from research findings	Evidence of publications, technical briefings and meetings to communicate and advocate findings	Research is successful in generating material suitable for communications activities

Component 5: Networks and partnerships			
Outcome: Networks and partnerships lead to strengthening of disease prevention and control			
Objective: To foster collaboration in preventing and controlling infectious diseases at the subnational, national, regional and global levels among the Government of Bangladesh and other key stakeholders/partners.	**Indicators:** 1) Numbers of functioning networks, partnerships and collaborations established. 2) Community, national and international engagement in One Health approach to control of EIDs. **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 **Assumptions:** Stakeholders effectively engage in efforts to develop networks for One Health Approach to selected disease(s).		
Expected Outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 5.1 Mapping of key stakeholders and collaborators, indicating their likely contributions to the project.	Number of stakeholders and collaborators identified Potential stakeholder contributions identified	Mapping report identifying stakeholder groups at different levels Verification with international partners of participation	
Output 5.2 Networks at the community level to facilitate implementation of the One Health approach to selected diseases	Number of networks developed at community level Level of access by community to disease control program.	Field verification of existence and functioning of networks to provide access to community stakeholders Participatory evaluations of networks at field level	Government and communities able to establish working relationships in a One Health context Mechanisms to engage communities successful
Output 5.3 Participatory approach to communication and feedback in communities	Participatory processed developed Number of operators trained in participatory processes Number of communities engaged in participatory processes	Manuals of procedures and training Field evaluation of processes in place and communications flow Satisfaction levels in communities	Suitability of operators to engage in participatory processes Agreement of local partners to engage in participatory processes
Output 5.4 Networks at the national level to facilitate implementation of the One Health approach to selected disease(s)	Number of national networks established Number of active individuals and organizations in networks	Project reports and reports of networks activities. Referencing with Government line agencies regarding network activities.	Commitment and engagement of line agencies in networks
Output 5.5 Working mechanisms for the operation and engagement of partnerships in disease control project(s)	Partners are working harmoniously in the disease control programme Numbers of workshop to develop working mechanism	Workshop report with details of mechanisms Project reports and reports of networks activities	Agreement reached to enable partnerships to flourish in the One Health context

Component 5: Networks and partnerships			
Outcome: Networks and partnerships lead to strengthening of disease prevention and control			
Objective: To foster collaboration in preventing and controlling infectious diseases at the subnational, national, regional and global levels among the Government of Bangladesh and other key stakeholders/partners.	**Indicators:** 1) Numbers of functioning networks, partnerships and collaborations established. 2) Community, national and international engagement in One Health approach to control of EIDs. **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 **Assumptions:** Stakeholders effectively engage in efforts to develop networks for One Health Approach to selected disease(s).		
Expected Outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 5.6 Collaboration and exchange of materials and information within the country network and with international programs, agencies and institutions	Numbers of linkages to and agreements with international programs Types and numbers of materials exchanged	Project reports and reports of networks activities Documented evidence of materials exchanged	International programs, agencies and institutions engage with the One Health approach project(s) in Bangladesh
Output 5.7 Bulletins, reports and meetings to facilitate the two-way exchange of project information in the One Health context.	Numbers of bulletins and meetings conducted with partners at different levels	Project reports of meetings and other communication and interaction modalities Field verification of activities	

Component 6: Strategic communication and advocacy			
Outcome: Strategic communication and advocacy enables individuals and communities to 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 take action to protect their own health, livelihoods and ecosystems against infectious diseases	**Indicators:** 1) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 2) Number of materials and activities used for strategic communications and advocacy to support the One Health approach 3) Number of stakeholders and service providers whose capacity strengthened in One Health approach **Means of verification:** 1) Field visits and evaluations of community actions arising 2) Sighting of materials used, project reports, field evaluations of change arising 3)Interviews with decision makers 4) Number of trainings conducted **Assumptions:** 1)Engagement of communities is successful, as people interested in the benefit of the behaviors promoted2)Political support for the One Health approach		
Expected outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 6.1: A comprehensive social and behavior change strategy with an advocacy component based on a detailed analysis of the issues and constraints at community level for disease prevention and control; and an action plan with a complementary budget.	Analysis of communication and advocacy requirements Activity to develop strategy in collaboration with technical partners One Health multidisciplinary analysis of issues and constraints on disease prevention and control at community level Strategic communication and advocacy plan with budget to address strategy	Report of workshop and documented plan by June 2012 Monitoring indicators met Reports of field investigations Reports of meetings and workshops to develop plan Strategy documents, Action Plan and budget Activity reports and Field validation of community engagement and empowerment	Communities interested to engage in One health projects
Output 6.2 Competencies of the different categories of implementers, including field workers, enhanced according to needs assessment to enable effective implementation of the strategy and work plans.	Needs assessment undertaken Training materials prepared Numbers of training workshops and field workers trained	Report of needs assessment Activity reports, field validation	Funds available for training Field workers available for training

Component 6: Strategic communication and advocacy			
Outcome: Strategic communication and advocacy enables individuals and communities to 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 take action to protect their own health, livelihoods and ecosystems against infectious diseases	**Indicators:** 1) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 2) Number of materials and activities used for strategic communications and advocacy to support the One Health approach 3) Number of stakeholders and service providers whose capacity strengthened in One Health approach **Means of verification:** 1) Field visits and evaluations of community actions arising 2) Sighting of materials used, project reports, field evaluations of change arising 3)Interviews with decision makers 4) Number of trainings conducted **Assumptions:** 1)Engagement of communities is successful, as people interested in the benefit of the behaviors promoted2)Political support for the One Health approach		
Expected outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 6.3 Validated materials and training packages developed for orientation of key stakeholders, including policy makers.	Numbers of formats and strategies developed and validated amongst partners Number of publications, other communications materials including webpage developed; and events held	Documented evidence of formats, strategy and advocacy material Reports of validation processes Documented evidence Press releases, media coverage Web site hits	
Output 6.4 Procedures and plan in place from commencement to monitor and evaluate component activities.	Monitoring and evaluation matrix prepared No. of behavioral and media analysis reports Number of evaluation reports	Documented evidence of M&E including updates of matrix Evaluation reports	

Component 7: Capacity Building			
Outcome: Capacity-building activities implemented in all One Health components			
Objective: To develop balanced, multidisciplinary capacity enabling the government, partners and key stakeholders to prevent, respond to, control and mitigate the impacts of infectious diseases.	**Indicators:** 1) Capacity of partners and stakeholders strengthened 2) Establishment of multi-disciplinary approaches to disease control **Means of verification**: 1)Reports of pre and post assessments of capacity 2) Records of capacity building inputs 3)Field assessment indicates multidisciplinary approach in action **Assumptions:**1) Sufficient financial resources to strengthen capacity as required 2) Sufficient and suitable personnel available to engage in capacity building		
Expected Outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 7.1 Detailed capacity needs assessment and map of resource requirements for One Health project(s)	Process to conduct capacity needs assessment established Capacity needs assessment with data to assist project development	Documented evidence of capacity needs assessment and resource requirements	
Output 7.2 Guidelines and materials produced to build key capacity requirements for the One Health approach	Guidelines and materials developed	Documented evidence of guidelines and use of such materials for training programs	
Output 7.3 One Health project design and implementation workshop(s) conducted	Number of workshops conducted Training material produced	Project records and workshop reports Documented training material	Personnel available to participate and necessary financial resources available
Output 7.4Plans and modalities for cross-sectoral capacity building initiatives using partnership resources	Reduction in key capacity imbalances as appropriate Number of programs to build capacity using partner resources	Field assessment of partners' increased capacity in key areas	Partners willing to share training resources to build capacity
Output 7.5Technical capacity related to wildlife and ecology issues, laboratory and diagnostic response; disease intelligence, reporting and epidemiology; strategic communications and advocacy strengthened according to assessment	Number of training inputs to area and number of activities improved or initiated	Records of training inputs Records of increased performance Field assessments of capacity change	Funds available to build capacity Suitable personnel available to engage in capacity building

Component 7: Capacity Building			
Outcome: Capacity-building activities implemented in all One Health components			
Objective: To develop balanced, multidisciplinary capacity enabling the government, partners and key stakeholders to prevent, respond to, control and mitigate the impacts of infectious diseases.	**Indicators:** 1) Capacity of partners and stakeholders strengthened 2) Establishment of multi-disciplinary approaches to disease control **Means of verification**: 1)Reports of pre and post assessments of capacity 2) Records of capacity building inputs 3)Field assessment indicates multidisciplinary approach in action **Assumptions:**1) Sufficient financial resources to strengthen capacity as required 2) Sufficient and suitable personnel available to engage in capacity building		
Expected Outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 7.6 Monitoring and evaluation indicators to assist delivery of capacity building	A system of M&E developed and implemented Adjustments to the project areas arising from M&E process	Documented M&E tables with indicators. Reports on M&E show consistent use of the system Reports showing adjustments to project documents based on M&E process	

Component 8: Behavioral, Social and Economic Aspects of Diseases			
Outcome: Behavioral, social and economic factors and their influence on disease incidence and impact defined			
Objective: To determine the social and economic factors that influence disease incidence and impact.	**Indicators:** 1) Number of studies and reports describing behavioral and socio-economic variables influencing disease incidence and impact 2) Number and % of programs use these factors to improve their effectiveness **Means of verification:** Published reports, project reports **Assumptions:** Investigations are successfully carried out		
Expected Outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 8.1 Details of behavioral and socio-economic factors that influence the disease control options for communities	Numbers of reports on field investigations, and number of control options identified Behavioral, social and economic factors identified Holistic approach to disease control developed	Project reports and publications, especially communications and advocacy materials	Financial and personnel resources available Stakeholder cooperation in field
Output 8.2 Evidence-based reports outlining the risk points for emergence and spread of diseases	Number of reports with HACCP and value chain analysis, including cross border studies on disease risks Numbers of high risk areas identified and described	Project reports and publications, especially communications and advocacy materials Project reports and publications	Financial and personnel resources available Stakeholder cooperation in field
Output 8.3 Economic and social impact analysis of specific disease(s)	Standard methodology developed Number of reports with analysis of impacts of disease	Project reports and publications, especially communications and advocacy materials	Investigations successfully conducted
Output 8.4 Key findings packaged for use in other components, especially strategy, communications and advocacy	Number of findings and reports used in strategy development, communications and advocacy	Specific communications and advocacy materials Project planning shows socio-economic inputs to strategy	Investigations successfully conducted

Component 9: Wildlife and ecology			
Outcome: Wildlife and ecology are integrated into the One Health approach			
Objective: To ensure that the role of ecology and wildlife in infectious diseases is addressed and that agro-ecological changes as drivers of disease emergence are understood.	**Indicators:** 1) New understanding of role of ecological and wildlife health in disease control and disease emergence **Means of verification:** 1) Published reports from the project(s) 2) Project plans with wildlife and ecological considerations that are enacted as shown by reports **Assumptions:** 1)Possible to engage communities and partners to enable ecological and wildlife matters to be integral to project activities in the field		
Expected outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 9.1 Formal and informal agreements for the engagement of national, regional and global partners and organizations developed	Number of linkages and agreements with established with partners, stakeholders and appropriate national and international organizations	Project reports and outlines of agreements for engagement of partners and stakeholders Reports with evidence of informal agreements	Key stakeholders willing to engage and enable project activities Appropriate organizations willing to engage
Output 9.2 Wildlife and ecological variables of disease outbreaks described and mapped	Historical record of outbreaks of disease with geographic, ecological and other descriptors	Reports with maps and descriptions of wildlife and ecological variables	Sufficient information exists to obtain full descriptions of historical incidents
Output 9.3 One Health plans with wildlife, ecological and environmental factors included	Numbers of One Health plans with wildlife, ecological and environmental factors included	Documented plans and reports of activities undertaken in component	
Output 9.4 Improved capacity and understanding among field operatives regarding wildlife and ecological issues	Gap analysis of training requirements Training manuals developed Numbers of field staff trained	Documented gap analysis Training materials for field staff Project reports with numbers trained Field validation of training conducted	Financial and personnel resources available to participate in field work
Output 9.5 Reports providing analytical insights for use in other components	Evidence gathered from field work Modification of field approach based on evidence	Project reports of field work Project plans indicating modification based on evidence	Field work is successful in obtaining new data
Output 9.6 A strategy for correcting the imbalances that leads to emergence of pathogen(s) at the wildlife interface	Number and details of plan to make changes at the wildlife interface Workshop to develop plan	Documentation of plan Materials developed to implement plan	

Component 9: Wildlife and ecology			
Outcome: Wildlife and ecology are integrated into the One Health approach			
Objective: To ensure that the role of ecology and wildlife in infectious diseases is addressed and that agro-ecological changes as drivers of disease emergence are understood.	**Indicators:** 1) New understanding of role of ecological and wildlife health in disease control and disease emergence **Means of verification:** 1) Published reports from the project(s) 2) Project plans with wildlife and ecological considerations that are enacted as shown by reports **Assumptions:** 1)Possible to engage communities and partners to enable ecological and wildlife matters to be integral to project activities in the field		
Expected outputs	**Indicators**	**Means of verification**	**Assumptions**
Output 9.7 Intervention plan implemented at the field level	Interventions undertaken at field level according to plan	Materials developed and resources assembled to implement plan Project reports of field activity	Feasible intervention can be developed Implementation is supported financially and by stakeholders

Annex 2: Action Planfor the Strategic Framework for the application of a One Health approach to infectious diseases in Bangladesh

Component 1: Institutional governance and programme management																					
Outcome: Institution arrangements in place facilitate One Health approach																					
Objective: To ensure that the institutional arrangements, policy frameworks and management mechanisms are in place to facilitate a One Health Approach to prevent emergence, re-emergence and high impact diseases at the animal, human and eco-system interface, and ensure food safety and security		**Indicators:** 1) One Health approach to at least one disease is functioning with effective collaboration between partners 2) Policy frameworks developed 3)Management mechanisms agreed and established **Means of verification**: 1) Documented memorandum of arrangement to establish processes 2) Documented evidence of policy frameworks developed 3) Project management outputs such as reports and meetings **Assumptions:** Institutional will and commitment to resolve constraints																			
		2012–2016																			
		2012				**2013**				**2014**				**2015**				**2016**				
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
Output 1.1 Details of structures and terms of reference necessary for the Government of Bangladesh to endorse the One Health approach	1.1.1 Approval of organogram of One Health: • Inter- ministerial agreement • Approval of the cabinet • Gazette notification																					Lead by: MoHFW, MoFL, MoEF Coordination by MoHFW Supported by:
Output 1.2 Institutional arrangements are in place to enable progress on the One Health approach in Bangladesh	1.2.1 Formation of Inter-ministerial Steering committee • Designating one institute as the One Health Secretariat Formation of: • Expert Advisory Group • Project Coordination committee • Technical Working Groups																					Lead by: MoHFW,MoFL,MoEF Supported by:
Output 1.3 Line agency and sector policies are updated to facilitate implementation of the One Health approach	1.3.1 Incorporation of One Health agenda in the sector policy																					Lead by: MoHFW,MoFL,MoEF Supported by: All relevant Agencies (e.g. DGHS, DLS, DoF)

Component 1: Institutional governance and programme management																					
Outcome: Institution arrangements in place facilitate One Health approach																					
Objective: To ensure that the institutional arrangements, policy frameworks and management mechanisms are in place to facilitate a One Health Approach to prevent emergence, re-emergence and high impact diseases at the animal, human and eco-system interface, and ensure food safety and security		**Indicators:** 1) One Health approach to at least one disease is functioning with effective collaboration between partners 2) Policy frameworks developed 3)Management mechanisms agreed and established **Means of verification**: 1) Documented memorandum of arrangement to establish processes 2) Documented evidence of policy frameworks developed 3) Project management outputs such as reports and meetings **Assumptions:** Institutional will and commitment to resolve constraints																		
		2012–2016																			
		2012				**2013**				**2014**				**2015**				**2016**				
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
Output 1.4 Selected existing activities are leveraged for the One Health approach	1.4.1 Identify existing activities that leverage one health approach • Hire a national consultant • Workshop involving multi sector expert • Preparation of reports																					Lead by: One Health secretariat Supported by: UN Agencies
Output 1.5 Mechanisms to ensure collaborative planning and to monitor the overall performance of projects/programs	1.5.1 Mechanism of collaborative planning and monitoring developed through workshops																					Lead by: One Health Secretariat Supported by: All relevant Agencies (e.g., DGHS, DLS, DoF) and partners
Output 1.6 Projects planned and managed according to the One Health approach Strategic Framework	1.6.1 Identify and prioritize projects/programs through Inter-sector Meeting • Workshops																					Lead by: One Health secretariat Supported by: All relevant Agencies (e.g., DGHS, DLS, DoF) and partners
Output 1.7 One Health Core Advisory Group provides independent advice to IMSCOH	1.7.1. One Health Advisory group convenes meeting to provide independent views to IMSCOH																					Lead by: Supported by:

Component 1: Institutional governance and programme management																					
Outcome: Institution arrangements in place facilitate One Health approach																					
Objective: To ensure that the institutional arrangements, policy frameworks and management mechanisms are in place to facilitate a One Health Approach to prevent emergence, re-emergence and high impact diseases at the animal, human and eco-system interface, and ensure food safety and security		**Indicators:** 1) One Health approach to at least one disease is functioning with effective collaboration between partners 2) Policy frameworks developed 3)Management mechanisms agreed and established **Means of verification**: 1) Documented memorandum of arrangement to establish processes 2) Documented evidence of policy frameworks developed 3) Project management outputs such as reports and meetings **Assumptions:** Institutional will and commitment to resolve constraints																		
		2012–2016																			
		2012				**2013**				**2014**				**2015**				**2016**				
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
Output 1.8 Project implementation undertaken following the One Health approach	1.8.1. Project approved 1.8.2. Implementation, monitoring by TWG, report publication and dissemination																					Lead by: by the GoB. Supported by: All relevant Agencies (e.g. DGHS, DLS, DoF)
Output 1.9 Intra-project communications and information exchange established	1.9.1. Communication mechanisms developed: • Workshops twice a year • Publication • Web based information sharing											Information sharing										Lead by: Supported by:

Component 2: Coordinated surveillance																							
Outcome: Coordinated surveillance for EIDs diseases under One Health approach																							
Objective: To undertake coordinated One Health surveillance activities enhance national surveillance capacity for early warning, prevention and control of emerging, re-emerging and high impact infectious diseases.		**Indicators:** Coordinated surveillance system for EIDs with contribution from and sharing among sector partners **Means of verification:** Reports showing joint surveillance activities 2) Pooling of data from different sectors **Assumptions:** Institutional arrangements in place 2) Resources available to build necessary capacity across sectors																			
		2012–2016																					
		2012				**2013**				**2014**				**2015**				**2016**					
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**	
Output 2.1 Joint surveillance system for the One Health approach to emerging infectious diseases	2.1.1. Develop a plan for joint surveillance for priority diseases																					Lead by: IEDCR/DLS	
	2.1.2. Establish institutional arrangement among relevant partners																					Supported by: LGRD, icddr,b	
Output 2.2 Standard operating procedures (SOPs) for surveillance and outbreak investigation	2.2.1 Develop SOP for a joint surveillance																					Lead by: DLS/IEDCR	
	2.2.2 Conduct workshops to finalize SOPs																					Supported by:	
Output 2.3 Surveillance capacities strengthened to build sufficient capacity in each sector partner	2.3.1 Assess existing capacity for joint surveillance of each sector partner																					Lead by: Joint team from DLS/ IEDCR /DoEF	
	2.3.2 Conduct the joint training																					Supported by: Icddr,b, CVASU, BAU, Academia	
Output 2.4 A platform arrangement to share passive surveillance data, including with third parties	2.4 Develop a platform (website) for passive data sharing																					Lead by: One Health Secretariat	
																						Supported by: IEDCR/DLS	
Output 2.5 Strengthening network for sample submission and result sharing	2.5.1 Develop SOP for joint sample collection, shipment, storage and sharing																					Lead by: IEDCR/DLS	

Component 2: Coordinated surveillance																							
Outcome: Coordinated surveillance for EIDs diseases under One Health approach																							
Objective: To undertake coordinated One Health surveillance activities enhance national surveillance capacity for early warning, prevention and control of emerging, re-emerging and high impact infectious diseases.		**Indicators:** Coordinated surveillance system for EIDs with contribution from and sharing among sector partners **Means of verification:** Reports showing joint surveillance activities 2) Pooling of data from different sectors **Assumptions:** Institutional arrangements in place 2) Resources available to build necessary capacity across sectors																			
		2012–2016																					
		2012				**2013**				**2014**				**2015**				**2016**					
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**	
	2.5.2 Develop an agreement for sample sharing among relevant partners																					Supported by: BLRI, CDIL, icddr,b	
Output 2.6 Diagnostic laboratory capacity and capability strengthened and fit for purpose in supporting the One Health approach to the selected disease(s)	2.6.1 Assess the existing laboratory capacity, capability and proficiency																					Lead by: DLS/IEDCR	
	2.6.2 Conduct joint training based on assessment findings																					Supported by: BLRI, DLS,IPH, CVASU, BAU, icddr,b	
Output 2.7 Maps of high-risk areas and a strategy for increasing the sensitivity of disease surveillance activities	2.7.1 Update the high-risk maps and share with relevant partner 2.7.2 Share the mapping software with relevant partners																					Lead by: DLS	Supported by: FAO
Output 2.8 Platform arrangement for reporting active surveillance and outbreak investigation data	2.8 Develop a platform (website) for active data sharing																					Lead by: IEDCR/DLS	Supported by:
Output 2.9 Application of participatory methods for detection and management of	2.9.1 Identify community in the community level																					Lead by: DGHS	
	2.9.2 Develop an educational toolkit																						

Component 2: Coordinated surveillance																					
Outcome: Coordinated surveillance for EIDs diseases under One Health approach																					
Objective: To undertake coordinated One Health surveillance activities enhance national surveillance capacity for early warning, prevention and control of emerging, re-emerging and high impact infectious diseases.		**Indicators:** Coordinated surveillance system for EIDs with contribution from and sharing among sector partners **Means of verification:** Reports showing joint surveillance activities 2) Pooling of data from different sectors **Assumptions:** Institutional arrangements in place 2) Resources available to build necessary capacity across sectors																		
		2012–2016																			
		2012				**2013**				**2014**				**2015**				**2016**				
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
diseases at the community level (if appropriate)	2.9.3 Conduct training of community workers and managers for application of participatory methods for disease detection and management																					Supported by: IEDCR/LGRD
Output 2.10 Inclusion of a component for considering the environmental interface in projects with wildlife interface	2.10 Develop surveillance proposals for priority wildlife diseases and high risk areas identified in 2.7																					Lead by: Forest Department Supported by: DLS/FAO

Component 3: Coordinated outbreak preparedness, prevention and response																							
Outcome: EID outbreak preparedness, prevention and response capabilities, capacity and coordination on One Health framework strengthened																							
Objective: To strengthen disease outbreak preparedness, prevention and response capabilities and coordination within a One Health framework.		**Indicators:** 1) Mechanisms in place for One Health approach to control of selected disease(s) 2) Strengthened capability, capacity and coordination of disease response in action **Means of verification:** 1) Documentation of joint approaches to strengthen control 2) Reduction of intervals from reporting to control of disease outbreaks 3)Documentation of coordination of outbreak preparedness and response **Assumptions:** 1)Possible to conduct assessments to measure improvement in control 2) Resources available at different levels to strengthen capability and capacity 3) Partners are able to develop the coordination mechanisms for One Health approach 3) Institutional arrangements in place. 4) Resources available to build necessary capacity across sectors																				
		2012–2016																					
		2012				**2013**				**2014**				**2015**				**2016**					
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**	
Output 3.1 Disease outbreak control and prevention strategies for selected diseases developed and communicated to stakeholders	3.1.1 Develop a disease outbreak control and prevention strategy																					Lead by: IEDCR	
	3.1.2 Endorse the strategy by relevant partners																					Supported by: Icddr,b/DLS	
	3.1.3 Disseminate the strategy among relevant stakeholders																						
Output 3.2 Detailed SOPs and contingency plans for field-level management of disease outbreaks	3.2.1 Develop contingency plans for responding to outbreaks using One Health approach																					Lead by: IEDCR	
	3.2.2 Develop SOPs for responding to outbreaks using One Health Approach																					Supported by: DLS, MOFL/DGHS, MOHFW	
	3.2.3 Endorse and disseminate contingency plans and SOPs																						
Output 3.3 Strengthened capacity for field response to disease outbreaks	3.3.1 Develop training modules and manuals																					Lead by: IEDCR	
	3.3.2 Conduct training of RRT																					Supported by:	
Output 3.4 Increased numbers of key officials in high-risk areas with	3.4 Advocate for increasing the numbers of key officials in high risk areas with understanding of outbreak response requirements																					Lead by: DLS, MOFL/DGHS, MOHFW	

Component 3: Coordinated outbreak preparedness, prevention and response																								
Outcome: EID outbreak preparedness, prevention and response capabilities, capacity and coordination on One Health framework strengthened																								
Objective: To strengthen disease outbreak preparedness, prevention and response capabilities and coordination within a One Health framework.		**Indicators:** 1) Mechanisms in place for One Health approach to control of selected disease(s) 2) Strengthened capability, capacity and coordination of disease response in action **Means of verification:** 1) Documentation of joint approaches to strengthen control 2) Reduction of intervals from reporting to control of disease outbreaks 3)Documentation of coordination of outbreak preparedness and response **Assumptions:** 1)Possible to conduct assessments to measure improvement in control 2) Resources available at different levels to strengthen capability and capacity 3) Partners are able to develop the coordination mechanisms for One Health approach 3) Institutional arrangements in place. 4) Resources available to build necessary capacity across sectors																					
		2012–2016																						
		2012				**2013**				**2014**				**2015**				**2016**						
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**		
understanding of outbreak response requirements																						Supported by:		
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)		
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		
	3.7.2 Form stand by team																					Supported by:		
Output 3.8 Specified amount of response equipment available in storage and audited for readiness	3.8.1 Conduct assessment in partner institutes/organizations																					Lead by: IEDCR/DLS/Wildlife		
	3.8.2 Procure necessary equipment and logistics																					Supported by:		
	3.8.3 Conduct audit periodically																							

Component 4: Applied Research																					
Outcome: Applied Research provides key evidence to facilitate disease control																					
Objective: To conduct research to generate evidence that enables stakeholders to address disease impacts appropriately according to One Health criteria.		**Indicators:** 1) Numbers of research projects undertaken 2) Results from research projects with impact on disease control **Means of verification:** 1) Research proposals funded2)Research reports with conclusions 3)Evidence, research conclusions incorporated into control strategy **Assumptions:** Funding and facilities available for research and key questions are amenable to investigations within budgets																		
		2012–2016																			
		2012				**2013**				**2014**				**2015**				**2016**				
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
Output 4.1 Lists of priority research issues for the disease in question, resources required and impediments to conducting research	4.1.1 Conduct workshops to define priority diseases																					Lead by: MoHFW/MoFL
	4.1.2 Organize follow-up workshops for identifying stakeholders, resources and constraints																					Supported by: Universities, icddr,b,/CDC, WHO, FAO
	4.1.3 Develop MoUs on research projects between in-country partners																					
Output 4.2 Assessment of national capacity to conduct the necessary research, identifying resource gaps that constrain research	4.2.1 Conduct national research capacity assessment and gap analysis																					Lead by: One Health Secretariat Supported by: All research partners
Output 4.3 Agreements with international partners for collaboration on main research questions	4.3.1 Develop and sign agreements with international partners to conduct collaborative research projects																					Lead by: Research project dependent Supported by: One Health Secretariat
Output 4.4 Enhanced national research	4.4.1 Engage national scientists in conducting research projects																					Lead by: One Health Secretariat

Component 4: Applied Research																						
Outcome: Applied Research provides key evidence to facilitate disease control																						
Objective: To conduct research to generate evidence that enables stakeholders to address disease impacts appropriately according to One Health criteria.		**Indicators:** 1) Numbers of research projects undertaken 2) Results from research projects with impact on disease control **Means of verification:** 1) Research proposals funded2)Research reports with conclusions 3)Evidence, research conclusions incorporated into control strategy **Assumptions:** Funding and facilities available for research and key questions are amenable to investigations within budgets																			
		2012–2016																				
		2012				**2013**				**2014**				**2015**				**2016**				
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
capacity through a research programme with well-defined and achievable targets	4.4.2 Identify training opportunities in research projects, including relevant One Health training and higher degrees programs																					
	4.4.3 Facilitate funding and enrolment of national scientists in these programs																					Supported by: All research partners
	4.4.4 Place national scientists in appropriate positions																					
	4.4.5 Conduct meetings to develop a national One Health research programme																					
Output 4.5 Results of research published and available to stakeholders	4.5.1 Prepare and publish research publications																					Lead by: Research project dependent
	4.5.2 Provide technical training and support for scientific writing																					
	4.5.3 Prepare briefings on research findings and share with stakeholders																					Supported by: One Health Secretariat
	4.5.4 Establish and manage an One Health scientific library																					
Output 4.6 Evidence generated used in advocacy and communication materials, and disseminated to key stakeholders	4.6.1 Prepare materials from research papers and reports																					Lead by: Research project dependent
	4.6.2 Disseminate materials to stakeholders																					Supported by: One Health Secretariat
Component 5: Networks and partnerships																						

Outcome: Networks and partnerships lead to strengthening of disease prevention and control																								
Objective: To foster collaboration in preventing and controlling infectious diseases at the subnational, national, regional and global levels among the Government of Bangladesh and other key stakeholders/partners .																								
Indicators: 1) Numbers of functioning networks, partnerships and collaborations established 2) Community, national and international engagement in One Health approachto control of EIDs **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 **Assumptions:** Stakeholders effectively engage in efforts to develop networks for One Health approachto selected disease(s)																								
		2012–2016																						
		2012				**2013**				**2014**				**2015**				**2016**						
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**		
Output 5.1Mapping of key stakeholders and collaborators, indicating their likely contributions to the project	5.1.1 Identification of Stakeholders/Collaborators																					Lead by: MoH,MoFL,MoFE, MoA		
	5.1.2 Identification of focal point at different animal, health, environment and wildlife, research and academic organization																							
	5.1.3 Define organizational responsibilities																					Supported by: WHO,FAO,UNICEF		
	5.1.4 Coordination meeting																							
Output 5.2 Networks at the community level to facilitate implementation of the One Health approach to selected diseases	5.2.1 Identification of the high Risk communities																					Lead by: MoH,MoFL,MoFE, MoA		
	5.2.3 Identification of community based organizations present there																					Supported by: WHO,FAO, UNICEF		
	5.2.3 Advocacy/consultation/ community/ collaborative meeting to capacitate the community in identifying outbreaks																							
Output 5.3 Participatory approach to communication and feedback in communities	5.3.1 SOP/guideline for participatory activities																					Lead by: MoH,MoFL,MoFE,MoA		
	5.3.2 Training and resource allocation																					Supported by: WHO,FAO, UNICEF		
	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: MoH,MoFL,MoFE,MoA		
	5.4.2 Define organizational responsibilities																					Supported by: WHO,FAO, UNICEF		
	5.4.3 Coordination meeting																							
Output 5.5 Working mechanisms for the	5.5.1Formation of multi sectoral working team																					Lead by: MoH,MoFL,MoFE,MoA		

Component 4: Applied Research																						
Outcome: Applied Research provides key evidence to facilitate disease control																						
Objective: To conduct research to generate evidence that enables stakeholders to address disease impacts appropriately according to One Health criteria.		**Indicators:** 1) Numbers of research projects undertaken 2) Results from research projects with impact on disease control **Means of verification:** 1) Research proposals funded2)Research reports with conclusions 3)Evidence, research conclusions incorporated into control strategy **Assumptions:** Funding and facilities available for research and key questions are amenable to investigations within budgets																			
		2012–2016																				
		2012				**2013**				**2014**				**2015**				**2016**				
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
operation and engagement of partnerships in disease control project(s)	5.5.2 Formation of groups for specific activities viz. surveillance, lab, response etc.																					Supported by: WHO,FAO, UNICEF
	5.5.3 Terms of reference for working mechanism through workshop																					
	5.5.4 Resource/logistics mobilization																					
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 int. labs and orgs to make memorandum of understanding/material transfer agreements																					Lead by: MoH,MoFL,MoFE, MoA
	5.6.2 Shearing information among pertinent int. organization and programs.																					Supported by: WHO,FAO, UNICEF
Output 5.7 Bulletins, reports and meetings to facilitate the two-way exchange of project information in the One Health context.	5.7.1 Publication of One Health bulletin biannually																					Lead by: MoH,MoFL,MoFE,MoA
	5.7.2 Event based reporting along with regular reporting to shear updates among the partners																					Supported by: WHO,FAO, UNICEF
	5.7.3 Quarterly meeting with partners at different levels																					

Component 6: Strategic communication and advocacy																							
Outcome: Strategic communication and advocacy enables individuals and communities to 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 take action to protect their own health, livelihoods and ecosystems against infectious diseases		**Indicators:** 1) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 2) Number of materials and activities used for strategic communications and advocacy to support the One Health approach 3) Number of stakeholders and service providers whose capacity strengthened in One Health approach **Means of verification:** 1) Field visits and evaluations of community actions arising 2) Sighting of materials used, project reports, field evaluations of change arising 3) Interviews with decision makers 4) Number of trainings conducted **Assumptions:** 1)Engagement of communities is successful, as people interested in the benefit of the behaviors promoted 2) Political support for the One Health approach																				
		2012–2016																					
		2012				**2013**				**2014**				**2015**				**2016**					
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**	
Output 6.1: A comprehensive social and behavior change strategy with an advocacy componentbased on a detailed analysis of the issues and constraints at community level for disease prevention and control; and an action plan with a complementary budget.	6.1.1 Literature review, formative research and establishing a baseline					■	■	■														Lead by: MoHFW/DGHS (IEDCR & BHE), MoFL/DLS and MOEF	
	6.1.2 Conduct national level workshops with multi-disciplinary and multisectoral partners to develop strategy including action plan & budget					■																Supported by: , MoA, Mo LGRD, UNICEF, FAO, WHO and ICDDR,B/BRAC University and other Research Organizations	
	6.1.3 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 according to needs assessment to enable effective implementation of the strategy and work plans.	6.2.1 Need Assessment of key stakeholders				■	■	■	■														Lead by: MoHFW/DGHS (IEDCR & BHE), MoFL/DLS and MOEF	
	6.2.2 Development of training packages, aids and materials for key stakeholders at different levels						■	■	■														
	6.2.3 Conduct training workshops for various stakeholders							■	■	■	■	■	■	■	■	■	■	■	■	■	■	Supported by: , MoA, UNICEF, FAO and WHO and icddr,b/BRAC University and other research Organizations	
	6.2.4 Conduct capacity evaluations of stakeholders trained										■				■				■				

Component 6: Strategic communication and advocacy																						
Outcome: Strategic communication and advocacy enables individuals and communities to 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 take action to protect their own health, livelihoods and ecosystems against infectious diseases		**Indicators:** 1) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 2) Number of materials and activities used for strategic communications and advocacy to support the One Health approach 3) Number of stakeholders and service providers whose capacity strengthened in One Health approach **Means of verification:** 1) Field visits and evaluations of community actions arising 2) Sighting of materials used, project reports, field evaluations of change arising 3) Interviews with decision makers 4) Number of trainings conducted **Assumptions:** 1)Engagement of communities is successful, as people interested in the benefit of the behaviors promoted 2) Political support for the One Health approach																			
		2012–2016																				
		2012				**2013**				**2014**				**2015**				**2016**				
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
Output 6.3 Validated materials and training packages developed for orientation of key stakeholders, including policy makers.	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
	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																					
	6.3.2 Develop and validate approaches, materials & tools for community engagement and empowerment;																					Supported by: MOEF/Dept of Forest, FAO, WHO (and UNICEF for pt.3 & 4)
	6.3.3 Document and disseminate evidence, success stories and good practices																					
Output 6.4 Procedures and plan in place from commencement to monitor and evaluate component activities. Regular monitoring = ... Evaluations =__	6.4.1 M&E framework developed																					Lead by: MoHFW/DGHS (IEDCR & BHE), MoFL/DLS and MOEF
	6.4.2 Collaborations with International and national Institutions to technically guide and conduct research initiatives related strategic communication and advocacy																					Supported by: MoA, UNICEF, FAO and WHO and icddr,b/BRAC University and other research organizations

Component 6: Strategic communication and advocacy																						
Outcome: Strategic communication and advocacy enables individuals and communities to 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 take action to protect their own health, livelihoods and ecosystems against infectious diseases		**Indicators:** 1) Number of communities with active One Health programs that protect health, livelihoods and ecosystems 2) Number of materials and activities used for strategic communications and advocacy to support the One Health approach 3) Number of stakeholders and service providers whose capacity strengthened in One Health approach **Means of verification:** 1) Field visits and evaluations of community actions arising 2) Sighting of materials used, project reports, field evaluations of change arising 3) Interviews with decision makers 4) Number of trainings conducted **Assumptions:** 1)Engagement of communities is successful, as people interested in the benefit of the behaviors promoted 2) Political support for the One Health approach																			
		2012–2016																				
		2012				**2013**				**2014**				**2015**				**2016**				
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
	6.4.3 Periodic monitoring and evaluation of media, communication materials, packages and initiatives																					

Component 7: Capacity Building																							
Outcome: Capacity-building activities implemented in all One Health components																							
Objective: To develop balanced, multidisciplinary capacity enabling the government, partners and key stakeholders to prevent, respond to, control and mitigate the impacts of infectious diseases.		**Indicators:** 1) Capacity of partners and stakeholders strengthened 2) Establishment of multi-disciplinary approaches to disease control **Means of verification**: 1)Reports of pre and post assessments of capacity 2) Records of capacity building inputs 3)Field assessment indicates multidisciplinary approach in action **Assumptions:** 1) Sufficient financial resources to strengthen capacity as required 2) Sufficient and suitable personnel available to engage in capacity building																			
		2012–2016																					
		2012				**2013**				**2014**				**2015**				**2016**					
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**	
Output 7.1 Detailed capacity needs assessment and map of resource requirements for One Health project(s)	7.1.1 Develop methodology and tools for need assessment																					Lead by:MOHFW MOFL; MOFE; MOA	
	7.1.2Conduct need assessment																					Supported by: FAO/UNICEF/WHO	
	7.1.3 Analyze And finalize needs to map requirements																						
Output 7.2 Guidelines and materials produced to build key capacity requirements for the One Health approach	7.2.1 Formation of working groups including research organizations and academic institutions																					Lead by: MOHFW; MOFL; MOFE; MOA	
	7.2.2 Develop guidelines, modules & materials as needed																					Supported by: FAO/UNICEF/WHO	
Output 7.3 One Health project design and implementation workshop(s) conducted	7.3.1 Consultative workshop to finalize materials/modules																					Lead by: FAO/UNICEF/WHO	
	7.3.2 Training on developed modules																					Supported by: FAO/UNICEF/WHO	
Output 7.4Plans and modalities for cross-sectoral capacity building initiatives using partnership resources	7.4.1 Development of training plan and the package for participants from different animal, health, environment and wildlife sectors with the support from research and academic institutions																					Lead by: FAO/UNICEF/WHO	
																						Supported by: FAO/UNICEF/WHO	

Component 7: Capacity Building																					
Outcome: Capacity-building activities implemented in all One Health components																					
Objective: To develop balanced, multidisciplinary capacity enabling the government, partners and key stakeholders to prevent, respond to, control and mitigate the impacts of infectious diseases.		**Indicators:** 1) Capacity of partners and stakeholders strengthened 2) Establishment of multi-disciplinary approaches to disease control **Means of verification**: 1)Reports of pre and post assessments of capacity 2) Records of capacity building inputs 3)Field assessment indicates multidisciplinary approach in action **Assumptions:** 1) Sufficient financial resources to strengthen capacity as required 2) Sufficient and suitable personnel available to engage in capacity building																		
		2012–2016																			
		2012				**2013**				**2014**				**2015**				**2016**				
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
Output 7.5Technical capacity related to wildlife and ecology issues, laboratory and diagnostic response; disease intelligence, reporting and epidemiology; strategic communications and advocacy strengthened according to assessment	7.5.1 Mainstream one health approach to ID in existing under and post graduate academic courses including developing a full time post graduate course with select academic institution																					Lead by: FAO/UNICEF/WHO
	7.5.2 Organize trainings on wildlife and ecology; laboratory; diagnostic response; Disease intelligence; reporting; epidemiology																					Supported by: FAO/UNICEF/WHO
	7.5.3 Strategic communications and advocacy with the support of research and academic institutions, if required.																					
Output 7.6 Monitoring and evaluation indicators to assist delivery of capacity building	7.6.1 Development of monitoring tools and assessment of capacity and feedback																					Lead by: FAO/UNICEF/WHO

Component 8: Behavioral, Social and Economic Aspects of Diseases																					
Outcome: Behavioral, social and economic factors and their influence on disease incidence and impact defined																					
Objective: To determine the social and economic factors that influence disease incidence and impact.		**Indicators:** 1) Number of studies and reports describing behavioral and socio-economic variables influencing disease incidence and impact 2) Number and % of programs use these factors to improve their effectiveness **Means of verification:** Published reports, project reports **Assumptions:** Investigations are successfully carried out																			
		2012–2016																			
		2012				**2013**				**2014**				**2015**				**2016**				
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
Output 8.1 Details of behavioral and socio-economic factors that influence the disease control options for communities	8.1.1 Conduct behavioral, socio-economic studies to identify factors influencing disease control options (Integrate in Activities of Component 4)																					**Lead by:** MoHFW **Supported by:** icddr,b, MoFL, MoF, universities.
Output 8.2 Evidence-based reports outlining the risk points for emergence and spread of diseases	8.2.1 Map the geographic distribution of risk for zoonotic infections 8.2.2 Ensure the incorporation of behaviors and socio-economic factors in mapping																					Lead by: Supported by:
Output 8.3 Economic and social impact analysis of specific disease(s)	8.3.1 Conduct socio-economic impact studies to assess disease impact on the national economy																					Lead by: MoF Supported by:
Output 8.4 Key findings packaged for use in other components, especially strategy, communications and advocacy	See component 4																					Supported by: LGRD, MoHFW, MoFL, universities. Lead by: One Health Secretariat

Component 9: Wildlife and ecology																						
Outcome: Wildlife and ecology are integrated into the One Health approach																						
Objective: To ensure that the role of ecology and wildlife in infectious diseases is addressed and that agro-ecological changes as drivers of disease emergence are understood.		**Indicators:** 1) New understanding of role of ecological and wildlife health in disease control and disease emergence **Means of verification:** 1) Published reports from the project(s) 2) Project plans with wildlife and ecological considerations that are enacted as shown by reports **Assumptions:** 1)Possible to engage communities and partners to enable ecological and wildlife matters to be integral to project activities in the field																			
		2012–2016																				
		2012				**2013**				**2014**				**2015**				**2016**				
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
Output 9.1 Formal and informal agreements for the engagement of national, regional and global partners and organizations developed	9.1.1 Identify the collaborative organizations 9.1.2 Identify the area of activities 9.1.3 Develop and sign MoU among partner organizations																					Lead by: One Health Secretariat Supported by: MoEF MoFL MoHFW
Output 9.2 Wildlife and ecological variables of disease outbreaks described and mapped	9.2.1 Identify disease outbreaks associated with wildlife 9.2.2 Describe the risk factor associated with outbreaks 9.2.3 Develop models for disease outbreaks 9.2.4 Map disease outbreaks																					Lead by: One Health Secretariat Supported by: MoEF MoFL MoHFW Other relevant donor and development organizations
Output 9.3 One Health plans with wildlife, ecological and environmental factors included	9.3.1 Identify interface areas among wildlife, humans and livestock 9.3.2 Identify the factors such as seasonal variation, habitat and climate change 9.3.3 Include identified factors in One Health plans																					Lead by: One Health Secretariat Supported by: MoEF MoFL MoHFW

Component 9: Wildlife and ecology																					
Outcome: Wildlife and ecology are integrated into the One Health approach																					
Objective: To ensure that the role of ecology and wildlife in infectious diseases is addressed and that agro-ecological changes as drivers of disease emergence are understood.		**Indicators:** 1) New understanding of role of ecological and wildlife health in disease control and disease emergence **Means of verification:** 1) Published reports from the project(s) 2) Project plans with wildlife and ecological considerations that are enacted as shown by reports **Assumptions:** 1)Possible to engage communities and partners to enable ecological and wildlife matters to be integral to project activities in the field																		
		2012–2016																			
		2012				**2013**				**2014**				**2015**				**2016**			
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
Output 9.4 Improved capacity and understanding among field operatives regarding wildlife and ecological issues	9.4 Identify the key personnel involved with wildlife surveillance or outbreak investigations 9.4.2 Assess current knowledge and identify gaps 9.4.3 Develop training activities to address identified needs 9.4.4 Provide support services for conducting disease investigations and surveillance																					Lead by: One Health Secretariat Supported by: MoEF MoFL MoHFW Related organizations and donor agencies
Output 9.5 Reports providing analytical insights for use in other components	9.5.1 Develop strategies for a multidisciplinary approach for data collection 9.5.2 Data analysis in the context of wildlife and ecology 9.5.3 Development of reports Timely dissemination of reports																					Lead by: One Health Secretariat Supported by: MoEF MoFL MoHFW Other relevant donor and development organizations
Output 9.6 A strategy for correcting the imbalances that leads to emergence of pathogen(s) at the wildlife interface	9.6.1 Identify imbalances, such as habitat or land-use changes, leading to emergence of pathogen(s) 9.6.2 Identify changes in migratory patterns and wildlife populations. 9.6.3 Develop strategy to address imbalances identified.																					Lead by: One Health Secretariat Supported by: MoEF MoFL MoHFW Other relevant donor and development organizations
Output 9.7 Intervention plan	9.7.1 Identify and engage communities																					Lead by: One Health Secretariat

Component 9: Wildlife and ecology																					
Outcome: Wildlife and ecology are integrated into the One Health approach																					
Objective: To ensure that the role of ecology and wildlife in infectious diseases is addressed and that agro-ecological changes as drivers of disease emergence are understood.		**Indicators:** 1) New understanding of role of ecological and wildlife health in disease control and disease emergence **Means of verification:** 1) Published reports from the project(s) 2) Project plans with wildlife and ecological considerations that are enacted as shown by reports **Assumptions:** 1)Possible to engage communities and partners to enable ecological and wildlife matters to be integral to project activities in the field																		
		2012–2016																			
		2012				**2013**				**2014**				**2015**				**2016**			
Expected Outputs	**Activities/Tasks**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Responsible Partner**
implemented at the field level	9.7.2 Advocacy and awareness creation 9.7.3 Agree on timelines for implementation 9.7.4 Source funding for activities 9.7.5 Implement intervention plan																					Supported by: MoEF MoFL MoHFW Other relevant donor and development organizations

Annex 3: Strategic Framework for application of a One Health approach to issues related to health and sustainable agriculture

During the initial workshop, *Envisioning One Health for Emerging Infectious Diseases and Beyond,* a working group formedthat focused on issues related to sustainability of agricultural practices and the impact of current practices on human health, food safety and food security.

The following is a summary taken from the final presentation. This outline can be used as a basis for a further planning workshop to develop a full strategic framework for a move towards sustainable agriculture.

Goal title

Move towards sustainable agriculture

Goal statement

Move towards sustainable agriculture to:

- reduce microbial and chemical hazards to humans, animals and their environments; and,
- enhance food security and safety.

Key components

- Coordinated assessment system for microbial and chemical hazards
- Coordinated monitoring system
- Infrastructure development and institutional arrangement
- Laboratory capacity for detection of hazards
- Human resource development
- Development of database and information sharing (Networking)
- Regulatory and legal mechanism
- Communication and mass awareness
- Community involvement
- Applied research

Factors affecting outcomes

Supporting factors

- Govt. policy and commitment for One Health
- Support from donors and partners
- Media

Constraining factors

- Inadequate understanding
- Economic crisis
- Insufficient coordination and cooperation among partners
- Ineffective execution of law/regulation

- Lack of awareness

Potential partners and collaborators

- Line ministries and concerned departments
- Academic and research institutions
- Quality control bodies
- Regulatory bodies
- Private sectors
- INGOs, NGOs
- Donors and partners

Key stakeholders

Ministry of Health and Family Welfare
Ministry of Agriculture
Ministry of Fisheries and Livestock
Ministry of Forest and Environment
Ministry of Food and Disaster Management
Ministry of Local Government
Ministry of Interior
Ministry of Education

Activities identified

Institutional arrangement

- Develop MoU and SOP among partner organizations for effective coordination and collaboration
- Identify participating institutions
- Gap analysis and capacity enhancement according to needs
- Form a coordinating committee
- Define roles and responsibilities of members

Output: A functional institutional system in place
Milestones: 2012-2013

Coordinated surveillance

- Develop environmental and food-chain monitoring system for microbial and chemical hazards in collaboration with participating partner organizations
- Assess microbial and chemical hazards
- Identify and agree for monitoring hazards
- Develop standard SOP and protocols for monitoring

Output: Mechanism for monitoring microbial and chemical hazards and sharing information
Milestones: 2014

Applied research

- Develop eco-friendly technology to reduce microbial and chemical hazards
- Identify and prioritize research needs
- Develop standard protocols for research
- Conduct research and disseminate research findings to stakeholders

Output: Availability of appropriate technology to mitigate identified hazards
Milestones: 2013-16

Networks and partnerships

- Develop a network of partner organizations to build up necessary database and share information
- Develop and agree protocol for database mgmt and information sharing
- Develop a shared data access system
- Explore possibility of collaboration and partnership with national and international centre of excellence

Output: A functional network and partnership in place
Milestones: 2013

One Health Management

- Develop a system of coordination at policy, institutional and operational levels for planning, implementation and M&E
- Define One Health policy and action plan for sustainable agriculture
- Define ToR and roles and responsibilities of stakeholders at different levels
- Develop agreed M&E tools

Output: A coordinated system for One Health Management in place
Milestones: 2012-13

Strategic actions

- Generate evidence-based information and appropriate actions for policy decision, law enforcement and risk communication
- Organize stakeholder meeting to share evidence based information and recommend appropriate interventions
- Develop risk communication materials to disseminate relevant information to mass media and general public

Output: Evidence-based information generated on identified hazards for targeted action
Milestones: 2015-16

Annex 4: List of Participants for 'Envisioning One Health for Emerging Infectious Diseases and Beyond,' 30 January to 2 February 2012

Name	Title	Organization	Email
Health Sector			
Prof. Dr. KhondhakerMdShefyetullah	Director General	Directorate General of Health Services	
Mr.SaifurRahman		Planning UNIT, Ministry of Health and Family Welfare	
Dr.MirMobarak (Hossain)	Research Officer	Planning, Directorate General of Health Services	Diaonto1976@gmail.com
Professor MahmudurRahman	Director	Institute of Epidemiology, Disease Control and Research (IEDCR)	mahmudur57@gmail.com
Professor Be-Nazir Ahmed	Director	Disease Control & LD-Center for Disease Control, DGHS	benazir1959@gmail.com
DrMushtuqHussain	Principal Scientific Officer	Institute of Epidemiology, Disease Control and Research (IEDCR)	mushtuq@iedcr.org
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Dr. SelinaKhatun	SNC	WHO-Bangladesh (IEDCR)	knselina@gmail.com
Dr Abdullah Al Kawsar	Medical Officer	Institute of Epidemiology, Disease Control and Research (IEDCR)	dr.akawsar@gmail.com
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