

BANGLADESH PARTICIPATORY PLANNING USING OUTCOME MAPPING: Summary Report



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STOP Spillover

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STOP SPILLOVER

Strategies to Prevent Spillover (STOP Spillover) enhances global understanding of the complex causes of the spread of a selected group of zoonotic viruses from animals to humans. The project builds government and stakeholder capacity in priority Asian and African countries to identify, assess, and monitor risks associated with these viruses and to develop and introduce proven and novel risk reduction measures.

Through outcome mapping (OM), a structured participatory tool that uses a collaborative context-specific process, spillover ecosystem stakeholders (both traditional and nontraditional) will be empowered to identify and reduce zoonotic spillover risks at the human-animal-environment interface and develop an outcome-oriented project action plan. This report outlines the details of the OM activities held in Bangladesh.

Acronyms

AIV	Avian Influenza Virus
BARC	Bangladesh Agricultural Research Council
BAPA	Bangladesh Poribesh Andolon
BAU	Bangladesh Agriculture University
BCCP	Bangladesh Center for Communication Programs
BFD	Bangladesh Forest Department
BFSA	Bangladesh Food Safety Authority
BLRI	Bangladesh Livestock Research Institute
BPICC	Bangladesh Poultry Industries Central Council
BSMMU	Bangabandhu Sheikh Mujib Medical University
CAB	Consumers Association of Bangladesh
CDC	Communicable Disease Control
CVASU	Chattogram Veterinary and Animal Sciences University
DAE	Department of Agricultural Extension
DGDA	Directorate General of Drug Administration
DGHS	Directorate General of Health Services
DLS	Department of Livestock Services
DPM	Deputy Program Manager
DNCC	Dhaka North City Corporation
DSCC	Dhaka South City Corporation
FAO	Food and Agriculture Organization
FIAB	Feed Industries Association of Bangladesh
FWA	Food, Water, Air, Climate, Livelihoods and Economics, and Policy and Security Resources
HPAI	Highly Pathogenic Avian Influenza
HR	Human Resources
IACUC	Institutional Animal Care and Use Committee
IEDCR	Institute of Epidemiology Disease Control and Research
IRB	Institutional Review Board
ISSP	Intervention/Study Selection Process
IUCN	International Union for Conservation of Nature
JSI	John Snow Research & Training Institute, Inc.
KGF	Krishi Gobeshona Foundation
LBM	Live Bird Market
LRI	Livestock Research Institute
LSSD	Laboratory Sciences and Services Division
MERS	Middle East Respiratory Syndrome
NGO	Nongovernmental Organization
NiV	Nipah Virus
OH-DReaM	One Health-Design Research and Mentorship Working Groups
OHB	One Health Bangladesh

Acronyms cont'd

OHS	One Health Secretariat
OIE	World Organization for Animal Health
OM	Outcome Mapping
PEI	Programme for Emerging Infections
RAC	Risk Analysis and Communication
SARS	Severe Acute Respiratory Syndrome
SBC	Social and Behavior Change
SEAOHUN	Southeast Asia One Health University Network
SMM	Surveillance, Mapping, and Modelling
SOP	Standard Operating Procedure
STOP Spillover	Strategies to Prevent Spillover
USAID	United States Agency for International Development
VOHUN	Vietnam One Health University Network
WHO	World Health Organization
WLE	Wildlife, Livestock, Epidemiology, Behavior Change, and Gender
WPSA	World's Poultry Science Association
WPSA-BB	World's Poultry Science Association Bangladesh Branch

Key Terms

Critical (boundary) partner: In OM, boundary partners are stakeholders or social actors with whom a project will work or whom the project will support or influence to achieve the project's vision. STOP Spillover uses the label critical partners as a more readily understood alternative. These may be individual organizations, groups, or institutions (e.g., local cultural or religious leaders, government agents, partner organizations, business entities, or other societal actors). It is through them that the project expects to influence change in the wider society toward the agreed upon OM vision.

High-risk interface: A socio-economic, environmental, and biological area in which the transmission of infectious agents across species (human, livestock, and/or wildlife) is known to occur. This may include bat guano collection sites, wet markets, wildlife farms and restaurants, and tourist areas. Human behaviors in these zones are driven by livelihood and economic needs, cultural traditions, and norms that cause contact and thus transmission risk. Each STOP Spillover intervention focuses on a specific high-risk interface relevant to a targeted zoonotic disease.

High-risk interface node: A particular interactive space in an interface where there is potential for transmission of infectious agents across species (human, livestock, and/or wildlife).

Intervention: Action taken by the project or other organizations to help critical partners achieve their outcome targets (also referred to as outcome challenges).

Outcome mapping (OM): A program design and implementation strategy that targets transformation in stakeholders to guide implementation, adaptive management, and evaluation. It is guided by how targeted ecosystem actors react to a project's interventions.

Outcome target: An outcome target (the challenge) is a statement of change that describes how the behaviors, relationships, activities, or actions of each critical partner will change if the project achieves its vision. Outcome targets capture partner behavior as anticipated in the vision.

Spillover: For the purposes of this project, spillover is defined as an event in which an emerging zoonotic virus is transferred from one animal host species (livestock or wildlife) to another or to humans.

Vision: Conveys the large-scale development-related changes that a project hopes to encourage in a given context. It is one or several statements and paragraphs that describe the economic, political, social, environmental, and relevant broad behavioral changes in selected critical partners.

Introduction

Bangladesh is deemed a hotspot for emerging and reemerging infectious disease epidemics. The highest-priority zoonotic viruses within the remit of STOP Spillover in Bangladesh are paramyxoviruses, primarily Nipah virus (NiV); zoonotic influenza A viruses, particularly avian influenza viruses (AIV); and zoonotic coronaviruses. The main spillover risks of these viruses occur at specific interfaces. The basic features of NiV and AIV are well researched, and key reservoir and bridging hosts have been identified. In Bangladesh, the highly pathogenic avian influenza (HPAI) H5N1 virus has now become endemic in poultry, and 556 outbreaks of HPAI H5N1 were confirmed in 52 of the 64 districts between 2007 and 2013. Nonetheless, significant challenges remain in designing and implementing effective and culturally relevant interventions that meaningfully reduce the risk of viral spillover, amplification, and spread.

On September 30, 2020, the United States Agency for International Development (USAID) awarded STOP Spillover to the Tufts University-led consortium. The five-year

initiative supports Bangladesh in strengthening its capacity to reduce the risk of viral spillover from animal hosts to humans. Specifically, STOP Spillover will collaboratively design, implement, and assess risk reduction interventions by empowering local stakeholders to better understand and act to reduce key risks. STOP Spillover’s scope is limited to the following priority viruses: Ebola, Marburg, Lassa, NiV, animal-origin coronaviruses (including SARS-CoV, SARS-CoV-2, and MERS-CoV), and animal-origin zoonotic influenza viruses (such as HPAI H5N1).

A core component of STOP Spillover is a participatory planning process based on OM (outcome mapping). OM focuses on changes in targeted actors and in the spillover ecosystem as project outcomes to be influenced by STOP Spillover. Through participatory workshops, stakeholders identify and prioritize high-risk interfaces, describe current opportunities and knowledge gaps in zoonotic spillover risk pathways, and identify potential and relevant activities to reduce related risks.

Outcome Mapping Process

OM focuses on changes in targeted actors and in the spillover ecosystem as project outcomes to be influenced by STOP Spillover. The STOP Spillover Bangladesh country team organized several OM participatory planning activities to prioritize high-risk interfaces and the most appropriate interventions for the project. These activities included a one-day virtual/online meeting (August 30, 2021) during which participants identified the country’s high-risk spillover interfaces from which participants would be invited to the planning workshops. This was followed by a national-level OM workshop in which high-risk interfaces were prioritized. Participants identified viral pathogens of interest and mapped risk management barriers and opportunities for

the associated interfaces as well as critical partners, and outcome targets. They then proposed interventions and support from STOP Spillover. The national OM workshop was an online workshop held between September 22, 2021, and October 7, 2021. The national meeting was followed by three interface-level OM workshops; two were held in the live bird markets (LBM) of Dhaka (November 21, 2021, and December 9–11, 2021), and the third was held at the Department of Livestock Services (DLS; December 28, 2021). After these workshops, STOP Spillover prioritized interventions to implement in Year 2 through an Intervention/Study Selection Process (ISSP) held on January 24, 2022. Figure 1 illustrates the sequence of OM activities.

Figure 1: OM Activities in Bangladesh



Workshop Activities and Outputs



Interface Prioritization

Workshop participants identified 20 high-risk interfaces during the one-day consultative meeting. Later, those interfaces were discussed and expanded upon during the six-day OM planning workshop. The 20 interfaces were consolidated into nine spillover interfaces:

- . primates within human settlements
- . transhuman and animal movement
- . migratory birds/wetlands
- . open safari parks
- . national parks
- . wildlife
- . research institutions/academia laboratories
- . hospitals/veterinary clinics/pet sellers (birds)/animal cargo handlers/cold storage facilities
- . fringe communities close to national parks-wildlife/human
- . bat-human interface
- . poultry value chain.

The participants agreed on prioritization criteria to select the priority interface. These included rates of morbidity and mortality; pandemic potential and transmissibility; mode of transmission and occupational exposure; frequency with which the community/people come into contact with animals; and behavioral, cultural, and stigmatization related to the risk. Two interfaces were prioritized for STOP Spillover: the poultry value chain (poultry farm-to-consumers, markets-meat markets-poultry processing and wet market, restaurants, waste disposal) and the bat-human ecosystem (bat-palm-human value chain, from sap harvesting to market; bat-livestock-human interface-pig farms; bat hunters in the wild to bat meat consumers; bats/animals within the household/shared spaces). The poultry value chain interface ranked highest and was given priority for the program's operations in year 2. In addition, most participants recommended LBMs in Dhaka as the point at which to start implementation activities.

Key Opportunities, Gaps, and Barriers

Participants in the national-level meeting identified¹ the following gaps and barriers in spillover risk management:

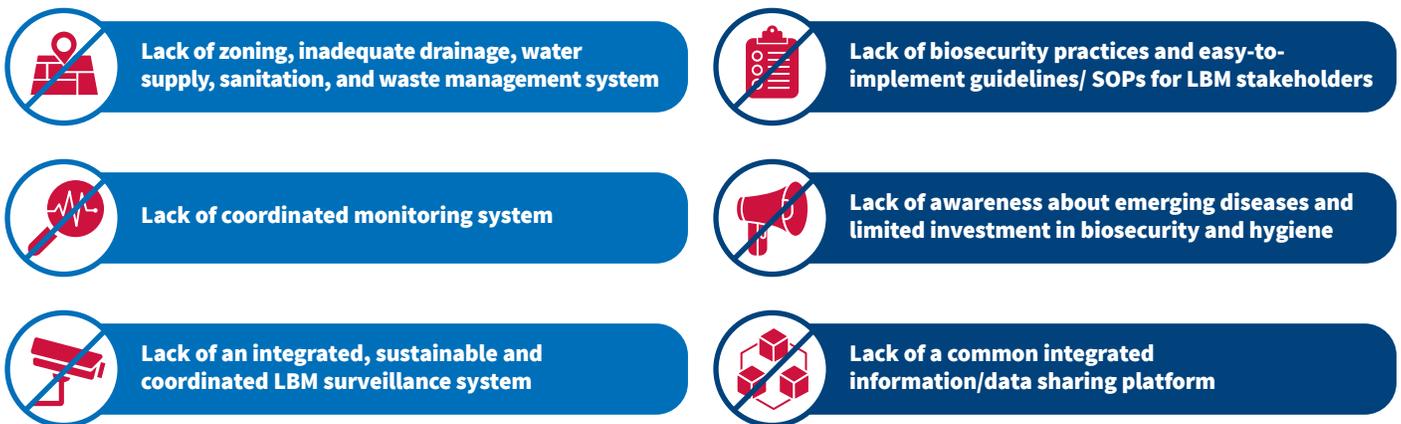
1. Inadequate funding, infrastructure, skilled human resources (HR), and logistic support
2. Inadequate intersectoral communication and data sharing
3. Lack of effective multisectoral coordination from central to field level
4. Inadequate lab infrastructure (Biosafety Level 3, lab animal facility, lab waste disposal facility)
5. Inadequate quality control (certification of biosafety cabinet, laboratory assessment, and accreditation), lab resources (e.g., HR, equipment), new technologies and tools (e.g., full genome sequencing)
6. Lack of intra-institute coordination, a common data-sharing platform to avoid duplication, harmonized ethical board, and resource optimization
7. Lack of monitoring and inspection system
8. Inadequate regulations and rules for LBMs
9. Limited investment in biosecurity and hygiene
10. Weak biosafety practices
11. Presence of mobile poultry vendors in the metropolitan area
12. Lack of modern live bird slaughtering facilities and slaughterhouses
13. Poor infrastructure and waste disposal practices in LBMs

Participants in the interface-level OM workshops identified the following poultry value chain gaps and barriers in spillover risk management:

1. Infrastructure: inadequate zoning for slaughtering, processing, and selling; limited space to separate sick birds; inadequate drainage, water supply, sanitation, and waste management system; inadequate modern live bird slaughtering facilities/slaughterhouse; and difficulties with access to safety equipment and that which was available being easily contaminated, according to some participants.
2. Poor waste disposal and weak biosafety practices, inappropriate disposal of dead poultry, inadequate waste management, gaps in aligning poultry waste management with the wider city corporation/ municipality waste management system, limited investment in biosecurity and hygiene, and slaughtering and marketing of sick birds.
3. Others: hygiene measures being compromised by low-profit margins and financial losses, especially during the COVID-19 lockdown, according to participants; unsafe transportation of poultry; inadequate knowledge and awareness of emerging spillover diseases; inadequate information dissemination on biosecurity; inadequate disease reporting; and lack of context-appropriate guidelines/standard operating procedures (SOPs) for LBM operations.

Participants also pointed out the need to advocate for relevant policy environments and regulation guidelines for government policymakers and development partners. There was also a need for a common integrated information/ data-sharing platform.

Figure 2: Gaps and barriers influencing spillover risk in the poultry value chain identified by national-level OM stakeholders in Bangladesh



¹ Similar OM elements were developed for the bat-human interface. This summary focuses on the poultry value chain, which will be the initial interface of focus for STOP Spillover in Bangladesh.

Figure 3: Live bird shop



Figure 4: Central waste disposal



Critical Partners from the Poultry Value Chain

Stakeholders identified various types of critical partners for effective risk elimination or management. These were government departments, market actors, regulators, research and training institutions, development partners and NGOs, and producer and consumer associations.

OUTCOME TARGETS FOR THE POULTRY VALUE CHAIN

After identifying critical gaps and barriers to reducing zoonotic spillover risk, workshop participants developed the following OM outcome targets that detailed what the critical partners wanted to achieve within the poultry value chain:

 The DGHS and IEDCR [see Figure 5] establish and operate a sensitive and robust surveillance system with enhanced community surveillance and efficient data sharing across relevant departments.

 The DLS, DAE, and DGDA develop and operate an integrated surveillance system that minimizes the risk of avian influenza spillover.

 The BFD implements and maintains a functional surveillance system for wildlife. This includes a monitoring system with the capacity for transnational wild bird hunting and consumption. The OHS will establish a functional multi-sectoral working group.

 The One Health partnership and the OHB will establish a related community of practice.

 The BPICC and the Feed Industries Association of Bangladesh (FIAB) promote, support, and enforce good farming practices among farmers.

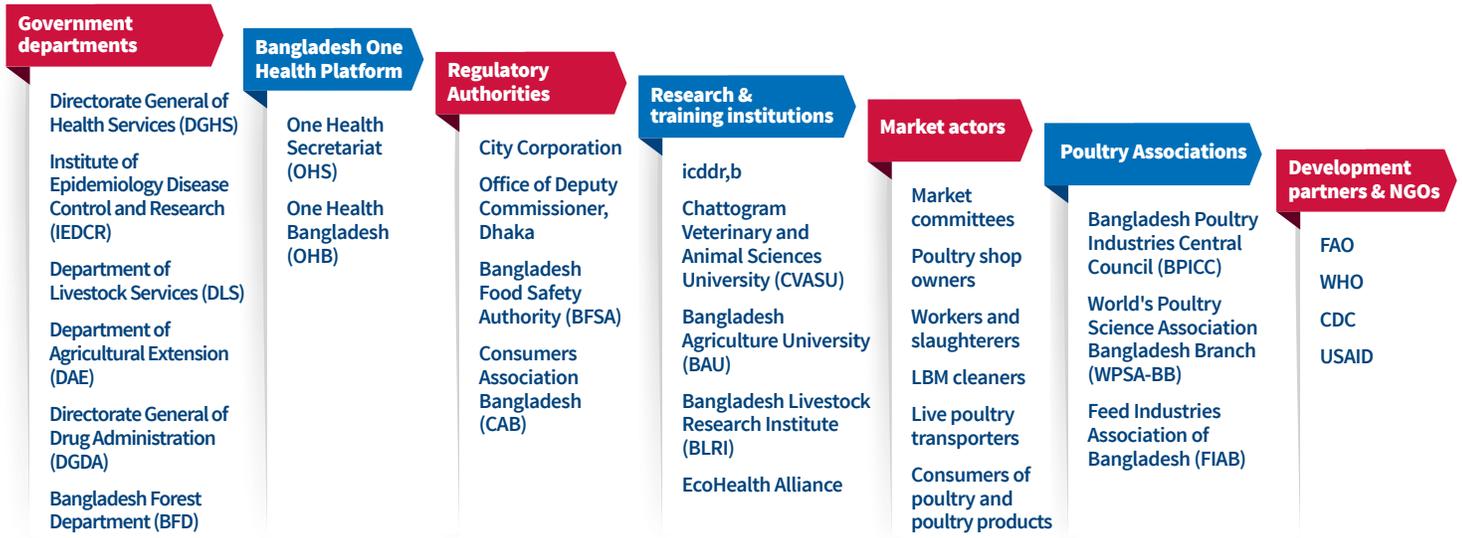
 International research institutes, academia, and training institutions have intra-institute coordination, a common data-sharing platform, an established harmonized ethical board, coordinated disease surveillance, and coordinated intervention to reduce the risk of spillover.

 Local government institutions, local administration, and community leaders have adequate, active, and skilled local government human resources available to monitor and conduct outreach regarding the importance of hygiene and waste management. They continually improve biosecurity through appropriate policy-based interventions.

 NGOs enhance community awareness and capacity on practices that reduce spillover risk.

 Development partners use local knowledge and context to co-design, co-implement, and co-monitor their programs.

Figure 5: Critical Partners from the Poultry Value Chain



Proposed Interventions for the Poultry Value Chain

The Bangladesh Country Team considered the partners’ outcome targets (in support of the vision) and consolidated the proposed interventions from 39 to 13 “intervention/ research areas.” The research and intervention areas were spread across the following six themes (see Figure 6):

- 1) infrastructure, logistics, and equipment;
- 2) research, surveillance, and early warning system;
- 3) collaboration and partnership;
- 4) monitoring and implementation;
- 5) awareness building;
- 6) policy and advocacy.

The table below presents the interventions per critical partner and intervention theme.

Figure 6: Intervention Themes



INFRASTRUCTURE, LOGISTICS, AND EQUIPMENT

Stakeholders/Critical Partners and Outcome Target	Proposed Intervention/Research
<p>Government departments (central and interface level), research institutes, academia and training institutions:</p> <ul style="list-style-type: none"> • They enhance laboratory capacity for investigation at the human-animal interface from the central to the local levels. 	<ul style="list-style-type: none"> • Develop laboratory infrastructure, laboratory resources, technology, and enforcement of biosecurity. • Strengthen capacity by training manpower (laboratory training on wildlife disease diagnosis, genome sequencing, disease risk modeling, genome sequencing, disease risk modeling, skills and refresher training, biosafety and biosecurity training).
<p>Government departments (central and interface level), research and training institutions, value chain actors (farmers, processors, transporters, wholesalers and retailers, and customers):</p> <ul style="list-style-type: none"> • They establish and operate a biosecure LBM with infrastructure that has adequate water supply, drainage, and sanitation, transportation, and disease zoning/segregation. 	<ul style="list-style-type: none"> • Develop market infrastructure (designated poultry transportation, loading, poultry cages, and slaughtering structures, water supply, drainage and aeration systems, entry and exit points, waste management, sanitation points, staff residential facilities). • Support maintenance of appropriate safety and hygiene measures with protective equipment and material, disposal systems, and practices.



RESEARCH, SURVEILLANCE, OUTBREAK INVESTIGATION, AND RESPONSE

Stakeholders/Critical Partners and Outcome Target	Proposed Intervention/Research
<p>Government departments (central and interface level), research and training institutions, value chain actors (farmers, processors, transporters, wholesalers and retailers, and customers):</p> <ul style="list-style-type: none"> They establish and operate a sensitive, integrated, and robust surveillance system capable of identifying outbreaks of the priority emerging zoonotic disease. 	<ul style="list-style-type: none"> Support the review of existing and establishment of a more integrated, regular, sustainable, and robust surveillance system. Help identify surveillance relevant data gaps. Support regular monitoring and surveillance of migratory birds/wild birds and anthropological investigation.
<p>Development partners:</p> <ul style="list-style-type: none"> They support an integrated and coordinated app-based early warning system in place to report unusual mortality of both humans and animals/poultry by local communities. 	<ul style="list-style-type: none"> Support the development of an app-based reporting system for tracking and reporting unusual human and animal mortalities by local communities.
<p>Research and training institutions (international and local), the OHS, and the EcoHealth Alliance:</p> <ul style="list-style-type: none"> They generate evidence of the effectiveness, feasibility, and sustainability of existing LBM interventions. 	<ul style="list-style-type: none"> Support interventions aimed at the coordinated generation of data. Support scientific, evidence-based assessment of the current status of LBMs (improved versus traditional) and the efficacy and feasibility of relevant interventions.



COLLABORATION AND PARTNERSHIP

Stakeholders/Critical Partners and Outcome Target	Proposed Intervention/Research
<p>Research and training institutions (international and local), development partners and NGOs, OHS, the EcoHealth Alliance, and community leaders:</p> <ul style="list-style-type: none"> They enhance coordination and collaboration among different national and international institutes through functionally integrated platforms. 	<ul style="list-style-type: none"> Support efforts aimed at improving One Health Bangladesh through coordination/collaboration between various national and international research institutes (common/One Health integrated data-sharing; intersectoral communication; the co-designing, implementation, and co-monitoring of programs; a harmonized ethical board, and membership database.
<p>OHS and One Health Board</p> <ul style="list-style-type: none"> A One Health University Network in Bangladesh/South Asian regional network is operational. 	<ul style="list-style-type: none"> Support the development of the One Health Bangladesh University Network: global-, regional-, national-, and subnational-level networking.
<p>Government departments (central and interface level), research and training institutions, One Health agencies, and community leaders:</p> <ul style="list-style-type: none"> They (the LBM stakeholders) establish and operate a coordinated consortium for funding. 	<ul style="list-style-type: none"> Establish an actively coordinated consortium for funded programs to prevent spillovers. Invest in biosecurity and safety practices. Continue production of the INTERFACE, a newsletter (previously supported by USAID).



KNOWLEDGE AND CAPACITY STRENGTHENING

Stakeholders/Critical Partners and Outcome Target	Proposed Intervention/Research
<p>Government departments (central and interface level), development partners, the market authority, value chain actors (farmers, processors, transporters, wholesalers and retailers, and customers), and community leaders:</p> <ul style="list-style-type: none"> All of these LBM stakeholders are aware of the risk of zoonotic spillover and the importance of (related) biosecurity. 	<ul style="list-style-type: none"> Develop knowledge for the various LBM stakeholders (including media personnel) through training, workshops, development, and distribution of IEC materials.



POLICY AND ADVOCACY

Stakeholders/Critical Partners and Outcome Target	Proposed Intervention/Research
<p>Research and training institutions:</p> <ul style="list-style-type: none"> The scientific community conducts research for evidence-based, safe LBM policies. 	<ul style="list-style-type: none"> Support (spillover risk management) policy advocacy and research. Strengthen and support related policy dialogue through the One Health platform.
<p>Development partners and value chains actors, the BFD:</p> <ul style="list-style-type: none"> They operate context-appropriate, easily understood and implemented guidelines/SOPs for LBM stakeholders. 	<ul style="list-style-type: none"> Support the development and revision of policies and regulations for the poultry market, including adaptable, easy-to-understand guidelines/SOPs for safe poultry farming.
<p>Regulators (e.g., city corporation):</p> <ul style="list-style-type: none"> They develop and implement guidelines/policies for phasing out LBMs from metropolitan cities. 	<ul style="list-style-type: none"> Support the development and implementation of guidelines/policies for phasing out LBMs from metropolitan areas and cities.



MONITORING AND EVALUATION

Stakeholders/Critical Partners and Outcome Target	Proposed Intervention/Research
<p>Government departments (central and interface level), development partners, the market authority, value chain actors (farmers, processors, transporters, wholesalers and retailers, and customers), and community leaders:</p> <ul style="list-style-type: none"> They establish, operate, and scale up a collaborative coordinated monitoring system. 	<ul style="list-style-type: none"> Support the development of coordinated monitoring and evaluation of LBM regulatory agencies (internal and external) for their efficiency and sustainability.

Intervention/Study Selection Process

Prioritization Criteria and Prioritized Interventions for Year 2

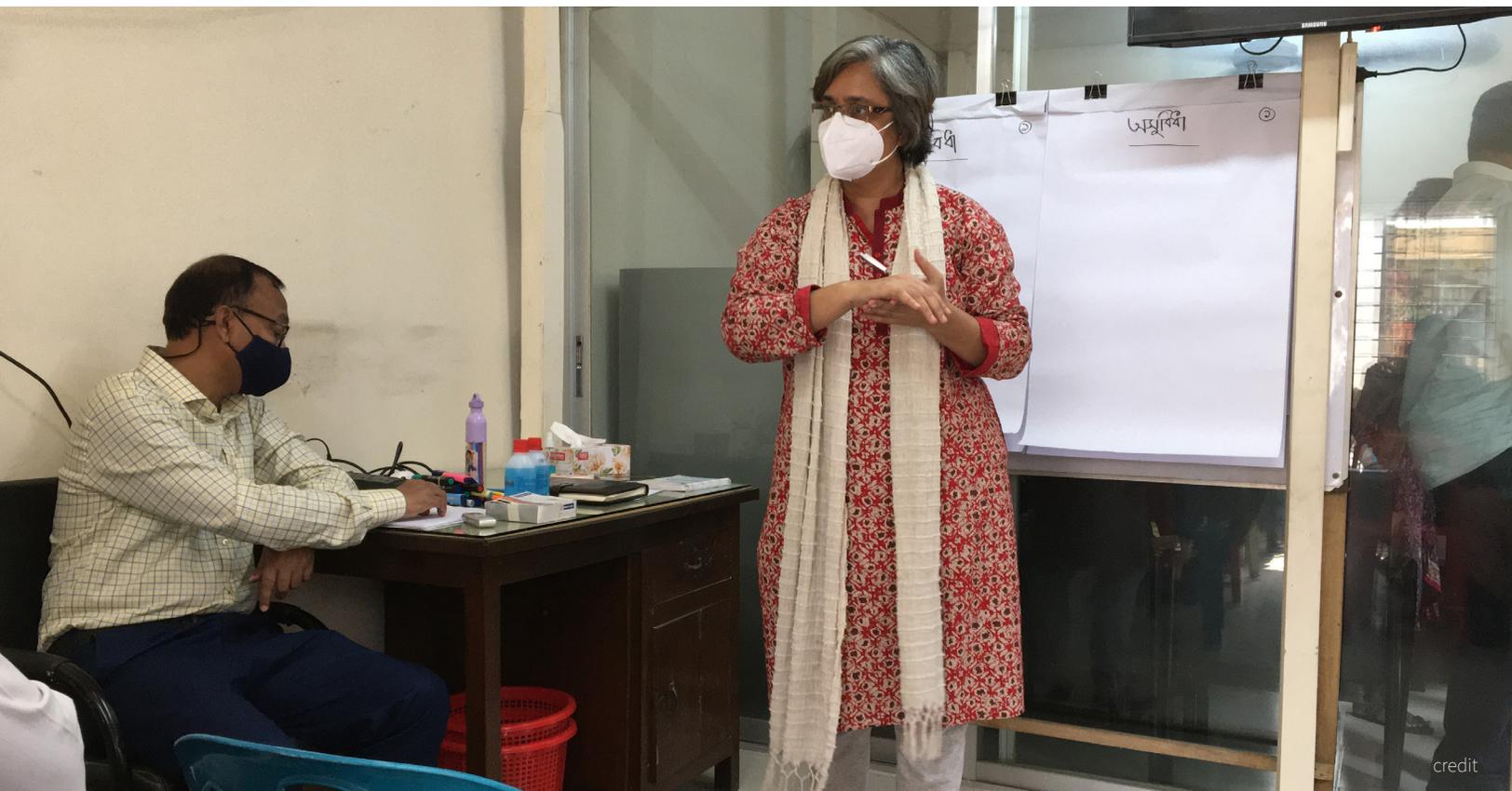
STOP Spillover conducted an ISSP to synthesize the information collected during the OM workshops and facilitate decision-making for the most appropriate interventions and studies. The following criteria were used to prioritize interventions and research studies:

- Alignment with local customs, needs, and priorities (local government, beneficiaries, and partners)
- Alignment with STOP Spillover's objectives and goals
- The potential impact of the interventions on risk reduction
- Feasibility in terms of cost, timeline, and joint resources
- Feasibility in terms of willingness and commitment of key stakeholders and local beneficiaries
- Foundation toward sustainability (e.g., established policy/institution, improved capacity)

This resulted in the following three interventions and two research activities for the year.

Intervention 1: Support LBM stakeholders to develop a holistic, multipronged design for the LBM with improved biosecurity and hygiene measures that reduce the risk of spillover. This intervention includes the following activities:

1. Support LBM stakeholders to design a biosecure LBM.
2. Support LBM stakeholders to develop and implement context-appropriate and easily understood and implemented biosecurity and hygiene guidelines/SOPs for various LBM actors.
3. Support LBM stakeholders to develop a coordinated biosecurity compliance monitoring plan.
4. Support LBM stakeholders to develop a coordinated funding mechanism shared among LBM stakeholders, local communities and regulatory bodies.
5. Develop and implement a comprehensive social and behavior change (SBC) strategy to increase understanding of the risk of spillover from LBMs and improve biosecurity and hygiene practices.



Intervention 2: Support stakeholders to prevent zoonotic spillover through establishing an integrated, coordinated, and sustainable platform for information sharing, advocacy, co-designing, co-implementation, and co-monitoring of surveillance activities and interventions at the LBMs. This intervention includes the following activities:

1. Establish a process of dialogue to create an integrated, coordinated, and sustainable surveillance system for LBMs.
2. Identify key data gaps and information needs and suggest areas for improvement in system governance, data analysis and use, resource allocation, and digital infrastructure requirements using the One Health Information Assessment Tool.
3. Enhance common integrated platforms for information sharing, co-designing, co-implementation, and co-monitoring of surveillance and interventions at the LBMs.

Intervention 3: Support stakeholders in the development/ modification/customization and utilization of an integrated and coordinated app-based system to report poultry workers' health status or unusual mortality in poultry and/ or crows in and around LBMs. The result will be to involve

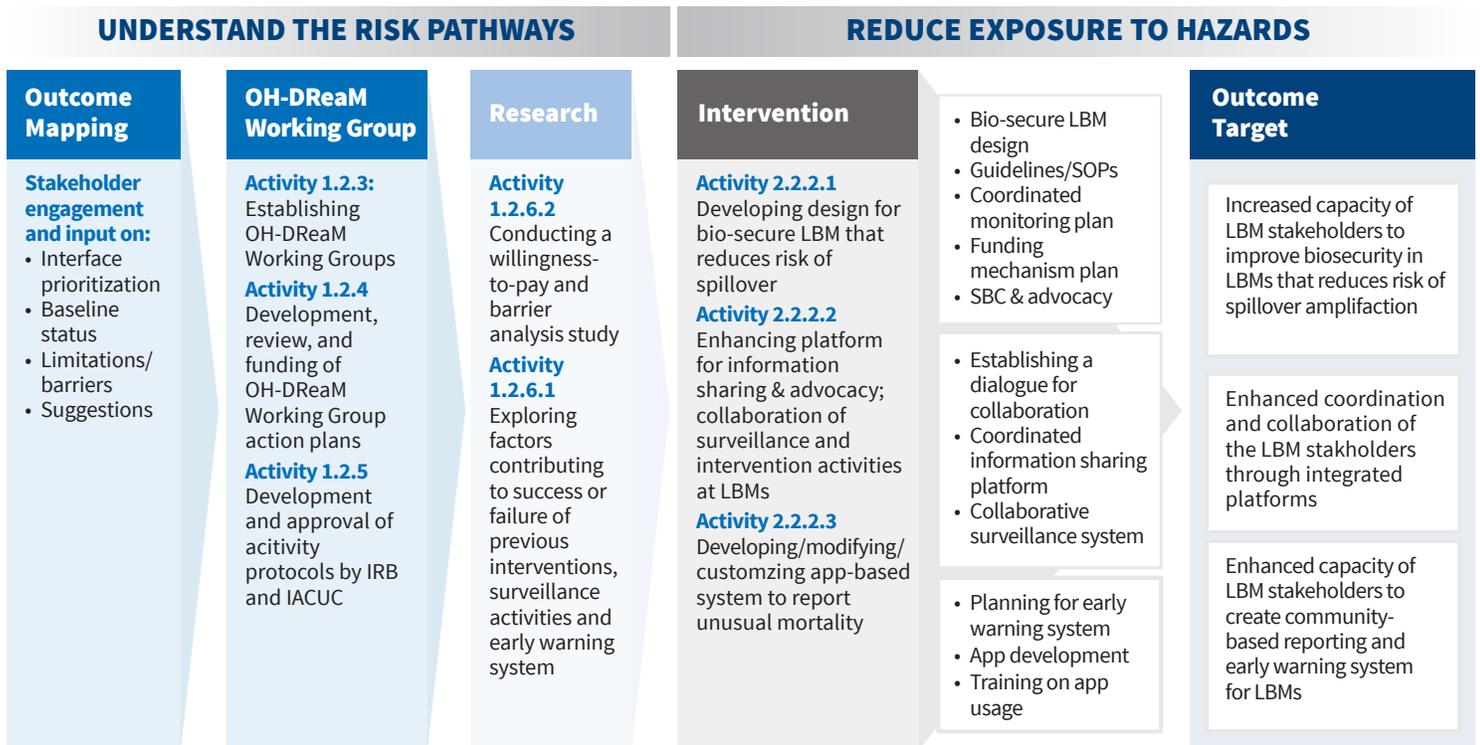
local market stakeholders in risk characterization and development of informed risk management options.

Research 1: Explore factors contributing to failures and success of previous interventions to improve biosecurity in the LBMs, LBM surveillance activities, and early warning systems of Bangladesh to concurrently inform the holistic intervention design and enhancement of a coordinated surveillance platform and early warning system.

Research 2: Conduct a willingness-to-pay analysis to identify consumer considerations in relation to pricing, and a barrier analysis to identify barriers faced by stakeholders concerning changing practices to improve biosecurity, biosecurity reporting, or price changes (the findings from this research will be used to inform Intervention 1).

Upon prioritization of the interventions, the Bangladesh country team and the global OM team developed a conceptual diagram (Figure 7) showing the link between OM workshops output, the selected interventions and research studies, and outcome targets. The interventions were presented in a holistic approach toward problem-solving and achieving the defined outcome targets.

Figure 7: Summary of interventions and research activities for year 2 work plan



Conclusion

Overall, the objectives of the OM workshops in Bangladesh were achieved. Stakeholders prioritized the poultry human interface and selected LBMs in Dhaka as the starting point for Year 2 activities. The top gaps and barriers identified for the LBM interface were inadequate infrastructure at the LBMs; inadequate drainage and water supply, sanitation, and waste management systems; lack of zoning; lack of coordination and monitoring systems; lack of an integrated, regular, sustainable LBM surveillance system; and lack of context-appropriate guidelines/SOPs for LBM stakeholders. Prioritized research gaps to address the above gaps and barriers were:

- 1) exploration of the factors contributing to failure and success of previous interventions to improve biosecurity, surveillance activities and early warning systems in the LBMs of Bangladesh; and
- 2) a willingness-to-pay analysis to identify consumer considerations in relation to pricing of poultry, and a barrier analysis to identify constraints faced by LBM stakeholders with regards to changing poultry-handling practices in markets to improve biosecurity.

Three interventions were prioritized:

- 1) support LBM stakeholders to develop a holistic, multi-pronged design for LBM aimed at improved biosecurity and hygiene measures that reduce the risk of spillover;
- 2) establish an integrated, coordinated, and sustainable platform for information sharing, advocacy, and co-designing, co-implementation, and co-monitoring surveillance activities and interventions at the LBMs; and
- 3) support stakeholders in the development/modification/customization and use of an integrated and coordinated app-based system to report poultry workers' health status or unusual mortality in poultry and wild birds in and around LBMs.

The prioritized research and interventions will contribute to meeting the three broad categories of outcome targets:

- 1) increased capacity for LBM stakeholders to improve biosecurity measures in LBMs that reduce the risk of spillover;
- 2) enhanced coordination and collaboration of the LBM stakeholders through integrated platforms; and
- 3) enhanced capacity of LBM stakeholders to create community-based reporting and early warning systems for LBMs.



Dr. Rebeca Sultana

Annex 1: National One-day Consultative Meeting Participants

	NAME	DESIGNATION	ORGANIZATION
1	Prof. Dr. Tahmina Shirin	Chairman Director	OHS IEDCR
2	Dr. A F M Rakibul Hasan Bhuiyan	Upazila Livestock Officer (Leave Reserve), Deputed to One Health Secretariat (OHS)	OHS
3	Dr. Yesmin Naher	Senior Scientific Officer	OHS
4	Dr. M. Salimuzzaman	Physician-Scientist, Public Health Specialist (former Principal Scientific Officer)	IEDCR
5	Dr. Mahbubur Rahman	Assistant Professor	IEDCR
6	Dr. Ahmed Nawsher Alam	Principal Scientific Officer	IEDCR
7	Dr. M Mushtuq Husain	Consultant	IEDCR
8	Dr. Monjur Mohammad Shahjada	Director and Administrator	DLS
9	Dr. Md. Abu Sufian	Principal Scientific Officer, Anthrax Vaccine Production Section, Livestock Research Institute	DLS
10	Dr. TABM Muzaffar Goni Osmani (Jewel)	Upazila Livestock Officer (Leave Reserve), Epidemiology Unit	DLS
11	Dr. Faisol Talukdar	Upazila Livestock Officer (Leave Reserve), Epidemiology Unit	DLS
12	Dr. Md. Shahinur Alam	Deputy Director (Health)	DLS
13	Dr. Sk Shaheenur Islam	Upazila Livestock Officer (Leave Reserve)	DLS
14	Dr. Koly Mustafa	Upazila Livestock Officer (Leave Reserve), Administrative Unit	DLS
15	Md. Jahidul Kabir	Deputy Chief Conservator of Forests, Forest Management Wing, Wildlife Section	BFD
16	Mr. Mollah Rezaul Karim	Conservator of Forests, Wildlife & Nature Conservation Circle, Wildlife Section	BFD
17	Mr. A. S. M. Jahiruddin Akon	Director, Wildlife Crime Control Unit, Wildlife Section	BFD
18	Dr. S.M. Golam Kaiser	Deputy Program Manager, Zoonotic Disease Control Program, CDC	DGHS
19	Dr. Mustufa Mahmud	Deputy Program Manager, International Health Regulation (IHR), Migration Health, Emerging Re-emerging Disease & Influenza Control Programme, CDC	DGHS
20	Dr. Mokhlesur Rahman	Deputy Chief, Technical Support Division	Health Education Bureau
21	Brigadier General Md. Zobaidur Rahman	Chief Health Officer	DNCC
22	Sanjida Islam	Health Officer	DSCC
23	Dr. Mohammed Abdus Samad	Principal Scientific Officer (PSO)	BLRI
24	Dr. A S M Ashab Uddin	Senior Scientific Officer (SSO)	BLRI
25	Dr. Mehedi Hossain	Program Specialist, Livestock	KGF
26	Prof. Dr. Paritosh K. Biswas	Dean, Faculty of Food Science & Technology	CVASU
27	Prof. Dr. Md. Ahasanul Hoque	Dean, Veterinary Medicine	CVASU
28	Prof. Sharmin Chowdhury	Professor, Department of Pathology and Parasitology; Faculty of Veterinary Medicine; Director, One Health Institute	CVASU

	NAME	DESIGNATION	PLACE OF WORK
29	Prof. Dr. Rafiqul Islam	Professor, Department of Pathology	BAU
30	Prof. Dr. Emdadul Haque Chowdhury	Professor, Department of Pathology Faculty of Veterinary Science	BAU
31	Prof. Dr. Md. Mahmudul Hassan Sikder	Professor, Department of Pharmacology, Faculty of Veterinary Science	BAU
32	Prof. Dr. K. B. M. Saiful Islam	Chairman, Department of Medicine and Public Health	Sher-e-Bangla Agricultural University
33	Prof. Dr. Syed Sayeem Uddin Ahmed	Professor	Sylhet Agricultural University
34	Dr. Eric Brum	Team Leader	ECTAD, FAO
35	Md. Zakiul Hasan	National Technical Advisor	FAO
36	Ms. Motahara Tasneem	National Technical Advisor	FAO
37	Dr. Kazi Mohammad Hassan Ameen	National Consultant (Training & Risk Communication)	WHO
38	Mr. Sheikh Masudur Rahman	Communication for Development Specialist	UNICEF
39	Dr. Susan Kaydos-Daniels (Neely)	Bangladesh Country Director	CDC USA
40	Prof. Mahmudur Rahman	Senior Technical GHSA Consultant	CDC USA
41	Prof. Nitish Chandra Debnath	National Coordinator; Team Lead, Fleming Fund Country Grant (FFCG)	OHB; Development Alternatives Incorporated (DAI) Dhaka
42	Dr. Md. Giasuddin	Former Chief Scientific Officer, Animal Health Research Division, Director, National Reference Laboratory for Avian Influenza (OIE Reference Laboratory), BLRI	OHB
43	Dr. Nazneen Akhter	Assistant Professor, Department of Public Health	North South University, and OHB
44	Dr. Md Nurul Islam	Field Epidemiology Training Programme for Veterinarians (FETPV), Technical Coordinator, Global Health Development (GHD)	OHB
45	Dr. Abul Kalam	Global Health Security Specialist	USAID
46	Dr. Ariful Islam	Program Coordinator	EcoHealth Alliance
47	Dr. Sharif Islam	Field Coordinator	EcoHealth Alliance
48	Mr. Syed Masud Ahmed	Professor and Director, CoE for Health Systems and UHC, BRAC James P Grant School of Public Health	BRAC University
49	Mr. Abhijit Saha	Research Fellow, BRAC James P Grant School of Public Health	BRAC University
50	Mr. Ishtiaq Ahmad	Chief Technical Advisor, Sustainable Forest and Livelihood Project and Former Chief Conservator of Forest	IUCN
51	Mr. Moshir Rahman	President	BPICC
52	Dr. A. M. Zakir Hossain	Convener, Environmental Health Committee	BAPA
53	Dr. M. Monirul H. Khan	Professor and Chairman, Department of Zoology	Jahangirnagar University
54	Prof. Dr. Sharmin Musa	Professor, Department of Zoology	University of Dhaka
55	Aleya Begum	Professor, Department of Zoology	University of Dhaka
56	Ms. Fariha Haseen	Associate Professor, Department of Public Health and Informatics	BSMMU
57	Mr. Shishir Moral	Special Correspondent	Prothom Alo
58	Ms. Nadia Ali Rimi	Bangladesh Country Team Lead, STOP Spillover	icddr,b

	NAME	DESIGNATION	PLACE OF WORK
59	Dr. Ausraful Islam	Bangladesh Lead, Wildlife, Livestock, Epidemiology, Behavior Change, and Gender (WLE) Hub, STOP Spillover	icddr,b
60	Dr. Syed M Satter	Bangladesh Lead, Surveillance, Mapping, and Modeling (SMM) Hub, STOP Spillover	icddr,b
61	Dr. Md. Enayet Hossain	Bangladesh Lead, Risk Analysis and Communication (RAC) Hub, STOP Spillover	icddr,b
62	Mr. Md. Khaled Saifullah	Senior Research Officer	icddr,b
63	Dr. Sayera Banu	Senior Scientist and Head, PEI	icddr,b
64	Dr. Ziaur Rahman	Scientist	icddr,b
65	Dr. Sukanta Chowdhury	Associate Scientist	icddr,b
66	Dr. Mahbubur Rahman	Project Coordinator	icddr,b
67	Dr. Ireen Sultana Shanta	Assistant Scientist	icddr,b
68	Manzoor Elahi	Member	BPICC
69	Liz Gold	Senior Technical Advisor	JSI
70	Janetrix Hellen Amuguni	Associate Professor	Tufts University
71	Esther Kihoro	Agricultural Economist	Right Track Africa
72	Meghan Stanley	Technical Support	Tufts University
73	Julius Nyangaga	Consultant	Right Track Africa
74	Deborah Kochevar	Professor, Project Director	Tufts University
75	Tristan Burgess	Assistant Professor, Wildlife Health and Epidemiology	Center for Wildlife Studies
76	Jill Falman	Research Scientist	University of Washington
77	Jonathon Gass	Technical Advisor	Tufts University
78	Patrick Webb	Professor	Tufts University
79	Kristin Cabrera	Resource Hub Administrator	Tufts University

Annex 2: National Outcome Mapping Stakeholder Engagement Workshop Participants

	NAME	DESIGNATION	PLACE OF WORK
1	Dr. A F M Rakibul Hasan Bhuiyan	Upazila Livestock Officer (Leave Reserve)	OHS
2	Dr. Yesmin Naher	Senior Scientific Officer	OHS
3	Dr. M. Salimuzzaman	Public Health Specialist	IEDCR
4	Dr. Mahbubur Rahman	Assistant Professor	IEDCR
5	Dr. Ahmed Nawsher Alam	Principal Scientific Officer	IEDCR
6	Dr. M Mushtuq Husain	Consultant	IEDCR
7	Dr. Sharmin Sultana	Senior Scientific Officer	IEDCR
8	Dr. Ahmed Sharif Raihan	Senior Scientific Officer	IEDCR
9	Dr. Mohammad Ferdous Rahman Sharker	Senior Scientific Officer	IEDCR
10	Mr. Md. Mahbulul Alam	IT Consultant	IEDCR
11	Dr. Monjur Md. Shahjada	Director Admin	DLS
12	Dr. Md. Abu Sufian	Principal Scientific Officer, Anthrax Vaccine Production Section, LRI	DLS
13	Dr. Md. Shahinur Alam	Deputy Director (Health)	DLS
14	Dr. Koly Mustafa	Upazila Livestock Officer (LR), Admin Unit	DLS
15	Dr. Monsur Ahmed	Upazila Livestock Officer, Quarantine Unit, Hazrat Shahjalal International Airport	DLS
16	Dr. Malay Kumar Sur	Deputy Director, Planning Section	DLS
17	Dr. Pallab Kumar Dutta	Deputy Director, Human Resource Development	DLS
18	Ms. Zeenat Sultana	Deputy Director (Farm)	DLS
19	DR. B. M. Jafar Ahammed	Upazila Livestock Officer	DLS
20	Dr. Md. Gazi Shah Alam	Upazila Livestock Officer	DLS
21	Dr. Tabm Muzaffar Goni Osmani	Upazila Livestock Officer (Leave Reserve), Epidemiology Unit	DLS
22	Dr. Faisol Talukdar	Upazila Livestock Officer (Leave Reserve), Epidemiology Unit	DLS
23	Dr. SK Shaheenur Islam	Upazila Livestock Officer (Leave Reserve)	DLS
24	Md. Jahidul Kabir	Deputy Chief Conservator of Forest, Forest Management Wing	BFD
25	Mr. Mollah Rezaul Karim	Conservator of Forests, Wildlife and Nature Conservation Circle	BFD
26	Mr. A. S. M. Jahiruddin Akon	Director, Wildlife Crime Control Unit	BFD
27	Md. Rahat Hossain	Wildlife and Biodiversity Conservation Officer	BFD
28	Dr. Nizam Uddin	Veterinary Surgeon, Sheikh Kamal Wildlife Center	BFD
29	Dr. S.M. Golam Kaiser	Deputy Program Manager (DPM), Zoonotic Disease Control Program, Communicable Disease Control (CDC)	DGHS
30	Dr. Mustufa Mahmud	Deputy Program Manager (DPM), IHR, Migration Health, Emerging Re-emerging Disease and Influenza Control Programme, Communicable Disease Control (CDC)	DGHS
31	Dr. Md. Tariqul Islam Limon	Assistant Surgeon, Communicable disease monitoring, Rohingya Refugee Premises	DGHS
32	Dr. Mujibur Rahaman	Mass Dog Vaccination Expert	DGHS
33	Dr. Mokhesur Rahman	Deputy Chief Technical Support Division	DSCC

	NAME	DESIGNATION	PLACE OF WORK
34	Brigadier General Md. Zobaidur Rahman	Chief Health Officer	DNCC
36	Ms. Sanjida Islam	Health Officer	DSCC
37	Dr. Md. Abdus Samad	Principal Scientific Officer	BLRI
38	Dr. A S M Ashab Uddin	Senior Scientific Officer	BLRI
39	Dr. Md Shahin Alam	Senior Scientific Officer	BLRI
40	Dr. Mehedi Hossain	Program Specialist, Livestock	KGF
41	Dr. Md. Rafiqul Islam	Principal Scientific Officer	BARC
42	Dr. Sharmin Chowdhury	Professor, Dept. of Pathology and Parasitology; Director, One Health Institute	CVASU
43	Dr. Rafiqul Islam	Professor, Department of Pathology	BAU
44	Dr. Md. Tanvir Rahman	Professor, Dept. of Microbiology and Hygiene	BAU
45	Dr. Emdadul Haque Chowdhury	Professor, Department of Pathology, Faculty of Veterinary Science	BAU
46	Dr. Md. Mahmudul Hassan Sikder	Professor, Department of Pharmacology, Faculty of Veterinary Science	BAU
47	Prof. Dr. K. B. M. Saiful Islam	Chairman, Department of Medicine and Public Health	Sher-e-Bangla Agricultural University
48	Prof. Dr. Syed Sayeem Uddin Ahmed	Professor, Sylhet Agricultural University	Sylhet Agricultural University
49	Dr. Eric Brum	Team Leader, ECTAD, FAO	FAO
50	Ms. Motahara Tasneem	National Technical Advisor, FAO	FAO
51	Dr. Kazi Md. Hassan Ameen	National Consultant (Training and Risk Communication)	WHO
52	Mr. S. Masudur Rahman	Communication for Development Specialist	UNICEF
53	Dr. Susan Kaydos-Daniels (Neely)	Bangladesh Country Director	CDC USA
54	Prof. Mahmudur Rahman	Senior Technical GHSA Consultant	CDC USA
55	Dr. Md Mahabub Ul Anwar	Public Health Specialist	CDC USA
56	Prof. Nitish Chandra Debnath	National Coordinator, One Health Bangladesh (OHB); Team Lead, Fleming Fund Country Grant (FFCG), Development Alternatives Incorporated (DAI) Dhaka	OHB
57	Dr. Md. Giasuddin	One Health Bangladesh	OHB
58	Dr. Nazneen Akhter	One Health Bangladesh	OHB
59	Dr. Md Nurul Islam	Global Health Development	OHB
60	Dr. Abul Kalam	Global Health Security Specialist	USAID
61	Ms. Miranda Beckman	Deputy Health and Education Director	USAID
62	Dr. Ariful Islam	Program Coordinator	EcoHealth Alliance
63	Dr. Sharif Islam	Field Coordinator	EcoHealth Alliance
64	Dr. Shusmita Dutta Choudhury	Medical Epidemiologist	EcoHealth Alliance
65	Mr. Md. Shahjahan	Director and CEO	BCCP
66	Dr. Zeenat Sultana	Medical Epidemiologist	BCCP
67	Dr. Md. Matiur Rahman	Manager, Livestock Services and Training, BRAC Artificial Insemination Enterprise	BRAC
68	Mr. Abhijit Saha	Research Fellow, BRAC James P Grant School of Public Health	BRAC University

	NAME	DESIGNATION	PLACE OF WORK
69	Dr. Mokhleshur Rahaman	Senior Manager, Operations, Ultra Poor Graduation Program	BRAC
70	Mr. Raquibul Amin	Country Representative, IUCN Bangladesh	IUCN
71	Sakib Ahmed	Senior Programme Assistant	IUCN
72	Kazi Zenifar Azmiri	Senior Programme Assistant	IUCN
73	Debashis Nag	Secretary	Poultry Traders Association
74	Md. Mahbub Hasan	General Secretary, WPSA-BB	Poultry Traders Association
75	Dr. Aftab Uddin	Member, Environmental Health Program Committee, BAPA; Chairperson, Public Health Foundation Bangladesh	BAPA
76	Prof. Dr. Sharmin Musa	Professor, Department of Zoology	University of Dhaka
77	Prof. Dr. Aleya Begum	Professor, Department of Zoology	University of Dhaka
78	Ms. Dr. Fariha Haseen	Associate Professor, Department of Public Health and Informatics	BSMMU
79	Dr. S M Iqbal Hossain	President and Associate Professor, Department of Zoology	Bangladesh Biodiversity Conservation Federation
80	Dr. Md. Rustom Ali Rukon	Senior Scientific Officer	Globe Biotech Limited
81	Dr. Nazmul Huda	Veterinary Surgeon	Dhaka National Zoo
82	Dr. Shahadat Hossain Shuvo	Deputy Curator	Chittagong Zoo
83	Mr. Ishtiaq Ahmad	Chief Technical Advisor	Sustainable Forest and Livelihood Project
84	Ms. N.R. Musfika Laizu	Gender Adviser	Haor Infrastructure and Livelihood Improvement Project
85	Mr. Toufiq Maruf	President, Health Reporter's Forum, and Deputy Chief Reporter	Kaler Kantho
86	Ms. Nadia Ali Rimi	Bangladesh Country Team Lead, STOP Spillover	icddr,b
87	Ms. Rebeca Sultana	Bangladesh Lead, Food, Water, Air, Climate, Livelihoods and Economics, and Policy and Security Resources (FWA) Hub, STOP Spillover	icddr,b
88	Dr. Ausraful Islam	Bangladesh Lead, Wildlife, Livestock, Epidemiology, Behavior Change, and Gender (WLE) Hub, STOP Spillover	icddr,b
89	Dr. Syed M Satter	Bangladesh Lead, Surveillance, Mapping, and Modeling (SMM) Hub, STOP Spillover	icddr,b
90	Dr. Md. Enayet Hossain	Bangladesh Lead, Risk Analysis and Communication (RAC) Hub, STOP Spillover	icddr,b
91	Mr. Md. Khaled Saifullah	Senior Research Officer	icddr,b
92	Dr. Nasir Uddin	Research Investigator	icddr,b
93	Dr. Sayera Banu	Senior Scientist and Head, PEI	icddr,b
94	Dr. Ziaur Rahman	Scientist	icddr,b
95	Dr. Sukanta Chowdhury	Associate Scientist	icddr,b
96	Dr. Arifa Nazneen	Deputy Project Coordinator	icddr,b
97	Ms. Shahana Parveen	Assistant Scientist	icddr,b
98	Dr. Mahbubur Rahman	Project Coordinator	icddr,b
99	Dr. Ireen Sultana Shanta	Assistant Scientist	icddr,b
100	Mr. Sumon Kumar Paul	Head, Animal Resources Branch, LSSD Special Activities	icddr,b
101	Ms. Nazmun Nahar	Scientific Staff, University Clinic	Heinrich Heine University
102	Liz Gold	Senior Technical Advisor	JSI
103	Janetrix Hellen Amuguni	Associate Professor, Cummings School of Veterinary Medicine	Tufts University

	NAME	DESIGNATION	PLACE OF WORK
104	Esther Kihoro	Agricultural Economist	Right Track Africa
105	Meghan Stanley	Technical Manager	Tufts University
106	Julius Nyangaga	Consultant	Right Track Africa
107	Deborah Kochevar	Professor and Project Director, STOP Spillover	Tufts University
108	Tristan Burgess	Assistant Professor, Wildlife Health and Epidemiology	Center for Wildlife Studies
109	Jill Falman	Research Scientist	University of Washington
110	Jonathon Gass	Technical Advisor	Tufts University
111	Patrick Webb	Professor	Tufts University
112	Kristin Cabrera	Resource Hub Administrator	Tufts University
113	Tuan Ha	In-country Food, Water, Air, Climate, Livelihoods and Economics, and Policy and Security Resources (FWA) Hub, Technical Advisor	VOHUN
114	Ha Nguyen Ngoc	Country Lead, Viet Nam	VOHUN
115	Nguyen Le Quyen	Country Technical Officer	VOHUN
116	Gabrielle Iglesias	Senior Monitoring, Evaluation and Learning Officer	SEAOHUN
117	Paul Monaghan	Project Manager, STOP Spillover	Tufts University
118	Rabindra Khaniya	Regional Lead	SEAOHUN
119	Elaine Faustman	Professor	University of Washington
120	Diafuka Saila-Ngita	Research Associate Professor and Co-Lead, SMM Hub	Tufts University
121	Alisa Pereira	Senior Public Health Advisor	USAID
122	Stella Paul	Environment and Health Project Officer	Internews
123	Dr. Shiyong	Senior Health Specialist	World Bank
124	Phạm Thanh Hà	Financial and Administrative Officer	VOHUN

Annex 3: Interface Workshop Participants

TARGET GROUPS AND PARTICIPANTS	
First Interface OM Workshop	
Market committee	Shomvunath Banik, Abul Hashem, Kazi Khalil, Arif Patowary, Aminur Rahman Lavlu
Live poultry shop owner (retail)	Md. Jahangir Alam, Md. Saiful Islam Rana, Abu Taleb, Anowar, Abu Taher, Akter Hossain
Poultry worker/slaughterer	Md. Rakib, Md. Hanif, Md. Hasan, Md. Khokon, Md. Akhil
Mobile poultry vendor	Abul Kashem, Md. Ashadhul, Md. Mamun, Md. Shakil, Md. Munna, Md. Zakir, Md. Mehedi
Cleaner	Md. Shakil, Md. Rasel, Md. Shagor, Shahbuddin, Ismail, Shohag, Md. Shohag
Live poultry transporter (long haul)	Humayun Kabir, Abdul Mabud
Restaurant owner	Md. Billal Hossain, Md. Towhid
Second Interface OM Workshop	
Cleaner	Md. Abdul Khalek, Md. Idris Mollah, Md. Sohel, Md. Mojammel, Md. Sagor
Fishery owner	Md. Tofazzal Hossain, Md. Habibur Rahman, Md. Mouladat, Md. Main Uddin
Fishery worker	Rofiqul Islam, Abul Hossain, Md. Zinnat Ali Inu
Mobile poultry slaughterer	Emran, Kawsar, Md. Kader, Shawon
Mobile poultry vendor	Md. Mannan, Md. Rubel Miah, Md. Mahfuz Hossen, Md. Basar
Poultry worker/slaughterer	Four (Md. Olid, Md. Akter, Md. Mehedi Hasan, Aminul Islam)
Three-wheeler van driver	Azharul Islam, Md. Motaleb, Md. Karim, Samim Hossain
Market committee and live poultry shop owner (wholesale)	Md. Ali Hossain, Md. Ebadullah, Md. Nur Islam, Md. Humayun Mamun
Live poultry shop owner (retail)	Md. Kasem, Md. Sohel, Md. Ibrahim
Staff of poultry dealers	Abu Hanif, Saiful Islam, Md. Asgor, Md. Monju Miah
Restaurant owners	Olid Miah, Md. Jakir Hossen, Md. Selim
Third Interface OM Workshop	
BFD	Dr. Md. Nizam Uddin Chowdhury
DLS	Dr. Nargis Khanam, District Livestock Officer Dr. Dipti Rani Paul, Upazila Livestock Officer Dr. Koly Mustafa, Upazila Livestock Officer Dr. B.M. Jafar Ahammed, Upazila Livestock Officer Dr. Mohammad Gazi Shah Alam, Upazila Livestock Officer Dr. Md. Shahinur Islam, Upazila Livestock Officer Dr. Jakia Murshida, Veterinary Surgeon Dr. Farhana Jahan, Veterinary Surgeon
IEDCR	Dr. Mahbubur Rahman, Assistant Professor
BLRI	Dr. Mohammed Abdus Samad, Principal Scientific Officer
icddr,b	Dr. Sukanta Chowdhury
BPICC/WPSA-BB	Sirajul Haque Fayzur Rahman
Sylhet Agricultural University	Md. Mukter Hossain, professor, Department of Veterinary Medicine

TARGET GROUPS AND PARTICIPANTS

City corporations (DSCC and DNCC)	Dr. S.M. Shafiqul Islam, Veterinary Officer, DSCC Md. Shafiqul Islam, fieldman, DSCC Abu Taher, Waste Management Officer, DSCC Dr. Sharmin Samad, Veterinary Officer, DNCC Md. Polash, Fieldman, DSCC
OHS	Dr. A.F.M. Rakbul Hasan Bhulyan, Upazila Livestock Officer Md. Rashedul Kabir Bhuiyan, Wildlife and Biosafety Conservation Officer
BFSA	Sumon Majumdar, Scientific Officer
EcoHealth Alliance	Dr. Shariful Islam, Field Coordinator
CVASU	Rashed Mahmud, Research Manager
Office of the Deputy Commissioner, Dhaka	Ms. Nazmun Layel, Assistant Commissioner
FAO	Md. Zakiul Hasan, National Technical Advisor
CAB	Ekramul Islam
Market committee	Kazi Khalilullah
Live poultry shop owner (retail)	Jahangir Alam
Poultry shop worker/slaughterer	Mijanur Rahman Md. Khokon
Fishery worker	Abul Hossain
Mobile poultry slaughterer	Md. Emran
Mobile poultry vendor	Md. Mahfuz Md. Munna
Cleaner	Md. Shohag
Live poultry transporter (long haul)	Abdul Mabud
Restaurant owner	Md. Towhid Md. Selim
Live poultry transporter (rickshaw van)	Md. Shamim



Tufts University



Africa One Health University Network



Southeast Asia One Health University Network



icddr,b



Right Track Africa



JSI Research & Training Institute, Inc.



Tetra Tech



University of Washington



University of Glasgow



University of California, Los Angeles



Broad Institute



University of Nebraska Medical Center



Humanitarian OpenStreetMap Team



Internews