

Document of
The World Bank

Report No: ICR2177

IMPLEMENTATION COMPLETION AND RESULTS REPORT
(IDA-43400 TF-90662)

ON A

CREDIT

IN THE AMOUNT OF SDR 10.5 MILLION
(US\$16.0 MILLION EQUIVALENT)

TO THE

PEOPLE'S REPUBLIC OF BANGLADESH

FOR AN

AVIAN INFLUENZE PREPAREDNESS AND RESPONSE PROJECT

UNDER THE

GLOBAL PROGRAM FOR AVIAN INFLUENZE AND HUMAN PANDEMIC
PREPAREDNESS AND RESPONSE

June 27, 2013

Sustainable Development Sector Unit
Agriculture and Rural Development Unit
Bangladesh Country Management Unit
South Asia Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective: March 4, 2013)

Currency Unit = Bangladeshi Taka (BDT)
BDT 1.00 = US\$ 0.01268
US\$ 1.00 = BDT 79.281

FISCAL YEAR
(July 1 – June 30)

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AHITF	Avian and Human Influenza Trust Fund
AI	Avian Influenza
AIPRP	Avian Influenza Preparedness and Response Project
AIV	Avian Influenza Virus
AIW	Avian Influenza Worker
AusAID	Australian Agency for International Development
AVS	Additional Veterinary Surgeon
BAU	Bangladesh Agricultural University
BCR	Benefit-Cost Ratio
BLRI	Bangladesh Livestock Research Institute
BPMC	Biosecure Poultry Market Chain
BSL	Biosafety Level
CVASU	Chittagong Veterinary and Animal Science University
CVO	Chief Veterinary Officer
DANIDA	Danish International Development Agency
DGHS	Directorate General of Health Services
DFID	Department for International Development
DGHS	Directorate General of Health Services
DLO	District Livestock Officer
DLS	Department of Livestock Services
DOC	Day Old Chick
DPP	Development Project Performa
DMC	Department of Mass Communication
ECTAD	Emergency Center for Transboundary Animal Diseases
EM	Environmental Management
EMP	Environmental Management Plan
EoP	End of Project
EpiU	Epidemiology Unit
ERL	Emergency Recovery Loan
FAO/TAS	Food and Agriculture Organization of the United Nations/Technical Assistance
FDIL	Field Disease Investigation Laboratory
FM	Financial Management
GAR	Gross Attack Rate
GDP	Gross Domestic Product
GoB	Government of Bangladesh
GPAI	Global Program for Avian Influenza and Human Pandemic Preparedness and Response
GPS	Global Positioning System

HIV	Human Immunodeficiency Virus
HNPSP	Health, Nutrition and Population Sector Program
HPAI	Highly Pathogenic Avian Influenza
ICDDR, B	International Centre for Diarrhoeal Disease Research, Bangladesh
ICRR	Implementation Completion and Results Report
IEDCR	Institute for Epidemiology and Disease Control Research
ILRI	International Livestock Research Institute
ISM	Implementation Support Mission
ISR	Implementation Support Report
IT	Information Technology
IDA	International Development Agency
JICA	Japan International Cooperation Agency
KAP	Knowledge, Attitude and Practice
LBM	Live Bird Market
LDIS	Livestock Disease Information System
M&E	Monitoring and Evaluation
MCQ	Movement Control and Quarantine
MIS	Management Information System
MOFL	Ministry of Fisheries and Livestock
MOHFW	Ministry of Health and Family Welfare
MTR	Mid-term Review
MOI	Ministry of Information
MOU	Memorandum of Understanding
NAIP	National Avian Influenza Policy
NGO	Non-Governmental Organization
OIE	World Organization for Animal Health
PAI	Public Information and Awareness
PCU	Project Coordinating Unit
PDO	Project Development Objective
PPE	Personal Protective Equipment
PPP	Public-Private Partnership
QER	Quality Enhancement Review
SI	Susceptible Infection
SMS	Short Message Service
TAD	Transboundary Animal Disease
TAS	Technical Assistance
TOT	Trainer of Trainers
UNICEF	United Nations Children's Fund
USAID	United States International Development Agency
UVO	<i>Upazila</i> Veterinary Officer
VO	Veterinary Officer
WHO	World Health Organization

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BANGLADESH

Avian Influenza Preparedness and Response Project

Implementation Completion and Results Report

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MAPS: IBRD 35246 and 35247

A. Basic Information			
Country:	Bangladesh	Project Name:	Avian Influenza Preparedness and Response Project
Project ID:	P102305	L/C/TF Number(s):	IDA-43400, TF-90662
ICR Date:	06/27/2013	ICR Type:	Core ICR
Lending Instrument:	ERL	Borrower:	PEOPLE'S REPUBLIC OF BANGLADESH
Original Total Commitment:	XDR 10.50M	Disbursed Amount:	XDR 6.51M
Revised Amount:	XDR 8.05M		
Environmental Category: B			
Implementing Agencies:			
Ministry of Information, Press Information Department			
Ministry of Fisheries and Livestock (MOFL)			
Department of Livestock Services (DLS)			
Co-Financiers and Other External Partners:			

B. Key Dates				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	12/29/2005	Effectiveness:	10/16/2007	10/16/2007
Appraisal:	12/04/2006	Restructuring(s):	01/25/2010	01/25/2010
Approval:	06/28/2007	Mid-term Review:	03/01/2010	07/26/2009
		Closing:	12/31/2012	12/31/2012

C. Ratings Summary	
C.1 Performance Rating by ICR	
Outcomes:	Moderately Satisfactory
Risk to Development Outcome:	High
Bank Performance:	Moderately Satisfactory
Borrower Performance:	Moderately Satisfactory

C.2 Detailed Ratings of Bank and Borrower Performance (by ICR)			
Bank	Ratings	Borrower	Ratings
Quality at Entry:	Moderately Unsatisfactory	Government:	Moderately Satisfactory
Quality of Supervision:	Moderately Satisfactory	Implementing Agency/Agencies:	Moderately Satisfactory
Overall Bank Performance:	Moderately Satisfactory	Overall Borrower Performance:	Moderately Satisfactory

C.3 Quality at Entry and Implementation Performance Indicators			
Implementation Performance	Indicators	QAG Assessments (if any)	Rating
Potential Problem Project at any time (Yes/No):	Yes	Quality at Entry (QEA):	Moderately Unsatisfactory
Problem Project at any time (Yes/No):	Yes	Quality of Supervision (QSA):	Moderately Satisfactory
DO rating before Closing/Inactive status:	Moderately Satisfactory		

D. Sector and Theme Codes		
	Original	Actual
Sector Code (as % of total Bank financing)		
General agriculture, fishing and forestry sector	50	17
General public administration sector		48
Health	31	31
Other social services		3
Solid waste management		1
Theme Code (as % of total Bank financing)		
Health system performance	13	13
Natural disaster management	25	25
Other communicable diseases	25	25
Pollution management and environmental health	13	13
Rural services and infrastructure	24	24

E. Bank Staff		
Positions	At ICR	At Approval
Vice President:	Isabel Guerrero	Praful C. Patel
Country Director:	Johannes C. M. Zutt	Xian Zhu
Sector Manager:	Simeon Kacou Ehui	Gajanand Pathmanathan
Project Team Leader:	Ousmane Seck	Mohinder S. Mudahar
ICR Team Leader:	Iheanacho Okike	
ICR Primary Author:	Iheanacho Okike	

F. Results Framework Analysis

Project Development Objectives (from Project Appraisal Document)

The overall objective of the project is to minimize the threat posed by highly pathogenic avian influenza (HPAI) to humans in Bangladesh by controlling such infections in domestic poultry, and preparing for, controlling, and responding to possible human infections, especially an influenza epidemic and related emergencies. Though the objective is specific to HPAI, the interventions are expected to contribute to the control of other zoonotic diseases and other types of infectious diseases, in terms of building overall response capacity in the country.

Revised Project Development Objectives (as approved by original approving authority)

(a) PDO Indicator(s)

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Project Development Objective	To minimize the threat posed by HPAI infection and other zoonoses in domestic poultry and to prepare for, control, and respond to an influenza pandemic and other infectious disease emergencies in humans.			
(i) Evidence that Animal Health Services Contain HPAI;	(i) 69 outbreaks at project onset in 2007; 11 Districts affected	(i) 80 percent. At most 14 outbreaks per year by end of project (EoP).		(i) 21 outbreaks in 2012 (70 percent reduction)
(ii) National Avian Influenza Plan (NAIP) approved, distributed and operational.	(ii) Draft NAIP prepared and updated in 2009 and 2011.	(ii) 2009-2011 strategy updated and operational.		(ii) Updated for 2011-2016 and fully operational.
Date achieved	04/30/2007	12/31/2012		12/31/2012
Comments (incl. % achievement)	Except 2011, the project achieved a steady reduction in outbreaks from 226 to only 21 outbreaks at EoP. The surveillance and diagnostic capacities built stand well against intern comparators. However, HPAI had become endemic and remains a source of concern.			

(b) Project Outcome Indicators

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
Component I.A	Adapting National Policy			
I.A.1 National A.I strategy /Plan adopted by the Government and updated periodically	Strategy available	Strategy updated in 2009 and 2012 and operational.		NAIP strategy fully operational
Date achieved	04/30/2007	09/04/2008		12/31/2012
Comments (incl. % achievement)	100% achieved			
I.A.2 Operational Manual for the Plan conforms with the guidelines of FAO/OIE and GPAI	Not available	Operational Plan prepared with NAIP, updated in PY2		NAIP was updated in 2009 and 2012
Date achieved		09/04/2008		12/31/2012
Comments (incl. % achievement)	100% achieved			
I.A.3 Risk communication strategy approved and adopted by government	Draft available	Strategy approved and operational.		Risk communication strategy approved and operational in late 2010
Date achieved	04/30/2007	03/15/2010		04/30/2009
Comments (incl. % achievement)	100% achieved with delays. Draft strategy was prepared by UNICEF as part of its own public awareness until taken over by the project late in 2010. 22,488 persons (equivalent to 23,056 person-days) received training and attended workshops on communication strategies and delivery.			
I.A.4 Compensation Strategy for affected poultry farmers approved and operational	Draft strategy available	Updated strategy published and revised three times June 2008, January 2011 & April 2011.		Compensation strategy approved and operational
Date achieved	04/15/2007	06/30/2008		12/31/2012
Comments (incl. % achievement)	100% achieved. Although implemented late, has been fully successful.			
Component I.B	Strengthening Disease Surveillance and Diagnostic Capacity			
I.B.1 Veterinary Services assessment completed and	Not available	Draft report prepared by OIE.		Assessment completed and DLS

development plan prepared				reorganization plan prepared.
Date achieved	04/30/2007	10/31/2011		12/31/2011
Comments (incl. % achievement)	100% achieved. OIE conducted the assessment in October 2011. 100 % completed.			
I.B.2 Emergency Supplies and Laboratory equipment Procured and Distributed. (Note: USAID donated PPE & disinfectants before Project onset, again in 2012 when it supplied 5,100 kg of disinfectant, 10K isolation gowns, 21K gloves, 50K face masks, and 500 aprons).	PPE and disinfectants supplied by donors prior to project onset	50% by PY1, 75% by June 2011; 100% completed by 2012.		Equipment procured and distribution fully completed after FDIL renovations
Date achieved	04/30/2007	12/31/2012		12/31/2012
Comments (incl. % achievement)	100% achieved. Most initial emergency supplies (PPE and disinfectants) were supplied by participating donors before and during project onset, and taken over by the project in PY2.			
I.B.3 Operational Laboratory Manual (OLM) complies with OIE, WHO, FAO and GAIP guidelines	Existing Operational Laboratory Manual (OLM) to be updated.	OLM updated, approved and operational in October 2009.		OLM was updated in PY2 and PY4 and fully adhered to by all 7 FDIL operations.
Date achieved	04/30/2007	10/17/2009		12/31/2012
Comments (incl. % achievement)	100% achieved. The OLM conforms to OIE and FAO guidelines.			
I.B.4 90 percent of National Reference Laboratory results are consistent with OIE Results	Accuracy of diagnosis of H5N1 strains unknown.	Molecular identification of H5N1 strains 99.2% accurate by PY2.		BLRI attained a very high 98.2% analytic accuracy.
Date achieved	04/30/2007	04/30/2009		04/30/2009
Comments (incl. % achievement)	109% achieved. The National Reference Laboratory for Avian Influenza (NRL-AI) in 2012 sent 110 split samples to the OIE avian influenza reference laboratory in Padova, Italy, which fed back a diagnostic accuracy of 98.2%, which is higher than the 90% targeted.			
I.B.5 DLS Staff Trained in Diagnosis and Surveillance	None trained in HPAI diagnosis	1,015 DLS workers, 102 AVS for surveillance and 72 laboratory workers trained		DLS staff training in diagnosis and surveillance far exceeded planned targets and staff

				capacity to address HPAI has substantially improved ¹
Date achieved	04/30/2011	05/25/2011		12/31/2012
Comments (incl. % achievement)	100% achieved. In addition, 36 laboratory workers each at BLRI and CDIL trained in ELISA diagnosis for Anthrax, <i>Peste des Petits Ruminants</i> (PPR), and Rabies, as part of diagnosis of livestock diseases other than HPAI.			
I.B.6 Reporting and Reaction Time Reduced to Acceptable Interval	Reaction time 4 to 5 days	Reduced to 1.4 days from identification of outbreak to culling.		Reaction time reduced to minimally accepted level
Date achieved	04/30/2007	05/21/2010		05/21/2010
Comments (incl. % achievement)	A reduction in response time of 243 percent from project onset to EoP. Progressive reduction time: PY2=25%; PY3=50%; PY4=75%; and PY5=100%			
I.B.7 Areas at High Risk to Avian Influenza are Being Monitored	No monitoring of high-risk areas <i>upazilas</i> .	75% coverage by PY 4		100% coverage of all 306 high risk areas
Date achieved	04/30/2007	End 2011		05/25/2011
Comments (incl. % achievement)	100% achieved. All 306 high-risk areas were covered..			
Component I.C	Strengthening Control programs and Containment Plans			
I.C.1 Periodic Table and Field Simulation Exercises in Avian Flu Control Are Being Conducted	No desk top or field exercises.		Abandoned due to real-time experience and training in avian flu containment.	Exercises cancelled. From PY1 on: 100% coordinated, multi-agency outbreak control.
Date achieved	04/30/2007		10/17/2009	10/17/2009
Comments (incl. % achievement)	100% achieved. The real-time experience thus gained was deemed sufficiently successful to negate the need for table or field exercises.			
I.C.2 Poultry Vaccination Strategy against Avian Influenza Being Considered	No strategy in place.	Government prohibits vaccination		Not completed

¹ 22,057 person-days training for surveillance; 28,898 person-days for farmers and containment personnel; 288 person-days for laboratory-based diagnosis.

Date achieved	04/30/2007			06/30/2012
Comments (incl. % achievement)	0% achieved. Poultry vaccination is not allowed in Bangladesh. However, in June 2012, the government appointed an eight-member expert committee to develop poultry vaccination strategy, a result of heavy pressure from commercial poultry industry. Vaccination proceeded on experimental basis in two districts (Kishoregonj & Gazipur) in PY5 but no follow up action was undertaken.			
I.C.3 Culling and Disinfection are Carried Out Effectively	No culling or disinfection carried out	100% culling and disinfection of infected farms.		100% culling and disinfection of infected farms.
Date achieved	04/30/2007	Begin 2008		01/31/2012
Comments (incl. % achievement)	100% achieved. The culling pattern was revised from 5km to a 1km radius around infected commercial farms only, and in a 0.5km radius around backyard farms. This is considered one of the responsive attributes of the compensation regime as wider culling radii had implications for both voluntary reporting of outbreaks and the rate of depletion of the compensation fund.			
I.C.4 Compensation is Carried Out Quickly and Transparently	No compensation policy	100% compensation rate of eligible claimants.		Fully effective. US\$3.88m in compensation paid within 4 weeks of claims made and subjected to post review.
Date achieved	04/30/2007	Begin 2008		12/31/2012
Comments (incl. % achievement)	100% achieved. Compensation was paid in a quick and transparent manner, with rates adjusted three times during the project lifespan, reaching full market prices by 2011.			
I.C.5 Poultry Movement Controls and Quarantine are Effectively Enforced in Infected Areas	No movement controls and only limited quarantine measures.	Effective enforcement shortly after project onset.		Movement controls effectively enforced by project and FAO teams
Date achieved	04/30/2007	PY2		10/09/2009
Comments (incl. % achievement)	100% achieved. MCQ procedures were strengthened as were import bans of poultry from surrounding infected countries (esp. India). MCQ efforts were helped by reduced response times, rapid compensation payments which improved reporting, and the reduction of the culling radius around infected farms.			
Component I.D	Improving Biosecurity in Poultry Production and Trade			
I.D.1 Monitoring of Commercial Poultry Farms and Backyard Poultry Completed	None undertaken	50% of monitoring all 306 <i>upazilas</i>		100% of monitoring all 306 <i>Upazilas</i> through SMS surveillance network
Date achieved	04/30/2007	May 2009		May 2011
Comments	Monthly monitoring of 150 of 306 high-risk <i>upazilas</i> (50 percent) was			

(incl. % achievement)	reached by FAO with SIDA funding in May 2009. 100 % reached by project-supported monitoring of 306 high-risk <i>upazilas</i> and 15 metro <i>thana</i> (sub-districts) in May 2011. Suspected samples sent to BLRI. Fully operational.			
Component I.E	Support for Surveillance of Migratory Birds			
I.E.1 Protocols Between Cooperating Agencies and NGOs signed.	None in existence	Abandoned.		No collaboration with Dept. of Forestry to monitor wild birds.
Date achieved	04/30/2007	05/25/2011		12/31/2012
Comments (incl. % achievement)	0% achieved. DOF not explicitly identified at design as an implementing agency of the project and refused to cooperate as it saw this activity outside its budgeted mandate. Subsequently, the US Geological Society in coordination with FAO and the ICDDR, B conducted a wild bird survey in 2011.			
I.E.2 Wild Birds are Being Monitored	No regular wild bird monitoring.	No monitoring program signed with Dept. of Forestry.		No alternate regular wild birds monitoring program developed by DLS
Date achieved	04/30/2007	12/31/2012		12/31/2012
Comments (incl. % achievement)	0% achieved. DOF refused to collaborate as it did not see wild bird monitoring as part of its budgeted mandate. In 2011, crows infected with new variant of the virus (clade 2.3.2.1) were identified which may lead to the belief that the entrenchment of the disease could be caused by migratory wild birds.			
Component II	Public Awareness and Information			
II.1 Public Awareness and Information and Monitoring & Evaluation National Communication Strategy Prepared and Implemented	Strategy available in PY1	100% operational at PY1		Fully operational only in PY4
Date achieved	04/30/2007			12/31/2012
Comments (incl. % achievement)	100% achieved with delays. Draft strategy was prepared by UNICEF as part of its own public awareness until taken over by the project late in 2010. Communication strategy implemented 23,056 person-days of training and workshops in risk-based communication provided. Mini campaigns carried out in 20 districts. Fully operational.			
II.2 Targeted Commercial Poultry Farmers Adopt Recommended Biosecurity Practices	No organized of biosecurity practices against avian influenza except in large commercial farms	Adoption rates: PY1=20%; PY2=50%; PY3=75%; PY4=100%		No data on adoption available, but 90 percent of targeted farmers aware of good biosecurity

				practices by PY4.
Date achieved	04/30/2007	12/31/2011		12/31/2012
Comments (incl. % achievement)	Though no data available, adoption rates for good biosecurity practices is likely to be low A 2012 KAP survey indicates that although 90% of surveyed commercial poultry farmers were aware of good biosecurity practices, the high proportion (84% of total) of HPAI outbreaks involving commercial farms indicated that biosecurity practices were inadequately applied..			
II.3 Targeted Backyard Poultry Farmers Adopt Biosecurity Practices	Virtually no biosecurity in backyard poultry flocks.	Adoption rates: PY1=10%; PY2=25%; PY3=40%; PY4=60%; and PY5=80%.		No data available on adoption, but 70% of targeted farmers aware of good biosecurity practices by PY4
Date achieved	04/30/2007	11/30/2012		11/30/2012
Comments (incl. % achievement)	Though no data available, adoption of recommended practices is likely to be poor, in spite the fact that the KAP survey of 2012 indicated that 70% of backyard poultry farmers were aware of good poultry practices. To minimize costs, farmers hedge against the additional costs of implementing certain biosecurity measures at certain perceived risk levels..			
II.4 80% of targeted people handling live poultry birds and processors are aware of hazards associated with HPAI	Limited public awareness of HPAI health hazards	Adoption rates: PY1=10%; PY2=25%; PY3=40%; PY4=60%; and PY5=80%.		65% of targeted live bird handlers aware of good biosecurity practices by PY4
Date achieved	04/30/2007	11/30/2012		11/30/2012
Comments (incl. % achievement)	80% achieved.			
II.5 Targeted Journalists are Trained in the Good Practices of Reporting on Avian Flu	Journalist awareness for reporting on avian flu is very limited.	Train 600 journalists in good practices for reporting on avian flu.		80% of targeted journalists aware of good practices for reporting on avian flu.
Date achieved	04/30/2007			11/30/2012
Comments (incl. % achievement)	80% achieved. The training was conducted as part of public awareness and information activities, and reporting quality has improved.			
Component III.A	Implementation and Technical Support			
III.A.1 Implementation Support, Monitoring and Evaluation Financial Management and Implementation Reports are Submitted on a Timely Basis.	None	100% timely submission compliance timely submission by PCU of all required reports from PY1 onwards.		Full compliance.

Date achieved	04/30/2007			11/30/2012
Comments (incl. % achievement)	100% compliance from PY1 to EoP. Reports submitted included: financial, disbursement, procurement, quarterly progress reports, internal and external audits, safeguards and environmental mgmt. reports.			
Component III.B	Monitoring and Evaluation			
III.B.1 Monitoring and Evaluation Baseline Report Has Been Prepared.	None.	Baseline report to be available by end PY1.		Baseline only prepared in July 2011
Date achieved	04/30/2007	03/31/2008		07/15/2011
Comments (incl. % achievement)	100% achieved with delays. Baseline report was only available in July 2011. The delay was mostly due to delays in signing the MoU with DOC to proceed with hiring a consulting firm to conduct the baseline survey. Completion date 17 months overdue.			
III.B.2 Methodology defined and M&E periodically undertaken	None	Fully defined by PY1		Methodology defined in October 2010 upon arrival of FAO/TAS M&E specialist
Date achieved	04/30/2007	03/31/2008		October 2010
Comments (incl. % achievement)	100% achieved with delays. No organized M&E based on sound methodology until October 2010 after the then arrived FAO M&E Specialist had developed the project's M&E framework.			

Two indicators present in the Technical Annex were deleted as they were either duplicative or redundant. They are, (i) Emergency supplies procured and available at strategic locations in the field, as these activities were carried out and reflected under Indicator I.B.2, and (ii) If appropriate, ring vaccination around infected areas completed, as vaccination against HPAI was prohibited. One new indicator was added at MTR to reflect the newly introduced biosecure poultry market chain subcomponent. Its evaluation is outlined below:

Biosecure Poultry Market Chains are Fully Operational (added at MTR to reflect the addition of integrated biosecure poultry market chain)s	No biosecure poultry market chains (BPMC) in existence	Establish 9 BPMCs.		Eight of nine BPMCs operational which form a pilot for a national application of integrated poultry chain biosecurity
Date achieved	04/30/2007	12/31/2012		12/31/2012
Comments (incl. % achievement)	90% achieved. This activity was included at MTR and involves PPP arrangements between poultry farmers, municipalities, with the project providing matching grants. Started late, but expands the responsibility of good biosecurity practices along with the entire poultry value chain..			

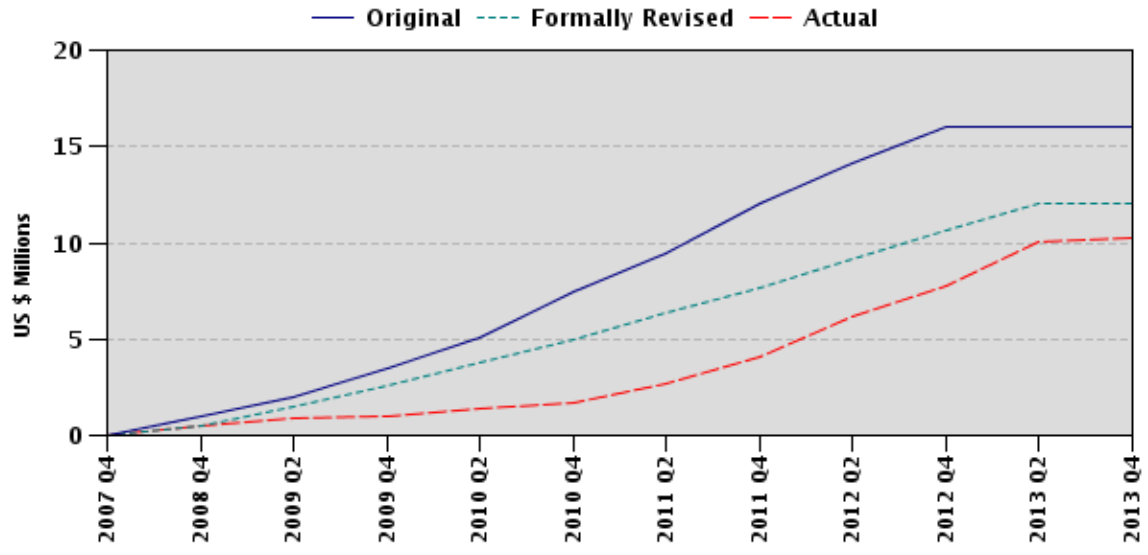
G. Ratings of Project Performance in ISRs

No.	Date ISR Archived	DO	IP	Actual Disbursements (USD millions)
1	12/24/2007	Satisfactory	Satisfactory	0.00
2	02/24/2008	Satisfactory	Satisfactory	0.50
3	09/04/2008	Satisfactory	Satisfactory	0.61
4	12/14/2008	Satisfactory	Moderately Unsatisfactory	0.94
5	03/28/2009	Satisfactory	Moderately Unsatisfactory	0.99
6	07/28/2009	Satisfactory	Moderately Unsatisfactory	1.04
7	11/10/2009	Moderately Satisfactory	Moderately Unsatisfactory	1.04
8	05/21/2010	Moderately Satisfactory	Moderately Unsatisfactory	1.62
9	12/11/2010	Moderately Satisfactory	Moderately Satisfactory	2.47
10	06/06/2011	Moderately Satisfactory	Moderately Satisfactory	3.84
11	10/02/2011	Moderately Satisfactory	Moderately Satisfactory	4.97
12	03/11/2012	Moderately Satisfactory	Moderately Satisfactory	6.44
13	09/25/2012	Moderately Satisfactory	Moderately Satisfactory	8.40

H. Restructuring (if any)

Due to donor-funded activities underway prior to appraisal and slow implementation progress at the beginning of the project, the GoB requested through the Ministry of Finance (07 April 2009) and the Ministry of Fisheries and Livestock (10 May 2009) the cancellation of US\$4 million of the IDA credit. At MTR, in July 2009, in consultation with involved donors and GoB, the project Financing Agreement was restructured reducing the project scope and related IDA credit from the original \$16m to \$12m. This became effective on countersigning on 25 January 2010. However, given the impact of this down-sizing on some of the project components, MTR missed the opportunity to fully restructure the project.

I. Disbursement Profile



1. Project Context, Development Objectives and Design

The project was developed as an emergency operation to respond to massive avian flu outbreaks in Bangladesh that began in April 2006. The potential impact of the outbreaks to the health of this densely populated country was considerable, especially where the first-responder veterinary service capacity was very weak. The project was requested by GoB and its framework follows the Bank's GPAI Technical Annex template.

1.1 Context at Appraisal

1.1.1 The Country. Bangladesh had a population of approximately 145 million and a national poultry flock of 152 million of all types of poultry. With a population density of 1,072 people per km² and a poultry density of 1,194 per km², Bangladesh posts one of the densest human and poultry populations in the world.² About 75 percent of the population lives in rural areas and depends heavily on poultry as a source of meat and household income. The combined high population density and low socioeconomic status contribute to a high burden of infectious diseases, which make Bangladesh prone to zoonotic disease outbreaks that can spread rapidly from animals to humans.

1.1.2 Avian Influenza. The country lies under several important migratory bird flyways, with resting places along several of the great river courses, wetlands, and estuaries that transect the country—increasing its risk to the introduction of HPAI by infected migratory birds from elsewhere. Bangladesh experienced its first HPAI outbreak wave between February and May 2007, with a second wave between September 2007 and May 2008. The first human case was identified in January 2008. By the end of the project (EoP), there were six human clinical cases but no deaths.³ Since the first outbreak in April 2007, five seasonal outbreak waves have followed, with signs of an early commencement of a sixth wave. By EoP, 550 outbreaks had occurred, infecting 52 of 64 districts. Outbreaks on commercial farms comprised 83 percent of the total, indicating that biosecurity on these farms remains weak. Borders between Bangladesh and neighboring India and Myanmar—both avian flu-infected countries—are porous, further increasing the threat of transboundary infection. In 2011, crows infected with a new variant of the virus (clade 2.3.2.1) were identified, which may lead to the belief that the entrenchment of the disease could be caused by migratory wild birds.

1.1.3 Poultry Farm Biosecurity. The consistently high infection rate, stood at a 4.7 to 1 ratio between commercial farms and backyard poultry, based on outbreak data collected, and points at serious biosecurity weaknesses in the commercial poultry sector. Biosecurity along the poultry market chain is very weak and a major contributor to the continuing circulation of the HPAI virus. Some 55 percent of poultry are kept under free-ranging backyard conditions without any degree of biosecurity. Village poultry farms

² Population and Housing Census, 2011, *Daily Star Quotidian*, 17 July 2012.

³ FAO AIDE News, Issue 31, January-March 2012. In 2012, three of the human cases identified were present in one LBM in the metropolitan Dhaka area, suggesting that LBMs can contribute to the spread of HPAI to poultry as well as humans. HPAI virus has been isolated from other LBMs across Bangladesh.

frequently are built side by side, with only a few meters of separation, promoting the spread of H5N1. Live bird market (LBM) structures in the larger towns stem from colonial days, and are dilapidated without any water supply or means of disinfection. In smaller villages, LBMs are located along roadsides without any infrastructure.

1.1.4 Agencies Involved in Avian Influenza. Within the Ministry of Fisheries and Livestock (MOFL), the two main agencies concerned with avian influenza control are the Department of Livestock Services (DLS) and the Bangladesh Livestock Research Institute (BLRI). The DLS has 5 Divisional Livestock Offices, 64 District Livestock Offices, 464 *Upazila* (sub-district) Offices, 1 Central Disease Investigation Laboratory (CDIL), and 7 Field Disease Investigation Laboratories (FDIL). Each *upazila* is staffed by 2 to 3 *Upazila* Livestock Officers (including veterinarians) and support staff, responsible for disease surveillance and reporting. At appraisal, the 7 FDILs were unable to undertake any avian influenza diagnostic work due to lack of equipment, consumables and training. The BLRI was established in 1985 and is a semi-autonomous agency within MOFL.

1.2 Original Project Development Objectives (PDO) and Key Indicators (as approved)

1.2.1 The overall objective of the project is to minimize the threat posed by HPAI to humans in Bangladesh by controlling such infections in domestic poultry, and preparing for, controlling, and responding to possible human infections, especially an influenza epidemic and related emergencies. Though the objective is specific to HPAI, the interventions are expected to contribute to the control of other zoonotic diseases and other types of infectious diseases, by building the country's overall response capacity.

1.2.2 This objective was to be achieved through three types of interventions: (i) prevention; (ii) preparedness and planning; and (iii) response and containment. If these types of interventions achieved their goals, the proposed project would reduce the burden of HPAI in poultry and the consequent economic losses. It would also lower the risk of human infection and the loss of productivity attributable to human infections in Bangladesh. Finally, it would limit the risk of HPAI in other countries.

1.2.3 By end of project, it was expected that (i) the capacity of the agencies involved in HPAI containment, control and mitigation would be improved; (ii) the threat to human health in the high-risk areas of Bangladesh would be reduced; and (iii) the general public will be better aware of, and would have adopted AI-related human health, animal health, and environmental safeguards.

1.3 Revised PDO (as approved by original approving authority) and Key Indicators, and Reasons/Justification

1.3.1 The PDO and Key Indicators have remained unchanged. At MTR, one additional intermediate outcome indicator was added to the Animal Health component to address the need for the closer monitoring of biosecurity along the poultry market chain. The indicator tracked the progress of the newly introduced piloted, integrated Biosecure Poultry Market Chains (BPMC).

1.4 Main Beneficiaries

1.4.1 The project was aimed at several groups of beneficiaries:

- a) The primary target beneficiaries were the five million commercial poultry farmers and poor households whose livelihoods benefitted directly or indirectly from project interventions;
- b) Veterinary diagnostic laboratories, the research institution BLRI, the CDIL, and the disease surveillance system;
- c) The implementing ministry MOFL and its DLS, which benefitted significantly from human and physical capacity building, and from institutional strengthening;
- d) Consumers and other poultry chain stakeholders who benefitted from science-based information and awareness of the risks of HPAI to poultry and human health; and
- e) Targeted consumers with access to nine hygienically operated biosecure LBMs from which they can buy safe poultry meat and eggs.

1.5 Original Components

1.5.1 Given limited implementation capacity of DLS at project onset, the project design of three components comprising 11 subcomponents, all with national scope, was quite ambitious.⁴ Other donors and ongoing GoB activities alleviated some complexities related to emergency supply delivery, surveillance, and biosecurity improvements in selected LBMs, and diagnostic laboratory training. The project was financed as an ERL by AHITF US\$2m, GoB US\$3m and IDA US\$16m, of which IDA US\$4m was cancelled in June 2009.

1.5.2 **Component I - Animal Health** (US\$5.7 million; 79 percent of total project cost), This component supported enhancement of prevention and preparedness, strengthening disease surveillance and diagnostic capacity, strengthening control programs, improving biosecurity, support for surveillance of migratory birds, and a contingency fund. A multi-member FAO/TAS team, scheduled to arrive in October 2009, supported the technical aspects of the PCU implementation under DLS.

- **Subcomponent IA - Enhancing Prevention and Preparedness Capability** (a) adapting and updating a National Policy Framework supporting a review of national policies⁵ with private sector and NGOs involvement, tested with “tabletop” and

⁴ The project was co-financed by the Government of Bangladesh, the International Development Association (IDA Credit No. 4340-BD), and AHI Trust Fund (Grant No. TF090662-BD). Trust Fund donors include the European Commission, the United Kingdom-DFID, Australia-AusAID, the Russian Federation, the Peoples’ Republic of China, the Republic of Korea, Iceland, Slovenia, and Estonia.

⁵ GoB designated MOFL and MOHFW to implement its National Avian Influenza Plan (NAIP), with appropriate support from other agencies, including MOEF and MOI. A National Advisory Committee (NAC) comprised of 16 Ministers and a representative of the Prime Minister’s Secretariat was designated as the apex coordinating body. Beneath the NAC, a National Multi-Sectoral Task Force (NMTF) has been established with representation from a wide range of public and private sector agencies. The cost for implementing the plan is being borne by GoB.

“real life” simulation exercises;⁶ (b) evaluating national veterinary services; (c) reviewing national compensation policy; and (d) fostering better understanding of HPAI by organizing conferences and workshops.

- **Subcomponent I.B - Strengthening Disease Surveillance and Diagnostic Capacity** by (a) legislation to strengthen veterinary services; (b) reorganizing DLS; (c) improving animal health information flow; (d) improving detection, reporting and follow-up of reported outbreaks in all of the high-risk upazilas and those holding large poultry population; (e) establishing community-based surveillance networks; (f) conducting epidemiological surveys; (g) improving laboratory diagnostic capacity; and (h) supporting applied research on HPAI through competitive grants.
- **Subcomponent I.C - Strengthening Control Programs and Containment Plans** (a) targeting virus elimination at source; (b) setting up effective quarantine parameters; (c) supporting poultry vaccination through a contingency fund; and (d) providing laboratory, field staff, and avian flu workers with training and personal protective equipment (PPE).
- **Subcomponent I.D - Improving Biosecurity in Poultry Production and Trade** to improve the biosecurity of Level 2 and 3⁷ commercial and semi-commercial poultry producers by supporting DLS staff to train producers to improve their biosecurity measures.
- **Subcomponent I.E - Support for Surveillance of Migratory Birds** funds for improving surveillance and reporting unusual wild bird die offs from HPAI, including the provision of limited amount of PPE and biosecure containers to transport samples laboratory for analysis.
- **Subcomponent I.F - Establishing a Contingency Fund** (a) establishment of a compensation program to reimburse affected poultry farmers; and (b) the procurement of PPE and avian flu vaccine.

1.5.3 Component II: Public Awareness and Information Component (US\$0.315 million; 9 percent of total project cost), to improve public awareness and information about HPAI to safeguard the human health of the general public, extension staff, animal health workers, poultry producers, poultry traders, poultry processors, and other poultry sector stakeholders. The component supported implementation of the National Communication Strategy and Action Plan to introduce innovative and best-practice examples to strengthen communication activities.

- **Subcomponent II.A - Advocacy and Collaboration with Stakeholders** support to disseminate information from the national level to public and private sectors; improve coordination and collaboration among all major stakeholders (e.g., Planning, Finance, Agriculture, Health, Information, DLS, national research

⁶ These simulations turned out to be unnecessary because DLS and MOH already were working together closely on monitoring and eradication programs, and thereby gained the necessary inter-agency experience.

⁷ FAO classification of poultry farms: Level 4 - backyard production with free ranging poultry without biosecurity; Level 3 - semi-commercial production with minimal biosecurity; Level 2 - Commercial production with confined poultry under medium to high biosecurity; Level 1 - Industrial, fully integrated commercial production with full confinement and high level of biosecurity.

institutions, and diagnostic laboratories), NGOs, civil society, and private poultry sector stakeholders.

- **Subcomponent II.B - Production and Dissemination of Communication Materials** development and testing of messages and materials to disseminate communication from national to local level public and private sectors (web-based, printed, audio, and video); presentations, slide sets, videos, and documentaries; and symposia on surveillance, treatment and prophylaxis.
- **Subcomponent II.C - Developing Community-based Communication Pilots**, the development and implementation of training courses in risk communications methodology for extension and veterinary staff, health workers, and NGOs at national and local levels.

1.5.4 Component III: Implementation Support and Monitoring and Evaluation Component (US\$0.945 million; 12 percent of total project cost). This component had two sub-components:

- **Subcomponent III.A - Implementation and Technical Support** (a) establishment of Project Coordination Unit (PCU) within DLS for project implementation, coordination and management, communications, procurement, financial management, safeguards, and implementation management; (b) technical assistance (international and national experts) from FAO, specifically long-term specialists with international veterinary expertise and project implementation, and support for incremental staffing needs by PCU, including M&E staff; and operational costs for the DLS/PCU.
- **Subcomponent III.B - Monitoring and Evaluation.** Financial and technical support for M&E expert,⁸ for the internal monitoring & evaluation of AIPRP and for periodic, independent evaluation. The M&E was part of the Management Information System (MIS) in the PCU.

1.6 Revised Components N/A

1.7 Other significant changes N/A

2. Key Factors Affecting Implementation and Outcomes

Several factors affected implementation and outcomes, as covered below. These were: the multi-donor assistance already underway before project onset, which impacted on the evaluation of the project's sole impact; the delayed arrival of the FAO/TAS Team, which delayed a number of important project activities, most important of which was monitoring and evaluation.

2.1.1 Bank involvement. Bank involvement was justified, given the global public good of HPAI – especially the possibility of a pandemic – and other emerging and reemerging transboundary zoonotic diseases. The 2007 H5N1 outbreaks in Bangladesh, and in

⁸ The M&E expert arrived three years after the GoB requested long-term FAO assistance. A baseline was prepared after the expert's arrival, and thereafter the PCU implementation capacity and M&E began to improve.

neighboring India and Myanmar in early 2006, highlighted that Bangladesh was at high risk. An urgent need existed to assist government in strengthening veterinary services, communication/public awareness infrastructure, and compensation policy.

2.1.2 Collaborative Assistance for Project Preparation and Implementation. Prior to the first avian flu outbreaks in early 2007, UNICEF assisted GoB in development of a risk communication strategy, and NAIP was developed, assisted by FAO, WHO and OIE. Several agencies were already supporting activities related to veterinary services. Japan International Cooperation Agency (JICA) supported development of the poultry industry and Danish International Development Agency (DANIDA) modernization of BLRI. When Bangladesh was declared an endemic country, DANIDA (BLRI laboratory) and JICA (regional risk communication) expanded their programs. Other donors and agencies began funding projects focusing on the control and containment of HPAI. FAO supported short-term emergency response teams; USAID the construction of 26 biosecure live-bird markets, and Asian Development Bank (ADB) the establishment of an HPAI Technical Unit (TU) within DLS. Other donors supplied PPE, disinfectants and other emergency supplies. USAID committed around \$20 million to finance different aspects of HPAI control (the Stop.AI program, building biosecure LBMs including success in closing major LBMs in Dhaka once a week for disinfection, the SMS Gateway and LDS, salaries for 15 national and international experts until 2014). All these were provided as grants. UNICEF developed a risk communication strategy which was adopted and published in 2008.

2.1.3 Project Design. The AIPRP design was developed to mesh into already ongoing activities by other development partners with whom the Bank share credit for eventual progress towards the achievement of the projects' development objectives. The World Bank's involvement was justified under the framework of the Global Program for Avian Influenza Control and Human Pandemic Preparedness and Response (GPAI).⁹ The project was processed under the Bank's emergency operation guidelines (OP/BP 8.50), which allow for the issuance of Emergency Recovery Loans (ERL) that can be used for the quick disbursing of project activities without due attention to long-term sector, economic policies. Given the impact of HPAI interventions in the high-risk environment of Bangladesh, the global public good aspects to strengthen capacity to contain HPAI, and other transboundary animal and human diseases, was well justified.

2.1.4 Quality at Entry. At entry, there were weaknesses in the design of the project relating to (i) its complexity relative to local implementation capacity at appraisal; (ii) overestimation of the budget which resulted from an under-evaluation of other

⁹ The World Bank's Board of Directors endorsed GPAI in January 2006 as a horizontal Adaptable Program Loan with a global fund of US\$500 million. When GPAI was set up in 2005, when H5N1 in humans was at its height in Asia. As avian flu virus strains evolve constantly with unpredictable results, the risk of a human pandemic was considered high. Any intervention would have to be multi-sectoral, involving health, agriculture, economics, finance, planning, and other sectors. The World Bank was considered the most suitable institution to coordinate the response among the United Nations and its technical partner agencies FAO, UNICEF, and the World Health Organization (WHO).

development partners' contribution to the initiative and later the cancellation of 25% of the loan package; (iii) unpreparedness for implementation of institutional and procurement arrangements, including FAO assistance; and (iv) weak monitoring and evaluation framework. A Quality Enhancement Review (QER) would have uncovered these constraints and weaknesses.

2.1.5 Government Involvement. GoB engaged early, established a PCU under DLS, adopted an Operation Manual, and deployed the already existing NAIP, the Risk Communication Strategy, and the Compensation Plan. DLS, under the Ministry of Fisheries and Livestock (MOFL), implemented the Animal Health component. The Department of Mass Communication (DMC) under Ministry of Information collaborated with DLS to implement parts of the public awareness and information component.¹⁰ Since MOHFW implemented the Human Health component under a different project, DLS assigned a liaison officer to maintain linkages with that component's implementation progress. The DLS and MOHFW established joint Rapid Reaction Teams in 481 *Upazilas* which cooperated continuously in such areas as the culling of exposed poultry, surveillance and administration of prophylaxis to in-contact persons, and information sharing to minimize the threat to human health posed by the disease. GoB contracted an FAO/TAS team¹¹ to assist in the technical implementation aspects. However, strong M&E capacity was compromised by the late completion of a baseline study, further compounded by the late arrival of the FAO/TAS M&E experts. However, the design failed to take into account the critical role of wild birds in maintaining the circulation of the HPAI virus and by so doing failed to involve the Department of Forestry (DOF) at the level as MOFL and MOHFW.

2.1.6 Assessment of Risks at Entry. The project's Technical Annex appraisal rated the overall risk assessment of the project and FM as *Substantial*, based on the rapidly spreading HPAI epidemic in the face of the weak implementation capacity of DLS and equally weak FM capacity. Risk of government commitment, implementation, and laboratory capacity were rated *High*, based on institutional and technical weaknesses. Access to collaborating agencies (FAO), initially rated *Medium*, was raised to *High* as the result of serious delays in the arrival of the FAO/TAS Team. Lack of Government commitment, initially rated *High*, turned out to be *Low*, as GoB demonstrated continuous vigilance in combatting and marshaling resources to avian flu containment. Risk assessment at appraisal did not foresee the importance of poultry chain biosecurity as a significant factor in controlling avian flu, which should have been rated *High*, which was only identified and addressed following MTR.

¹⁰ MOHFW implemented the Human Health component under the avian influenza component of HNPSP. MOI signed a MoU with DLS to implement the public awareness and information component, assisted by a national consulting firm.

¹¹ The FAO/TAS team comprised a Team Leader/avian influenza expert, an international and national M&E expert, a national communications expert, and a national community-based surveillance expert.

2.2 Implementation

Overall project implementation was delayed as the result of: (i) delay in hiring FAO for technical assistance to the PCU (initiation was delayed by GoB and MoFL and the Development Project Performa (DPP) had to be revised among other things to accommodate the payment of VAT from GoB funds in lieu of VAT due from FAO staff); and (ii) PCU staff lack of skills and experience in project management, particularly dealing with Bank procurement.

2.2.1 Project Changes at MTR (mission of July-August 2009). Two major changes took place: (i) A subcomponent entitled Biosecure Poultry Market Chains (BPMC) was added to the Animal Health component in 2011, comprising the establishment of nine piloted biosecurity poultry market chains in nine of the Districts at highest risk to HPAI; and (ii) As the result of donor-funded activities underway prior to appraisal, the MTR, in consultation with involved donors and at the request of GoB – through the Ministry of Finance (07 April 2009) and the MoFL (10 May 2009) – restructured the project Financing Agreement reducing the project scope and related IDA credit from the original US\$16m to US\$12m. The enabling document was countersigned on 25 January 2010 to effect the cancellation of US\$4m. Given the impacts of this reduction on some of the major components of the project, the MTR came short of fully restructuring the project based on an in-depth analysis of the scope of such impacts.

2.2.2 The impact of several activities of which IDA budgets were reduced during the 2009 MTR mission should have been more closely evaluated. For example, budgets for outbreak containment plans, biosecurity and the compensation fund contingency were reduced between 46 and 54 percent, even though these activities turned out to be instrumental in contributing to more effective containment measures that might have further reduced the outbreak incidence. Other items, such as capacity building for public awareness, were reduced to ensure improved synergism between project and non-project supported activities. On the other hand, IDA budgets for technical implementation support and M&E were substantially increased.¹²

2.2.3 However, notable progress in implementation progress began in late 2010 after GoB completed the long pending approval of its revised DPP, followed by signing an equally long pending FAO/TAS team contract in April 2010, and the hiring of staff to strengthen the PCU. This resulted in achieving the following project development outcomes: (i) enhanced surveillance capacity leading to the reduction in infectious period (time between reporting and culling) from 4.8 days to 1.4 days;¹³ (ii) 70 percent reduction in outbreaks at EoP relative to baseline; (iii) strengthened capacity for accurate diagnosis of HPAI and its molecular characterization by gene sequencing; (iv) a responsive, timely, equitable, and transparently implemented compensation scheme; and (v) the emergence

¹² See MTR Aide Memoire, August 2009, Annex V, Table 1

¹³ An *ex post* analysis of the Bangladesh HPAI outbreak data, using simple compartmental Susceptible-Infectious (SI) model, shows that this reduction in infectious period alone reduced the equilibrium prevalence rate from 30.58 percent to 11.69 percent, thus greatly contributing to control and containment efforts (Annex 3).

of a demand-driven, tripartite, inter-ministerial (MOFL, MOI & MOHFW) platform for collaboration to respond to other emerging or reemerging major public health threats e.g. it facilitated H1N1 pandemic preparedness reaction in Bangladesh.

2.2.4 Component I: Animal Health

The overall implementation of this component was *Moderately Satisfactory*. The reduction of response time from outbreak to culling from 4.8 days to 1.4 days and reaching laboratory diagnostic accuracy for HPAI of 98 percent are key achievements and compare favorably with world standards. However, Bangladesh still had 21 outbreaks recorded in 2012 – the highest incidence of HPAI in the South Asia region and one of six countries where HPAI remains endemic, which remains a cause for continued concern.¹⁴ Weak poultry farm biosecurity and potential seasonal reinfection by migratory birds remain obstacles to successful control and eradication.

- **Enhancing Prevention and Preparedness Capability.** The 2006-2008 NAIP was adopted, published, and updated to cover 2009-2016 to reflect new priorities related to institutional strengthening, diagnostic and surveillance capacity, and communications and information. The OIE completed its review of national veterinary services in October 2011, based on which DLS prepared a reorganization plan to (i) internalize budget to support the upgraded surveillance provided by enhanced surveillance, epidemiology and laboratory diagnosis; (ii) expand the Livestock Disease System to monitor all livestock species; (iii) support the newly established epidemiology unit; (iv) support the full staffing, training and operations of the renovated FDILs; and (v) streamline disease information flows between the FDILs, BLRI, CDIL, and DLS.
- **Strengthening Disease Surveillance and Diagnostic Capacity.** Disease surveillance and diagnostic capacity were significantly strengthened. On surveillance (i) commercial poultry farms across the country, including their poultry inventories, were registered and geo-referenced, allowing for rapid identification of infected farms; (ii) 306 high-risk *upazilas* receive priority monitoring by 1,117 SMS gateway workers, resulting in reduction of outbreak response time from 4.8 days to 1.4 days; (iii) over 86 percent of outbreaks are now covered by the SMS Gateway, compared to 14 percent passively reported cases by farmers; (iv) community-based surveillance was established and linked to the SMS Gateway system; and (v) a total of 22,057 person-days of training for surveillance workers, and 28,898 person-days for 1,888 poultry farmers, containment personnel, animal health workers, and veterinary staff at supervisory and field investigation levels of surveillance received training equivalent to

¹⁴ The same analysis above confirmed a high likelihood of sustained endemicity if control efforts continued to depend on separate single rather than integrated packages of interventions (Annex 3). The results support the concept of BMPC entailing broadening control efforts to take into consideration the capacities, practices, and incentives of all poultry value chain stakeholders. When completed and fully functional, the pilot BMPC will play crucial roles in further weakening the probability of spread of the virus, especially when coupled with the observation of weekly rest days in all LBMs.

22,057 person-days and 288 person-days for FDIL laboratory workers. On diagnostic capacity, (i) seven existing FDILs were renovated and two new FDILs were constructed, equipped, and supplied with consumables; (ii) diagnostic capacity has been enhanced in the diagnosis of avian flu and other emergency diseases; and (iii) capacity was established in virus characterization by gene sequencing. Current diagnostic accuracy at BLRI for HPAI virus is internationally benchmarked at 98.2 percent. Diagnostic capacity of the veterinary diagnostic laboratory system was substantially strengthened. At project onset, FDIL staffing was only 30 percent of required level, and improved to 63 percent by EoP. Further staff recruitment is in progress.

- **Strengthening Control Programs and Containment Plans.** With initial assistance from Sweden, later continued by USAID and taken over by the project, DLS used the SMS Gateway system for rapid detection of outbreaks and fielding rapid response teams (RRT) to cull sick and in-contact poultry. By EoP, the project supported the monitoring of 306 high-risk *upazilas* by the SMS Gateway system, identified and contained 550 outbreaks, entailing the culling of a total of 3.46 million poultry and destruction of 2.97 million eggs belonging to 822 farmers. Although this system has worked well, seasonal outbreaks have continued, primarily as the result of continuing weak farm biosecurity and possible re-infection by the overflying and resting of HPAI-carrying migratory birds. Initially, neither the government nor the project supported poultry vaccination, in view of the disappointing results found elsewhere and the large outlay of human and physical resources required. However, in June 2012, government decided to allow limited vaccination without project support on selected, large-scale commercial farms using approved H5N1 vaccines in two districts.
- **Improving Biosecurity in Poultry Production and Trade.** At MTR, the concept of piloting Biosecure Poultry Market Chains (BPMC) was introduced, in particular, to tackle weak farm biosecurity, which was identified as a major constraint to effective avian flu containment. The project established nine piloted BPMCs under PPP arrangements in nine high-risk *upazilas*. These BPMCs comprise nine new LBMs, 18 broiler and layer demonstration farms, 324 participating poultry farmers, 90 middlemen/transporters and 180 LBM workers, and 1,260 poultry chain stakeholders trained in biosecurity. An estimated 15,500 consumers are benefiting from buying safe, clean poultry meat from these nine market chains.
- **Support for Surveillance of Migratory Birds.** Inadequate attention paid to wild bird surveillance during the lifetime of the project has not helped to resolve the contributing factors to the endemic status of HPAI in Bangladesh. Targeted surveillance and the reporting of unusual wild bird die offs from HPAI was not implemented due to the refusal by the Department of Forestry to cooperate as it could not be brought around to support this activity which it viewed as out of its mandate. Subsequently, the US Geological Survey, in coordination with FAO and

the ICDDR, B, conducted a wild bird survey in 2011. Aside from this survey, no organized wild bird monitoring took place. Media reports mentioned migrating birds (crow) die-offs during the second outbreak wave (September 2007-May 2008) and during the fourth 2009-2010 outbreak wave in the Dhaka region. In 2011, crows infected with a new variant of the virus (clade 2.3.2.1) were identified, which may lead to the belief that the entrenchment of the disease could be caused by migratory wild birds.

- **Establishing a Contingency Fund.** This fund comprised allocations for compensation and emergency supplies (PPE), and was reduced at MTR from US\$3.265 million to US\$1.746 million by cancelling funds allocated for PPE, in view of the substantial amounts of PPE provided by donors.¹⁵ The compensation strategy was in place at project onset and was revised three times (June 2008, January 2011 and April 2011). A total of US\$3.88 million was paid in compensation to 822 farmers for 2.58 million birds and 2.97 million eggs that were culled or destroyed (Annex 2). changes in 2011 to reflect compensation rates for culled poultry at the prevailing market prices resulted in an overall increase in pay-out per bird culled from US\$1.28/bird in the pre-2011 period to US\$1.80/bird from 2011 onwards, i.e., an overall increase of 41 percent. Further analysis showed that overall average compensation rates (US\$1.42/commercial chicken vs. US\$1.46/backyard chicken) were pro-poor and equitable in that sense. Also, traceable payments were reportedly made within four weeks from date of culling. Although disbursement of compensation was temporarily halted between November 2011 and April 2012, due to untimely release of counterpart funding by GoB, the entire scheme is considered to have been conducted in a responsive, pro-poor, equitable, transparent, and timely manner.

2.2.5 Component II: Public Awareness and Information. Overall implementation of this component was rated *Satisfactory*. Although implementation started well behind schedule, substantial progress was made in the final 14 months of the project. The National Communication Strategy (drafted by UNICEF with JICA funding) was revised and published in September 2010, and a second KAP survey was conducted that same month. In October 2011, DLS signed the MOU with the Department of Mass Communications (DMC) and took over the public awareness and risk communication activities. This activity was assisted by FAO/TAS and the Technical Task Force on Communication led by the CVO and assisted by IECDR. DMC made remarkable progress in conducting mini campaigns in 20 *upazilas* in 20 districts using film shows, folk songs, school programs, distribution of leaflets, posters and banners, deploying DLS and other MOI staff trained under the project.

¹⁵ MTR Aide Memoire, August 2009. Annexes V and VI. USAID donated PPE & disinfectants before project onset, again in 2012 when it supplied 5,100 kg of disinfectant, 10,000 isolation gowns, 21,000 gloves, 50,000 facemasks, and 500 aprons. Emergency supplies delivered by project: 4,500, 1 of D4 Plus and 1,500 kg of Vikron-S disinfectants to 52 *upazilas*

- **Advocacy and Collaboration with Stakeholders.** A total of 22,488 persons (equivalent to 23,056 person-days) received training and/or attended workshops on communications strategies and delivery, held in 20 high-risk districts across the country. Trainees included 568 DLS and other MOFL staff, 120 news media reporters, and 11,800 poultry farmers attended workshops. The KAP survey (2012) reports that 80 percent of targeted journalists accept good reporting practices, while respectively 90 percent and 70 percent of surveyed commercial and backyard poultry farmers are aware of and adopt good biosecurity practices. However, the high proportion (84 percent of total) of HPAI outbreaks involving commercial farms indicates a disconnect between the KAP and practice as evidenced by persisting weak biosecurity in that sector and is a source of concern.
- **Production and Dissemination of Communication Materials.** An advertising agency, contracted in December 2011, produced an assortment of communications and information materials, which were distributed across the country. These included 10 roadside billboards, 100 banners, 10,000 festoons, 100,000 leaflets and 4-page booklets, 50,000 picture cards for schoolchildren, 2,000 flipcharts, 200,000 booklets, and 3 videos on LBM and poultry farm biosecurity, and on general biosafety for consumers. These materials were distributed to schools, project-supported trainees, shops and malls, government departments, TV stations, farmers, LBMs, wet markets, and consumers. There was a reported increase in awareness of risks associated with HPAI among 80 percent and 65 percent of targeted poultry consumers and processors (KAP survey, 2012).
- **Developing Community-based Communication Pilots.** In one-day workshops, ten-thousand workers were trained in community-based awareness and communications to support “pilot” formation of a feedback mechanism to facilitate the flow of information from the grassroots level to project management and stakeholders. At the same time, the preparation and dissemination of information materials to the workers was monitored. There was no information or reporting at EoP to follow up on forming community-based groups.

2.2.6 Component III: Implementation Support and Monitoring and Evaluation

The overall implementation of this component was rated Moderately *Satisfactory*, in view of the delayed arrival of the FAO/TAS team and the institutional capacity weaknesses of the DLS.

- **Implementation Support.** The initial limited human capacity of the PCU, established under DLS, resulted in slow implementation progress. However, with the arrival of the FAO/TAO team experts, implementation speed and quality improved due to PCU staff training and the recruitment of capable financial management and M&E staff. The reorganization plan prepared by PCU in response to the OIE self-evaluation exercise provided a major impetus to improve not only the quality of project implementation but also the management of

ongoing DLS programs. This included improved coordination between DLS, the FDIL, and SMS Gateway information flows, supported by the newly established Epidemiology Unit and the computerized LDIS network. The commitment by DLS to internalize the budgets associated with these new activities will ensure sustainability. Although late in arrival, the FAO/TAS team performed progressively well and has provided broad-based support to the PCU and DLS.

- **Monitoring and Evaluation.** A comprehensive Management Information System (MIS) and Monitoring and Evaluation (M&E) capacity was not set up until after the arrival of the FAO/TAS Team in October 2010. Although this design worked well during the remaining project life, the delay significantly hampered the project team's response to intervene in implementation problems. Once the M&E design was in place, however, the Team within a space of two years implemented the M&E (financial management and reporting, program reporting, Quarterly Progress Reports) to compile data on BPMC, FDIL renovations, SMS Gateway and compliment the baseline survey. This sub-component provided financial and technical support for an international M&E expert¹⁶ responsible for the internal monitoring and evaluation of AIPRP and for periodic independent evaluation. A contracted external M&E firm collected data from 17 districts in six divisions to produce a KAP survey on training and public awareness, and completed baseline and impact assessment reports published in August 2012. The utilization of the M&E system contributed to improved identification of problems; especially of lagging farm biosecurity and farm monitoring; a principal factor in the continuing avian flu outbreaks.

2.3 Safeguards and Fiduciary Compliance

2.3.1 Environmental Safeguard. Considering the nature and magnitude of environmental impacts of the activities financed under the project, AIPRP was classified as category 'B' project and only the World Bank Policy on Environmental Assessment (OP/BP 4.01) has been triggered. An Environmental Management Plan (EMP) was prepared to address potentially adverse environmental impacts and guide project implementation, especially regarding safe culling, safe disposal of carcasses and biosafety at FDILs, and biosecurity at LBMs and the pilot BPMC facilities. A Bio-safety consultant hired by FAO worked closely with the project team for a certain period. The July to December 2012¹⁷ review of existing environmental safeguard and biosafety of the above facilities indicates that structural and operational biosecurity improved substantially after project intervention. Yet, there remains room for improvement, particularly of dead bird disposal practices at the LBMs, and biosafety practices in the FDILs, e.g., scientific disposal of postmortem and laboratory wastes, personal and

¹⁶ The M&E expert arrived three years following the request by GoB for long-term FAO assistance, after which time a baseline was prepared, and PCU implementation capacity and M&E began to improve.

¹⁷ A National Consultant on Environment and Biosecurity was engaged by the FAO/TAS team to Review existing environmental safeguard and biosafety of FDILs, Live Bird Market and demonstration and adapter farms (linked to the nine pilot BPMC) in July 2012.

laboratory hygiene practices. The compliance to environmental assessment was rated *Moderately Satisfactory*.

2.3.2 Fiduciary Compliance. At appraisal, Financial Management (FM) risk was rated *Substantial*, with mitigation measures in place that made the residual risk as *Modest*. A unique control framework, very specific to this project, outlining major expenditure eligibility and indicators of fraud, corruption, collusion, and coercion was agreed at project startup, which contributed to bring down the risk from S to M. In addition, operational guidelines for accessing to the compensation fund were developed. FM supervision reports indicate whether due procedures outlined in the Compensation Payment Guidelines were followed for payments made at various levels. To ensure appropriate controls in poultry culling and use of the compensation fund, project activities include extensive training, workshops, awareness programs, and oversight. Given initially low capacity for financial management within the PCU, the project assisted in building the necessary capacity from the beginning, which led to a *Satisfactory* rating for financial management. Project Audit reports were timely with major issues. The project has maintained the timeline for submission of financial reports which were reviewed in a timely manner.

The overall rating for borrower procurement is “Moderately Unsatisfactory” which is mainly contributed by weak procurement capacity of DLS and consistent delays in processing procurement activities, particularly in case of civil works and equipment for laboratories. There were regular Procurement Post Reviews (PPR) of this project. In FY12 PPR, three contracts amounting to \$320,902 were found with significant deviations and are being considered for mis-procurement. The major deviations were accepting inferior quality goods by DLS compared to contract specifications, and not conducting proper due diligence by the Tender Evaluation Committee. After the FY12 PPR, a set of mitigation / improvement measures have been agreed between the Bank and DLS. The implementing agency took proactive actions on some of these measures including debarment of concerned suppliers, removal of Project Director, etc. However, in FY13 PPR a couple of contracts with major deviations were found which need further investigation. It is to be noted that all these contracts were signed before finalization and sharing of the FY12 PPR report to DLS and hence the improvement measures were not applicable to these contracts.

2.4 Post-completion Operation/Next Phase

2.4.1 At EOP, evidence indicates animal and public health services capacities to contain HPAI outbreaks have become increasingly effective, technical and scientific support have been enhanced and surveillance strengthened. Even though outbreaks continue, they are quickly contained and diminishing in their occurrence pattern. However, with 1.5 percent of the poultry population estimated to be sero-positive,¹⁸ the risk that HPAI outbreaks

¹⁸ Information provided by the CVO during a meeting with the ICR team. A simple compartmental Susceptible-Infectious (SI) model was used to analyze HPAI transmission in Bangladesh using the actual outbreak data (2007-12). Results show an equilibrium prevalence rate of 1.46% (+ or - 0.05%) for the

may increase again cannot be ruled out. In addition, other emerging and re-emerging transboundary zoonotic diseases might pose a threat in the future. In a post-completion report prepared by DLS and FAO/TAS, the need to sustain reforms and institutional capacity developed by the project is presented, based on the platform from which surveillance, diagnosis, and communication can be further strengthened. MOFL needs to (i) complete the reorganization of DLS and streamline the disease information exchange between BLRI, the FDILs, and DLS;¹⁹ (ii) internalize and expand the operation of the SMS Gateway surveillance system and the LDIS to include all livestock species;²⁰ (iii) build further diagnostic laboratory capacity to cover other priority livestock and zoonotic diseases; (iv) build risk-based epidemiology capacity within the newly established Epidemiology Unit (EpiU); (v) and ensure that all nine pilot BPMCs reach full functionality and greatly expand their geographical scope. Public awareness for the BPMCs should continue through PPP arrangements with commercial poultry industry players, who would support part of the cost.

2.4.2 Awareness is increasing of the need to link HPAI and all animal-borne diseases with the human and environment interface. Preliminary discussions concerning the feasibility of a One Health operation in Bangladesh have been initiated. It is apparent in Bangladesh that ancient diseases (anthrax, TB, rabies), newly emerging zoonotic disease incidence (Nipah encephalitis), and economically important transboundary livestock diseases (*Peste des Petits Ruminants*, Foot and Mouth Disease, New Castle Disease) are increasing. The demand-driven, tripartite, inter-ministerial (MOFL, MOI and MOHFW) collaboration, fostered under AIPRP, the strengthened BLRI, and the SMS Gateway surveillance system all provide the necessary requirements for a solid platform to launch such a One Health initiative.

3. Assessment of Outcomes

3.1 Relevance of Project Objectives, Design, and Implementation

The PDO, project design, and implementation of AIPRP were highly relevant and in harmony with the 2006-2009 and 2011-2014 CAS supporting activities relevant to the HPAI threat, such as public-private partnerships and financial sustainability in setting up the integrate biosecure poultry marketing chains, strengthening public health through addressing the HPAI threat, and strengthening risk mitigation in a country prone to natural and health-related disasters. When avian influenza struck Bangladesh in early 2007, the veterinary services system was clearly unprepared to act as first responder. The DLS was chronically understaffed and underfunded, and with the exception of BLRI, the country had no human or physical capacity to rapidly and accurately diagnose and characterize the disease. Surveillance was passive and sporadic, and field mobility limited. There were no agencies to adequately carry out public awareness, and inter-agency technical communications and disease data sharing within MOFL and between

scenario where time from reporting to culling is 1.5 days coupled with delayed restocking of 90 days (Annex 3). This agrees with the estimated 1.5% HPAI sero-positive status estimated by the DLS survey.

¹⁹ See Annex 2 for details.

²⁰ DLS/CVO indicated that plans were underway in December 2012 to absorb the SMS Gateway workers into the system for a period of up to six months following end of project.

MOFL and MOH were rudimentary. There was very little coordination between poultry sector organizations and the government, while weak poultry farm biosecurity prevailed. The project design addressed all of these deficiencies, based on the NAIP policy document that governed GoB's institutional and technical activities, in line with FAO, WHO, OIE guidelines, and the GPAI framework.

3.2 Achievement of Project Development Objectives

3.2.1 The achievement of the PDO was *Moderately Satisfactory*, based on the achievement of the three key PDO indicators (1a, 1b, and 2 in the Results Framework) and a majority of the listed 23 intermediate outcome indicators; though weak farm biosecurity persists, the epidemiological impacts of wild migratory birds are ignored and the country is rated as HPAI endemic. Project implementation to achieve PDO was shared among too many agencies complicating assessment and attribution of success. In some cases, e.g., the SMS Gateway system, the project took over from other agencies. The Key Performance Indicators were threefold:

3.2.2 **(i) Evidence of improved effectiveness of animal and public health services to an HPAI outbreak and/or pandemic; National Plan prepared and accepted by FAO, WHO and OIE. Final Status:** Operational Manuals were prepared in conformity with FAO and OIE guidelines to provide implementation support. Evidence of key outcomes in support of this achievement include: improved diagnostic laboratory capacity to diagnose HPAI; greatly expanded active surveillance in all high-risk areas; improved public awareness of consumer protection against avian flu; and the onset of an integrated approach to biosecurity along the poultry marketing chain.

3.2.3 **(ii) Evidence of improved effectiveness of animal and public health services to an HPAI outbreak and/or pandemic; contained and diminishing pattern of HPAI infection in poultry. Final Status:** Evidence on the ground suggests that animal/public health services to contain HPAI outbreaks are being effective, as measured by significant reductions in the number of outbreaks (21 outbreaks in 2012, the lowest since 2007) and in outbreak-to-reporting-to-culling times (reduced from 4.8 days to 1.4 days), improved pandemic preparedness in terms of isolation capacity at hospital and public facilities, the monitoring of respiratory disease, and the implementation of joint medical-veterinary containment campaigns to confine outbreaks (tested during the 2009 H1N1 pandemic). Although outbreaks continue, they have not surpassed the 2008 peak and are now rapidly contained. No human fatalities have occurred, although six human cases have been identified. Public awareness is high; 96 percent of consumers surveyed knew how to protect themselves against avian flu (KAP survey 2010).

3.2.4 **(iii) Development of the NAIP to provide the institutional and logistic framework for countering the avian flu threat. Final Status:** The NAIP was revised and updated to 2016 by the country's animal and human health services. It conforms to international guidelines, was formally approved by GoB, and became the policy used to handle the avian flu crisis.

3.3 Efficiency

3.3.1 Although not required for an emergency project, the Technical Annex has included a financial and economic analysis. The economic analysis at appraisal, using a Gross Attack Rate (GAR) scenarios model (0.7 percent of the poultry population being affected), projected the impact of HPAI to range from losses of US\$154 million or 0.3 percent of GDP to US\$1.2 billion in the case of both severe human and poultry pandemic (more than 2 percent of Bangladesh's GDP). Between inception in 2007 and EoP in 2012, 2.58 million poultry or 1.7 percent of the poultry population were affected by the disease (died or culled) – a worse scenario than that at appraisal which would have led to higher economic losses at EoP.

3.3.2 Data available during project implementation—especially the outbreak data collected by FAO/ECTAD in Bangladesh—enabled EoP analysis of the magnitude of the economic losses (costs of the disease) and losses avoided as a result of the intervention (benefits). The analysis models the project's economic contribution as flowing from its contribution to a reduction of the prevalence rate of the disease (days of infectiousness). As a result of this reduction, fewer birds become ill, less mortality occurs and less culling is required. In addition, risks to human health and other benefits arise, but are not quantified and are excluded from the analysis. The reduction in the costs to the economy of the disease with the project (which may still be substantial) compared to the costs of the project is the relevant measure of project worth.

3.3.3 It is impossible to know with any certainty the stream of economic damages from the disease in the without project situation. For the purposes of analysis, a stochastic model was used to estimate the average cost of disease based on the average of 5,000 possible pathways of the disease over the six years (2007-2012) with the pre-project prevalence rate (30.8%) as the starting point. The model's average estimated the cost of the disease at US\$347 million. The project substantially contributed to reducing the prevalence rate of the disease from 30.8% (given 5 days of infectiousness at project inception) to 11.7% (given only 1.5 days of infectiousness at EoP). Based on this reduction in prevalence of the disease, the stochastic model's average estimate of the costs of the disease over the same period fell from US\$347 million to US\$17 million. This reduction in prevalence as a result of the intervention from the project and other development partners, saved Bangladesh US\$330 million which would have been incurred had the higher pre-intervention level of prevalence prevailed. Less total intervention costs of US\$34.5²¹ million, of which \$12.3 million came from the project, the net present value of the intervention is estimated at US\$295.5 million, of which all

²¹ Numerous agencies and development partners contributed money and materials to support various complimentary aspects of the fight against the disease in Bangladesh culminating in the reduction of its prevalence. Specifically, AsDB contributed US\$0.5 million, UNICEF US\$0.5, JICA US\$1.0, DANIDA US\$0.2 and USAID US\$20 million making a total of US\$22.5 million in addition to direct project costs of US\$12.3 million made up of IDA loan US\$9.91, AHITF US\$1.17 and GoB US\$1.25. In some cases, e.g. the SMS Gateway, the project took over activities from other agencies.

things being equal, about US\$105.5 million can be attributed to the project, given that its contribution represents 35.7% of the total cost of the intervention.

3.3.4 Additionally, it has to be considered that the investment has also, *inter alia*, resulted in substantial improvements in surveillance and diagnostic capacities, assisted the country to respond in timely manner to the 2009 H1N1 pandemic, forged inter-ministerial collaboration and created a platform for responding to other emerging diseases. Overall, efficiency is rated as *Satisfactory*.

3.4 Justification of Overall Outcome Rating

3.4.1 PDO Rating: *Moderately Satisfactory*. The project objectives were relevant. However, the design was too complex with too many indicators for a small ERL project given the limited capacity available in Bangladesh at its inception. The design also failed to explicitly involve the DOF as an implementing agency concerned with wild bird monitoring/surveillance. Nevertheless, project economic efficiency was satisfactory and substantial progress made in building institutional technical and human resource capacity, as evidenced by (i) a shift from passive to real-time active surveillance by the SMS Gateway surveillance system which now covers 62 percent of *upazilas*,²² (ii) enhanced diagnostic capacity at BLRI²³ and FDILs in diagnosing HPAI; (iii) 90 percent public awareness and understanding of protection against avian flu; (iv) greatly improved managerial and technical capacity of DLS, which will be further enhanced by its planned reorganization; and (v) a commitment by MOFL to internalize sustainable budgets to support the incremental capacity built. However, persisting weak farm biosecurity and the failure of GoB, through DoF, to deal with wild migratory birds contributed to HPAI endemicity and is a source of concern.

3.5 Overarching Themes, Other Outcomes, and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

3.5.1 Controlling HPAI at source in poultry has the expected outcome of mitigating some of the socioeconomic impacts that would otherwise occur. In Bangladesh, poultry is a source of livelihood and first point/step for investing in livestock for millions of poor households, many of which are female-headed. At the commercial level, one million farm workers are employed. By contributing significantly to the reduction of outbreaks, the project has improved livelihoods, protecting investment and labor opportunities of poor and non-poor workers. The compensation scheme was also pro-poor and equitable in paying equal rates for commercial and indigenous poultry.

(b) Institutional Change/Strengthening

3.5.2 The reorganization of DLS into a more functionally capable institutional entity, the inclusion of a new epidemiology unit, the modernization and expansion of its disease surveillance network and the upgrading of its veterinary laboratory system have been very significant capacity building initiatives that will render DLS more capable to address

²² Not all *upazilas* contain poultry and are therefore not being monitored. All of the high-risk *upazilas*, together with *upazilas* holding large poultry populations, are being monitored.

²³ See Annex 2a for a summary of project improvements at NRL-AI in BLRI, 2007-12.

national animal and zoonotic disease emergencies. The internalization of budgets to cover enhanced institutional strengthening will ensure sustained capacity by DLS to address HPAI and other priority diseases. The reorganization of DLS in accordance with the OIE assessment report will contribute greatly to improved first responder capacity and the control of other livestock diseases that hamper efficient production.

(c) Other Unintended Outcomes and Impacts (positive or negative)

None reported.

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

3.6.1 A mid-term and end-of-project KAP beneficiary surveys were conducted in 2010 and 2012, which reported the following key findings:

- Overall general awareness of HPAI was high (90 percent)
- For farmers, their sources of knowledge on HPAI were TV (35.1 percent), veterinary services (28.6 percent), medical representative (7.8 percent), local market (5.2 percent), radio, drug seller, neighbor/friend (3.9 percent each), poster and local leader (2.6 percent each), and other sources (6.5 percent)
- 90 percent of surveyed commercial poultry farmers are aware of good biosecurity practices
- 65 percent of targeted people handling poultry products (processors) are aware of hazards associated with HPAI
- 70 percent of backyard poultry holders are aware of recommended biosecurity practices
- 96 percent of surveyed consumers of poultry products are aware of hazard associated with HPAI (KAP 2010)

4. Assessment of Risk to Development Outcome

4.1 Rating: *High*

The risk of a pandemic attack threat that might result in a massive loss of human life under a worst-case scenario was estimated as *High* at Appraisal, based on 663,000 human fatalities (1 percent of the population) resulting from a Gross Attack Rate (GAR) by end of project, and a 10 percent loss of national poultry inventory. Although the actual data by EoP, based on surveillance and compensation results and humans affected, stood at 1 percent GAR for poultry and zero percent for human fatalities, the fact that HPAI is now endemic in the country warrants serious consideration to launch a follow up project. Even though the capacity to address outbreaks has vastly improved, poultry farm biosecurity remains the weak link in containing outbreaks, and the internalization of surveillance, continued public awareness, and further upgrading of laboratory diagnosis remain essential. Given the continuing outbreaks and the declared endemicity of HPAI in the country, the risk to development outcome must continue to be rated as *High*.

5. Assessment of Bank and Borrower Performance

Although designed as an emergency operation the project design was overly ambitious and did not take into sufficient account the limited technical and managerial implementation capacity of DLS. Implementation quality was further impacted by the delayed technical assistance by FAO and the belated recognition that biosecurity along

the poultry market chain was a main constraint in overcoming the continuing HPAI outbreaks. These factors contributed to the MS ratings for overall Bank and Borrower performance.

5.1 Bank Performance

(a) Bank Performance in Ensuring Quality at Entry

Rating: *Moderately Unsatisfactory*

5.1.1 The project design followed the GPAI template and the Bank task team incorporated lessons from other HPAI projects, identified and addressed key risks associated with implementation especially developing sound fiduciary, financial management and procurement structures. The team also elicited strong government commitment and leadership, provided for implementation support from a FAO/TAS team to address weaknesses in capacity among DLS and PCU staff, and coordinated donor-supported inputs. However, the Bank should have insured that the project design for emergency operations is simple and easy to implement, which was not in line with the objectives of the implementation of emergency operation under OP/BP 8.50, and the GPAI template format which was designed to simplify project design and thereby speed implementation. The complexity of the numerous sub-components and the long period between the concept note and appraisal and approval do not fit the scope of an emergency operation. In this respect, the Bank's performance is rated as *Moderately Unsatisfactory*.

(b) Quality of Supervision

Rating: *Moderately Satisfactory*

The Bank team was committed and made significant efforts in providing day-to-day support to DLS and PCU staff pending the arrival of the FOA/TAS team. The Bank team strongly reminded the GoB to complete the revision and approval of its Development Project Performa (DPP) and to meet its other project commitments. The team also mounted timely implementation support missions, including the MTR. Although the MTR restructured the Financial Agreement of the project and introduced the BPMC concept to tackle biosecurity, supervision failed to ensure full restructuring at MTR given the scope of the impacts of the reduction in the project activities on some of its major components. Bank supervision of environmental safeguard, financial management, procurement and fiduciary compliance were equally satisfactory. With regard to procurement which was one of the most critical weaknesses of the implementing agency, regular post-procurement reviews were carried out and specific recommendations made which have largely contributed to improving overall procurement management performance (see section 2.3). Related to the non-participation of DOF in wild bird monitoring, the Bank team should have worked out an alternative option to ensure that this activity was effectively implemented. Based on the above, quality of supervision is rated as *Moderately Satisfactory*.

(c) Justification of Rating for Overall Bank Performance

Rating: *Moderately Satisfactory*

Based on the *Moderately Unsatisfactory* rating of Quality at Entry, a *Moderately Satisfactory* rating for Quality of Supervision and a project outcome rating of *Moderately Satisfactory*, overall Bank performance was rated *Moderately Satisfactory*. An overall

rating of Moderately Unsatisfactory for Bank performance is plausible given that Quality at Entry was Moderately Unsatisfactory and contributes to the weighting. However, the Bank team did provide satisfactory support in a pragmatic and responsive manner for project implementation and review, and consultant quality, especially during the project implementation period prior to the arrival of the FAO/TAS Team. The Bank team overcame significant challenges to turn around flagged implementation delays and guide the project to achieve its PDOs with a *Moderately Satisfactory* rating. These weigh in favor of an overall rating of *Moderately Satisfactory* for Bank performance.

5.2 Borrower Performance

(a) Government Performance

5.2.1 Rating: *Moderately Satisfactory*. There was some evidence of commitment by GoB to implement the project as an emergency operation e.g. approval of the transfer of 105 AVSs before the approval of the second RDPP, which is usually not allowed in non-emergency projects; a positive response to the adjustment of AIPRP plan to include the BPMC and lobbying DLS and other Government authorities to support it and to make it a success. However, slow procurement due to the lengthy bureaucratic process in obtaining multiple-level government clearances delayed implementation. The DLS procurement team began operating more effectively following staff training and the contracting of capable procurement officers. Nonetheless, more effort on the side of GoB was needed to implement the project as an emergency operation, as intended under the implementation arrangements of the Bank's OP/BP8.50. The delays in signing agreements with DMC resulted in significant delays in implementing Component II, even though excellent progress was made after signing. The cancellation of IDA \$4m in project activities during the MTR review was initiated by GoB (see para. 2.2.2.). Some of these were the result of duplication by other donors; others the result of less than anticipated requirements in outbreak containment and biosecurity, which in retrospect of emerging needs, should not have been reduced.

(b) Implementing Agency or Agencies Performance

5.2.2 Rating: *Moderately Satisfactory*. The initial rating of the implementing agency - PCU under DLS - was overall *Unsatisfactory* with procurement rated as *Moderately Unsatisfactory*. This might have been as a result of its very low initial human resource capacity, which only improved to *Moderately Satisfactory* following the arrival of the FAO/TAS Team. Although the signing of the FAO Agreement to field a technical assistance team to support DLS was seriously delayed, its performance contributed greatly to the technical and managerial capacity, not only of the PCU but also of DLS. Original signing was scheduled for March 31, 2009, but the TAS team did not arrive until October 2010, 18 months after the scheduled arrival date. Although the performance of the TAS team, once in the field, was rated *Satisfactory*, the delay by FAO headquarters in organizing and fielding the Team was only *Moderately Satisfactory*. The three ratings for PCU/DLS, FAO/TAS and FAO Headquarters combined, form the rationale for the overall MS rating of the implementing agencies.

(c) Justification of Rating for Overall Borrower Performance

5.2.3 Rating: *Moderately Satisfactory*. Although capacity to respond to HPAI outbreaks have been very significantly strengthened, the performances of both the Government and the Implementation Agency (FAO) were both *Moderately Satisfactory* justifying an overall rating of *Moderately Satisfactory*.

6. Lessons Learned

6.1 *Project-specific:*

- The project design and scope should have been simpler by better balancing technical content against the limited local implementation capacity and tailoring the design accordingly. There were too many complex indicators which overburdened this relatively small project.
- Bank and Borrower implementation performance could have been substantially improved by a simpler project design, earlier institution of better M&E quality, better cognizance of matching project funds and activities to already ongoing donor activities, quicker government action to recruit partner organization, if necessary for project implementation, and speedy internalization of incremental budgets associated with upgraded avian flu containment activities.
- In particular and relating to Bank and donors' approaches to emergency projects, it would be helpful during design and in spite of associated pressures to streamline and channel financing in ways that complement rather than duplicate each other's effort. Care should be taken to explicitly include all relevant agencies as implementing partners. The case of DOF opting out of wild bird monitoring despite the importance of the exercise is in focus here.
- Inadequate poultry farm biosecurity is the paramount constraint in containing avian influenza in Bangladesh, which should have been recognized during project preparation. The PPP arrangements employed to include private sector poultry organizations (farms) and involved municipalities (LBMs) as major participants were instrumental in achieving broad cooperation.
- Public awareness messaging is expensive and should be shifted from sole government financing to PPP arrangements with private sector business stakeholders, under which the costs of circulating messages is borne as part of the goodwill advertising by businesses (i.e., poultry feed and drug companies, breeder farms and hatcheries).
- Risk-based epidemiology capacity should be developed quickly, so that the costs of disease control strategies becomes focused on the least-cost analysis of high-risk areas, thereby limiting human physical resource costs whilst making interventions more effective and sustainable.
- Speeding up procurement in HPAI emergency operations implemented under GAIP needs full readiness for implementation prior to negotiation, greater Borrower cooperation, and more intensive PCU training.

6.2 *General:*

- Limit the "sticker shock" of incremental operating and maintenance costs from upgraded laboratory and surveillance systems by a gradual, proportional shift

- from project to government funding during the project's lifespan, leading to full government financing by end of project.
- Emergency operations must be implemented as such. Avian flu is a rapidly spreading infection; a slow response will increase the risk of endemicity.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies

(Awaiting Borrower's Comments on ICR)

(b) Co-Financiers

There were no co-financiers.

(c) Other partners and stakeholders

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent)

Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
1. Animal Health	9.826	8.603	87.55%
2. Public Awareness and Information	1.468	0.312	21.25%
3. Implementation Support, Monitoring & Evaluation	1.372	1.314	95.77%
Total Baseline Cost	12.666	10.229	80.76%
Physical Contingencies	0.507	0	
Price Contingencies	0.380	0	
Total Project Costs	13.553	0	
Front-end fee PPF			
Front-end fee IBRD			
Total Financing Required	13.553	10.229	75.47%

(b) Financing

Source of Funds	Effective- Closing Dates	Appraisal Estimate (USD millions)	Revised Estimate (USD millions)	Disbursed/ Committed at EoP (USD millions)	Percentage of Appraisal
Avian and Human Influenza Trust Fund (AHITF)	Oct. 16, 2007 – June 30, 2011	2.00	1.17	1.17	100 percent
Government of Bangladesh – GoB	March 2007 – June 30, 2013	2.00	1.50	1.25	62.5 percent
International Development Association (IDA)	Oct. 16, 2007 – Dec. 31, 2012	16.00	12.17	9.91	61.9 percent
Total		20.00	14.84	12.33	61.6 percent

*Due to exchange rate fluctuations (SDR vs. US\$) figure might slightly change.

Annex 2. Outputs by Component

Project Outputs	Output Indicators (as per the Project Appraisal Document)	Actual Outputs
Component I: Animal Health		
Component I.A: Define a national policy framework and a national strategy	National AI Strategy Plan (NAIP) adopted by the government and updated periodically	National AI Strategy Plan (NAIP) adopted, published, updated, and fully operational
Operational Manual for the Plan and conform with FAO/OIE and GPAI guidelines	Operational Manual completed and in conformation	Approved in October 2009 and operational; conforms to FAO, WHO and OIE guidelines. Distributed to all 7 FDILs, BLRI and NRA-AI laboratories
Develop a risk communication strategy	Risk communication strategy approved and adopted by Government	Risk communication strategy updated for 2009-11, incorporated into the NAIP, and supported by risk management training
Develop a compensation strategy and operational guidelines	Compensation strategy and operational guidelines developed and operationalized	Compensation strategy published and updated in June 2008, and in January and April 2011 to adjust compensation rates to prevailing market prices. 822 claimants compensated to the amount of \$3.88 million-equivalent
Component I.B: Strengthen animal disease surveillance and diagnostic capacity	Number of <i>upazilas</i> under surveillance and diagnostic capacity functional	SMS Gateway surveillance system operation in 306 <i>upazilas</i> ; 7 FDILs renovated and functional; 2 new FDILs in Jessore and Chittagong yet to reach full functionality; BLRI now runs BSL-2 facilities at international standards
Assess the status of veterinary services	Assessment completed and reorganization plan prepared	Assessment completed by OIE in October 2011 and reorganization plan prepared by DLS
Deliver laboratory equipment and other materials	Laboratory equipment and materials are procured, distributed and installed	Equipment delivered to all 7 FDILs upon completion of renovations in June 2011 and to NRL-AI and BLRI by end-2011. Delivery to Jessore and Chittagong FDILs delayed
Update Operational Laboratory Manual	Updated and operationalized	Manual was updated in 2009 and 2011, distributed to all FDILs, and is fully operational
Train laboratory staff in HPAI diagnosis and surveillance	Number of staff trained in surveillance and diagnostic methods	23,984 farmers and 480 NGO workers attended workshops on avian flu control and surveillance; 1,040 TOTs were trained to conduct various trainings; and 2,710 field and laboratory staff

		were trained in AI diagnosis and personal safety. ²⁴ The FDIL staffing rate improved from 30 percent at onset to 70 percent for Scientific Officers; 57 percent for lab technicians; 70 percent for lab attendants. 63 percent achieved
Reduce reaction time from HPAI outbreak to culling	Reaction time of suspected cases of HPAI is reduced to the minimally acceptable levels	Reporting time from diagnosis of outbreak to culling reduced from 4.8 days to 1.4 days, reduced by 243 percent below target
Ensure regular monitoring coverage in high-risk areas.	Number of high-risk areas monitored regularly	Monthly monitoring in all 306 high-risk <i>upazilas</i> , with immediate monitoring by 1,006 workers, with outbreak reports submitted electronically to the Epidemiology Unit via the DMS Gateway surveillance system. 100 percent achieved
Component II: Public Awareness and Information (PAI)		
Develop public information practices for control and eradication of HPAI among key target groups.	Number of trainings and delivery of risk communication information delivered	11,688 DLS staff, media personnel and educational institutional staff trained. ²⁵ Materials distributed: 10 billboards, 100 banners, 10,000 leaflets, 300,000 booklets, 2,000 flipcharts, and 3 videos. 100 percent achieved
Operationalize national communication strategy for pandemic influenza operationalized	National communication strategy operationalized	UNICEF supported by JICA prepared the strategy and action plan in December 2007, based on a KAP survey, and revised it in September 2010 based on a second KAP survey. 100 percent achieved
Target commercial poultry farmers to adopt biosecurity practices	100 percent of targeted commercial poultry farmers to be targeted by EoP	70 percent of commercial farmers adapt recommended practices. 70 percent achieved
Target backyard poultry farmers to adopt biosecurity practices	80 percent of targeted backyard poultry farmers adopt recommended practices	70 percent of backyard poultry holders adapt recommended practices. 88 percent achieved
Target consumers and processors with awareness of hazards associated with HPAI	80 percent of targeted people handling poultry products are aware of hazards associated with HPAI	65 percent of targeted people handling poultry products are aware of hazards associated with HPAI. 81 percent achieved
Target consumer awareness of	80 percent of targeted consumers	96 percent of surveyed consumers

²⁴ See Table 2 in Annex 2 for further details.

²⁵ See Table 3 in Annex 2 for details.

poultry products associated with HPAI	of poultry products are aware of hazard associated with HPAI	of poultry products are aware of hazard associated with HPAI (KAP 2010). >100 percent achieved
Target journalists' awareness of good practices for reporting on HPAI	80 percent of targeted journalists are aware of good practices in reporting HPAI	600 of targeted journalists, trained in December 2007, are fully aware of the good practices for reporting on HPAI. 100 percent achieved
Ensure that media outlets can produce quality reports on HPAI	50 percent of targeted outlets produce quality HPAI reports	100 percent achieved
Component III: Implementation Support and Monitoring & Evaluation		
Component III.A: Ensure that coordination and project implementation activities are carried out as planned.	Evidence of timely and satisfactory progress toward delivery of Component III.A outputs, including the above indicators: Program reports, financial monitoring, procurement and disbursement reports, audits, management and financial reports prepared and submitted periodically	The Bank's June 2012 ISM acknowledged the satisfactory performance of the financial management and reports; program reports and preparation and submission of the Quarterly Progress Reports was rated Satisfactory.
Component III.B: Coordination and management of timely M&E activities carried out in a professional manner, as planned	M&E is carried out in a timely and quality manner	Lack of timely prepared baseline and late onset of M&E hampered its quality and timeliness. Quality of final M&E format and implementation was satisfactory
Define and implement M&E methodology, and develop baseline data	M&E methodology and baseline defined and implemented	FAO-TAS M&E Survey compiled data on BPMC, FDIL renovations, SMS Gateway to compliment baseline survey. The contracted external M&E collected data from 17 districts in six divisions and produced KAP Survey on training. Baseline and Impact Assessment reports completed in August 2012.

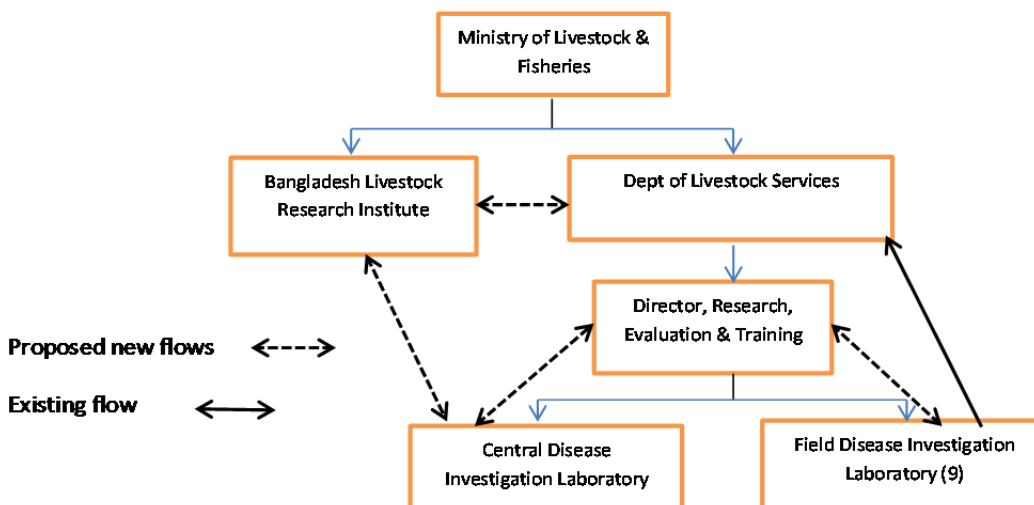
Component I - Animal Health

1. **Component I Animal Health** This component strengthened the legal framework to address avian influenza by revising the NAIP; strengthened disease surveillance by intensive training and supporting the SMS Gateway active surveillance system; renovated seven diagnostic laboratories and constructed two new ones; and provided equipment to the CDIL-NAI. The component also supported the establishment of nine biosecure marketing poultry chains, and established a contingency fund to cover compensation, PPE, and the financing of unforeseen events. FAO was contracted to provide technical assistance to DLS.

2. **Subcomponent I.A - Enhancing Prevention and Preparedness Capability.** The 2006-2008 National Avian Influenza Control Plan (NAIP) was adopted and published, and was updated to cover the period 2009-2016 to reflect new priorities related

to strengthening surveillance, increase awareness and risk communication training, focusing on backyard poultry, improving farm biosecurity, and supporting applied research into avian influenza, and strengthening the operations of BLRI and its National Avian Influenza Reference Laboratory. The OIE completed its review of national veterinary services in October 2011. Based on the review, DLS prepared a reorganization plan that would (i) internalize budget to support the upgraded surveillance provided by the SMS Gateway System; (ii) expand the Livestock Disease System to monitor all livestock species; (iii) support the newly established epidemiology unit; (iv) support the full staffing, training and operations of the renovated FDILs; (iv) and streamline disease information flows between the FDILs, BLRI, CDIL, and DLS. Under the reorganization, the existing Director of Research, Evaluation and Training in charge of CDIL and the FDILs would be replaced by a Director of Disease Investigation and Epidemiology (DDIE). The DDIE will oversee three entities: (i) the Central Disease Investigation Laboratory (CDIL) and its divisions; (ii) the FDILs; and (iii) the new Epidemiology Unit. The proposed reorganization (Table 1) would greatly improve the disease information flow, disease investigation, and diagnostic services.

Table 1 - MOFL Organogram with Existing and Proposed Information Flows



3. Subcomponent I.B - Strengthening Disease Surveillance and Diagnostic Capacity. Legislation was passed to strengthen the veterinary services framework. The animal health information flow was improved in several ways; (i) a reduction of outbreak detection to culling time from 4.8 days to 1.4 days; (ii) commercial poultry farms across the country, including their poultry inventories, were registered and geo-positioned, which allows for the rapid identification of infected farms; (iii) the 306 high-risk *upazilas* receive priority monitoring by 1,006 SMS Gateway workers; and (iv) inter-agency meetings on the technical aspects of the status of HPAI, chaired by the Chief Veterinary Officer, the PCU, FAO/TAS team, and participating donors, have improved; and (v) community-based surveillance was established, linked to the SMS Gateway system.

4. **Surveillance.** The SMS Gateway system provides real-time avian flu outbreak information via cellphones from GPS-located farms by electronic transmission to the Epidemiology Unit (EpiU). The system has reduced outbreak response time between reporting and culling from 4.8 to 1.4 days. Over 86 percent of outbreaks are now covered by the SMS Gateway, compared to 14 percent passively reported cases by farmers. The system needs to more closely monitor backyard poultry farms, since the 88 percent of all outbreaks reported on commercial farms may signal a lack of accurate information from the more difficult to monitor non-commercial (backyard) farms and household flocks. A total of 21,888 poultry farmers, animal health workers, and veterinary staff involved at the supervisory and field investigation levels of surveillance were trained. Details of specific training and workshops are presented in Table 2.

Training Category	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	Total Participants	Duration (days)	Total Person days
Regional Surveillance Workshop	-	-	-	612	-	-	612	1	612
Workshop with Chokidar and Dofadar	-	-	-	7,149	2,400	-	9,549	1	9,549
Workshop with female Ansar VDP	-	-	-	7,140	2,400	-	9,540	1	9,540
Preparatory/ Refresher's training for VO/AVS	-	-	-	102	-	67	169	2	338
Preparatory/ Refresher's training for AIWs	-	-	-	1,015	-	1,003	2,018	1	2,018
Total	-	-	-	16,018	4,800	1,070	21,888		22,057

5. **Laboratory Capacity.** The diagnostic capacity of the veterinary diagnostic laboratory system was substantially strengthened. At project onset, FDIL staffing was only 30 percent of required level and improved to 63 percent by EoP. Further staff recruitment is in progress. Details up to EoP are presented in Table 3.

Category	Scientific Officers		Lab Technicians		Lab Attendants		Total	
	Permanent	Deputation	Permanent	Deputation	Permanent	Deputation	Permanent	Deputation
Actual	16	3	20	3	6	1	42	7
Planned	27		41		10		78	0
% achieved	70%		57%		70%		63%	

Even though the staffing rates of 70 percent for Scientific Officers and Laboratory Attendants show good progress in recruitment, the recruitment of laboratory technicians needs further improvement, as these are the workers directly involved in conducting the avian flu and other diagnostic tests.²⁶ A total of 72 FDIL, CDIL and Veterinary Hospital laboratory staff, 100 percent of permanent and deputant staff were trained in avian flu diagnostics (Table 4). However, more training will be required to ensure that FDIL technicians are familiar with at least three of the six diagnostic tests for HPAI, as recommend by OIE. Tests related to nuclear characterization will be performed at NDIL or at BLRI/NRL-AI.

²⁶ These tests are Rapid Antigen Test (RAT), Hemagglutination (HA), Hemagglutination Inhibition (HI), Agar Gel Immunodiffusion (AGID), Enzyme-Linked Immunosorbent Assay (ELISA), and Serum Neutralization (SN), of which the first three should be performed by FDIL technicians.

Table 4 - Animal Health Component I - Training and Workshops									
Training Category	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	Total Participants	Duration (days)	Total Person days
Workshops									
Lead Farmers workshop (Backyard, commercial & stakeholders)	597	11,273	6,838	5,216	-	60	23,984	1	23,984
Major NGO's involved in surveillance	-	480	-	-	-	-	480	1	480
Training									
TOTs: Culling, safe disposal, bio-containment and biosecurity	348	384	70	208	-	-	1,010	2	2,020
TOTs: Biosecurity procedures concerning HPAI	-	30	-	-	-	-	30	2	60
Field staff in personal safety procedures	-	1,890	419	30	60	239	2,638	1	2,638
Lab staff of FDILs/CDILs/District veterinary hospitals	-	-	-	-	36	-	36	4	144
Training for lab officers of FDILs/CDILs/District veterinary hospitals	-	-	-	-	36	-	36	4	144
Training for persons involved in the BPMC pilot	-	-	-	-	35	630	665	2	1,330
Study Tours									
HPAI prevention strategy in affected countries for DLS planning staff	-	-	-	7	-	-	7	14	98
HPAI prevention strategy in affected countries for PCU/DLS/MoFL	-	-	-	-	12	-	12	10	120
Total	945	14,057	7,327	5,461	179	929	28,898		31,018

6. Seven existing FDILs were renovated and two new FDILs were constructed.²⁷ Support to the national laboratories to enhance national capacity for disease diagnosis resulted in completion of the renovation and provision of supplies and equipment to the seven FDILs. Renovations of the existing FDILs were completed in May 2011, and they have attained full functionality. The delivery of HPAI-dedicated diagnostic equipment, chemicals and consumables (i.e., Rapid Test field kits) to all FDILs was conducted upon the completion of their renovations, which required a phased laboratory staff training program for each FDIL, using their own equipment, consumables and renewed facilities. Although the targeted delivery of 75 percent of emergency supplies (PPE, disinfectants and sprayers) by June 2011 was achieved, the delivery of laboratory equipment and furniture to the new FDIL laboratories under construction in Jessore and Chittagong has been delayed as a result of slow procurement. The National Reference Laboratory-Avian Influenza (NRL-AI), located at BLRI, received two BSL-3 cabinets to improve the biosafety of laboratory workers.

7. The capacity of FDILs to conduct basic HPAI tests remains confined to two HPAI tests recommended by OIE for that level of laboratory. However, the Avian Influenza Reference Laboratory under BLRI is fully capable of conducting all 12 OIE-recommended tests, and carries most of the diagnostic load. An assessment of FDIL laboratory training indicated that of the six common HPAI tests recommended by OIE, FDIL staff were able to perform the two or three tests that define the H antigen of the H5N1 virus, with BLRI/HRL-AI performing the more complicated nucleotide tests; the accuracy of which proved to be over 90 percent compatible with dual tests performed by the International Avian Influenza Reference Laboratory in Padova, Italy. Renovations, instrumentation and training have been completed at BLRI and at the seven existing FDILs, although construction of the two new FDILs (Jessore and Chittagong) was significantly delayed.²⁸

²⁷ Renovated FDILs are located in Manikgonj, Barisal, Joypuhat, Feni, Sirajgonj, Gaibandha and Sylhet. New FDILs were constructed in Jessore and Chittagong.

²⁸ Construction at FDIL Jessore was delayed as the result of heavy monsoon rains. Proposals for a new FDIL in Chittagong were received late in the project lifespan.

8. The project initially earmarked funds for DLS staff to undertake collaborative applied research into HPAI by issuing competitive grants to veterinary colleges and faculties. The PCU received at least ten proposals under the auspices of the Bangladesh Agriculture University (BAU) at Mymensingh, BLRI, DLS and Chittagong Veterinary and the Animal Science University (CVASU). However, there is no indication that this competitive grant scheme materialized during the project.

9. **Subcomponent I.C - Strengthening Control Programs and Containment Plans.** The targeting of HPAI virus elimination at source comprised the principal NAIP containment policy to contain HPAI virus, and was addressed by the establishment of rapid response teams. With initial assistance from Sweden, later continued by USAID and taken over by the project on October 2010, DLS used the SMS Gateway system for the rapid detection of outbreaks and fielding rapid response teams to cull sick and in-contact poultry. By EoP, the project supported the monitoring of 306 high-risk *upazilas*, employing 102 trained VOs and AVSs and 1,015 trained AIWs, using SMS messaging, supervised by 50 UVSs. By EoP, 550 outbreaks had been identified and contained, comprising the culling of 2.3 million poultry.²⁹ Although this system worked well, seasonal outbreaks have continued, primarily as the result of continuing weak farm biosecurity. The estimated monthly cost of full surveillance and containment amounts to \$200,000, and options to support this cost following EoP include: monitoring documented high-risk *upazilas*, whilst further strengthening poultry farm biosecurity.

10. DLS, supported by FAO/ECTAD, established twelve roadside checkpoints to monitor poultry movements across the country along with the monitoring and disinfection of live bird markets. Neither the government nor the project supported poultry vaccination, in view of the unsubstantiated results found elsewhere, and the insupportable human and physical resources required. However, as the result of heavy pressure by the poultry industry, in June 2012 the government allowed limited vaccination on selected, large-scale commercial farms using approved H5N1 vaccines in two districts, implemented without project support.

11. **Subcomponent I.D - Improving Biosecurity in Poultry Production and Trade.** The project established nine piloted biosecure poultry market chains (BPMC) in nine high-risk *upazilas*. The nine BPMCs comprise nine new LBMs, 18 broiler and layer demo farms, 324 participating poultry farmers, 90 middlemen/transporters, and 180 LBM workers; 1,260 poultry chain stakeholders were trained in biosecurity. When fully operational, an estimated 15,500 consumers will benefit from buying safe, clean poultry meat from these nine market chains. Each LBM has separate delivery, sales and slaughter areas, with one-way flows of consumers.

12. Financing was achieved through public-private partnerships between Level 2 and 3 participating lead poultry farmers, LBMs, poultry transporters, and municipal marketing committees, in which most of the LBMs are located. The project supplied matching grants for the upgrading of participating farms, program, mobilization,

²⁹ DLS and World Poultry websites, August 14, 2012.

participant training, and LBM renovations. All participants have committed themselves to purchase, transport and slaughter poultry from within each chain, and adhere to a set of regulations. An estimated 15,500 consumers will benefit from safe, hygienically prepared poultry meat supplied by the chains. A total of US\$315,000 in matching project funds was allocated for the mobilization, training, construction and supervision of the BPMC pilot. Construction work was of high quality at all locations, except the demonstration farm at Nilfamari, which was rejected. As a result, only eight of the nine BPMCs were completed and operational at EoP.

13. **Subcomponent I.E - Support for Surveillance of Migratory Birds.** Targeted surveillance and the reporting of unusual wild bird die-offs from HPAI was not implemented due to the Department of Forestry’s refusal to cooperate as it saw this task as outside its mandate. Subsequently, the US Geological Society, in coordination with FAO and the ICDDR, B, conducted a wild bird survey in 2011.

14. **Subcomponent I.F - Establish a Contingency Fund for Compensation and PPE.** Compensation paid from all sources for destroyed poultry and eggs was \$3.88 million, of which the project’s contribution was \$0.83 million, with \$3.05 million from GoB (Table 1). The project’s compensation funds were paid out over the period FY2007-2008, with GoB paying compensation paid out for the periods FY2006 and FY2008-2012.

Table 1 - Compensation paid for birds culled and eggs destroyed (\$US'000)

Type of Poultry	2007	2008	2009	2010	2011	2012	Total
Commerical layer	107.22	1,446.58	183.11	424.60	554.43	577.27	3,293.21
Broiler	10.00	1.42	1.23	-	5.33	-	17.98
Parent stock	140.12	21.40	-	-	20.83	111.12	293.47
Backyard poultry	39.70	2.29	1.24	0.06	0.06	0.03	43.38
Ducks and Geese/1	2.26	-	1.07	-	0.17	-	3.50
Eggs	21.21	148.05	2.83	25.36	27.09	1.56	226.10
Other types of poultry	1.74	0.22	0.51	-	2.11	-	4.58
Compensation for eggs	21.21	148.05	2.83	25.36	27.09	1.56	226.10
Compensation for poultry	301.04	1,471.91	187.16	424.66	582.93	688.42	3,656.12
Total compensation paid out	322.25	1,619.96	189.99	450.02	610.02	689.98	3,882.22
Total Backyard	41.96	2.29	2.31	0.06	0.23	0.03	46.88
Total Commercial	259.08	1,469.62	184.85	424.60	582.70	688.39	3,609.24
Total paid, backyd & comm	301.04	1,471.91	187.16	424.66	582.93	688.42	3,656.12
% backyd/comm	16.2%	0.2%	1.2%	0.0%	0.0%	0.0%	1.3%

15. The number of poultry culled and eggs destroyed is detailed in Table 2, and reflects the number of outbreaks on commercial poultry farms versus the number of backyard flocks culled. Over the period 2007 to 2012, over 80 percent of avian flu outbreaks were reported on commercial farms.

Table 2 - Number of birds culled and eggs destroyed

Type of Poultry	2007	2008	2009	2010	2011	2012	Total
Commercial layer	88,741	1,360,884	53,557	174,966	322,534	336,703	2,337,385
Broiler	10,132	1,434	1,165	-	4,375	-	17,106
Parent stock	126,927	19,389	-	-	6,840	36,481	189,637
Backyard poultry	21,722	4,131	2,097	108	113	70	28,241
Ducks and Geese/1	2,749	9	883	11	142	-	3,794
Eggs	278,542	1,944,238	37,149	333,105	355,705	20,478	2,969,217
Other	572	71	173	-	697	-	1,513
Total eggs destroyed	278,542	1,944,238	37,149	333,105	355,705	20,478	2,969,217
Total poultry culled	250,843	1,385,918	57,875	175,085	334,701	373,254	2,577,676

/1 - Ducks and geese counted as backyard poultry

Payments were made to 822 claimants for a total of 2.58 million poultry and 2.97 million eggs (Table 2). Compensation was paid within four weeks of claims received. The cleaning and disinfection of affected places became a pre-condition for payment of compensation to commercial farmers. The predominance of commercial over backyard claims did not reflect a failure to disproportionately compensate commercial claimants, but rather the predominance of outbreaks on commercial operations and their larger number of poultry and eggs culled. The ratio of the amount of compensation paid and the number of poultry covered is rather similar: 1.42 for all poultry, 1.42 for commercial, and 1.46 for backyard poultry (Table 3). This indicates that amounts paid, based on ongoing compensation prices for culled poultry, were similar for backyard as well as commercial poultry, with the only difference to composition of claim comprising different classes of poultry.

Table 3 – Proportional ratio of compensation payments for commercial and backyard poultry

Category	All Poultry	Commercial	Backyard
Compensation paid (US\$'000)	3,656.12	3,609.24	46.88
Number of poultry culled	2,577,676	2,545,641	32,035
Proportional payment ratio	1.42	1.42	1.46

16. The project disbursed all of its contingency funds to cover the cost of paying compensation. At MTR, these funds, which included the purchase of PPE and H5N1 vaccines, were reduced from \$3.2565 million to \$1.746 million, based on the rationale that donors were already providing substantial amounts of PPE and disinfectants, and that GoB had decided not to use poultry vaccination as an HPAI control strategy.

Component II: Public Awareness and Information.

17. This component was designed to improve public awareness and information about HPAI to safeguard the human health of the general public, extension staff, animal health

workers, poultry producers, poultry traders, poultry processors, and other stakeholders dealing with poultry. Although the implementation of this component started behind schedule, substantial progress was made in the remaining 14 months of project lifespan. Outputs comprised human resource development as well as the distribution of multi-media messages and information on avian influenza.

18. **Subcomponent II.A - Advocacy and Collaboration with Stakeholders.** A total of 22,488 persons (equivalent to 23,056 person-days) received training and/or attended workshops on communications strategies and delivery, held in 20 high-risk districts across the country. Trainees included 568 DLS and other MOFL staff, 120 news media reporters, and 11,800 poultry farmers attending workshops (Table 5).

Training Category	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	Total Participants	Duration (days)	Total Person days
Training on basic communication skills for DLS staffs	-	-	-	-	418	150	568	2	1,136
Workshop with media personnel & news reporters on AI reporting	-	-	-	120	-	-	120	1	120
Community-based communication (educational institutes)	-	-	-	3,750	-	6,250	10,000	1	10,000
Poultry farmer training in farm biosecurity				3,500		8,245	11,800	1	11,800
Total	-	-	-	7,370	418	14,645	22,488		23,056

19. **Subcomponent II.B - Production and Dissemination of Communication Materials.** An advertising agency, contracted in December 2011, produced an assortment of communications and information materials, which were distributed across the country. These included 10 roadside billboards, 100 banners, 10,000 festoons, 100,000 leaflets and 4-page booklets, 50,000 picture cards for school children, 2,000 flipcharts, 200,000 booklets, and 3 videos on LBM and poultry farm biosecurity, and on general biosafety for consumers. These materials were distributed to schools, project-supported trainees, shops and malls, government departments, TV stations, farmers, LBMs, wet markets and consumers.

20. **Subcomponent II.C - Developing Community-based Pilots.** Ten-thousand workers were trained in one-day workshops in community-based awareness and communications (Table 5). This activity was designed to support “pilot” formation of the community-based communication groups and provide a feedback mechanism to facilitate the flow of information from the grassroots level to project management and stakeholders. The groups were to monitor the preparation and dissemination of information materials but there was no evidence of their formation or activity at EoP.

Component III: Implementation Support and Monitoring and Evaluation

21. **Subcomponent III.A - Implementation and Support by the PCU and FAO/TAS teams.** The initial human capacity weakness of the PCU established under DLS resulted in slow implementation, which contributed to the *Moderately Unsatisfactory* ISR ratings of March and July 2009. However, with the arrival of the

FAO/TAS team experts, these ratings improved to *Satisfactory* as the result of PCU staff training and the recruitment of capable financial management and M&E staff. The reorganization plan prepared by PCU in response to the OIE self-evaluation exercise provided a major impetus to improve not only the quality of project implementation but also the management of ongoing DLS programs. This included improved coordination between DLS and the FDIL and SMS Gateway information flows, supported by the newly established Epidemiology Unit and the computerized LDIS network. The commitment by DLS to internalize the budgets associated with these new activities will ensure sustainability.

22. Although late in arrival, the FAO/TAS team has performed well and has provided broad-based support to the PCU and DLS. Outputs include the design of the BPMC pilot, training and technical support provision to DLS and PCU staff, and to civil society; assistance in the implementation of Component II activities, an evaluation of the biosecurity status of Bangladeshi LBMs, and close collaboration with other assistance agencies involved in avian flu control.

23. Procurement, although often slow as the result of multiple government clearances beyond the responsibility of the PCU, proceeded within Bank guidelines, as did financial management, as evidenced by the non-qualified status of all external audits conducted. Reports and other required project documentation were provided in a timely fashion. The issuance of the environmental management report and the arrival of an EM consultant were delayed, but poultry culling operations, field worker and laboratory worker biosafety were conducted under acceptable conditions.

24. **Subcomponent III.B - Monitoring and Evaluation.** This sub-component provided financial and technical support for an international M&E expert,³⁰ responsible for the internal monitoring and evaluation of AIPRP and for periodic independent evaluation. M&E will be part of the Management Information System (MIS) that will be established in the PCU.

³⁰ The M&E expert arrived three years after the GoB's request for long-term FAO assistance. A baseline was prepared, and PCU implementation capacity and M&E began to improve.

Annex 2a: National Reference Laboratory for Avian Influenza (NRL-AI), present status and future requirements

Background: When the National Reference Laboratory for Avian Influenza (NRL-AI) in BLRI diagnosed the first case of HPAI in Bangladesh, it did so with basic equipment (a biosafety cabinet and conventional PCR donated by JICA). The capacity for diagnosis was very poor. Assistance from AIPRP started in 2009, and by 2010, the NRL-AI was upgraded to BSL-2 level and diagnostic equipment, supplied by the Project, DANIDA and JICA, was installed. The laboratory now has a capacity for the molecular diagnosis of HPAI through conventional and real-time PCR (RT-PCR), using conventional as well as quantitative PCR systems and gene sequencing. Furthermore, NRL-AI has capacity to carry out ELISA, HI, HA, AGPT, and virus culture in embryonated eggs, and primary as well as continuous tissue cell lines, even though the laboratory is understaffed and has difficulty fulfilling the national demand for advanced diagnostic with its limited work force.

Achievements: The NRL-AI conducted several research projects in the monitoring and diagnosis of circulating avian influenza virus. Other than routine diagnostic activities, the laboratory facilitated advanced studies and research on the following topics: (i) identification of the risk factors for incursion and spread of HPAI; (ii) identification of HPAI virus in wild migratory birds and domestic ducks; (iii) identification of two new HPAI sub-clades (Clade 2.3.4 and 2.3.2.1), co-circulating with previously identified sub-clade (Clade 2.2) by this laboratory; and (iv) identification of circulating low- and highly pathogenic avian influenza virus in wild and domestic birds, which contributed to the development of effective control strategies.

Network development and advanced studies support. NRL-AI is providing a platform to promote the optimal utilization of the country's laboratory networks. The laboratory developed strong collaboration with the laboratories of ICDDR, B, Bangabandhu Sheikh Mujib Medical University, the Jute Research Institute, the Biotechnology Institute, and others. NRL-AI also supported research programs for MSc and PhD degree studies in collaboration with the Bangladesh Agricultural University (BAU), Chittagong Veterinary and Animal Sciences University (CVASU) and other organizations.

Knowledge dissemination: Since 2009, the NRL-AI has organized two hands-on training programs per year for officers of the Central Disease Investigation Laboratory (CDIL) and the Field Disease Investigation Laboratories (FDILs). NRL-AI also conducted training on virus culture and detection for medical professionals from ICDDR, B. With project support, NRL-AI also arranged a hands-on training program for DLS officers, as well as lectures in training program arranged by other organizations.

Constraints and Conclusions: Aside from its limited workforce, the laboratory faces a critical transportation problem, which hampers its field mobility in cases where a rapid field response is needed. Additional vehicles and a mobile clinic for field operations will be necessary to achieve this objective. The NRL-AI itself needs to be upgraded to the BSL-3 level to allow it to work safely with highly infectious organisms. The laboratory's

long-range plans include its continuation as an important facilitator in avian influenza control, especially in the areas of staff training, scientific liaison with other institutions, improvements in laboratory management, advanced disease investigation, and the monitoring of public and private sector disease investigation laboratories.

Diagnostic Accuracy Verification: Since 2007, 100 samples have been sent to the Veterinary Laboratory Agency in Weybridge, UK and the International Avian Influenza Laboratory in Padua, Italy for quality control comparison. Over 90 percent of diagnoses were rated identical.

List of Referred Publications by NRL-AI staff:

1. *Avian Influenza outbreaks in chickens, Bangladesh*, Paritosh K. et al., *Emg Inf Dise** www.cdc.gov/eid* Vol.1 No. 12, Dec. 2008.
2. *Risk factors for infection with highly pathogenic influenza A virus (H5N1) in commercial chickens in Bangladesh*. P. K. Biawas, et al., *Veterinary Record*, 2009, 164, 743-746.
3. *Risk of Infection with Highly Pathogenic Avian Influenza Virus (H5N1) in Backyard Chickens, Bangladesh*. Paritosh K. et al., *EDI Journal Home*, Volume 15, Number12-December 2009. www.cdc.gov/eid/content/15/12/1931.htm.
4. *Recent evidence of Avian Influenza in Bangladesh: A Review*. Jahangir Alam, et al., *World Poultry Science Journal*, Vol.66, Sep. 2010.455-463.
5. *New introduction of clade 2.3.2.1 Avian Influenza Virus (H5N1) into Bangladesh*. M.R. Islam, M.M. Rahman and P. Monoura. *Transboundary and Emerging Diseases Journal*, Black Verlag GmbH, Oct. 2011.
6. *Mortality rate and Clinical Features of Highly Pathogenic Avian Influenza in Naturally Infected Chickens in Bangladesh*. P.K. Biswas, et al., *Rev. Sci. Tech. Off. Int. Epizootics*, 2011, 30(3), 871-878.

Annex 3. Economic and Financial Analysis

The economic analysis at appraisal projected the impact of HPAI to range from losses of US\$154 million or 0.3 percent of GDP in the case of 0.7 percent of the poultry population being affected, to US\$1.2 billion in the case of both severe human and poultry pandemic, which would be more than 2 percent of Bangladesh's GDP. For lack of relevant information, these were based on Gross Attack Rate (GAR) scenarios. As more data became available during project implementation—especially the outbreak data collected by FAO/ECTAD in Bangladesh—the data quality enabled the use of epidemiologic-economic modeling.

On the epidemiology side, a simple compartmental Susceptible-Infectious (SI) model was used to determine the transmission characteristics of the virus and estimate its prevalence in various compartments (in this case district-by-district), as well as overall, depending on changes in the major factors that affect transmission, e.g., infectious period (number of days between reporting an outbreak and culling), restocking gap (time between culling/disinfecting premises and bringing in new birds). Depending on combinations of factors (scenarios), equilibrium prevalence rates are estimated for each scenario. Project interventions resulted in the reduction of infectious days from 5 days (or 30.8 percent prevalence) in 2007 to 1.5 day (or 11.69 percent prevalence) by 2009. The analysis shows that a further reduction in prevalence rate was possible by combining a reduction of the duration of infectiousness and delaying restocking by 90 days. If the project had combined the 1.5 days achieved with 90 days delays in restocking, the equilibrium prevalence rate could have been driven down to 1.46 percent by 2009³¹.

On the economics side, a stochastic simulation model is used to combine the transmission parameters from the epidemiologic model with production, productivity and price data to generate a distribution (after 5,000 simulations) of the physical losses from mortality in egg production.

The results show that in the scenario where infectious period was reduced from 5 days to 1.4 days.; Without intervention and with 5 days infectious period as starting point of 5,000 possible disease pathways, the stochastic average of costs to Bangladesh amounted to nearly US\$347 million (ranging from US\$3 million to US\$1,261 million) over six years. With reduction in factious period from 5 days to 1.4 days the cost of the disease was reduced to US\$17 million saving Bangladesh US\$330 million (ranging from US\$0.1 million to US\$1,248 million) over the same period.

Details of the epidemiological and economic modeling are presented below.

The rate of transmission of highly pathogenic avian influenza in Bangladesh: In this analysis, the transmission rate of the H5N1 HPAI virus between districts is quantified, focusing on a total of 550 cases observed between 15 March 2007 and 5 April 2012 (the last outbreak).The reproductive number of the disease as the product of the transmission rate and the duration of infectiousness are also estimated.

³¹ This and related results were not reported in the main text to focus the reader's attention on the activities implemented during the project rather than scenarios developed after the operations.

Analytical methods: It is assumed that H5N1 HPAI transmission can be represented through a simple compartmental Susceptible-Infectious (SI) model, assuming that all newly infected districts (C) are infected through indirect contact with infectious districts (I) during the same wave of the epidemic. Contact between districts could occur via movement of migratory birds, purchase and transport of poultry or transfer of infectious material (e.g., feces) via fomites from infected to uninfected village (FAO, 2008). Representing the number of susceptible districts per week as S , the number of infectious districts per week as I and the total number of districts as N , the number of C is given by $\frac{\beta SI}{N}$, where β is the transmission rate parameter representing the rate of transmission of H5N1 HPAI virus per effective contact.

The parameter β is therefore given by $\frac{NC}{SI}$, and the reproductive number, R_e is calculated as the product of β and T , the duration of infectiousness (Ward et al., 2009).

Transmission coefficients were estimated for each outbreak, as well as for the entire period covered by the data. The fact that this pattern has been maintained over time suggests that the virus is being maintained in the country, though the exact mechanisms involved in this maintenance have not been identified.

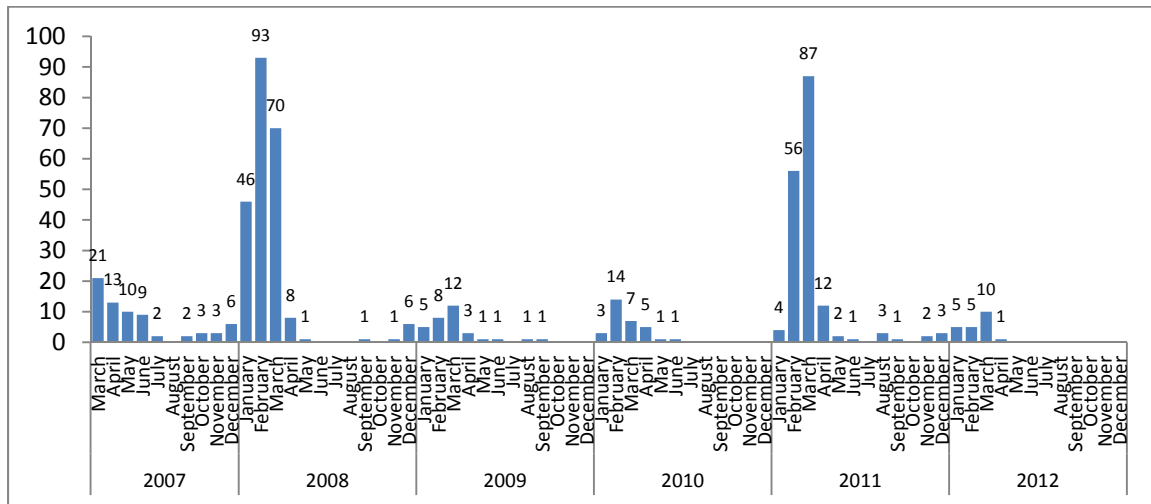


Figure 1. Epidemic patterns of H5N1 HPAI virus in Bangladesh between the period March 2007 and November 2012

Probability of an infection in a district: A compartmental Susceptible-Infectious model (SI) was used to estimate the probability of a district getting infected based on the transmission parameters estimated. The other assumptions made include: (i) The incubation period of the virus is three days; (ii) Restocking of poultry after culling varies from 20 to 100 days. The overall and outbreak-specific district-level transmission coefficients of H5N1 HPAI virus in Bangladesh, based on the data collected between March 2007 and April 2012 are outlined in Table 1.

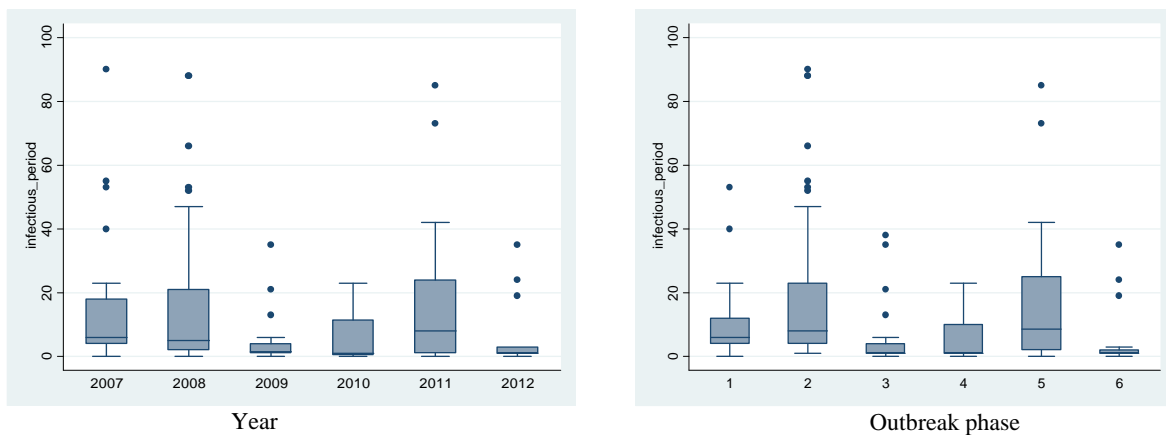
Table 1. Mean and outbreak-specific transmission coefficients of H5N1 HPAI virus in Bangladesh for the period March 2007 to April 2012.

Epidemic period	Period between repeat outbreaks/district		
	7 days	14 days	21 days
Overall mean	1.16/week (0.17/day)	1.90/week (0.17/day)	0.87/week (0.12/day)
Outbreak 1	1.08/week (0.09/day)	0.50/week (0.07/day)	0.50/week (0.07/day)
Outbreak 2	1.08/week (0.15/day)	1.06/week (0.15/day)	1.21/week (0.17/day)
Outbreak 3	1.33/week (0.19/day)	1.18/week (0.17/day)	0.82/week (0.12/day)
Outbreak 4	1.06/week (0.15/day)	0.96/week (0.14/day)	0.64/week (0.09/day)
Outbreak 5	1.75/week (0.25/day)	2.17/week (0.31/day)	1.09/week (0.16/day)
Outbreak 6	1.23/week (0.18/day)	1.01/week (0.15/day)	0.81/week (0.12/day)

Generally, the rate of transmission is higher for outbreaks 3 and 5 compared to those of the other outbreaks. The estimated duration of infectiousness estimated for each of the three scenarios given in Table 1 is: 7 days – 5.81 days (Standard deviation 9.02); 14 days – 9.36 days (SD 15.18); and 21 days – 12.24 days (SD 17.58)

Mean duration of infectiousness: Further analysis of the mean duration of infectiousness by year and phase of the outbreak, assuming a 21-day repeat infection, is demonstrated in Figure 2 and Table 2. This analysis shows that this period was shorter in the 2009 and 2012 (or outbreaks 3 and 6) compared to the other years.

Figure 2. The distribution of the duration of infectiousness of H5N1 HPAI virus in Bangladesh by year and phase of the outbreak



Predicted prevalence of H5N1 HPAI by district: The SI model explained above has been used to explore basic scenarios of H5N1 HPAI prevalence in Bangladesh. Figure 3 shows the impact of reducing the mean duration of infectiousness from 17 days (second outbreak) to five days (sixth outbreak). An additional scenario of two days is included to assess whether the disease could be eliminated if the duration of infectiousness was substantially reduced.

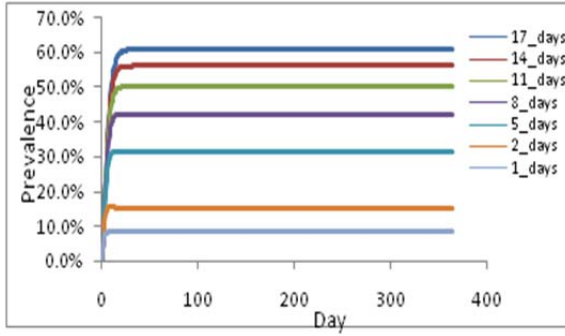


Figure 3. Impact of reducing the mean duration of infectiousness of H5N1 HPAI on the prevalence of the disease in Bangladesh

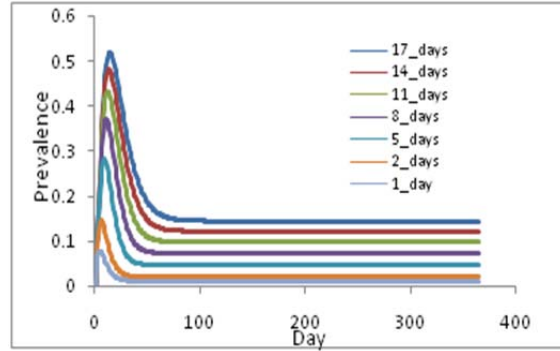


Figure 4. Predicted prevalence of H5N1 HPAI in Bangladesh by district when the duration of infectiousness is reduced, while simultaneously delaying the period of restocking by 90 days

Figure 3 shows that the equilibrium prevalence of H5N1 HPAI declines with a reduction in the mean duration of infectiousness. Prevalence rates associated with the mean durations defined in the graph are 59.4 percent, 54.9 percent, 49.1 percent, 41.4 percent, 30.8 percent, 15.2 percent, and 8.3 percent, respectively. This suggests that the disease would most likely remain endemic even in low periods of infectiousness if no other measures are implemented. Figure 4 shows the impact of combining a reduction of the duration of infectiousness and delaying restocking by 90 days. The most optimistic scenario is an infectious period of one day and restocking after 90 days (1.2 percent prevalence).

Mortality rates in poultry: A total of 410,351 chickens out of 2,535,059 (16.2 percent) died from the disease, and a further 2,123,843 (83.8 percent) were culled (79 percent from the commercial sector, and 4.8 percent from backyard systems). Based on the above, the disease is likely to remain endemic if single measures were applied in isolation, e.g., reducing the duration of infectiousness, even when response time from reporting to culling is reduced to 1.4 days. The most promising option would be an integrated approach, where the duration of infectiousness is reduced, while at the same time restocking is delayed.

Estimating cost of the disease: Total cost of HPAI is the sum of direct and indirect costs. The direct costs of HPAI are the monetary values of these physical losses calculated at market prices. The indirect costs referred to the ripple effects, the spillover effects, and the wider macroeconomic effects. . Data were collected on prices for various categories of poultry and eggs, as well as for the chicken population (26 percent layers, 27 percent broilers, 45 percent backyard, and 2 percent parent stock). Average egg yield for a commercial layer is estimated at 190 eggs annually, while that of a village chicken is estimated at 30 eggs. It is also assumed that only 10 percent of eggs produced by backyard chickens are harvested.

The prevalence and mortality rates were derived based on observed data. They are simulated 5,000 times to generate a distribution of the physical losses from mortality among all poultry categories, as well as the losses in egg production associated with mortality of layers and backyard chickens. The key output variables are incremental costs, incremental benefits, incremental net benefits, and benefit cost ratio derived using a 12 percent discount rate with 2007 as the base year. For each key output variable, the 5,000 simulation was applied and plausible values were obtained.

Figure 5 presents a truncated normal distribution of mortality rate. The average mortality rate is estimated at 25.8 percent. Based on these parameters, the stochastic average of costs under a

single option amounted to nearly US\$347 million (US\$3 million-1,261 million) over six years and the benefits to US\$330 million (US\$0.1 million-1,248 million) , leading to an average net loss amounting to US\$17 million (Table 2).

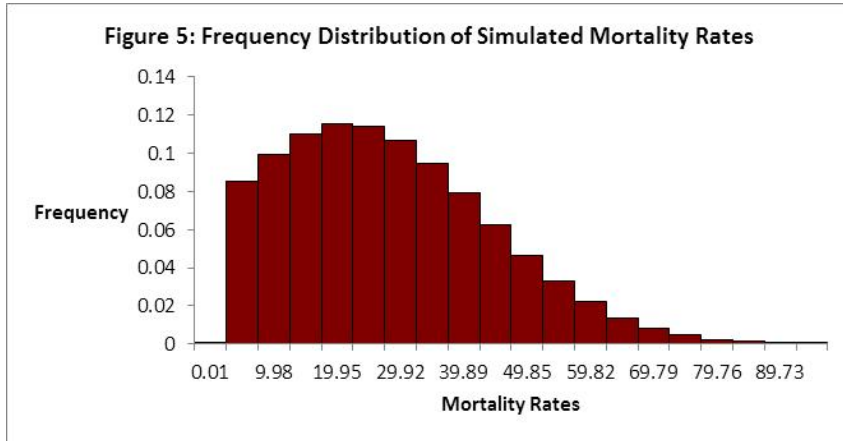


Table 2: Effects (thousand US Dollars) and Benefit-Cost Ratio of Reducing Infection Period from Five days to One and a Half Day

	Prevalence rates (%)		US\$'000	
	Five Days	One and a Half Days	Costs	Benefits
Mean	30.57	11.69	346,737	330,444
Standard Deviation	0.41	0.24	216,929	208,828
Coefficient of Variation	1.34	2.03	63	63
Minimum	29.86	11.28	3,085	101
Maximum	31.28	12.10	1,261,043	1,247,905

Note: The results presented in each column should be interpreted separately. They are averages of 5,000 possible solutions.

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Lending

Names	Title	Unit
Mohinder S. Mudahar	Task Team Leader	SASSD
Dinesh M. Nair	Co-Task Team Leader	SASHD
Kees Kosterman	Lead Public Health Specialist	SASHD
S.A.M. Rafiquzzaman	Irrigation Engineer	SASSD
Charles C. Bevan	Mission Leader (Preparation)	FAO/CP
Mohinder Oberoi	Animal Health Specialist	FAO
Ray Webb	Veterinarian	SASSD
Stephen Ostroff	Human Influenza Expert	SASHD
Nuno Santos	Economist	FAO/CP
Dan Vadnjaj	Economist	FAO/CP
Sumith Pilapitiya	Environmental Specialist	SASSD
Zafrul Islam	Senior Procurement Specialist	SARPS
Tanvir Hossain	Procurement Analyst	SARPS
Suraiya Zannath	Financial Management Specialist	SARFM
S. M. Rezawan Ul Alam	Senior Communications Officer	SAREX
Kishore Uprety	Senior Counsel	LEGMS
Chau-Ching Shen	Senior Finance Officer	LOAG2
Bilquis Amin Hoque	Consultant (Environment)	SASSD
Iffat Mahmud	Research Analyst	SASHD
Nadia Islam	Program Assistant	SASSD
Tarak Chandra Sarker	Program Assistant	SACBD
Guzman P. Garcia-Rivero	Peer Reviewer	EASRD`
David Evans	Peer Reviewer	EASHD
Michael St. Louis	Peer Reviewer	CDC
Supervision/ICR		
Ousmane Seck	Task Team Leader	SASDA
Shah Mohammed Rezwan Ul Alam	Consultant	SASGP
Muhammad Ali	Consultant	SARPS
Shakil Ahmed Ferdausi	Senior Environmental Specialist	SASDI
Nihal Fernando	Sr. Water Resources Mgmt. Spec.	AFTWR
Tanvir Hossain	Senior Procurement Specialist	SARPS
Marghoob Bin Hussein	Senior Procurement Specialist	SARPS
Muhammed Riadul Islam	Procurement Specialist	SARPS
Mehrin A. Mahbub	Communications Officer	SAREX
Iffat Mahmud	Operations Analyst	SASHN
Mohinder S. Mudahar	Consultant	SASDA
Dinesh M. Nair	Senior Health Specialist	AFTHE
Gajanand Pathmanathan	Manager	SASDO
Norman Bentley Piccioni	Lead Rural Development Special	SASDA
S. A. M. Rafiquzzaman	Consultant	SASDA
Tarak Chandra Sarker	Program Assistant	SASDO
Suraiya Zannath	Sr. Financial Management Spec.	SARFM
Brenda Scott	Information Assistant	SASDO

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY07	21.54	154.81
FY08	-	0.00
Total:	21.54	154.81
Supervision/ICR		
FY07	-	0.00
FY08	17.91	54.21
FY09	17.18	61.89
FY10	15.82	71.48
FY11	10.55	78.25
FY12	13.46	111.61
FY13	9.70	82.71
Total:	84.62	460.15

Annex 5. Beneficiary Survey Results

The 2012 KAP Survey was conducted to assess the impact of risk communications training to poultry farmers. The results are summarized below.

1. The 2012 KAP survey was designed to assess the effectiveness of previous AI-IEC campaigns and inform future communications campaigns concerning KAP of the general population. The survey was conducted across all divisions in Bangladesh. Both qualitative and quantitative research methods were used to gathered information. Apart from specific tools to gauge the impact of training and massive IEC campaign, six open-ended questions were added to the questionnaires used for the earlier KAP surveys (2007 and 2010) conducted by the GoB, with assistance from UNCEF. These earlier surveys provided the comparators. There were 2,163 respondents from the backyard poultry sector, with 136 commercial farmer respondents. In addition, a number of stakeholders along the poultry value chain were interviewed.

Main Findings and Conclusions

2. Knowledge of Avian Influenza of Backyard Poultry Farmers

In the face of the avian flu outbreaks that began in early 2007, poultry farmers had no knowledge to deal with this crisis, and viewed AIPRP as an important way to control the outbreaks and protect their livelihoods. Ninety percent of backyard poultry farmers indicated that they had no knowledge of HPAI, and 65 percent mentioned that they knew of bird-to-bird transmission but had no idea about bird-to-human transmission. Two percent of respondents were able to quote clinical signs of bird flu: sudden death, bluish changes in skin color, depression and respiratory signs. Over 70 percent of respondents were aware of avian flu, a significant increase from 2007 when AI was totally unknown to farmers. Poultry husbandry practices related to biosecurity remains weak. About 58 percent of respondents agreed that separate pens should be used for chickens, and that enforcement and implementation of biosecurity measures is lacking. Adherence to hygiene codes, as prescribed by AIPRP, hinges upon tighter monitoring and continuous advocacy. Between 30 and 40 percent of backyard farmers have made changes in rearing practices to improve biosecurity.

Knowledge of Avian Influenza of Commercial Poultry Farmers

3. Eighty percent of respondents mentioned that hand washing was strictly practiced after touching birds. However, AI workers said that “appropriate and safe” washing varies from area to area and implementation of biosecurity measures remains inadequate. Twenty to 30 percent of *upazilas* have taken measures to establish checkpoints and wash/disinfect poultry cages. In some *upazilas*, ULOs have supplied mechanical sprayers to farmers. In Kapasia, farms verify their poultry transport vehicles as “germ-free.” Thirty percent of farmers have seen vehicles being washed upon entry or exit of LBMs. In 60 percent of *upazilas*, project ownership demonstrated by accepting recommendations is strong. The seasonality on outbreaks results in a slackening of biosecurity, as mentioned by 60 percent of respondents.

4. Eighty percent of large and medium-sized farms carry out cleaning and washing areas appropriately, separate poultry by species, and 60 percent keep children away from poultry. Training of poultry market chain workers remains limited, and safety measures are often ignored. According to sellers and processors, wearing gloves and masks scare away buyers. Market committees have yet to implement intensive cleaning with regular market closures to carry out firm disinfection breaks. Disease reporting by farm owners has increased substantially, compared to the baseline scenario (slaughtering, consumption, and selling of sick birds), and 60 percent of respondents strongly held the view that they are more conscious of handling poultry safely.

Behavior in key poultry-related activities

5. Sixty-six percent of poultry transporters/sellers indicated that they sold poultry from local poultry farms; 64.3 percent bought live chickens, 35.2 percent eggs; 48 percent were middlemen; 45 percent sold chickens “by foot,” and 4.3 percent rented transport. Sixty-four percent did not think that wild birds were a cause of infection, and only 8 percent thought there were severe risks. Respondents’ lack of adequate knowledge of poultry diseases became evident when 42 percent indicated that they thought that keeping poultry of different species in the same cage was not a risk factor; 55.8 percent of them said there were some risks, and only 2.2 percent thought that there was a severe risk of doing so.

6. Out of 536 backyard farmers surveyed, 24.8 percent said their poultry comes in contact with wild birds of other species on a daily basis, while 46 percent said their poultry never does so. However, 98.3 percent of poultry were kept in non-confined locations, providing significant scope for the poultry to mix with other birds or animals. Over 50 percent of farmers were reluctant to have their children in close proximity to their poultry. Forty-two percent of respondents slaughtered and consumed sick poultry. When asked which government livestock department was nearby, almost 50 percent said they did not know. Over 90 percent of those surveyed said they never had any liaison with any employee of the government livestock department.

7. Half of respondents indicated they disposed of dead birds (dead from any cause) “in the bush;” about 7 percent threw them in the river. Only 0.2 percent indicated they informed the livestock office. Almost 10 percent said they did not inform anyone, even if poultry died of disease. As to why they did not inform anyone, 41.2 percent said that they did not know they needed to do so; 35.6 percent thought that they were not required to do so; and 22.5 percent said that they did not know whom to inform.

Annex 6. Summary of Borrower's ICR and/or Comments on Draft ICR

1.0 Introduction. The highly pathogenic avian influenza was first detected in Bangladesh on March 2007. As a result of this new scare, the Government of Bangladesh decided to control the disease by all available means, including entering into a five-year financial support agreement with the World Bank for a total of US\$21 million, of which US\$2 million was recipient's contribution and US\$2 million was from the AHITF. The Responsible Agency for the project was the Department of Livestock Services (DLS) under the Ministry of Fisheries and Livestock (MOFL) Building 6, Room 509, Bangladesh Secretariat, Dhaka – 1000 Bangladesh. The country was also supported in this effort by development agencies and donors, such as USAID, JICA, DANIDA, as well as others. The intervention methods applied to control the disease were based on international guidelines prepared by FAO-OIE, and to some extent the WHO. Even though these interventions are believed to have contributed to controlling the potential damage the disease could have caused to the public health and the economy of the country, the disease remains entrenched in Bangladesh.

1.1 Project Objectives. The overall objective of AIPRP is to minimize the threat posed by pathogenic avian influenza (HPAI) to humans in Bangladesh by controlling such infections in domestic poultry, and preparing for, controlling and responding to possible human infections, especially an influenza epidemic and related emergencies. Three main components were identified for the AIPRP, with specific subcomponents under each one, as listed below:

- (a) Animal Health Component: (a) Strengthening control programs and containment plans; (b) Strengthening disease surveillance and diagnostic capacity; (c) Enhancing prevention and preparedness capacity; (d) Improving biosecurity in poultry production and trade; (e) Supporting surveillance of migratory birds; and (f) Creating a Contingency Fund.
- (b) Public Awareness and Information Component: (a) Capacity Building; and (b) Information and Communication Services.
- (c) Implementation Support and Monitoring and Evaluation Component: (a) Implementation and Technical Support; (b) WB Implementation Support Mission; and (c) Monitoring and Evaluation.

1.2 Project Design. With the above objectives agreed between the Government of Bangladesh (GoB) and the World Bank, the Avian Influenza Preparedness and Response Project (AIPRP) was created within the Department of Livestock Services of the Ministry of Fisheries and Livestock (MoFL). The AIPRP started recruiting its staff from the government departments to constitute the Project Coordination Unit (PCU), with a Project Director *and* a Deputy Project Director (DPD) [serving?] as administrative managers. The PCU had the following subcomponents: Procurement Unit, Financial Management Unit, Technical Unit, and support staff. Outside consultants were recruited to support the Financial Management Unit and the Procurement Unit.

In April 2010, three years after the GoB and WB signed an agreement, the Food and Agriculture Organization was called to provide technical support through its Technical Assistance System, and the Technical Assistance Services (TAS) group was formed within the DLS. As a result, the consultants of the TAS team, which cover the fields of surveillance, biosecurity, M&E, and communication, were recruited for different durations. In 2010 and 2011, the AIPRP, whose principal activity was to search and respond to cases of avian influenza, absorbed over 1,000 avian influenza workers and 88 additional veterinary officers, who were working under the USAID-funded and FAO implemented project. The latter group was supported by the SMS-Gateway reporting system for rapid response in case of AI detection.

The FAO communication specialist mainly implemented the public awareness and communication component. She prepared several messages to disseminate to peoples of different levels of knowledge and understanding of the HPAI situation. Relevant sectors of society were trained, particularly media personnel and DLS staff. The monitoring and evaluation team within the FAO-TAS team, which joined the AIPRP two years before the end of the project, streamlined the project activities and improved the reporting and communication systems between the Bank and the AIPRP. It developed systems that enabled the project to intervene more successfully in.

The financial management team, with able consultant support, managed financial reporting systems to the satisfaction of the donor. The procurement team tried to meet the project needs and accomplished the implementation of the activities to some extent. An expert from FAO TAS and a senior technical officer engaged from the DLS coordinated training on HPAI in general and in biosecurity in particular. The external M&E consulting firm produced KAP documents reflecting the projects impact in the area of HPAI control and prevention. The FAO TAS internal M&E supported the project in producing good expert reports and sound questionnaires for investigative assessments of project assisted structures and activities.

1.3 Project Implementation. As previously stated, the project was implemented in great part by the Project Coordination Unit and assisted by private consultants and firms. The PCU was mainly responsible for preparing necessary procurement documents and managing the project's financial aspects. The project director supervised the PCU members' day-to-day activities, and approved procurement and disbursement of funds as needed. The FAO Technical Assistance Services (TAS) implemented the significant components assigned to it, e.g., managing its own team, preparing meetings with PCU and other relevant partners, such as the FAO Avian Influenza Unit funded by USAID, producing communication materials and guidelines, and curricula for different stakeholders, such as biosecurity intermediaries, laboratory technicians, and community surveillance agents, such as AIW and AVSs. The advertising firm prepared communication materials including billboards, posters, festoons, and leaflets. Different engineering firms selected by the PCU in accordance with the GoB and WB procedures supported inputs for the construction of LBMs, demonstration farms, FDILs, and conference rooms.

The FAO-TAS Team provided technical specifications for laboratory and some farm or market materials, and advised the PD and project procurement team on biosecurity concerns that can impact the new or improved laboratories and farms. The development of the Biosecure Poultry Market Chain, which took the last 18 months of the project, was lead principally by the FAO-TAS Team experts with support from PCU and FAO AI Unit experts. The TAS Team was instrumental in the formation of the Central Task Force and the District Task Forces, which developed the project activities and surveyed over 50 percent of the potential markets and farms that were selected for inclusion in the project. Following the joining of the FAO-TAS Team, all the documents including quarterly progress reports (QPR), project impact reports, and tentative future activity proposals were prepared with improved quality for submission to relevant World Bank authorities.

1.4 Operational Experiences. The AIPRP contributed greatly in terms of control and prevention of avian influenza, specifically because it absorbed the AVSs and AIWs from the FAO implemented, USAID-funded initial project. These groups, in conjunction with the Epidemiology Unit of DLS and the SMS “Gateway” apparatus already in place, have enabled the government to be on top of the control initiative and especially in early detection and reporting. The agreement between FAO and the GoB allowed the insertion of the FAO-TAS Team in the AIPRP program and helped the project’s activities to move forward and to achieve its mandate.

The TAS Team was instrumental in developing the communication materials, training materials, M&E reports, and in providing technical inputs to improve biosecurity in selected model farms and markets. The PCU is an integral part of the AIPRP, and has improved its deliveries in the years 2011 and 2012 through the experiences and assistances provided by the TAS of FAO. The last two entities of the project have developed strong liaison and communication mechanisms to achieve the majority of the shared activities to meet the lender’s expectations. The FAO-TAS Team had no mandate to provide direct support to the PCU’s procurement inputs. Because of this and government officers’ lack of procurement experience, procurement delays were unprecedented. As a result, some items necessary to support the laboratories diagnostic works remain Unobtained. The AIPRP has enjoyed open access to the Director General and the CVO offices, which facilitated obtaining activity approval. The DLS, which has the primary mandate to control the scourge of avian influenza, was greatly supported by the AIWs and AVSs enrolled under this project. The work of the Epidemiology Unit, created to be an integral part of DLS following the WB Implementation Missions’ strong recommendations, is highly commendable. The Epidemiology Unit is now included in the MoFL organogram. The DLS’s agenda includes improving communication mechanisms within its ranks by including communication experts in the Epidemiology Unit.

2.0 Outcome of the Project Operations against Agreed Objectives. In spite of the very slow start of project activities, the AIPRP accomplished the five-year forecasted project objectives effectively in the last two fiscal years of 2010/11 and 2011/12. The GoB rates the overall outcome of the project development objectives as satisfactory. The achievements of the AIPRP against objectives prescribed in the Revised Development Project Proposal (DPP) are listed below.

2.1 The AIPRP has successfully executed payment of compensation rights to 822 farmers that suffered losses as a result of HPAI. The total amount paid up to May 2012 was US\$3.88 [million?].

2.2 Surveillance and SMS Gateway: The highly acknowledged Short Message System was applied successfully after its development by FAO AI Unit. Currently, 306 *upazilas* in 64 districts benefit from this reporting system. The AIPR absorbed 103 AVSs and 1,003 AIWs in 2011 to conduct backyard and commercial farms surveillance. These individuals worked as effective reporting agents to enable the DLS's rapid detection and response in case of outbreaks. These agents reported an estimated 5 percent of the outbreaks in 2011. In addition, the project sustained the field offices involved in HPAI surveillance by providing fuel and vehicle maintenance.

2.3 Strengthening of Disease Information Networking was accomplished by providing computers and accessories, including internet modems, to six divisional DLS offices, FDILS, CDIL, BLRI, and the Epidemiology Unit in Dhaka. Additional funding was also provided to improve government facilities such as DLS, Gov't Zoo and MoFL and offices of the National AI Coordinator.

2.4 Disease Search and Diagnostics was enhanced by the renovation, extension or building of new Field Disease Investigation Laboratories in nine districts of Bangladesh during the project. Seven of these laboratories were improved and reagents and equipment were provided to diagnose not only AI infection but also other relevant diseases. The two other laboratories, Jessore and Chittagong, are fully constructed and waiting to be equipped. The main animal health building at the National Research Laboratories-AI of Bangladesh Laboratories Research Institute (BLRI) was renovated specifically for use in AI diagnosis. The project also provided this AI National Reference Laboratory with modern diagnostic equipment and reagents for AIV diagnostics.

2.5 Culling, Disposal, and Cleaning and Disinfection that follows confirmation of a positive AI outbreak were fully financed by the project following the second revision of the DPP.

2.6 Training and Workshops were conducted during the project for different sectors of society. The main categories of trainees and the number trained are summarized in the table below.

SI No	Category of Training	FY (2007-08)	FY (2008-09)	FY (2009-10)	FY (2010-11)	FY (2011-12)	FY (2012-13)	Total Participants
1	Animal Health Component	945	14,057	7,327	5,461	179	929	28,898
2	Training on Surveillance Activities	-	-	-	16,018	4,800	1,070	21,888
3	Public Awareness & Communication Service Component	-	-	-	3,870	418	6,400	10,688
	Total	945	14,057	7,327	25,349	5,397	8,399	61,474

Additional training for 630 stakeholders referred to as intermediaries involved in the Biosecure Live Bird Market Chain initiative was completed in December 23, 2012. This project training is considered the most efficient. The FAO TAS team contributed immensely to the training effectiveness of all categories.

2.7 Biosecure Live Bird Market Chain activities were activated only after the ISM of December 2011, when the DPP was revised and approved. However, the FAO Technical Assistance Services had understood the sense of the project prior to the PCU and started assessing the potential to effect this initiative. In nine districts of Bangladesh, LBMs were renovated with a focus on their biosafety and biosecurity, along with broiler and layer Demonstration and Adopter farms, which supply the improved markets with healthy chickens. This activity was funded as Private Public Partnership. All the LBMs and Demonstration Farms have been completely renovated; while a fraction of the Adopter farms are in process of renovation. The GoB is highly satisfied with the outcome of this initiative and will continue to pursue it when the follow up project for AI control and prevention is launched.

2.8 Public Awareness and Information Component. The AIPRP has benefitted greatly by incorporating the Awareness and Information Component in its work plan. These activities were accomplished primarily by the FAO-TAS communication consultant with technical inputs from the same. The project's national consultant has designed and produced communication materials addressing the HPAI situation in the country and guidelines to prevent infection and disease spread. As indicated in the table paragraph 2.6 above, over 10,000 individuals from different sectors were trained in biosecurity, poultry production, cleaning and disinfection, and media communication. The DLS staffs, media personnel, LBM poultry handlers and sellers, and schoolchildren were among the beneficiaries.

3.0 Recipient/Borrower's Performance.

3.1 Despite the DLS (borrower/recipient) unpreparedness to mitigate HPAI and lack of prior experience handling World Bank loans, the DLS slowly has assumed responsibility for managing the project and controlling the disease. The biggest hurdle was procurement technicalities and procedures, which the PCU government officials found unclear. Financial management was also a concern early into the start of the project. However, the

recruitment of a consultant and the efficiency of the assigned government official brought the financial issues under control. The intended rapid diagnosis and response were accomplished by reducing the interval between reporting and culling. The interval was reduced by 80 percent in 2012. The FAO Team's work with the PCU perhaps helped the rapid offing of the project towards the end of its effective period. Project activities have resulted in the training of over 6,000 citizens in AI and its control, as well as in biosecurity and diagnostics. Nine Field Disease Investigation Laboratories have been successfully renovated and constructed. DLS has become a leading government structure that improved a chain of Farms and LBMs interconnected in their approach to control the AI disease. The AIPRP can be regarded as a pioneer in affecting the use of M&E strategy to improve project performance and in communication material development to enlighten the public on the dangers of uncontrolled HPAI.

3.2 Lessons Learned. The GoB and the WB signed the project agreement before members of the DLS staff were trained in their assigned fields, such as finance, procurement, and even project implementation. To optimize communication between different project actors, assigning project directors and/or their deputies who are able to communicate in a second language, such as English, would have been preferable. Observations indicate that team members did not seem to understand the seriousness of their tasks, especially in respect to time constraints in dealing with the outbreak. As a result, activities were rushed towards the end of the project period. The PCU members had no exposure to project implementation in the field because they rarely travelled outside Dhaka. The lack of field experience was attributed to the PCU staff as government personnel being entitled to a very low daily subsistence allowance. More frequent visits by World Bank experts working on the project would have been useful to explain to the project team the procurement and other Bank regulations.

4.0 Proposed arrangements for future project operations. Even though avian influenza remains endemic in Bangladesh, the government has made progress in containing it. The momentum needs to be sustained to strengthen simultaneously the newly created Epidemiology Unit of DLS and the surveillance and diagnostic capacity of the animal husbandry and public health. Due to the persistence of known enzootic and transboundary diseases, some of which negatively affect the country's economy, it is essential for Bangladesh to pursue disease mitigation methods such as the One Health approach. After the completion of the current project, the following diseases need to be addressed in a follow up proposal: Anthrax, which re-emerged in Bangladesh in 2010; Rabies has resulted in over 300,000 Bangladeshis receiving treatment for rabid dog bites. Nipah Virus encephalitis is an emerging highly infectious zoonotic viral disease with high mortality, and Transboundary Animal Diseases (TAD) with a high negative impact on livelihood. Other high impact diseases to address include the *Peste des Petits Ruminants* (PPR), Foot and Mouth Disease (FMD), and New Castle Disease (NDV). Bangladesh should submit a follow up proposal to potential financial and technical partners as soon as possible to maintain the gained momentum and to achieve the national objectives of controlling HPAI and other TADs.

5.0 Lessons learned. The AIPRP has learned useful lessons in project implementation for future efforts.

- (a) An emergency project must be launched with experienced personnel for successful project delivery and disbursement. In the absence of experienced personnel, the project director needs to engage external support.
- (b) The PCU needs to ensure that all sectors are adequately staffed, particularly in procurement and contract distribution.
- (c) Continuity of project directors during the activity period is necessary to prevent delivery delays.
- (d) Technical requirements need to be assessed in a timely manner to ensure that if necessary, a technical support agency, such as the FAO is engaged early in the implementation period to ensure delivery of activities.

6.0. Contribution to the World Bank's ICRR Preparation. The AIPRP openly presented its project portfolio to the Bank's ICRR mission and responded to all queries. It allowed access to every document and activity site, with assistance from its FAO Technical Assistance Services. During his mission, the ICRR reporter was introduced to all aspects of the project's past, present, and future profiles. He visited the MoFL offices and met with the Secretary of the MoFL to discuss project issues, especially regarding the surveillance agents that have not yet been absorbed into the government's budgeted structure. He was also briefed by the FAO's ECTAD country team leader and his team on the AI situation in Bangladesh and on pending sustainability concerns of the current activities. The ICRR reporter visited the Sirajgonj and the Chittagong Districts where the project has biosecurity and laboratory development activities, respectively. He participated in the Bank organized ICRR training. The ICRR reporter had several briefings and a final debriefing with the WB Task Team Leader who provided clear guidance in the Bank's reporting norms and expectations.

Annex 7. Comments of Co-Financiers and Other Partners/Stakeholders

The project had no true co-financiers.

Annex 8. List of Supporting Documents

- Avian Influenza Control and Human Pandemic Preparedness and Response Project – Technical Annex
- Global Program for Avian Influenza Control and Human Pandemic Preparedness and Response – Program Framework Document
- Bangladesh Avian Influenza and Human Pandemic Influenza National Communications Strategy and Action Plan, 2007-2008
- Credit and Financing Agreements*
- Aide Memoires
- FAO/TAS Progress Reports*
- FAO/TAS Live Bird Market Assessment Report , April 2012
- KAP Training Gap Assessment Reports, 2009 and July 2012*
- Results Monitoring Status Plans*
- Implementation Support Reports (ISR)*
- AHITF Grant Reporting and Monitoring (GRM) Reports
- Project Correspondence*
- PCU Quarterly Progress Reports
- National Avian Influenza and Influenza Pandemic Preparedness and Response Plan
- Monitoring and Evaluation – Baseline Survey, Mid-term Evaluation & End of Project Evaluation of Avian Influenza Preparedness and Response Project, November 2012

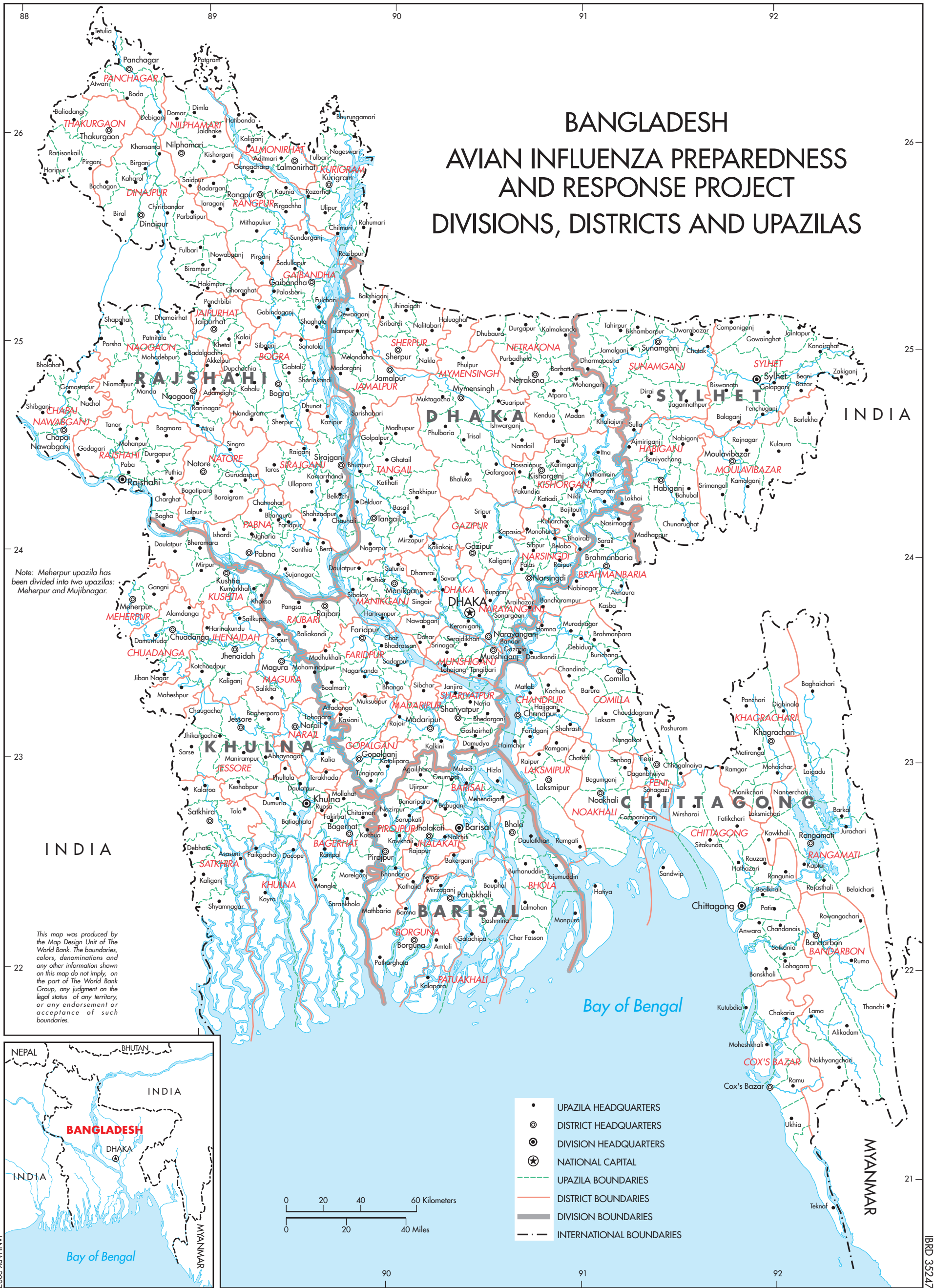
BANGLADESH AVIAN INFLUENZA PREPAREDNESS AND RESPONSE PROJECT GEOGRAPHY

- DISTRICT CAPITALS
- ⊙ DIVISION CAPITALS
- ⊗ NATIONAL CAPITAL
- - - DISTRICT BOUNDARIES
- DIVISION BOUNDARIES
- - - INTERNATIONAL BOUNDARIES



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BANGLADESH AVIAN INFLUENZA PREPAREDNESS AND RESPONSE PROJECT DIVISIONS, DISTRICTS AND UPAZILAS



Note: Meherpur upazila has been divided into two upazilas: Meherpur and Mujibnagar.

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