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The World Bank

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IMPLEMENTATION COMPLETION AND RESULTS REPORT  
(IDA-39520)

ON A

CREDIT

IN THE AMOUNT OF SDR 46.9 MILLION  
(US\$68 MILLION EQUIVALENT – original approved)

TO THE

Republic of India

FOR A

Integrated Disease Surveillance Project

November 26, 2012

Human Development Unit  
South Asia Region

## CURRENCY EQUIVALENTS

(Exchange Rate Effective 03/31/2012)

Currency Unit=Indian Rupee (INR)

US\$ 1.00 = INR 50.95

FISCAL YEAR  
April 1- March 31

## ABBREVIATIONS AND ACRONYMS

ADD	Acute Diarrheal Disease
AI	Avian Influenza
AM	Aide Memoire
ASHA	Accredited Social Health Activist
BSL	Bio-safety Level
BWMP	Bio-waste Management Plan
CAS	Country Assistance Strategy
CCHF	Crimean-Congo Hemorrhagic Fever
CSU	Central Surveillance Unit
CVD	Cardio-Vascular Disease
DALY	Disability Adjusted Life Year
DIR	Detailed Implementation Review
DSU	District Surveillance Unit
EID	Emerging Infectious Disease
FAO	United Nation Food and Agriculture Organization
FM	Financial Management
GFATM	Global Fund for AIDS, Tuberculosis and Malaria
GAVI	Global Alliance for Vaccines and Immunization
GIS	Geographic Information System
GoI	Government of India
HPAIV	Highly Pathogenic Avian Influenza Virus
HR	Human Resource
ICT	Information and Communication Technology
IDS	Integrated Disease Surveillance
IDSP	Integrated Disease Surveillance Project
IHR	International Health Regulations
IMR	Infant Mortality Rate
InCLEN	Indian Clinical Epidemiology Network
IPD	In-patient Department
M&E	Monitoring and Evaluation

MMR	Maternal Mortality Rate
MDG	Millennium Development Goal
MOHFW	Ministry of Health and Family Welfare
NCD	Non-Communicable Diseases
NCDC	National Center for Disease Control
NICD	National Institute for Communicable Diseases
NRHM	National Rural Health Mission
OPD	Out-patient Department
OIE	International Office of Epizootics
P&L	Probable case and laboratory
PDO	Project Development Objective
PM	Procurement Management
RF	Result Framework
RITES	Rail India Technical and Economic Services
SARS	Severe Acute Respiratory Syndrome
SEARO	South East Asia Regional Office, WHO
SSU	State Surveillance Unit
TDAP	Tribal Development Action Plan
UNOPS	United Nations Office for Project Services
USAID	United States Agency for International Development
VC	Videoconference
WHO	World Health Organization

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**THE REPUBLIC OF INDIA**  
**Integrated Disease Surveillance Project**

**CONTENTS**

**Data Sheet**

1. Project Context, Development Objectives and Design .....	1
1.1 Context at Appraisal .....	1
1.2 Project Development Objectives (PDO) and Key Indicators.....	2
1.3 Revised PDO and Key Indicators, and reasons/justification.....	3
1.4 Main Beneficiaries .....	4
1.5 Original Components .....	5
1.6 Revised Components .....	6
Other significant changes.....	7
2. Key Factors Affecting Implementation and Outcomes .....	8
2.1 Project Preparation, Design and Quality at Entry.....	8
2.2 Implementation.....	9
2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization ....	12
2.4 Safeguard and Fiduciary Compliance .....	14
2.5 Post-completion Operation/Next Phase .....	15
3. Assessment of Outcomes .....	16
3.1 Relevance of Objectives, Design and Implementation .....	16
3.2 Achievement of Project Development Objectives.....	17
3.3 Efficiency .....	20
3.4 Justification of Overall Outcome Rating.....	21
3.5 Overarching Themes, Other Outcomes and Impacts .....	22
3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops ...	25
4. Assessment of Risk to Development Outcome .....	26
5. Assessment of Bank and Borrower Performance.....	27
5.1 Bank Performance.....	27
5.2 Borrower Performance .....	29
6. Lessons Learned .....	31
7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners.....	33
Annex 1. Project Costs and Financing .....	36
Annex 2. Outputs by Component.....	37
Annex 3. Economic and Financial Analysis.....	42

Annex 4. Bank Lending and Implementation Support/Supervision Processes.....	46
Annex 5. Beneficiary Survey Results.....	49
Annex 6. Stakeholder Workshop Report and Results .....	50
Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR.....	57
Annex 8. Comments of Co-financiers and Other Partners/Stakeholders .....	61
Annex 9. Explanation on Rating of Achievement of PDO .....	63
Annex 10. List of Supporting Documents .....	64

## List of Figures

Figure 1: Number of Outbreaks in Nine World Bank Project States Since 2008.....	17
Figure 2: Improved Quality of Disease Reporting over Time in 2011 .....	18
Figure 3: Percentage of Diseases Reported via IDSP Portal over the Years.....	18
Figure 4: The Project Result Chain .....	19
Figure 5: The Structure of Integrated Disease Surveillance System.....	23
Figure 6: Calls received by 24X7 Call Centers Per Annum .....	43
Figure 7: Trend of the Reported Malaria Cases over the Years .....	43
Figure 8: Trend of the Reported Acute Respiratory Infections over the Years.....	44

## List of Tables

Table 1: Changed Project Financing Plan .....	8
Table 2: Hiring and Training Status of Selected Professionals by March 31, 2012 .....	12
Table 3: Progress Made for the Project PDO and Intermediate Outcome Indicators .....	17
Table 4: Rating of Selected Risks to Development Outcome .....	26
Table 5: Project's Incremental Cost per Annual, per Capita under Different Scenarios ..	42
Table 6: Changes of Reported Dengue Related Cases and Deaths over the Years .....	44

<b>A. Basic Information</b>			
Country:	India	Project Name:	IN: Integrated Disease Surveillance Project
Project ID:	P073651	L/C/TF Number(s):	IDA-39520
ICR Date:	10/02/2012	ICR Type:	Intensive Learning ICR
Lending Instrument:	SIL	Borrower:	GOVERNMENT OF INDIA
Original Total Commitment:	XDR 46.90M	Disbursed Amount:	XDR 18.17M
Revised Amount:	XDR 24.61M		
<b>Environmental Category: B</b>			
<b>Implementing Agencies:</b> Ministry of Agriculture Ministry of Health and Family Welfare			
<b>Cofinanciers and Other External Partners:</b> International Development Association (IDA) Government of India			

<b>B. Key Dates</b>				
Process	Date	Process	Original Date	Revised / Actual Date(s)
Concept Review:	06/20/2001	Effectiveness:	10/28/2004	10/28/2004
Appraisal:	04/28/2003	Restructuring(s):		01/10/2007 02/13/2007 03/29/2010 12/09/2011 03/30/2012
Approval:	07/08/2004	Mid-term Review:	07/31/2007	06/16/2008
		Closing:	03/31/2010	03/31/2012

<b>C. Ratings Summary</b>	
<b>C.1 Performance Rating by ICR</b>	
Outcomes:	Moderately Satisfactory
Risk to Development Outcome:	Moderate
Bank Performance:	Moderately Satisfactory
Borrower Performance:	Moderately Satisfactory

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

<b>C.3 Quality at Entry and Implementation Performance Indicators</b>			
<b>Implementation Performance</b>	<b>Indicators</b>	<b>QAG Assessments (if any)</b>	<b>Rating</b>
Potential Problem Project at any time (Yes/No):	No	Quality at Entry (QEA):	None
Problem Project at any time (Yes/No):	Yes	Quality of Supervision (QSA):	None
DO rating before Closing/Inactive status:	Moderately Satisfactory		

<b>D. Sector and Theme Codes</b>		
	<b>Original</b>	<b>Actual</b>
<b>Sector Code (as % of total Bank financing)</b>		
Central government administration	5	15
Health	55	40
Information technology	10	15
Sub-national government administration	30	30
<b>Theme Code (as % of total Bank financing)</b>		
Decentralization	14	11
Health system performance	29	29
Injuries and non-communicable diseases	28	10
Other communicable diseases	29	50

<b>E. Bank Staff</b>		
<b>Positions</b>	<b>At ICR</b>	<b>At Approval</b>
Vice President:	Isabel M. Guerrero	Praful C. Patel
Country Director:	Onno Ruhl	Michael F. Carter
Sector Manager:	Julie McLaughlin	Anabela Abreu
Project Team Leader:	Somil Nagpal	Peter F. Heywood
ICR Team Leader:	Shiyong Wang	
ICR Primary Author:	Shiyong Wang	

## F. Results Framework Analysis

### Project Development Objectives (from Project Appraisal Document)

To contribute to improved health outcomes by providing specific, timely information on selected priority health conditions and risk factors in order to plan and manage programs to prevent them.

### Revised Project Development Objectives

At restructuring in 2007

To (i) improve the information available to the Borrower's health services and private health care providers on a set of high priority diseases and risk factors, with a view to enhance the mechanism for the on-the-ground responses to such diseases and risk factors, and (ii) to minimize the threat posed to humans by AI infection and other zoonoses from domestic poultry and prepare for the prevention, control and response to an influenza pandemic in humans.

At restructuring in 2010

To support the Government of India (GoI) to strengthen the integrated disease surveillance system for epidemic prone diseases by (i) enhancing central level monitoring and coordination functions, and (ii) improving state/district surveillance and response capacity with emphasis on selected (nine) states. Additionally, the project will support GoI efforts to timely prepare for, detect and respond to influenza outbreaks in humans and animals.

#### (a) PDO Indicator(s)

The following indicators represent the final revised Results Framework (RF), as agreed during the 2010 restructuring. According to the final data on these indicators, 3 of the 4 PDO indicators were fully achieved and 17 of the 19 Intermediate Outcome indicators were fully achieved.

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
<b>Indicator 1 :</b>	Percentage of districts providing surveillance reports timely and consistently in 9 priority states			
Value quantitative or Qualitative)	25% of priority state districts report timely and consistently on 'P' forms from Primary Health Centers.	Neither baseline nor target was available at appraisal. The goal was to increase the %.	70	67
Date achieved	03/30/2009	09/30/2009	03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved (96%).</b> This indicator was revised in 2010 to focus on % districts (not states).			



<b>Indicator 2 :</b>	Percentage of responses to disease specific outbreaks assessed to be adequate as measured by 3 essential criteria in 9 priority states			
Value quantitative or Qualitative)	45	Neither baseline nor target was available at appraisal.	75	74
Date achieved	03/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved (99%).</b> Use of labs with appropriate human samples (the second criterion in PDO indicator, after adjusting denominator by excluding disease conditions where lab confirmation of human samples is not technically feasible.			
<b>Indicator 3 :</b>	Improved diagnostic capacity for H5N1 and H1N1 as measured by the number of functional diagnostic laboratories for human influenza established			
Value quantitative or Qualitative)	7		12	11
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved (92%).</b> This indicator was added during the 2007 restructuring. All 12 established but only 11 of 12 HH AI labs functional. NEIGRIMS, Shillong is the only lab which is yet to test any human samples for either H5N1 or H1N1.			
<b>Indicator 4 :</b>	Improved diagnostic capacity for H5N1 and H1N1 as measured by the number of functional BSL3 laboratories for animal influenza established			
Value quantitative or Qualitative)	2		6	3
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Partially Achieved (50%).</b>			

**(b) Intermediate Outcome Indicator(s)**

Indicator	Baseline Value	Original Target Values (from approval documents)	Formally Revised Target Values	Actual Value Achieved at Completion or Target Years
<b>Indicator 1 :</b>	Percentage of districts with IT network for on portal data entry, software for data analysis, videoconferencing and inter-voice connection between states and access to toll free 1075			
Value (quantitative or Qualitative)	Portal: 40 VCF: 50 TFA: 25		80 for all three types facilities throughout year	95
Date achieved	09/30/2009		03/31/2012	02/29/2012
Comments (incl. % achievement)	<b>Achieved (120%).</b> -%districts with Portal data entry:97%; baseline: 40% -%districts using VC facility:95%; baseline 50%; -%districts with Toll free no.1075 connectivity:95%; baseline 25%			
<b>Indicator 2 :</b>	AI testing laboratories and routine surveillance from sentinel hospitals			

	operational			
Value (quantitative or Qualitative)	7/12		12/12	11/12
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved (92%).</b> 11/12 labs functional. Three sentinel sites established per lab catchment.			
<b>Indicator 3 :</b>	Percentage of districts IT linked to the SSU/CSU			
Value (quantitative or Qualitative)	50%		90	97
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved (110%).</b> 97% (776) data center sites are IT linked to the SSU/ CSU 93% (745) training center sites are IT linked to the SSU/ CSU			
<b>Indicator 4 :</b>	Number of states providing monthly feedback on surveillance data to the districts			
Value (quantitative or Qualitative)	5/9		9/9	9/9
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved (100%).</b> All states provide feedback to the districts on a monthly basis, as well as whenever an issue arises.			
<b>Indicator 5 :</b>	Percentage of responses to disease specific triggers assessed to be adequate by SSU			
Value (quantitative or Qualitative)	0-66		80	>85 for 2 criteria; 5 for 1 criteria
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved.</b> On three essential criteria measuring the quality of outbreak investigations by the end of 2011: - Investigation within 48 hours of first case information: 85% - Appropriate samples sent for lab investigation: 85% - Availability of final outbreak investigation report: 5% Tools for adequate assessment not yet used by SSU.			
<b>Indicator 6 :</b>	Percentage of major hospitals enrolled, doing in-patient, out-patient and lab surveillance and sharing Probable & Laboratory forms			
Value (quantitative or Qualitative)	20		50	>70
Date achieved	09/30/2009		03/31/2012	02/29/2012
Comments (incl. % achievement)	<b>Achieved (140%).</b> Average for P form: 70%; Average for L form: 74%. However, the indicator measures this information only for major hospitals under the pilot, not all hospitals, and therefore is not a good representation on coverage or quality of the surveillance system.			

<b>Indicator 7 :</b>	Percentage of blocks in which at least one private provider shares weekly surveillance reports			
Value (quantitative or Qualitative)	20		60	>90
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved (150%).</b> This indicator was established after the restructuring in 2010. 92 for P form (423/458) and 93 for L form (343/368).			
<b>Indicator 8 :</b>	Community based surveillance established and percentage of villages reporting to Call Center no: 1075 or nearest PHC			
Value (quantitative or Qualitative)	0		50% villages in pilot blocks	100% of villages in pilot blocks reporting
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved (200%).</b>			
<b>Indicator 9 :</b>	Annual documentation of best practices and progress reports			
Value (quantitative or Qualitative)	0		Annual	Six monthly progress reports and documentation provided
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved.</b>			
<b>Indicator 10 :</b>	Number of referral lab network and district labs established in nine states			
Value (quantitative or Qualitative)	0		At least 1 private hospital involved in the lab network and 1 district lab established per project state	63 private hospitals involved; 17 district priority labs established
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved.</b> 16/17 District Priority Labs reported on 'L' forms, referral lab networks of all 9 states submitted quarterly reports.			
<b>Indicator 11 :</b>	Number of referral and district labs who underwent External Quality Assurance Supervision (EQAS)			
Value (quantitative or Qualitative)	0		1 EQAS/lab in each year (2011-12)	1 EQAS each for 65 referral and 17 district priority labs
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments	<b>Achieved.</b>			

(incl. % achievement)				
<b>Indicator 12 :</b>	Percentage induction training completed for epidemiologists/microbiologists and entomologists in position			
Value (quantitative or Qualitative)	40		90	73.5
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<p><b>Partially Achieved (82%).</b>  This indicator was established after the restructuring in 2010.  Epidemiologists: sanctioned 231, in position 126, trained 91  Microbiologists: sanctioned 26, in position 22, trained 17;  Entomologists: sanctioned 9, in position 7, trained 6  Total in position: 155, trained: 114</p>			
<b>Indicator 13 :</b>	Number of influenza testing facilities established for human health			
Value (quantitative or Qualitative)	7/12		12/12	12
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved (100%).</b>			
<b>Indicator 14 :</b>	Number of sentinel hospitals sending samples of routine surveillance to Influenza laboratories			
Value (quantitative or Qualitative)	0		10	36
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved.</b> By the end of the project, three sentinel sites were identified for each lab and samples were collected routinely and analyzed at 11 labs.			
<b>Indicator 15 :</b>	Epidemiological survey to detect causes and spread of HPAI outbreak			
Value (quantitative or Qualitative)	0		Final survey report (DADF)	50,000 samples analyzed as of December 2011, across the country in the BSL II, BSL III and the BSL IV referral lab at Bhopal.
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Partially achieved.</b> The sample taken and detected increased tremendously. However, the testing strategy was wrong. The studies were not designed to detect any causes and spread of HPAI outbreak(s).			
<b>Indicator 16 :</b>	National surveillance system with adequate coverage			
Value (quantitative)	Not set up		20,000 samples/year	More than 600,000 analyzed in BSL III

or Qualitative)			(BSL III lab reports)	labs
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved.</b> Regular sample collection taken from all different potential risk areas.			
<b>Indicator 17 :</b>	Lead time for availability of diagnostic results significantly reduced			
Value (quantitative or Qualitative)	No baseline was available		3 days	2 days from BSL II labs; 5-6 days for samples referred to BSL III and IV labs
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved.</b> Areas nearer to BSL III labs get initial results within 24-30 hours.			
<b>Indicator 18 :</b>	Emergency supplies available at strategic field locations			
Value (quantitative or Qualitative)	Limited		Adequate supplies of PPE kits and disinfectants	Field test kits and disinfectants available
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved.</b>			
<b>Indicator 19 :</b>	Regular meetings between health officials and animal husbandry officials			
Value (quantitative or Qualitative)	Regular in some states		Regular (at least one/six months)	it appears that that the coordination mechanism is weak in all states. Coordination efforts are robust only during emergencies.
Date achieved	09/30/2009		03/31/2012	03/31/2012
Comments (incl. % achievement)	<b>Achieved.</b> Monthly meetings held in high risk states and bi-monthly in at risk states by Additional Chief Secretary and Principal Health Secretary with all line department Secretaries			

### G. Ratings of Project Performance in ISRs

No.	Date ISR Archived	DO	IP	Actual Disbursements (USD millions)
1	10/08/2004	Satisfactory	Satisfactory	0.00
2	04/11/2005	Satisfactory	Satisfactory	6.80
3	10/11/2005	Moderately Satisfactory	Moderately Satisfactory	6.81

4	04/23/2006	Moderately Satisfactory	Moderately Satisfactory	6.81
5	10/19/2006	Moderately Unsatisfactory	Moderately Unsatisfactory	7.92
6	04/19/2007	Moderately Unsatisfactory	Moderately Unsatisfactory	8.82
7	07/19/2007	Moderately Satisfactory	Moderately Satisfactory	10.20
8	01/11/2008	Moderately Satisfactory	Moderately Satisfactory	13.74
9	07/15/2008	Moderately Satisfactory	Moderately Satisfactory	16.44
10	01/30/2009	Moderately Unsatisfactory	Moderately Unsatisfactory	18.13
11	07/31/2009	Moderately Unsatisfactory	Moderately Unsatisfactory	19.52
12	05/06/2010	Moderately Unsatisfactory	Moderately Unsatisfactory	22.52
13	11/13/2010	Moderately Unsatisfactory	Moderately Unsatisfactory	24.08
14	06/20/2011	Moderately Satisfactory	Moderately Satisfactory	25.99
15	02/08/2012	Moderately Satisfactory	Moderately Satisfactory	26.49
16	04/10/2012	Moderately Satisfactory	Moderately Satisfactory	26.49

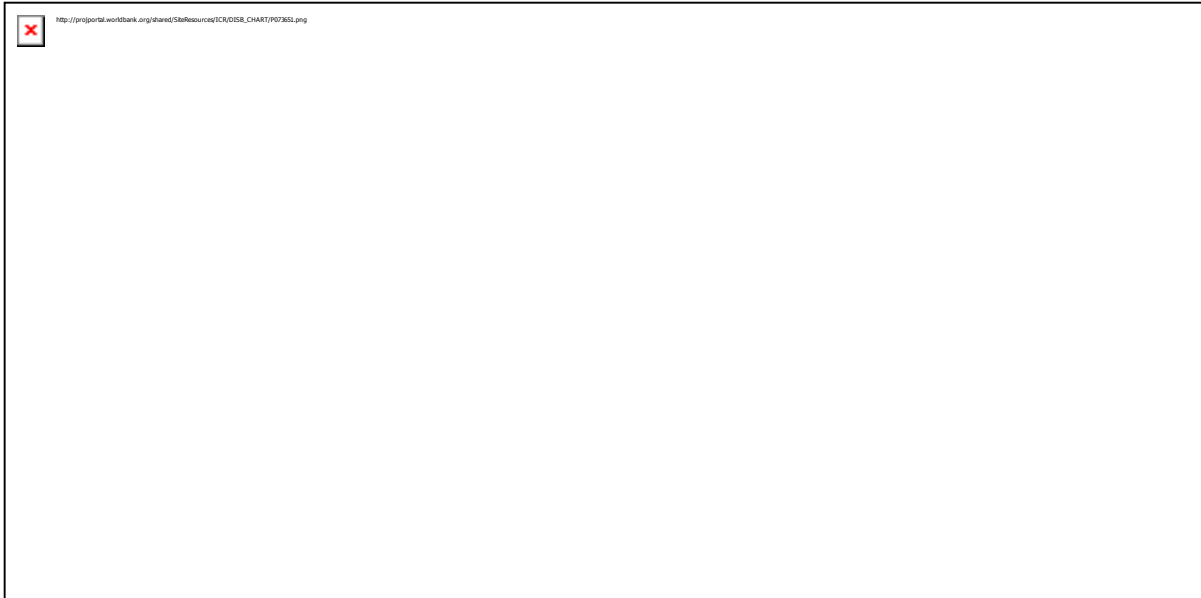
#### H. Restructuring (if any)

Restructuring Date(s)	Board Approved PDO Change	ISR Ratings at Restructuring		Amount Disbursed at Restructuring in USD millions	Reason for Restructuring & Key Changes Made
		DO	IP		
02/13/2007	Y	MU	MU	8.82	Inclusion of component supporting India's program for preparedness, control and containment of Avian Flu through IDSP
03/29/2010	Y	MU	MU	22.52	Project components restructured; project scope revised and restricted to 9 priority states; implementation structure revised; USD 8 million cancelled
12/09/2011		MS	MS	25.99	Cancellation of USD 15.954 million from Human Health Components
03/30/2012		MS	MS	26.49	Cancellation of USD 10 million from Animal Health Component

If PDO and/or Key Outcome Targets were formally revised (approved by the original approving body) enter ratings below:

	Outcome Ratings
Against Original PDO/Targets	Moderately Unsatisfactory
Against Formally Revised PDO/Targets (2007)	Moderately Unsatisfactory
Against Formally Revised PDO/Targets (2010)	Moderately Satisfactory
Overall (weighted) rating	Moderately Unsatisfactory

## I. Disbursement Profile



## 1. Project Context, Development Objectives and Design

### 1.1 Context at Appraisal

#### *Global context*

**Globalization of the world economy increases the reach and impact of pathogens.** Modern transportation means allow a person with early, minor, or misleading symptoms of a dangerous, highly contagious infection to be exposed to hundreds of others in planes, at airports around the world, and in every hotel visited or bus ridden. Businesses that transcend political boundaries and rapid transportation allow food contaminated in one country, to contaminate large quantities of other food in bulk processing plants in another country, and be shipped to additional countries where illnesses result.

**Emerging Infectious Diseases (EIDs) can be devastating,** as demonstrated by the emergence of novel Highly Pathogenic Avian Influenza virus (HPAIV) H5N1 in 1997, Anthrax incident in USA in 2001 and the swift spread of Severe Acute Respiratory Syndrome (SARS) globally in 2003. These diseases caused serious social instability, as well as heavy economic and human losses.

**Greater efficiency of surveillance systems is pivotal to disease prevention and timely response to disease outbreaks.** To overcome the disadvantages of the silos of individual disease programs, the concept of integrated infectious disease surveillance emerged in late 1990s and it was put into practice by a number of countries since then. In 2003, the World Health Organization (WHO) Regional Office for South-East Asia (SEARO) developed a regional Integrated Disease Surveillance (IDS) strategic plan in promoting an integrated approach to communicable and non-communicable diseases (NCD) surveillance. After the plan was issued, SEARO supported a comprehensive assessment of the national surveillance and response systems in a number of member countries in the Region.

#### *Country context*

**Government of India was committed to human development.** In its Tenth Five Year Plan covering 2002 to 2006, the ruling alliance asserted that it would retain the broadly liberal economic policy thrust of the last decade, with a strengthened emphasis on the social programs and benefits to low income groups, especially in rural areas. Delivery of public services was one of the four reform priorities in the plan.

#### *Health Sector Context*

**India was experiencing a dual epidemic of infectious diseases and NCDs.** WHO estimated that communicable diseases, maternal and prenatal conditions and nutritional deficiencies accounted for 50.3 percent (down from 56 percent in 1990) of the disability adjusted life years (DALY) lost and NCDs for the remaining 49.7 percent in India in



1998. It was predicted that NCDs such as cardiovascular diseases, diabetes, as well as injuries and mental illnesses would increase dramatically in the years to come.

**India was not performing as favorably when compared with other countries at the same level of income.** Despite its increasing public spending on health since 1990, reduction of IMR and MMR, India showed a clear sign of slowing down in achieving MDGs in 1990s and the country witnessed worsening HIV/AIDS issues. In addition, the disparity in health status between different states and different segments of the Indian population was prominent.

**The main health sector issues:** The major sectoral issues articulated in the Bank's *India Health Nutrition and Population Strategy* of June 2001 included: (i) low health status of the population, particularly the poor; (ii) inadequate institutional arrangements and weak program management; (iii) low quality of HNP services in both the public and private sectors; (iv) lack of proper targeting of the public funds to the poor; (v) inadequate framework for engaging the private sector; and (vi) low efficiency and limited financial resources. These problems existed within a general institutional environment of poor oversight and inadequate measurement of health system inputs and outputs.

**The Government strategy for improving health outcomes and health sector development:** the strategy involved: (i) increased community involvement; (ii) increased investments in economic growth and human development; (iii) decentralized planning and program implementation; (iv) integrating communicable, non-communicable and nutrition-related health services; (v) convergence of service delivery at the community level; and (vi) increased collaboration with the private sector and NGOs.

#### *Development of integrated disease surveillance*

**The disease-specific surveillance systems introduced over time in India existed for many years before the integrated disease surveillance was set up.** Such an approach suffered from a number of shortcomings: (i) a fragmentation of various disease surveillance systems; (ii) limited roles of other players within the systems because surveillance activities were centrally controlled; (iii) the number of diseases under surveillance was too large while at the same time some important diseases were neglected; (iv) inadequacy of laboratory support for disease surveillance; (v) deficient data analysis and utilization; and (vi) failure in prompting effective and timely responses to disease outbreaks.

**GoI was committed to addressing the challenges associated with the disease specific surveillance systems.** A five year plan was developed to introduce an integrated disease surveillance system across all districts in a phased manner. A central unit and a national coordination committee were established for implementing this initiative. GoI intended to standardize, consolidate and integrate different surveillance and control programs covering communicable diseases, accidents, water quality, outdoor air quality, surveillance of risk factors for NCDs, and state-specific priority diseases.

## **1.2 Project Development Objectives (PDO) and Key Indicators**

The PDO was to improve the information available to the government health services and private health care providers on a set of high-priority diseases and risk factors, with a view to improving the on-the-ground responses to such diseases and risk factors.

The key outcome indicators included:

- Number and percentage of districts providing monthly surveillance reports on time - by state and overall;
- Number and percentage of responses to disease-specific triggers on time - by state and overall;
- Number and percentage of responses to disease-specific triggers assessed to be adequate - by state and overall;
- Number and percentage of laboratories providing adequate quality of information - by state and center;
- Number of districts in which private providers are contributing to disease information;
- Number of reports derived from private health care providers;
- Number of reports derived from private laboratories;
- Number and percentage of states in which surveillance information relating to various vertical disease control programs have been integrated under the Integrated Disease Surveillance Project (IDSP);
- Number and percentage of project districts and states publishing annual surveillance reports within three months of the end of the fiscal year;
- Publication by the Central Surveillance Unit (CSU) of a consolidated annual surveillance report (print, electronic, including posting on websites) within three months of the end of fiscal year.

### **1.3 Revised PDO and Key Indicators, and reasons/justification**

The PDO and the key indicators were revised twice, both constituting level one restructuring, approved by the Bank Board of Executive Directors, as follows:

#### *(i) 2007 restructuring*

Three major factors contributed to the first project restructuring. Firstly, HPAIV H5N1 outbreaks in 2006 in India revealed the suboptimal AI surveillance and the inadequate capacity for laboratory investigation of AI at national and mainly regional levels. Secondly, the revised International Health Regulations (IHR, 2005) mandated member states to strengthen their existing capacities for public health surveillance and response, and report any event of potential international public health concern. Thirdly, the project implementation had been slow and a number of bottleneck issues emerged which needed to be overcome. The revisions in the PDO and the indicators reflected these changes.

The revised PDOs were to (i) improve the information available to the Borrower's health services and private health care providers on a set of high priority diseases and risk factors, with a view to enhance the mechanism for the on-the-ground responses to such diseases and risk factors; and (ii) to minimize the threat posed to humans by AI infection

and other zoonoses from domestic poultry and prepare for the prevention, control and response to an influenza pandemic in humans.

The key aspects of overall performance of the surveillance system would be assessed by using the following indicators:

- Number and % of districts providing monthly surveillance reports on time;
- Number and % responses to disease-specific triggers on time;
- Number and % of laboratories providing adequate quality information;
- Number & % of districts in which private providers are contributing information;
- Number & % of states in which surveillance information of vertical diseases control programs have been integrated;
- Number & % of project districts states and CSU publishing annual surveillance reports within 3 months of the end of fiscal year and Publication of CSU consolidated report;
- Non communicable diseases information (life styles & behavior) collected through surveys done once in 3 years;
- Evidence of improved public awareness and widespread adoption of recommended practices for the prevention and control of HPAI by poultry producers, distributors, and retail vendors; medical practitioners and the general public.

*(ii) 2010 restructuring*

The reasons for the second restructuring were (i) slow implementation progress as a result of serious human resource challenges - especially the lack of dedicated specialized human resources like epidemiologists, and microbiologists – and a focus on a high number of peripheral laboratories hampered implementation, and (ii) the pandemic influenza caused by the novel H1N1 virus in 2009 yet again highlighted the importance of surveillance and rapid response to infectious diseases. The restructuring aimed to streamline the project design by focusing on 9 states rather than country-wide, and focus on overcoming the human resource challenges within an extended project period.

The revised PDO was to support the GoI to strengthen the integrated disease surveillance and response system for epidemic-prone diseases by (i) enhancing central level monitoring and coordination functions, and (ii) improving state/district surveillance and response capacity with emphasis on selected (nine) states. Additionally, the project was to support GOI efforts to timely prepare for, detect and respond to influenza outbreaks in humans and animals.

The streamlined set of key indicators included:

- Percentage of districts providing surveillance reports timely and consistently in 9 priority states;
- Percentage of responses to disease specific outbreaks assessed to be adequate as measured by 3 essential criteria in 9 priority states;
- Improved diagnostic capacity for H5N1 and H1N1, as measured by:
  - Number of functional diagnostic laboratories for human influenza established; and
  - Number of functional BSL3 laboratories for animal influenza established.

#### **1.4 Main Beneficiaries**

The beneficiaries were not explicitly specified in the PAD although it is clear that the project was intended to benefit the general population with the reduced disease burden as a result of timely identification, reporting and response. It had secondary beneficiaries in the community-level workers, paramedics and health professionals, policy makers working at different levels would benefit from training and technical assistance under the project. Their capacity for identifying and responding to infectious diseases would be improved with laboratory equipment and response kits supplied by the project.

The beneficiaries of the Tribal Development Action Plan (TDAP) were to consist of all the tribal populations in the pilot blocks in the selected project states and districts. Integration of the various disease surveillance programs were to provide complete and coherent health information, better monitoring of disease burden and improve health system response in the tribal areas. Community-based information would be a key input to the District Surveillance Unit (DSU) to coordinate all the analysis, feedback of information and response to diseases. All of these interventions were to have a positive impact on the tribals and their health status.

## **1.5 Original Components**

**Component 1: Establishing and Operating a Central-level Disease Surveillance Unit (US\$2.02 million).** Under this component, the Ministry of Health and Family Welfare (MOHFW) was to establish a new Disease Surveillance Unit at the central level to help coordinate and decentralize disease surveillance activities. This new unit was to support and complement the states' disease surveillance efforts. The unit was to be staffed by existing permanent staff reassigned from within the MOHFW. This component was to address the constraints of lack of coordination despite central control of surveillance activities and the need for changing the list of diseases included in the system. Effective coordination (as compared to control) of disease surveillance activities depends on establishing the appropriate processes and institutional arrangements at the central level.

**Component 2: Integrating and strengthening disease surveillance at the state and district levels (US\$40.54 million).** This component was to address the constraints imposed by lack of coordination at the sub-national levels, the limited use of modern technology and data management techniques, the inability of the system to act on information and the need for inclusion of other stakeholders. It was to integrate and strengthen disease surveillance at the state and district levels, and involve communities and other stakeholders, in particular, the private sector.

**Component 3: Improving laboratory support (US\$22.67 million).** This component was to support: (i) upgrading laboratories at the state level, in order to improve laboratory support for surveillance activities. Adequate laboratory support is essential for providing on-time and reliable confirmation of suspected cases; monitoring drug resistance; and monitoring changes in disease agents; (ii) the introduction of a quality assurance system for assessing and improving the quality of laboratory data.

**Component 4: Training for disease surveillance and action (US\$2.77 million).** The changes envisaged under the first three components required a large and coordinated training effort to reorient health staff to an integrated surveillance system and provide the new skills needed. Training programs under this component were to be targeted at representatives from the private sector, NGOs and community groups.

## **1.6 Revised Components**

An additional component was added to the Project during the 2007 restructuring, named “Support to India’s Country Program for Preparedness, Control and Containment of Avian Influenza”. It included three sub-components: (i) human health; (ii) animal health; and (iii) public awareness and coordination support. The total cost of that component was US\$32.63 million of Bank financing. The allocation for the original component 2 and 3 was reduced to US\$30.58 million.

The restructuring in 2010 regrouped the previous project design into three components, as follows:

**Component 1 Central Surveillance Monitoring and Oversight (US\$6.01 million):** Strengthening disease surveillance capacity at the central level through, *inter alia*, the financing of: (i) technical and managerial staff in the CSU; (ii) the information technology network including the portal, the satellite network, the call center, the SMS based reporting system, the strategic health operations center and maintenance of existing hardware/software; and (iii) training activities.

**Component 2: Improving State/District Surveillance and Response Capacity (US\$22.66 million).** Strengthening disease surveillance capacity in selected states through, *inter alia*, the financing of: (i) surveillance staff; (ii) operating costs for state surveillance and outbreak investigations; (iii) training activities; (iv) priority public health laboratories (including equipment and operating costs); and (v) the establishment of a laboratory referral network (on a pilot basis) and its evaluation.

**Component 3: Flu Surveillance and Response (US\$30.53 million).** This component included two sub-components:

(a) Human Health: Strengthening preparedness, detection and response capacity to influenza outbreaks in humans through, *inter alia*, the financing of: (i) selected laboratories (including equipment and operating costs); (ii) specialized laboratory technicians; (iii) drugs, vaccines, kits to control and respond to influenza epidemics in humans; and (iv) training activities.

(b) Animal Health: Strengthening preparedness, detection and response capacity to influenza outbreaks in animals through, *inter alia*, the financing of: (i) selected laboratories (including works, equipment and operating costs); (ii) technical and managerial staff in the Bird Flu Cell (BFC); (iii) training activities; and (iv) necessary equipment to respond to outbreaks.

## Changed scope and scale:

### *Human health*

- Disease surveillance and response was focused only on infectious diseases with outbreak potential after 2010. NCD surveillance was dropped from the Project;
- the number of project states was reduced to nine states from all thirty five states and territories.

### *Animal health*

- AI surveillance among wild birds (component B1.1), satellite mapping of bird sanctuaries, water bodies and wetlands (B1.3), development of GIS-based animal disease surveillance and information system (B1.4) were dropped from the Project because of procurement constraints.

### *Human and animal health*

- Establishment of a Bio-safety (BSL) Level IV laboratory was dropped because this high tech laboratory could not be designed and constructed within the project period. Priority was given only to strengthen laboratories for detection of outbreaks in humans and animals. A functional network of 12 regional laboratories for routine surveillance of H5N1 and H1N1 in humans was set up and functioning.

## Other significant changes

**Modified implementation arrangements and schedule:** (i) for the animal health sub-component, a fully staffed national bird flu cell (BFC) was expected to be established and responsible for the coordination of implementation under the overall supervision of the Department of Animal, Dairy and Fishery Joint Secretary; and (ii) for the human health sub-component, staffing for the Central Surveillance Unit (CSU) would be further strengthened and tasked with regular supervision of state level activities under Component 2 and 3a, in addition to the implementation of activities under Component 1 and 3a.

**Cancellation of credits:** The original Credit amount of SDR46.9 million (US\$68 million) was reduced to SDR24.61 million, of which SDR18.17 million was disbursed at the end. There were three cancellations made, as follows: (i) US\$8 million was cancelled during the 2010 restructuring as a result of reduced project scope from 35 states and territories to 9 states, with the number of human health laboratories to be set up at district level also significantly reduced; (ii) in 2011, a cancellation of US\$15.95 million was made from Human Health Components to further reduce the original project scope to make it as realistic as possible with estimated needs; and (iii) finally, US\$10 million cancellation was made for the Animal Health sub-component under Component 3 of the project because it was impossible to spend the remaining allocation for the sub-component by the project Closing Date of March 31, 2012. The Government requested an extension of the Closing Date to complete that sub-component but agreement on this extension could not be reached with the Bank since conditions for readiness of the project

sites was not met according to the agreed plan. Hence, completion of that sub-component would take a much longer time than the requested extension period given previous delays.

**Table 1: Changed Project Financing Plan**

	<b>Original</b>	<b>Restructuring in 2007</b>	<b>Restructuring in 2010</b>	<b>Final Disbursement</b>	
	Amount (Million USD)	Amount (Million USD)	Amount (Million USD)	Amount (Million USD)	% of the Original Allocation
<b>World Bank</b>	68	68	60	26.49	39.0
<b>GoI</b>	20.64	20.64	32	17.14	83.0
<b>Total</b>	<b>88.64</b>	<b>88.64</b>	<b>92</b>	<b>43.63</b>	<b>49.2</b>

**The project closing date was extended twice.** The original Closing Date of September 30, 2009 was extended to March 31, 2010 during the 2007 restructuring. In 2010, the ClosingDate was extended to March 31, 2012 in order to complete the restructured activities.

## **2. Key Factors Affecting Implementation and Outcomes**

### **2.1 Project Preparation, Design and Quality at Entry**

**A number of novel disease surveillance activities were under pilot by the time of project preparation.** National Surveillance Program for Communicable Disease, a syndromic surveillance system focusing on diseases with outbreak potential, was piloted in 100 districts under the leadership of the National Institute of Communicable Diseases (NICD) with support from WHO; Pilots of integrated disease surveillance system in selected districts in the states of Tamil Nadu and Maharashtra; and, a pilot scheme for NCD surveillance under the All-India Institute of Medical Sciences was implemented. These experiences and the lessons learnt informed the design of the Project.

The Project was well designed technically, informed by the existing experiences, with the participation from WHO, a number of domestic institutions and academic networks as well as the Bank team. Integration of disease surveillance and response represented the updated understanding of public health surveillance and was promoted by WHO and other international organizations. The potential spread of infectious diseases needed to be curtailed. Hence, it was legitimate and imperative to develop a nation-wide disease surveillance and response system. Also, in order to extend the reach of disease surveillance, community participatory disease reporting, the tribal action plan, and the involvement of private service providers were included in the design. The project was designed to harness the advances in information and communication technologies (ICT) and geographic information system (GIS). Potential social and environmental issues were adequately identified and the respective strategy or action plans were developed.

**The preparation of the project reflected an urgent need to integrate disease surveillance programs in India.** This was in line with similar initiatives developed at the same time around the world. Indeed, international technical agencies, such as WHO, FAO, and International Office of Epizootics (OIE), had developed technical strategies and guidelines for implementation of integrated disease surveillance response at regional and country levels.

**The GOI was committed to the development of the integrated disease surveillance and response system.** A national plan was developed and a central unit responsible for promotion of the system was established within the MOHFW. The Central Government assumed full responsibility for repayment. Hence the project proceeds would be allocated to states as grants. Memoranda of Understanding were signed between the GoI and all the states on their roles in implementation of the Project.

**The added value of the Project:** The project was positioned to build on and coordinate across previous investments by the Bank and other donors in disease surveillance, as well as to stimulate and accelerate the process of decentralization of disease control efforts to the states. The project also meant to strengthen capacity to respond to emerging changes in disease patterns and to strengthen overall capacity to manage public health programs.

While the project was technically well prepared and the nine risks identified were relevant, **at least four risks were underrated.** These four risks were all rated as Moderate. However, as it turns out, these risks were indeed major impediments to smooth implementation and therefore should have been rated higher, in retrospect. The four identified risks were as follows: (i) the project would not expand at the rate proposed in the phased approach with the result that the project will not be implemented on the scale intended; (ii) districts do not have the skills, resources and authority to move to an action-oriented surveillance system and are unwilling or unable to involve villages and the private sector; (iii) delayed procurement; and (iv) delayed assignment of staff and consultants. Among these four risks underrated, the real bottlenecks were delayed assignment of staff and consultants and delayed procurement because of human resource challenges.

Also, it is important to note that the project took three years to prepare. This prolonged period was due to the difficulty in identifying appropriate institutional niches for project implementation. This was regrettable in view of the fact that similar projects supported by the World Bank in Argentina and Brazil took shorter periods of time to prepare and were able to yield benefits of the project much earlier.

## **2.2 Implementation**

Initially, the project had a smooth start but very soon it entered into a prolonged period of slow implementation, starting in the second year. The project encountered a number of critical bottlenecks including (a) difficulty in hiring quality technical staff and project management staff; and (b) delays in project procurement of goods and consultancies because both the GoI and the Bank could not reach an agreement on the appropriate rules



and procurement methods in a timely manner. To overcome these challenges, the 2010 restructuring shifted and narrowed down project support to a number of technical and geographic priorities: (a) the diseases with outbreak potential; (b) the nine best performing states; and (c) a reduced number of laboratories for both human and animal health sectors, significantly different from those at the time when the project was started in 2004. The scaling back of project size and foci turned out to be a pragmatic approach and far more realistic than the originally planned activities and objectives. Such an approach was feasible as the GoI opted to use its own budget to replace the originally planned project proceeds to implement some of the planned procurement. This resulted in a substantial cancellation of the project proceeds, first during the 2010 restructuring and subsequently in 2011.

### **Factors and events that favorably contributed to the project implementation**

- **Supportive global and country specific political and economic environment:** (i) the heightened global awareness and commitment to EIDs and NCDs exemplified by the declaration of commitment to the MDGs, the issuance of revised International Health Regulations (IHR) and the Asia Pacific Strategy for Emerging Diseases (APSED) and the UN summit on NCDs; (ii) continuous economic growth over the years led to the increased revenue for the government to use for the social development including better health for people.
- **GoI demonstrated strong commitment to the establishment of IDSP in India.** To address the human resources crisis faced by the Project, the National Rural Health Mission (NRHM) sanctioned all contractual positions of epidemiologists, microbiologists and entomologists needed for the functioning of the integrated disease surveillance system. The Government assumed a greater responsibility for funding the project after the Bank and Government decided to cancel part of the Bank's credit and also for funding the IDSPs in the states that were dropped from the Project in order to make sure the IDSPs had the full coverage of all states and territories in India.
- **Development of IT infrastructure:** Proliferation of advanced ICT infrastructure helped tremendously to increase the coverage and quality of IDSP, even in remote areas. The creation of the IDSP portal made data entry, query, and analysis with graphs and report generation at district level possible. The Portal also served as a repository for on-line IT training modules and made other information resources related to disease surveillance available for all IDSP units. Broadband access allowed video conferencing (VC) and training. The improved quality and coverage of mobile phone and landline services in India made the functioning toll free Call Centers a reality.
- **Fully-functional Central Surveillance Unit (CSU):** In the early years of project implementation, there was limited supervision and technical assistance from the understaffed CSU. Inadequacies in arrangements for trouble shooting and technical support to states were frequently documented in the supervision Aide-Mémoire on account of the lack of sufficient manpower at the CSU. Remarkable strengthening of CSU was observed after the 2010 restructuring, which correlated well with the expedited progress toward achieving the set targets.

- **Local champion:** Local political and technical leadership was imperative for the success of IDSP at state level and below. For instance, in the State of Gujarat, where ICR mission field visits were undertaken, the state level policymakers were very forward-looking, and committed to the overall health development and the project. The state surveillance officer was extremely dedicated to the project. As a result, the IDSP implementation in Gujarat was impressive. Highlights of the achievements in the State included (i) sufficient staffing for the project at all district levels; (ii) a comparatively wider coverage of private health service providers and hospitals in the surveillance network; (iii) piloting TDAP; (iv) piloting data entry on IDSP portal at block level; (v) using GIS for data presentation and visualization; (vi) joint human health and animal health investigation and response to Crimean Congo Hemorrhagic Fever (CCHF), and public health partnership with other sectors for acute diarrheal disease prevention and response.
- **International technical assistance:** WHO played an important role in assuring the quality of the IDSP. SEARO developed the regional Integrated Disease Surveillance (IDS) strategic plan to guide member states in the region to set up the IDS systems. Issuance of revised IHR (2005) and APSED and their implementation provided the legal and technical framework for the project. The WHO Country Office provided dedicated staff including a full time microbiologist and 50% of staff time from two epidemiologists, one information technology specialist and one microbiologist. Support from United States Centers for Disease Control and Prevention was also important for the improvement of quality through independent assessment, networking with the national center for disease control and other forms of technical assistance.
- **Training activities:** At the central and state levels, a large number of orientation and refreshment training activities were implemented by a network of national and state institutes and universities contracted under the project. With the improvement in staff training, a steady improvement in technical performance in surveillance coverage, timeliness, consistency, and number of outbreaks detected and investigated was observed. Under the animal health component, ninety five percent of veterinary and para-veterinary staff were trained under the project, and overseas postgraduate training was organized for 25 veterinary staff, which significantly upgraded the capacity of the regional centers for veterinary services.
- **Flexibility in adapting to changing circumstances:** The project responded swiftly and positively to the changed needs for disease prevention and control in the country. For instance, with the reported outbreaks of HPAIV (H5N1) in India, the Bank and the GoI quickly reached an agreement on the restructuring of the project to respond the perceived threat from HPAI H5N1 for both human and animal health sectors in 2007. Besides, after 2010, as the investment from the GoI increased for the national IDS program, the project proceeds were strategically shifted and focused on the aspects that could generate greater added values by focusing on improving technical oversight from the CSU as well as the selected technical and geographic priorities.

## Factors and events which negatively impacted project achievements

- **Chronic HR related issues:** Lack of adequate and qualified human resources constantly plagued the project. As demonstrated in Table 2, even by the time of project completion, still a significant number of the needed staffposts remained unfilled or untrained. Besides, as frequently documented in the supervision Aide-Mémoires, the project suffered from high turnover of technical, financial management (FM) and procurement management (PM) staff because of (i) limited availability and uncompetitive salary structures; (ii) lack of job security; and (iii) unequal opportunities for training and promotion of the contracted staff working for IDSP in comparison with those of full-time government officials. In addition, centralized recruitment of the project staff in the early phase of the project also exacerbated the human resource challenges.

**Table 2: Hiring and Training Status of Selected Professionals by March31, 2012**

Category	Sanctioned number of staff	Posts filled	Number of staff trained
<b>Epidemiologist</b>	231	127	112
<b>Microbiologist</b>	26	22	22
<b>Entomologists</b>	9	7	6
<b>Total</b>	<b>266</b>	<b>156</b>	<b>140</b>

*Notes:* Data from Borrower's Project Completion Report, March 31,2012.

- **Low capacity of project financial and procurement management:** This was problematic at national and state levels, and contributed to serious delays in project implementation and dampened the enthusiasm of the participating districts and states. Mainly, key problematic issues included (i) poor quality of FM practices and delayed financial reports, and (ii) significant amount of ineligible expenditures. Also, the project was affected by the outcome of the Detailed Implementation Review (DIR). The DIR Action Plan<sup>1</sup> prohibited decentralized expenditures and since the project was designed to finance such expenditures at local level, this new rule led to enormous frustration among the project states and below. A substantial amount of time during supervisions was devoted to procurement and expenditure eligibility issues.
- **Safeguard compliance:** As described below, in Section 2.4, there was significant delay in implementing the agreed safeguard actions and the actions were implemented partially.

## 2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

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<sup>1</sup> A Detailed Implementation Review (DIR) is an instrument used by the World Bank to help assess the risk of fraud and or corruption. Based on the DIR findings in some health sector projects in India, a joint action plan was developed in cooperation with the Ministry of Health and Family Welfare (MoHFW), to address and remedy issues raised by the DIR and address key aspects of systemic weaknesses in the health sector.

**Design of the M&E system:** The Results Framework (RF) was designed for gauging the system's performance in terms of coverage and consistency of disease/outbreak reporting, timeliness of outbreak detection and response. The RF included a number of key performance indicators, of which, most were sound. The PDO and intermediate outcome indicators were systematically documented. The RF was revised twice during the project implementation to reflect the changed PDO and the components.

While the RF (particularly following the 2010 restructuring) was adequate to measure the PDO, it did have a number of deficiencies worthy of notice: (i) the framework did not measure some critical technical performance indicators such as sensitivity<sup>2</sup> and specificity<sup>3</sup>, both of which should typically be included as indicators for disease surveillance systems; (ii) the indicator measuring timeliness of reporting failed to capture the time interval between the date of disease suspected or diagnosed and the date of reporting; (iii) it would have been better to measure the number of suspected HPAI H5N1 and novel pandemic H1N1 samples processed (output indicator reflecting functional status) rather than the number of functional diagnostic laboratories for human influenza established and number of functional Bio-Safety Level II/III laboratories for animal influenza established; and (iv) it would also have been helpful if independent evaluation activities such as under reporting investigation, cost effectiveness analysis, were planned as part of the project design.

**Implementation of M&E activities:** Limited capacity for data analysis was prominent and prevailing during the early phase of the project because there was no designated full time staff working on M&E activities at central and local levels. As implementation moved forward, this issue was progressively addressed. It gradually became a norm for all states to systematically collect information on key project indicators, though the quality varied.

**Utilization of M&E information:** Increasingly in the last two years before project completion, it became evident that feedback to the states and districts was provided based upon monitoring results for continuous quality assurance and improvement, and the M&E information was used for the targeted supervision and technical assistance<sup>4</sup>. Besides, weekly reports of a standardized list of infectious diseases were accessible to policy makers as well as the general public. The disease surveillance information was made available for development of different national programs such as for vaccine preventable diseases, etc.

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<sup>2</sup>Sensitivity measures the proportion of actual diseases or outbreaks which are correctly identified and reported. A sensitive surveillance system will win time for disease response.

<sup>3</sup>Specificity measures the proportion of no disease or outbreak which are correctly identified. The higher specificity of a surveillance system, the fewer false alarms, and less resources wasted.

<sup>4</sup>For instance, based upon monitoring information, visits made by senior officers of MOHFW and CSU helped in improving IDSP implementation in the states of Tamil Nadu, Uttarakhand, Karnataka, Gujarat, Haryana, HP, and Rajasthan.

**Sustainability of the M&E arrangements:** Benefits of the M&E efforts have been fully appreciated by the GoI. It intends to maintain the arrangements. However, unless there is full time, well trained and designated staff working on M&E at different levels, the M&E arrangements designed under the project are not likely to be further improved.

On balance, design, implementation and utilization of M&E are rated as **Moderately Satisfactory** given steady progress over the project period.

#### **2.4 Safeguard and Fiduciary Compliance**

Enforcement of safeguard policies was delayed, particularly in the early phase of the project implementation when the project implementers were struggling for getting the basics such as increased coverage, and improved consistency of reporting right.

**Bio-waste Management Plan (BWMP):** The potential environment impact of the project was rated as B at appraisal. Out of the eight agreed actions to be taken, six of them failed to be accomplished by the end of the first year as agreed. Laboratory bio-safety guidelines were not developed and the supplies to district/sub-district level for specimen collection and transport were not provided until 2009 (this means four years' delay). Efforts in implementation of the plan were only started in 2010. One of the reasons for the delayed implementation was that many national programs had implemented bio-waste management measures in the facilities covered by the project. However, there was no evidence that a required monitoring and reporting system for the bio waste management program was established and integrated in the overall project monitoring even by the end of the project.

**Tribal Development Action Plan (TDAP):** The Action Plan was developed before the project started. According to the plan, the tribal development action should be implemented in at least seven out of the nine project states after the 2010 restructuring. However, translating the plan into action was delayed, and in a significantly reduced scale and coverage. The project did not make any progress in implementing the plan until late 2010 when the states of Gujarat, Maharashtra and Karnataka started the pilots of the community based disease surveillance initiatives in the localities where tribal groups concentrated. The hiring of a communication and documentation specialists and preparation of IEC action plan was also delayed. As documented in the agreed TDAP, compared to their majority peers, tribal groups suffered from more health problems and greater difficulty in access to health services. The project may potentially enlarge the disparity in health status and access to health care services because of delay in the implementation of the TDAP. Unfortunately the project failed to report any disaggregated data to demonstrate whether the tribal groups were participated in and benefited from the project, as mandated in the TDAP.

The implementation of Biomedical Waste Management Plan (BWMP) and Tribal TDAP is rated as **Moderately Unsatisfactory**.

**FM and procurement compliance:** Before 2010, the project was frequently rated as moderately unsatisfactory or unsatisfactory for financial and procurement management. There were serious delays in implementing the project procurement plan and fulfilling the requirements for financial audit. There were frequent occurrences of ineligible expenditures involving a significant amount of the project proceeds.

Financial management for the project was improved significantly after 2010. The financial management arrangements for the project were established at different levels. FM team at central level became stable. The financial reporting requirements were streamlined. As a result, the financial reports, in terms of quality, reliability and timeliness, improved.

Financial management compliance under the project is rated as **Moderately Satisfactory** and procurement compliance under the project is rated as **Moderately Unsatisfactory**.

## **2.5 Post-completion Operation/Next Phase**

**IDSPs were operated in all states in India.** The only difference was the sources of funding. While the nine project states were funded by the Project, the rest were financed by the GoI. The rest of discussion in this section applies to the IDSPs in all states.

**The NCDC and the states have developed basic technical expertise in a functioning integrated disease surveillance and response system.** An echelon of technical professionals including epidemiologist, microbiologist, entomologists, statisticians, data managers, etc. were recruited and trained under the project. The networks of public health and veterinary laboratories were established and are functioning. Viable modes of and good practices in community-based surveillance, hospital-based surveillance, urban surveillance schemes, rapid investigation and response, etc., were developed and can be further scaled up.

**Integration with the existing health programs:** GoI has integrated the National Disease Surveillance Project under the NRHM. All the posts working for IDSP in project and non-project states have been continued by the Government with domestic funding support. Development of regional CDCs and inclusion of disease surveillance as one of its key responsibilities would further improve sustainability of the project achievements. The laboratory network established under the animal health components has become an integrated part of the regional disease diagnostic laboratories.

**Secured Funding:** For the human health components, after the project restructuring in 2010, MOHFW assumed all the funding responsibility for the integrated disease surveillance in 26 states and union territories that were not included in the restructured project. Funding beyond 2012 for the Project has been planned by GoI under the budgetary provision in the 12th Five Year Plan (2012-2017). On the animal health sub-component under the project, the budget line established for co-financing the project activities has been continued after the project was completed.

**Consolidation of the achievements request additional efforts.** GoI needs to further expand the coverage and quality of the IDSP in the whole country. The key for achieving this target lies in how to recruit, maintain and further strengthen the capacity of a stable workforce for infectious disease surveillance and response. To establish a nation-wide CDC system provides an opportunity for sustain this essential public health function.

The integrated disease surveillance system is **highly likely to be sustained** in India.

### **3. Assessment of Outcomes**

#### **3.1 Relevance of Objectives, Design and Implementation**

**The PDO was and remains Highly Relevant to one of the CAS (2009-2012) pillars: increasing the effectiveness of service delivery.** Information generated from the IDSPs is a public good that all Governments should be obliged to provide. Such information is crucial for designing the overall health sector strategy, and specifically the appropriate preventive and curative interventions to address the determinants of disease occurrence and spread. It is also useful for improving the efficiency of public spending on health with better targeting in terms of disease, geographic and temporal distribution, as well as population. Since diseases do not spread evenly and the disadvantaged and the poor are often at greater risk, an improved disease surveillance and response system will certainly have positive implications on poverty alleviation.

**The revised PDO in 2007 and 2010 were Highly Relevant by incorporating surveillance and response the threat posed to humans by AI infection, the novel H1N1 influenza and other zoonoses.** New infectious diseases have kept on emerging and infecting the human population. In the last 30 years, about 40 new infectious diseases emerged on this planet and the world today is even more vulnerable to infectious diseases than before because of (i) improved transportation and the resulting increase in human, animal as well as pathogen mobility, (ii) urbanization and consequential high population density. Besides, infectious disease in India still contributes to a significant portion of disease burden.

**The project design and implementation before 2010 was Moderately Relevant to the original and the revised PDO in 2007.** The technical design was sound, but the implementation was faced serious challenges in terms of (i) inadequacy in capable human resources; (ii) procurement issues; and (iii) ineligible expenditures.

**The project design and implementation were Highly Relevant to the revised PDO in 2010.** The project design was streamlined and focused more on performance and outcomes. It highlighted the efforts needed for establishing monitoring and oversight roles of the CSU. After the restructuring, the staff number in the CSU increased significantly. The project became pragmatic and focused on a smaller number of states in order to set up fully functional disease surveillance and response systems as a

demonstration to the rest of the country. It also recognized the urgent need to prepare for, detect and respond to HPAI H5N1 outbreaks and the possible human influenza pandemic.

Relevance of the PDOs, design and implementation is rated as **High**.

### 3.2 Achievement of Project Development Objectives

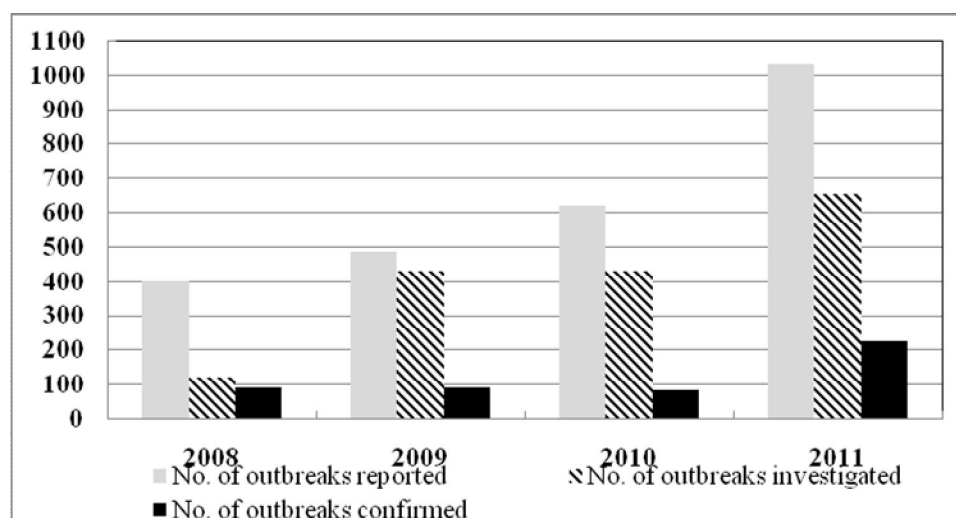
Three of the four PDO indicators and seventeen of the nineteen intermediate outcome indicators were achieved (Table 3).

**Table 3: Progress Made for the Project PDO and Intermediate Outcome Indicators**

Indicator	PDO Indicators (%)	Intermediate Outcome Indicators (%)
<b>Total Number</b>	4	19
<b>Achieved</b>	3 (75)	17 (89)
<b>Partially achieved</b>	1 (25)	2 (11)

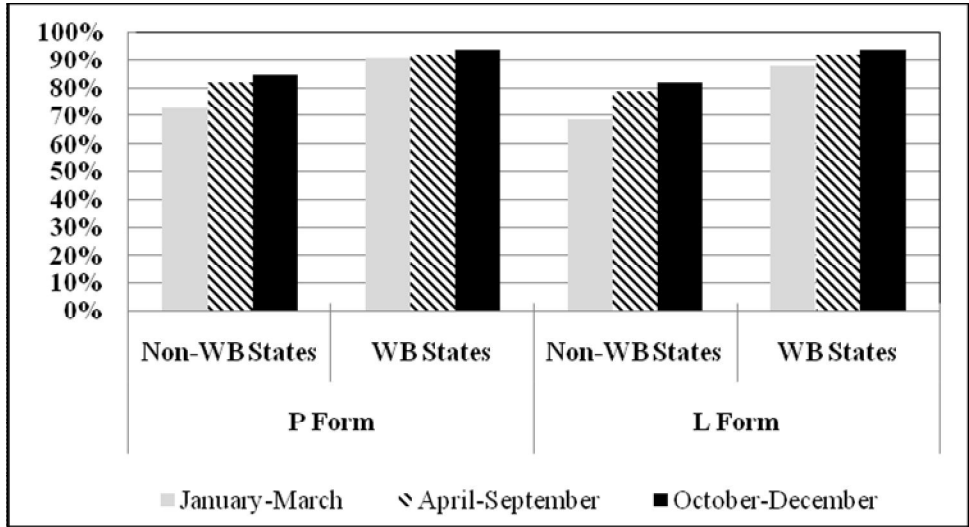
The number of infectious diseases and outbreaks that were reported, investigated and confirmed increased over time (Figure 1 and Annex 3). A similar pattern was also reported in China and other countries with newly established disease surveillance programs as a result of reduced underreporting of diseases and outbreaks. Besides, the quality of disease reporting measured by timeliness and consistency increased and the coverage of reporting via internet improved over time. More importantly, measured by these indicators, the project states out-performed the non-project states (Figure 2 and 3).

**Figure 1: Number of Outbreaks in Nine World Bank Project States Since 2008**



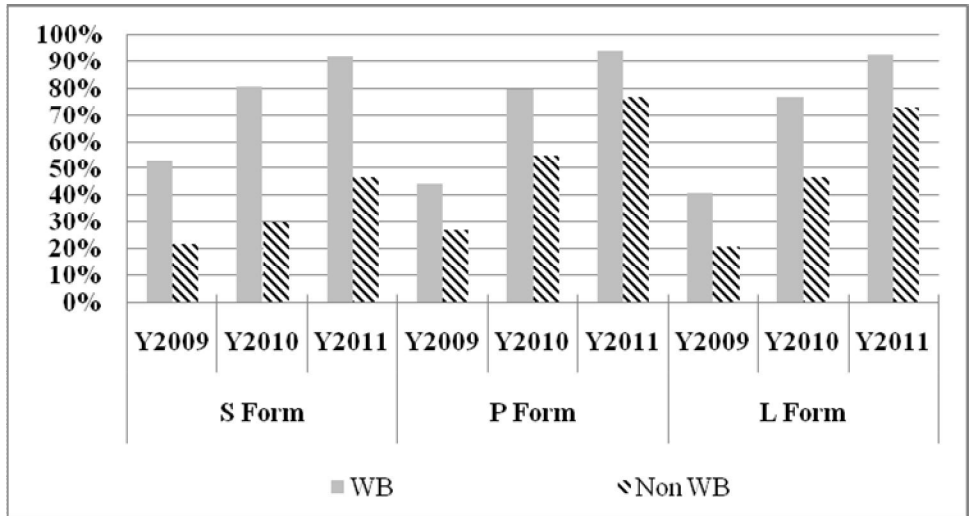


**Figure 2: Improved Quality of Disease Reporting over Time in 2011**



**Notes:** P stands for probable cases; L stands for laboratory confirmed cases.

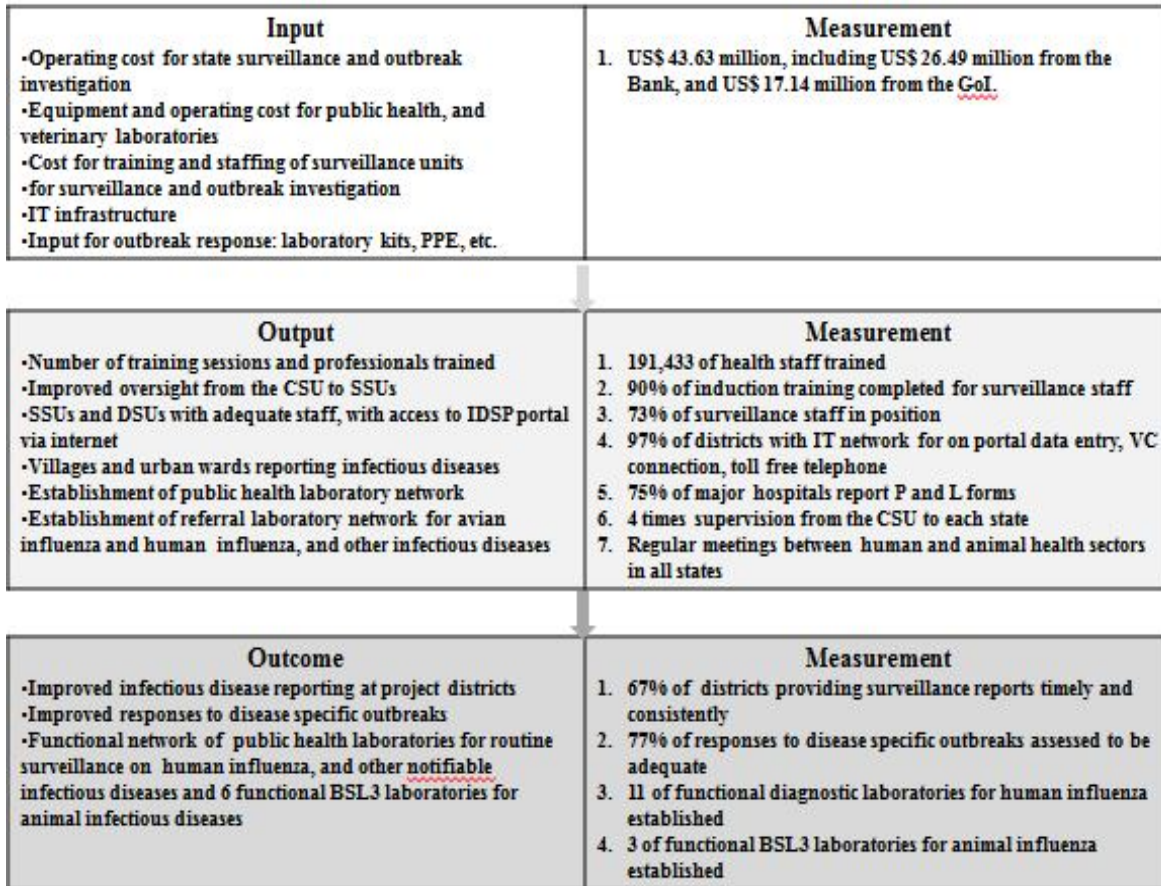
**Figure 3: Percentage of Diseases Reported via IDSP Portal over the Years**



**Note:** The portal was established in 2009. **Sources:** Central Surveillance Unit, NCDC, 2012.

The outcomes achieved corresponded well with the progress made in output indicators/criteria such as (a) number of staff recruited and trained, (b) number of supervision by CSUs to SSUs, (c) number of communication between human and animal health sectors, and (d) improved IT infrastructure for disease surveillance and response, as illustrated by the project result chain (Figure 4).

Figure 4: The Project Result Chain



The Project represented the only mainstream disease surveillance and response initiative covering 24 diseases and conditions in the project states. The establishment of CSU, SSUs and DSUs was solely funded by the Project (including the government counterpart funds), and the same was the training of professionals working on the integrated disease surveillance, and the necessary equipment provided to public health and veterinary laboratories at state and district levels. Hence, the achievements in disease surveillance and response in the project states and districts can be attributed to the project.

It should be emphasized that the project’s impacts went beyond the nine states because (a) while the Project covered only nine states since the restructuring in 2010, GoI continued the integrated disease surveillance and response systems in the remaining states and territories by using the same technical approach; (b) even after the restructuring in 2010, the Project continued to support capacity building for CSU that provided technical assistance and supervision to all states and territories; (c) the established BSL3 laboratories under the animal health component functioned as the regional reference laboratories serving not only the stationed states but also the neighboring states.

**The achievement of the PDO is rated as Moderately Unsatisfactory.** This rating reflects the favorable results made in achieving intended outcomes in nine states and the positive impact of the project on the integrated disease surveillance and response systems in other states. However, it should be noted that the significantly reduced project scope, as compared to the original intent, and the weighted ratings pre and post restructurings pointed to a moderately unsatisfactory rating, as per calculations documented in Annex 9.

### 3.3 Efficiency

The project adopted a low cost approach and improved efficiency, compared to the old disease surveillance systems in India before the project for a number of reasons:

- The new system focusing on a manageable subset of twenty four priority diseases/conditions/factors represented a cost effective approach because (a) before the project, the number of conditions under disease reporting and surveillance was between 50 and 65 in most states. With the implementation of the project, the separated disease reporting systems were merged as a single one that saved redundancy in terms of human resources and running cost; (b) the diseases/conditions selected under the IDSP represented the major contributors to the country's or states' overall disease burden;
- The operating cost for such a project was low. Under different scenarios, the incremental cost per capita per annum for the project ranged from US\$ 0.01 to 0.02 (Annex 3). Another study also revealed that the annual incremental cost for operating a similar integrated surveillance and response system in a district with a population of 5 million in Tamil Nadu, south India was only US\$ 0.01 per capita (John J. et al, 1998);
- In the project states, the project was mainly operated in rural areas rather than urban centers. Such targeting represented a greater efficiency in use of resources for surveillance since infectious disease dominated the morbidity pattern in rural areas than in urban areas in India (MOHFW, 2011);
- By the end of the project, ninety seven percent of districts started to report disease via portal instead of traditional ways of using telephone calls, faxes, and emails. IT infrastructure was used for training and feedback. This represented gains in efficiency in data collection and communication;
- Underreporting of infectious diseases were reduced (Annex 3) and the time between the date of outbreak and the data of notification of laboratory results was shortened from more than a week to two days. Nowadays, on an average, 20-30 outbreaks are reported every week by the states. Earlier, only a few outbreaks were reported in the country by the States/UTs<sup>5</sup>. This would result in a significant number of lives saved, and new infections averted;
- The project may demonstrate a higher efficiency than the rest of other non-project states. For instance, in terms of infectious disease outbreak reported, from 2008 to 2011, the nine project states reported 72%, 63%, 63%, and 62% of the total

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<sup>5</sup><http://www.idsp.nic.in/>

- number of outbreaks respectively, where the population of the nine project states account for only 44% of the total population in India. However, further analysis needed to be performed before confirming such a hypothesis;
- Economic analysis was done for prevention and control of HPAIV (H5N1) in India during the restructuring in 2007. It suggested that that with effective strategy under highly conservative assumptions, the cost saving could be as high as US\$2 billion for the country.

**Perhaps, greater efficiency gains could have been achieved.** Clearly more attention could have been given to the disease hot-spots such as tribal group concentrated areas so as to achieve greater efficiency. Infectious diseases tend to concentrate among the vulnerable or poor segments of the population in both rural and urban settings. The project might also have been able to achieve its objectives sooner had it not taken three years to prepare and eight years to implement. Despite the different country environments, similar system in Chinatook about five years to be set up to achieve a national-wide coverage<sup>6</sup>, while at least urban centers in India still awaited to be covered by or integrated within the IDSPs. Other countries also significantly improved their IDSP systems within a shorter period of time. In Eritrea, the completeness of reporting case-based data from the healthcare centers to the next high level increased from 50 percent to 93 percent between 2000 and 2003. In Burkina Faso, the timeliness of surveillance reporting, especially data on epidemic-prone diseases, increased from 71% in 2000 to 99% by the end of 2004.

Overall, efficiency is rated as **Satisfactory**.

### **3.4 Justification of Overall Outcome Rating**

**The project's overall outcome rating is considered as Moderately Satisfactory.** The justifications include (i) the original and revised PDOs in 2007 and 2010 remained highly relevant to the CASS; (ii) project outcomes were attained; and, (iii) the project was implemented in a relatively efficient way.

The IDSP will be continued by the Government with its own budget. However, the project's experience indicated that technical and institutional arrangements were at least equally important for a healthy and sustainable development of the project. The project could have added value by helping the government to improve its action plan between 2012 and 2017.

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<sup>6</sup>In China, the web-based disease surveillance and response system cover all townships, and even more than 80 percent of villages, identified notifiable diseases can be reported at village and township level on the same day. Tally of daily occurrence of infectious diseases has been automated and the system can generate outbreak alert automatically. The system is GIS-enhanced. The design and implementation of the system was started in 2003 after the SARS outbreak, and was completed in 2008.

### 3.5 Overarching Themes, Other Outcomes and Impacts

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

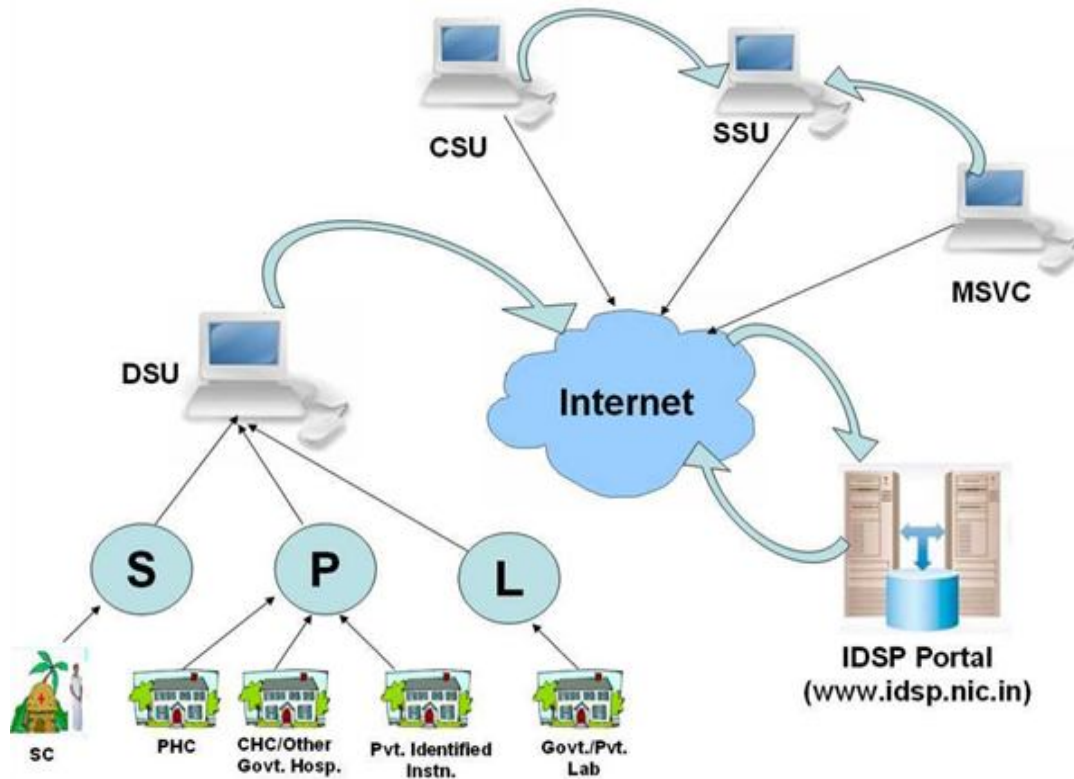
The possible negative economic impacts of disease on health have been well documented. Besides, diseases and ill health such as tuberculosis, dengue fever, viral hepatitis, etc. are important contributors to poverty and tend to be concentrated among the poor. Hence, timely disease/outbreak detection and response will mitigate disease spread and its consequential health, human and economic loss, and also contribute to greater equity. During the project implementation, there was an increased number of diseases reported, outbreaks reported, investigated and responded. **The project contributed to the reduced overall negative health and economic impacts on individuals, particularly the vulnerable and the poor.**

**The IDSP contributed to improvement in governance.** Information on disease occurrence and outbreaks was available to both government officials and the general public. Through ASHAs (Accredited Social Health Activist) and 24 X 7 call centers, the general public participated in outbreak detection and health event reporting. Information generated from the IDSP was not only used for design of specific disease prevention and control programs, but also for verifying their impacts. Availability of district and state specific information on disease facilitated decentralized decision making and in turn improved states' ownership of the system. Compared to the pre-project era, clearly, districts and states became more willing to report disease occurrence and outbreaks during and after the project. In addition, the project became a training ground in public health and epidemiology, and exported a number of capable staff to other important positions in the Government.

#### (b) Institutional Change/Strengthening

**The first large scale integrated disease surveillance and outbreak response system in India.** For the first time in the history of India, such a system was set up from central level down to district level (Figure 5). An IDSP section was formally set up under the NCDC. SSUs and DSUs were also institutionalized in the project states. The project also established an echelon of trained surveillance officers, epidemiologists, microbiologists, entomologists, as well as data management specialists to systematically generate, analyze and disseminate critical information on diseases.

**Figure 5: The Structure of Integrated Disease Surveillance System**



*Notes:* SC stands for sub-clinics; CHC for community health centers; PVT for private service providers.

**The project contributed to the establishment of a system for AI preparedness and response.** AI surveillance among domestic birds was institutionalized in India. Functioning rapid response teams were established at central, state and district levels under the project for investigation of and response to infectious disease outbreaks. Appropriate stockpiles of personal protective equipment, vaccines were set up at state and district levels. Regular communication between human health and animal health sectors on AI and other zoonotic diseases have been institutionalized in all project states.

**Establishment of new networks for public health:** (i) three laboratory networks were set up under the project. The human influenza laboratory network played a pivotal role in the response to the influenza pandemic in 2009, seasonal influenza and human influenza. The public health network comprising regional laboratories, one state reference laboratory in each state and 50 district laboratories undoubtedly improved quality of disease surveillance and outbreak confirmation and response. This public health laboratory network was supported by a national expert panel, provided with laboratory guidelines. EQAS was conducted for all the state reference laboratories. Lastly, the veterinary laboratory network comprising of BSL-III and BSL-II labs was further expanded and strengthened; (ii) a network for field epidemiology training programs was established with the participation from nine national and regional institutions.

**Innovations implemented under the project:** These included (i) various models for improving the system's coverage. For instance, ASHAs were recruited for community-based outbreak identification and reporting in a number of states such as Gujarat and Punjab, etc.; (ii) Infectious disease hospital network was included in the IDSP; (iii) disease reporting via portal was accessible to districts; (iv) Red/ Yellow/ Green Card system was developed for water quality monitoring in one of the states; and (v) AI surveillance among wild birds was initiated in India under the project. It was later on continued with the government's financial input. The critical information on HPAI among bird migration was generated, which was an important contribution to the complete mosaic of the global understanding of HPAI evolution and transmission.

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

**Together with other disease prevention and control projects under the NRHM, the project contributed to the revitalization of public health in India.** The National Institute for Communicable Disease was evolved into the National Center for Disease Control (NCDC). A number of regional equivalent CDCs were also set up. A plan has been developed by the Government to set up a dedicated vertical public health system made up of CDCs at state, and regional levels in addition to the NCDC. Weekly reporting on disease trends to state health secretaries and directors of health services and timely disclosure of disease outbreak information helped to enhance the attention of the senior government officials to public health as well as the IDSP. Vice versa, the heightened attention from the government officials and the general public also helped to resolve IDSP implementation bottlenecks.

**The project also contributed to the partnership for addressing the determinants of diseases.** The 'One health' approach was implemented by both human and animal health sectors in the country for addressing the threat from HPAI H5N1. Other examples of public health partnerships included the multi-sectoral interventions against acute diarrheal diseases (ADD) in a number of states, the enforcement of food safety in the state of Maharashtra, and CCHF investigation and response in the state of Gujarat. In the city of Ahmadabad, mapping of diarrhea incidence revealed the geographic concentration of the ADD outbreaks, and further investigation pointed out the weakness in the city's water supply system. Eventually, urban development, water and health sectors were brought together to design and implement interventions against drinking water contamination.

**IDSP serves as a platform:** The project successfully facilitated the birth of the One Health Project in the South Asia Region for the joint advanced training of public health and veterinary specialists. The South Asia One Health Project was the first of this kind funded by Avian and Human Influenza Facility. Besides, the IDSP has developed surveillance units from central level down to district level, public health and veterinary laboratory networks and rapid response teams. The systems set up under the both human health and animal health components are well positioned to serve as a platform for adding upon other public and veterinary functions/activities such as food borne pathogen

surveillance, epidemiology intelligence training, water laboratories, and other zoonotic diseases, etc.

**The Project pointed out the future needs for some critical expertise to be developed.** On one hand, more professionals in epidemiology, microbiology and entomology need to be recruited, trained and re-trained; on the other hand, expertise in health promotion and communication, behavioral sciences, veterinary sciences, health economics, emergency management as well as M&E need to be developed and recruited so that efficiency for disease surveillance and response can be further improved.

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

A one day project completion workshop was held in NCDC on February 25, 2012 on human health components. It was attended by NCDC, selected states, vendors for provision of technical support and WHO. The summary of the workshop is in Annex 6.

The workshop was dedicated to the following topics such as (i) key outcomes against PDO indicators; (ii) good practices for disease surveillance and response at states (including WB supported and Non-World Bank supported project states); and (iii) key challenges during the project implementation, as well as sustainability of the project.

Key findings from the workshop included: (i) achievements in the nine priority project states were significant, particularly since 2010; (ii) local commitment to and ownership of the project was the key for better project performance and outcomes as demonstrated in the states of Gujarat, Tamil Nadu, Punjab and Andhra Pradesh; (iii) key good practices under the project were the utilization of ICT for disease surveillance development such as reporting via portal, e-learning, mobile technology for disease reporting in remote areas, development of influenza surveillance network in the country, hospital based disease surveillance under performance based contracting, data analysis practices in West Bengal, involvement of ASHAs in outbreak detection and reporting; (iv) key challenges included lack of qualified human resources, absence of public health institutions to support the project, complicated procurement and financial management regulations; and (v) actions have been taken by the Government to sustain the integrated disease surveillance and response system where IDSP will be adopted by the government and evolve into NDSP under the NRHM.

To prepare the report, the ICR team visited the states of Punjab, Gujarat, West Bengal, Karnataka and Delhi. At these sites, public health institutions and veterinary laboratories were visited. Meetings with both human health and animal health professionals and government officials were held to collect their comments on the project in terms of achievements, challenges and lessons learned, and suggestions for future improvement. The field visits also provided opportunities for the ICR team to verify some of the project's contributions. The findings from the field visits have been incorporated in this report.



#### 4. Assessment of Risk to Development Outcome

The overall risk to development outcome is rated as **Moderate**. The main risk exists insocial inclusion. The explanations have been summarized in Table 4.

**Table 4: Rating of Selected Risks to Development Outcome**

<b>Criteria</b>	<b>Explanation</b>	<b>Rating</b>
<b>Technical</b>	<ul style="list-style-type: none"> <li>• Innovation: integrated system, web based reporting, event based surveillance; lack of GIS functionality; automatic warning/alert; powerful analytical functions; coverage in remote or difficult to access areas/populations.</li> </ul>	M
<b>Financial</b>	<ul style="list-style-type: none"> <li>• Government has committed to IDSP</li> <li>• Financial management capacity was improved</li> </ul>	M
<b>Economic</b>	<ul style="list-style-type: none"> <li>• Cost for maintaining the functioning IDS is low</li> <li>• Economic growth is expected</li> </ul>	L
<b>Social</b>	<ul style="list-style-type: none"> <li>• Challenges for IDS in tribal groups and remote areas remain</li> <li>• Inclusion of local stakeholders in the surveillance and response</li> </ul>	S
<b>Political</b>	<ul style="list-style-type: none"> <li>• Disease surveillance is a public good, and politically neutral; therefore , there is limited political risk</li> <li>• Improving social services wins support from constituencies</li> </ul>	L
<b>Environmental</b>	<ul style="list-style-type: none"> <li>• Improved disease surveillance increases sample transportation, medical waste, exposure of health workers which increases environmental risk;althoughguidelines for infection control and bio-security measures were developed, they are still not adequately practiced</li> </ul>	M
<b>Government ownership</b>	<ul style="list-style-type: none"> <li>• Government ownership is high as documented in certain sections in the report</li> </ul>	L
<b>Stakeholder ownership</b>	<ul style="list-style-type: none"> <li>• Stakeholder ownership is high as documented in certain sections in the report</li> </ul>	L
<b>Institutional support: project entities and legal/legislative framework</b>	<ul style="list-style-type: none"> <li>• Legal framework exists: mandatory disease reporting, issuance of public health bill; but enforcement of legal framework is challenging for urban centers, private service providers, etc.</li> </ul>	M
<b>Governance</b>	<ul style="list-style-type: none"> <li>• The system is transparent: community-based disease reporting, call centers, media rumor scanning, willingness to report by districts and states</li> <li>• Information from IDSPhas been used for designing disease prevention and control programs and for results verification</li> </ul>	M
<b>Natural disaster exposure</b>	<ul style="list-style-type: none"> <li>• Back-up plans need to be worked out in case of IT system breakdown during natural disasters, etc.</li> </ul>	M

**Notes: L stands for negligible or low; M stands for moderate; S stands significant.**

## **5. Assessment of Bank and Borrower Performance**

### **5.1 Bank Performance**

#### **(a) Bank Performance in Ensuring Quality at Entry: Moderately Satisfactory.**

The Bank team worked closely with GoI and other stakeholders, including WHO, with technical expertise in disease surveillance and response, to design the technically sound project. The project was responsive to an urgent need for significantly improved disease surveillance and response in India which was a global and local public good. The risk assessment was comprehensive and the ratings on (i) strategic relevance and approach; (ii) technical, financial, economic context; (iii) environmental and social safeguards policies, and (iv) policy and institutional aspects were appropriate.

During preparation, workshops and focus groups discussions were held in selected participating states with some major stakeholders such as (i) field workers such as the Anganwadi Workers in villages and urban wards, teachers, local health committees, elected representatives (Panchayat Raj Institutions - PRIs), self-help groups, youth groups and NGOs.

For the triggered environment and social safeguard policies, to mitigate the negative impacts on the project, a BWMP and a TDAP were developed.

However, the deficit in implementation arrangements was underestimated, in particular, in the aspects of constraints in hiring competent staff working on surveillance and project management. As proven during the project implementation, human resource policies plus unavailability of technically skilled staff in India presented a huge challenge to the project, and were the one of major causes for the slow project implementation progress.

Also, while the design of the result framework was on balance sound, it could have included some additional critical indicators, as suggested above in Section 2.3.

#### **(b) Quality of Supervision: Moderately Satisfactory.**

**The Bank maintained close supervision and provided intensive support and oversight during project implementation.** The supervision missions were critical for problem identification and solving, hence facilitating project implementation, as highlighted by the government counterparts during the ICR mission in July 2012. AMs and Implementation Status Reports (ISRs) adequately and candidly documented project implementation progress, key implementation issues and actions to be taken to resolve them. Supervision involved WHO every time and other technical agencies -- such as the US CDC, as much as possible. Progress in implementation and towards PDO was thoroughly reviewed and the key indicators and assessment results systematically documented.

**Project restructuring:**the Bank was responsive to the changed country and global context, particularly in 2007, responding to the threat of the HPAIV (H5N1). The revised components were appropriately designed. Furthermore, in 2009, when it became evident that project implementation progress was stagnating, the Bank was proactive in working with the Government to reduce the number of states, and to focus on priority diseases with outbreak potential (given the new H1N1 pandemic in 2009). The 2010 restructuring was also used as an opportunity to see how much of the Credit would be needed to implement the revised activities, which led to the first cancellation of funds. Subsequently, additional cancellations of project activities had to be made given the limited timetable for project implementation.

**Bank's financial management team was responsive to the project's needs.** Contrary to the agreement between the GoI and the Bank that only central level expenditures (80%) & limited decentralized expenditures (training) would be allowed to be financed by the project under the animal health component, the DADF transferred funds to the state and district agencies for training and other activities related to AI response. The Bank FM team pragmatically agreed to reimburse such expenditures based on acceptable audit reports from the selected states with large expenditures. In addition, to mitigate the impact of DIR, FM team streamlined reporting requirements by allowing financial reports instead of originally agreed SOEs.

**Ensuring consistency and continuity of task management was challenging.** During the eight years of project implementation, the task leadership on the Bank side changed six times. In 2010, in particular, the task team leadership was changed twice. While other team members provided greater continuity than the individual TTLs, a high turnover was also the case for procurement and financial management specialists and their successors were not always adequately briefed on the project.

More importantly, starting in 2007 when the Avian Flu component was added, the Bank team encountered additional challenges in terms of supervising a multi-sectoral operation, requiring close collaboration between two sector units in the Bank. This was not always a very effective relationship. It was common that separate missions and supervision AMs were organized for human health and animal health components. As a matter of fact, only one third of supervisions were jointly conducted. Smooth information sharing and collaboration between the two sectors in the context of the project was never fully established.

**Technical oversight on AI surveillance:** the selection of appropriate testing strategy and method for AI surveillance should have been better informed by international best practices with the involvement from international organizations like WHO and US CDC, etc. Testing of AI antibody was used to verify the existence of HPAI outbreaks and for HPAI surveillance among poultry birds. Such an approach was erroneous, particularly among chicken. Existence of antibody only proves the historical exposure to H subtype viruses (in case of true positive), and on the other hand, lack of antibody cannot rule out infection during the outbreaks because development of antibody within birds takes time. Meanwhile, new and more reliable and cost-effective technologies emerged. For instance,

Polymerase Chain Reaction testing has been available at lower cost (in terms of unit cost of per positive sample tested). It represents the mainstream technology for HPAIV surveillance and virus detection. The above observations and recommendations were reported to DADF, Ministry of Agriculture during the last ICR mission in July, 2012. **The mission was pleased to know that DADF has upgraded the national *Action Plan of Animal Husbandry for Preparedness, Control and Containment of Avian Influenza in August 2012*. The newly proposed surveillance strategy and methods are in line with the international best practices.**

### **(c) Justification of Rating for Overall Bank Performance**

The overall Bank performance is rated as **Moderately Satisfactory**. The project was well prepared, and adequately supervised. The Bank team was responsive to the changed situation in terms of emerging diseases and the implementation challenges.

## **5.2 Borrower Performance**

### **(a) Government Performance is rated as Satisfactory.**

The Government demonstrated strong commitment to and ownership of the Project. A national plan for IDS had been developed and a unit for IDS set up at the central level even before the project started. GoI assumed financing responsibility for the rest of 26 states for the project implementation when the Bank's support was focusing on the nine priority states. The arrangements for sustaining IDS were planned before the project ended and the IDS would be fully integrated into NHRM. The issuance of Public Health Emergency Bill highlights the importance and the needs of disease surveillance. During the project implementation, key stakeholders were adequately consulted and involved.

Collaboration was strengthened for HPAIV H5N1 surveillance and response among the relevant ministries. A Memorandum of Understanding was signed between MOA and Ministry of Environment and Forest for AI surveillance among wild birds. Inter-sectoral collaboration was also exemplified by the identification and response to ADD and CCHF, etc.

To solve the bottleneck HR issues, Government decided to decentralize staff hiring during the project implementation. To ensure stability of the workforce for IDS after the Project, all the IDSP posts were sanctioned under the NRHM before the end of the project.

### **(b) Implementing Agencies' Performance is rated as Moderately Unsatisfactory.**

#### *Human Health*

It was undeniable that the project implementing agencies' capacity was improved significantly. The surveillance units were established at central, state and district levels. The roles of supervision and technical assistance were strengthened at central and state levels, standardized operating protocols were developed and mainstreamed, and effective

coordination between all of the relevant sectors was started to be built up. However, there were a number of key roadblocks as follows:

- **Staff recruitment was a chronic problem during project implementation.** Even by the time of the project completion, not all the posts were filled and not all recruited staff trained.
- **Deficiency in safeguards compliance** (as discussed in Section 2.4).
- **Supervision to the SSUs and DSUs.** the CSU could further strengthened its supervision and feedback to the SSUs and DSUs.

#### *Animal Health*

The animal health component was well designed. However, many activities had to be dropped from the project (refer to Section 1.6) because the prolonged delay in planned procurement by UNOPS, the project's proceeds were not allowed to pay the activities to be implemented by other ministries such as the ministry of forest and environment and low capacity of some project sites. By the end of the project, only three activities were implemented under the component: (i) establishment of BSL-II, and BSL-III laboratories; (ii) AI surveillance among domestic poultry; (iii) training activities.

#### *Both Human and Animal Health*

- **Inadequate attention was given to FM and Procurement.** Insufficient number and low capacity of FM staff was evident, as exemplified by the suboptimal quality and delays in submission of financial reports, and significant amount of ineligible expenditures. The project also suffered from inadequate capacity for procurement management and bureaucracy in securing internal clearance. These contributed to delays in implementation and cancellations of proceeds.
- **M&E arrangements were inadequate.** It was only the last two years when the M&E results were increasingly used for decision making of targeted supervisions and technical assistance from the central level.

**The implementation agencies' performance improved after 2010.** Both MOHFW and the DADF, of Ministry of Agriculture were committed to the PDO as were their equivalents at state and district levels. Consultation with and involvement of beneficiaries/stakeholders were adequate though delayed during the project implementation. The IDSRS was established and the capacity at central, state and district levels was improved. The safeguards compliance and financial management compliance were improved as well. For instance, efforts were made to establish financial management capacity at different levels, to streamline the financial reporting requirements and training. By the end of the project, financial rules and regulations conforming to the World Bank norms were at least established under human health component.

### (c) Justification of Rating for Overall Borrower Performance

The overall Borrower Performance is rated as **Moderately Satisfactory**. Justifications include (i) the improvement was made in project implementation in the last two years before the project completion; (ii) GoI was proactive in paying for the activities that could not be funded by the project proceeds, and assuming the responsibility for funding the IDSPs in other non-project states; (iii) GoI has committed to the national IDSPs and to consolidation of the achievements under the animal health component.

## 6. Lessons Learned

Two categories of lessons learned for the project's experience: technical and project management fronts.

### *Technical Front*

**An opportunity for improving efficiency and equity of the project was missed:** In the restructuring in 2010, instead of originally covering all the states and territories, the project prioritized the nine best performing ones for further support by the Project under Component 2. The selection was based on the ranking of performance, based on a mix of process indicators like (i) provision of trained staff dedicated to the IDSP, (ii) establishment of surveillance mechanisms, (iii) reporting coverage and effective outbreak response, and fulfillment of the Bank's fiduciary requirements. Such a kind of prioritization was understandable but it was at the cost of equity consideration and risk-based surveillance rationale since usually the infectious diseases reside at the lagging states with lower capacity that deserves more attention and help. Besides, best performing could and should be interpreted as the incremental progress by comparing the measurements of performance and achievements between the starting points and the end points, rather than end points only.

**The risk-based disease surveillance and response system was not implemented:** Diseases' risks and occurrences exist unevenly among different subgroups/communities and tend to impact more seriously on the socially and economically vulnerable ones. Implementation of TDAP would not only improve equity of the project but also efficiency. Unfortunately, the importance of TDAP was undervalued and its implementation seriously delayed, which may potentially reduce and delay benefit accruable to the tribal groups.

**The project should have focused on preparedness for infectious disease outbreaks:** improvement in detecting, reporting, investigating, and responding to disease outbreaks was evident under the project. However, it was also clear that some diseases reoccurred over the years and even in the same locations. This calls for a mindset change from the current *response* to the future *preparedness and prevention* among policy makers, health and veterinary professionals. Disease risk factors and associated determinants need to be identified, mitigated or even eliminated so as to break the causal chain between them and the disease occurrences.

**Right institutional niche for NCD surveillance:** NCDs was a major contributor to the overall burden of diseases in India even at the time when the project was designed. It should have been treated as a core and essential public health function/activity rather than an undervalued, one-off research. However, NCD risk factor surveillance survey was seriously delayed and was implemented only in several provinces rather than as a nationally representative activity. NCD surveillance was eventually integrated into the National NCD Program and would be sustained.

### *Project Management Front*

**Project management should not be treated as an adjunct to other technical focus.** It would be beneficial to the project for project management to be treated as a central issue requiring attention. This means greater focus on the planning and investing in infrastructure and capacity building for project management. For example, advances in ICT should be harnessed for improving efficiency, quality and transparency of project management, as was the case for the railway projects supported by the Bank. Besides, learning from other projects' experience need to be promoted. For instance, the streamlined review and clearance process, greater degree of delegation of authority, as granted under the National AIDS Program could have improve the efficiency of the project management.

At the design phase, delayed procurement and delayed assignment of staff and consultants were under-rated hence no ex-ante alternative was designed on how to overcome the two major challenges. In the project led by health professionals, it was foreseeable that HR issues, procurement and financial management issues would be overlooked and not prioritized until their negative impacts on project implementation became evident.

**Design and implementation tools were not flexible enough to meet to the need of the clients:** (i) the design took more than three years. During this lengthy time of preparation, more effort and foresight could have been used to design proper procurement arrangements to allow more flexibility, particularly in view of the types of activities such as, IT infrastructure for disease surveillance, etc. the project would support. Similarly, proper arrangements, for instance, through revision of the legal documents, adoption of result based financing, etc., should have been planned during the restructuring of the project in 2007 so that the project proceeds could be allowed to pay for the activities such as AI surveillance among wild birds, IT infrastructure establishment and maintenance, implemented by other sectors. This would have saved substantial amount of time and effort during implementation and damage in the relationship with DADF. Besides, this could have prevented the cancellations of large amounts of credit proceeds; (ii) Project restructuring could have been done earlier. Many issues such as HR related issues and fiduciary issues were identified in the early phase of the project implementation and documented in the AMs. In case no action was taken on the government side, the Bank team should have initiate discussion on project restructuring earlier on.

**The Bank was not prepared for cross-sectoral collaboration for avian influenza and EID.** When the Bank had been actively advocating the principle and practice of “One health” for avian influenza and other EID surveillance, preparedness and response, it seemed that the institutional arrangements and incentive mechanisms were not congruent to this principle under the project. Many originally planned activities such as AI surveillance among wild birds, satellite mapping of wild bird sanctuaries, using of national information and communication system for surveillance could not be reimbursed by the Bank’s proceeds because of so-called conflict of interest defined by the Bank’s procurement guidelines. Perhaps in the future, pay for performance, or result based financing can offer a solution. As a matter of fact, the Bank and GoI can amend the legal document to allow these activities to be implemented and incurred cost reimbursed. Within the Bank, there was room for improve the collaboration between Sustainable Development and Human Development sectors to avoid separate supervision and separate AMs. Seeking synergy between different sectors need be norm rather than an exception. Without adequate mandates (e.g. setting as bank wide priority, legitimated by country assistance/partnership strategies, etc.), incentive mechanisms (streamlined review process, adequate resources), and user friendly tool to guide staff at each step in the project cycle, cross-sectoral collaboration for “One Health” would not be sustained within the Bank.

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

### **(a) Borrower/implementing agencies**

A number of issues were brought up by the counterparts during the interviews on project implementation. These included (i) outputs and outcome targets were not set realistically; (ii) HR issues related to contracted staff: limited access to postgraduate training and promotion opportunity compared to civil servants, less competitive salary scheme, etc. as a result, there were insufficient professionals working for the project and a low sense of professionalism among staff working on IDSP; (iii) procurement challenges; (iv) inadequate supervision and feedbacks to states; (v) issues related to timing and pace of incorporating other initiatives such as implementation of community-based surveillance, tribal development strategy and action plan; (vi) lacking of ownership of the data and the system at state and district levels; (vii) overseas study tours were not included in the project design so opportunities for interacting and learning from other countries on disease surveillance were missed; and (viii) inadequate inter-sectoral coordination in disease surveillance and response and low priority set to public health and disease surveillance by states.

Relating to the Bank’s performance, there was room for improving continuity and consistency in technical inputs from the Bank. Besides, communication could be improved, in case efforts could be spent on better understanding of the constraints faced by each side, which would help in problem solving and reaching agreement on important decision makings.



In terms of further improvement needed, the following points were mentioned by the human health counterparts: (i) disease reporting via portal could be accessible to block level and below; (ii) automated feedback/warning function to states and below needs to be developed; (iii) the IDS needs to be enhanced by GIS functions; (iv) the system also needs to improve the timeliness of response from within 48 hours to 24 hours; and (v) additional competences need to be developed in terms of epidemiology, statisticians, veterinary medicine, health economics and behavior sciences.

**The ICR team agrees to the all the issues identified and suggestions on the future direction for disease surveillance and response development in India:** Under the project, lack of capacity in financial and procurement management rather than the Bank's fiduciary rules and regulations were held responsible for the significant delays and cancellation of important procurements and activities. Cross-sectoral interaction in disease surveillance on and response had been limited to information sharing and response on HPAI, ADDs, pandemic influenza and CCHF in a small number of states, and these need to be promoted systematically in all states for all diseases and to embrace prevention of and preparedness for diseases; supervision and technical assistance to states were still inadequate though significant progress was made in the last two years before the project completion; feedback on the IDS performance and promotion of data utilization could be done by the CSU in order to nurture the ownership of the system; in case turnover of the Bank task team leaders is unavoidable, a period of overlapping should be arranged to improve continuity and consistency in project management; Overall, between the key project staff on both Government (on human health) and the Bank sides, a genuinely respectful and effective working relationship was observed by the ICR team. This had corresponded with the improved and expedited project implementation in the last two years before it was completed. Such evidence verifies that a respectful working relationship between the Bank team and the counterparts is a key for the project's success. Perhaps from the Bank side, some of the team members could have been more helpful in case the approach of problem solving or even pre-empting foreseeable problems could be adopted. The suggestions on the future directions are congruent to the most updated understanding of disease surveillance and response.

#### **(b) Cofinanciers**

There was no co-financier.

#### **(c) Other partners and stakeholders**

Two outstanding issues were raised by WHO representatives. These included (i) a disproportionate amount of time (70%) during supervision was spent on the issues related to financial and procurement management and only remaining 30 percent on technical issues; and (ii) the Bank team should have relied more on country-based WHO expertise, rather than on technical assistance from outside.

For the future of IDSPs in the country, WHO colleagues suggested that (i) the national expert panel should be expanded to include experts on epidemiology and veterinary medicine; and (ii) portal based data entry should be available at point of services.

The above-mentioned issues raised by WHO are highly relevant. Although it is important to spend sufficient attention and time on fiduciary issues that constrained the project implementation, perhaps discussions on the fiduciary issues could be arranged in parallel to the sessions on technical issues in order to improve efficiency for discussions on both. More important, it would be much more constructive and beneficial if the Bank team could follow up problem identification with problem solving, and provide support to clients whenever they needed, not only when supervision took place.

The ICR team agrees to the suggestion for tapping more the existing country-based WHO's technical assistance while relying on outsiders for technical assistance on independent assessments or on those areas where country based WHO lacked technical strength. The ICR team also concurs with the two forward-looking suggestions on the future direction of the IDS in the Country.

## Annex 1. Project Costs and Financing

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

Components	Appraisal Estimate (USD millions)	Revised Estimate 2007(USD million)	Revised Estimate 2010(USD million)	Actual Latest Estimate (USD millions)	Percentage of Appraisal
<b>Original Components</b>					
Component 1: Establishing and Operating a Central-level Disease Surveillance Unit	2.02				
Component 2: Integrating and Strengthening Disease Surveillance at the State and District levels	40.54				
Component 3: Improving Laboratory Support	22.67				
Component 4: Training for Disease Surveillance and Action	2.77				
<b>2007 Restructuring</b>					
Component 1: Establishing and Operating a Central-level Disease Surveillance Unit		2.02			
Component 2: Integrating and Strengthening Disease Surveillance at the State and District levels		30.58			
Component 3: Improving Laboratory Support					
Component 4: Training for Disease Surveillance and Action		2.77			
Component 5: Support to India's Country Program for Preparedness, Control and Containment of Avian Flu		32.63			
<b>2010 Restructuring</b>					
Component 1: Central Surveillance Monitoring and Oversight			6.01	0.91	15%
Component 2: Improving State/District Surveillance and Response Capacity			22.66	17.79	79%
Component 3a: Influenza Surveillance and Response: Human Health			4.53	7.78	25%
Component 3b: Influenza Surveillance and Response: Animal Health			26.00		
<b>contingencies</b>			0.80		
<b>Total Bank Financing</b>	68.00	68.00	60.00	26.49	39%
<b>Total Borrower Financing</b>	20.64	20.64	32.00	17.14	83%
<b>Total Financing Required</b>	<b>88.64</b>	<b>88.64</b>	<b>80.64</b>	<b>43.63</b>	<b>49%</b>

Note: US\$8 million was cancelled during the 2010 restructuring. Subsequently an additional \$25.9 million was cancelled under 2 separate cancellations, for a total of \$33.9 million.

## **Annex 2. Outputs by Component**

### **Project outputs by component by 2007**

#### *Component 1: Establishing and Operating a Central-level Disease Surveillance Unit.*

The CSU was integrated with the NICD divisions. For strengthening the management functions of CSU, the focal points, with clear TORs were identified and assigned to each of the fourteen states for oversight and trouble-shooting; a standardized checklist for monitoring state performance was developed. Weekly progress reviews, feedback and troubleshooting by the CSU were institutionalized, though sometimes delays were experienced in fulfilling this role. A call center was established and functioning at the NICD with a toll free telephone number (1075) to report any unusual event by health staff. Collaboration with National Polio Surveillance Project (NPSP), the National Vector Borne Diseases was explored.

#### *Component 2: Integrating and strengthening disease surveillance at the state and district levels.*

A notable improvement in disease reporting, in terms of coverage and quality, among the fourteen project states: fifty percent of the states were rated as satisfactory by system performance standards. Eighty four percent of districts in the fourteen states were reporting disease regularly. In addition to disease reporting at primary health care centers, twenty-three percent of districts in the project states launched disease surveillance among private health service providers. After the prolonged delay, surveillance on NCD risk factors was started and data collection was completed.

#### *Component 3: Improving laboratory support.*

A needs assessment on laboratory development was conducted in twenty randomly selected district laboratories. The External Quality Assurance System was established and assessment was completed for the Level 3 laboratories in 12 project states. A training manual for peripheral lab technicians was developed and printed. In addition, a total of 58 district surveillance officers were trained in a two week field epidemiology course.

#### *Component 4: Training for disease surveillance and action.*

Training for state and district surveillance officers was largely completed in all Phase I and II states. Induction training among medical officer's and health workers made steady progress. Overall, 2,071 district and state surveillance officers/members of rapid response teams, 22,087 medical Officers, 133,821 Health workers and 6,176 laboratory technicians were trained in basic IDSP protocols.

## Project outputs by component by between 2007 and 2010

### *Component 1: Establishing and Operating a Central-level Disease Surveillance Unit.*

The capacity of CSU was improved and could provide strategic technical and managerial leadership for IDSP, oversight, coordination and technical assistance to states. Weekly outbreak reports prepared by the CSU were regularly shared with all key stakeholders including the Prime Minister's Office. A tool to monitor the quality of outbreak investigations was introduced.

Indicators	Value 9/30/2009
% of placement & induction training of Epidemiologists/microbiologists and entomologists completed	40%
number of quarterly review meetings of priority states	2
number of on site visit for supportive supervision, for states by CSU	18
number of videoconferences held to give feedback on outbreak response assessed using the tool	n.a.
number of referral lab network & district labs established	0
number of referral and district who underwent EQASlab network & district labs established	0
% of districts with IT network for on portal data entry, videoconferencing and inter-voice connection between states & have access to toll free 1075	Portal: 40%; VCF: 50%; TFA: 25%

**Notes:** VCF stands for videoconferencing facility; TFA stands for toll free access.

### *Component 2: Integrating and strengthening disease surveillance at the state and district levels.*

The surveillance infrastructure was established in all 35 states. The nation-wide IT network was functional in over 700 sites and video-conferencing facilities covered 351 sites. An operational project portal was developed for on-line data entry, analysis and e-learning, a national toll-free call center for SOS reporting. Recruitment for 766 positions (646 epidemiologists, 85 microbiologists, 35 entomologists) was ongoing and 239 epidemiologists, 30 microbiologists and 10 entomologists were in position. A number of states started weekly disease outbreak alerts and sharing the information with NRHM and other departments. Efforts to generate similar reports at the district level were initiated.

Consistent improvements in data reporting, analysis and use at the national level and in some states were evident. In 2009, 799 outbreaks were reported as compared to 553 outbreaks reported in 2008. Over 500 outbreaks were investigated with laboratory confirmation and locally responded. Media scanning was initiated in some states. The IDSP system was employed for contact tracing, sample collection and ensuring supplies

of pharmaceuticals during the H1N1 human influenza pandemic in 2009. The population-based NCD surveillance survey in seven states was completed.

Indicators	Values 9/30/2009
% of districts IT linked to the SSU/CSU	less than 50%
Number of states providing feedback monthly to the districts	5
% of responses to disease specific triggers assessed to be adequate by SSU	up to 66%
% of major hospitals enrolled, doing IP, OP and lab surveillance, and sharing P&L forms	less than 20%
% of blocks in which at least 1 private provider shares weekly to surveillance reports	less than 20%
CBS established and % villages reporting to call center No 1075 or nearest PHC	Nil
Annual documentation of best practices and progress reports	60%

**Note:** CBS stands for community based surveillance; IP stands for inpatient department; OP stands for outpatient department.

*Component 3: Improving laboratory support.*

Laboratory equipment was provided to all Phase I states. Four out of nine priority states have now finalized a laboratory referral network plan. Thirty five percent of the 85 microbiologists were employed for the development of the public health network.

Guidelines for adequate specimen transportation and collection were finalized. Supervision by CSU to district public health labs was initiated.

*Component 4: Training for disease surveillance and action.*

The project trained 2035 trainers for surveillance, who in turn trained 26,065 medical officers, 138,772 health workers and 8,315 laboratory technicians. Different models for epidemiological capacity building were initiated: two weeks FETP; and a set of self-learning CDs for FETP. Training materials, covering internal quality assurance and biomedical waste management issues, was developed and the first training session finished.

*Component 5: Support to India's Country Program for Preparedness, Control and Containment of Avian Influenza.*

**Animal Health:** The project improved national diagnostic capability through establishment of BSL laboratory facilities. Strategic reserves of equipment and PPEs was set up for dealing with future outbreaks. Many workshops and training programs for vets, para-vets, Rapid Response Teams (RRTs), villagers and field staff were conducted.

**Human Health:** a network of ten regional labs was set up. Two rounds of training were held for the nodal officers and the lab technicians from the network with the second training covering the H1N1 identification using real time PCR. Surveillance of

Influenza-like illness (ILI) was started at two sites. The network contributed to swift laboratory diagnosis and contact tracing for novel H1N1 infections in 2009.

### **Project output components between 2010 and the date of project completion**

#### *Component 1: Central Surveillance Monitoring and Oversight.*

Good progress was made on the training program for the trainers as well as the two week Field Epidemiology Training Program (FETP) for state epidemiologists. Over the life of the project 1033 trainers were trained against a load of 921 and a total of 222 epidemiologists availed the FETP training as against the planned 219. A total number of 188,030 health professionals including medical officers and hospital doctors, lab technicians, pharmacists/nurses and health workers were trained in disease surveillance and appropriate response. Besides, monitoring and supervision role of the CSU improved as reflected in the number of visits to states, interaction with states via quarterly meetings and videoconferences.

<b>Indicators</b>	<b>Value at March 2012</b>
% of placement & induction training of epidemiologists/microbiologists and entomologists completed	73% and 89.7%
number of quarterly review meetings of priority states	2
number of on site visit for supportive supervision, for states by CSU	4
number of videoconferences held to give feedback on outbreak response assessed using the tool	63
number of referral lab network & district labs established	16
Strategic Health Operation Center functional and being used	Not yet
number of referral and district who underwent EQAS	10
% of districts with IT network for on portal data entry, videoconferencing and inter-voice connection between states & have access to toll free 1075	Portal: 97%; VCF: 95%; TFA: 95%

**Notes:** SHOC stands for state health operation center; EQAS stands for external quality assurance scheme; VCF stands for videoconferencing facility; TFA stands for toll free access.

#### *Component 2: Improving State/District Surveillance and Response Capacity.*

An average of 97% of the districts of the nine priority states reported on both 'P' and 'L' forms. Quality of reporting by private health care providers and hospitals (both public and privates) was improved considerably. Improvement in quality of laboratory investigation of district public laboratories was confirmed by the EQAS. Pilots on community based surveillance (CBS) started in the selected blocks in the states of Gujarat, Karnataka and Maharashtra. The number of reported outbreaks and the number of outbreaks confirmed by laboratory evidence increased. Information generated from the IDS systems were increasingly disseminated to policy makers and the public, and used for informing the design of public health programs.

<b>Indicators</b>	<b>Value at March 2012</b>
% of districts IT linked to the SSU/CSU	97%
Number of states providing feedback monthly to the districts	9
% of responses to disease specific triggers assessed to be adequate by SSU	No information
% of major hospitals enrolled, doing IP, OP and lab surveillance, and sharing P&L forms	For P form: 75%; For L form: 75%
% of blocks in which at least 1 private provider shares weekly surveillance reports	For P form: 92%; For L form: 93%
CBS established and % villages reporting to call center No 1075 or nearest PHC	2 blocks in each district in GJ, 1 in KN, 1 in MH, 1 in OR
Annual documentation of best practices and progress reports	not reported

*Component 3: Flu Surveillance and Response.*

Human Health: a network of 12 public health laboratory network was established for human influenza surveillance, of which, 11 are fully functional. Thirty six percent of sentinel hospitals started ILI reporting. Three of six BSL level 3 laboratories were set up and functioning.

Animal health: 28 BSL-II laboratories were setup at regional level. 3 BSL-III laboratories were set up and functional. PPE and other materials for rapid response were stockpiled. The following planned activities were cancelled: (i) AI surveillance among commercial poultry farm flocks; (ii) surveillance for migratory birds and backyard poultry around wetlands and along flyways; satellite mapping of bird sanctuaries, water bodies and wetlands; (iii) development of GIS based animal disease surveillance and information system.

<b>Indicators</b>	<b>Value at Feb 2012</b>
Number of sentinel hospitals with routine surveillance for human influenza	36%
Epidemiological survey to detect causes and spread of HPAI outbreak	No information
National surveillance system with adequate coverage	Not information
Lead time for availability of diagnostic results significantly reduced	2 days for BSL-2; 5-6 days for BSL-3
Emergency supplies available at strategic field locations	Fulfilled
Regular meetings between health officials and animal husbandry officials	monthly



### Annex 3. Economic and Financial Analysis

**It is a challenging task to quantify economic benefits of surveillance system development** because of the long chain of links from setting up and operating a new system for disease surveillance to the actual economic benefits eventually resulting from it. Conducting economic analysis, which if not built-into a project from the start, often runs into difficulties as changes in disease morbidity and mortality could be due to a number of factors that make it difficult to measure the effects of the surveillance and response activities on disease morbidity and mortality.

**The Project represented a low cost approach.** The author calculated the last two years' spending (Figure 5) and concluded that the annual per capita operating cost for the project were from 0.01 to 0.02 US dollars, which was extremely of low cost. Such a low operating cost was also documented for Burkina Faso (US\$ 0.04, from 2002 to 2005), Eritrea (US\$ 0.16, from 2002 to 2005), Mali (US\$ 0.12, from 2002 to 2005), Tamil Nadu (US\$ 0.01, 1998)<sup>7</sup>.

**Table 5: Project's Incremental Cost per Annual, per Capita under Different Scenarios**

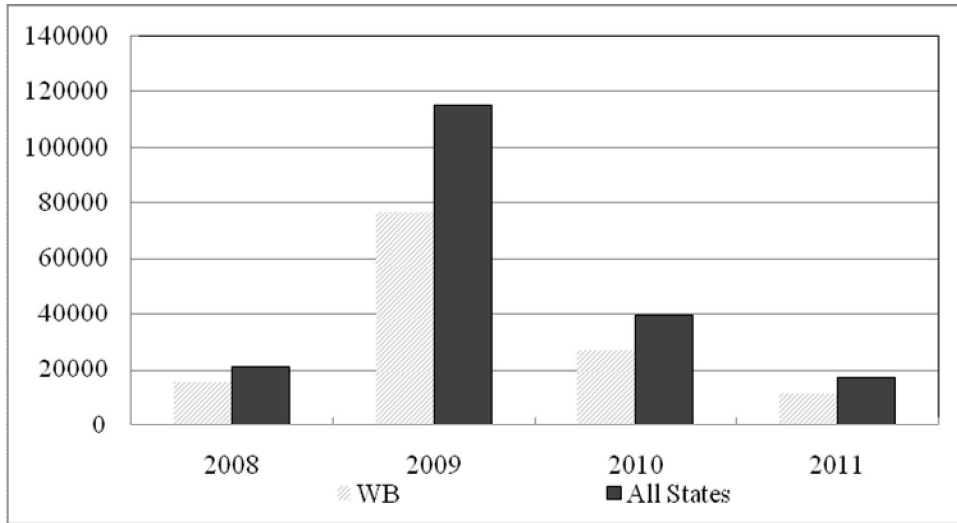
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
<b>Total population in 9 project states</b>	588,481,531	588,481,531	588,481,531	588,481,531	588,481,531
<b>Urbanization rate</b>	32%	32%	32%	35%	30%
<b>Rural population coverage</b>	70%	50%	40%	75%	60%
<b>Total project cost (million USD)</b>	43.63	43.63	43.63	43.63	43.63
<b>% spent in the last two years</b>	15%	15%	15%	15%	15%
<b>Per capita spending per annum (USD)</b>	0.012	0.016	0.020	0.011	0.013

**The project achieved better outcomes compared to the rest of non-WB project states.** Despite of the similar income levels, similar level of urbanization compared to the non-project states, and similar geographic locations, the nine states accounted for an average of 67.3 percent of phone calls to the 24X7 call centers, and 64 percent of outbreaks reported during 2008 to 2011, with a share of 48.6 percent of the national population (Figure 2, 3, 6). The coverage of internet based disease reporting was also higher in the project states than in non-project states (Figure 6).

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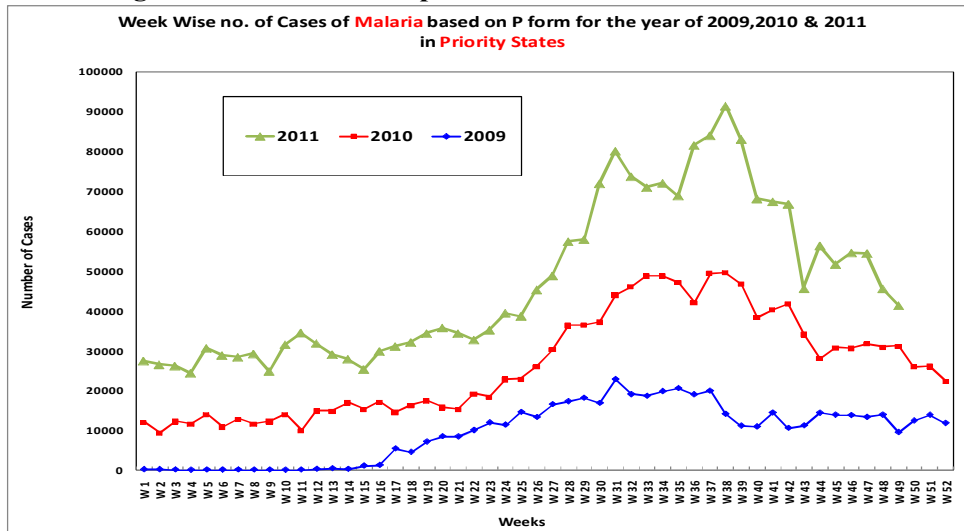
<sup>7</sup> Refer to the reference

**Figure 6: Calls received by 24X7 Call Centers Per Annum**

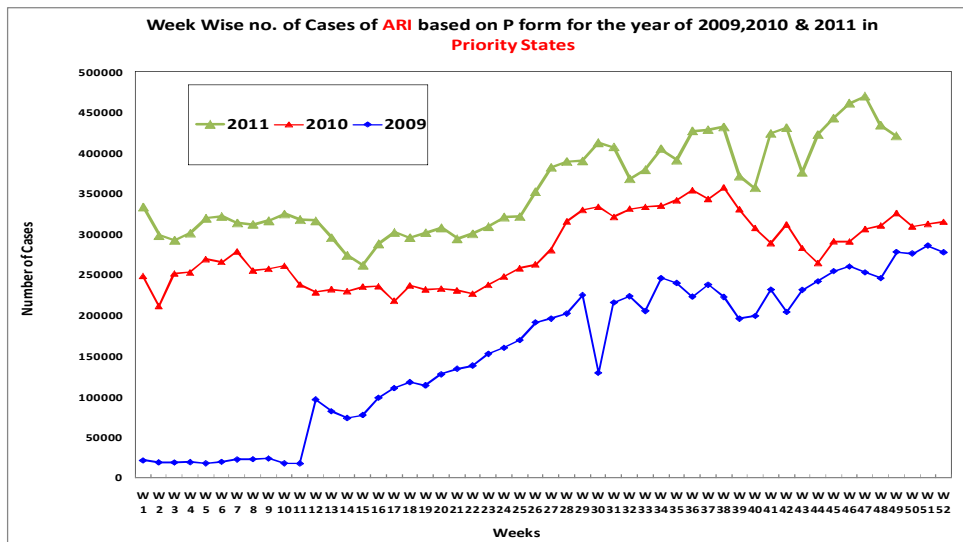


**The project achieved a higher efficiency over the years.** With the improved coverage of the project and quality of report, the reported number of diseases increased over the years (Figure 7, 8). Similar trends were also observed in other non-project states and in other countries like China during the process of established integrated disease surveillance systems. In India, for an example, the increased reported number of dengue cases corresponded well with the implementation of the integrated disease surveillance project. Between 2001 and 2011, the total number of reported dengue cases per year increased at a rate of 170 percent. In the same period, the reported number of deaths caused by dengue increased at a rate of 74 percent. Such an increase could not be fully explained by increased urbanization, and population growth. The real increase happened after 2007, and particularly 2009 (Table6). One possible explanation is that more mild cases of dengue were increasingly identified and reported by the system.

**Figure 7: Trend of the Reported Malaria Cases over the Years**



**Figure 8: Trend of the Reported Acute Respiratory Infections over the Years**



**Table 6: Changes of Reported Dengue Related Cases and Deaths over the Years**

Year	Number of Cases	Annual Increase Rate	Number of Deaths	Annual Increase Rate
2001	3306		53	
2002	1926	-42%	33	-38%
2003	12754	562%	215	552%
2004	4153	-67%	45	-79%
2005	11985	189%	157	249%
2006	12317	3%	184	17%
2007	5534	-55%	69	-63%
2008	1256	-77%	80	16%
2009	15535	1137%	96	20%
2010	28292	82%	110	15%
2011	18860	-33%	169	54%
<b>Average Annual Increase Rate</b>		<b>170%</b>		<b>74%</b>

**The project was cost-effective, suggested by the following evidence:**

- The new system focusing on a manageable subset of twenty four priority diseases/conditions/factors represented a cost effective approach because (a) before the project, the number of conditions under disease reporting and surveillance was between 50 and 65 in most states. With the implementation of the project, the separated disease reporting systems were merged as a single one that saved redundancy in terms of human resources and running cost; (b) the

- diseases/conditions selected under the IDSP represented the major contributors to the country's or states' overall disease burden;
- In the project states, the project was mainly operated in rural areas rather than urban centers. Such targeting represented a greater efficiency in use of resources for surveillance since infectious disease dominated the morbidity pattern in rural areas than in urban areas in India (MOHFW, 2011);
  - The time between the date of outbreak and the data of notification of laboratory results was shortened from more than a week to two days;
  - Economic analysis was done for prevention and control of HPAIV (H5N1) in India during the restructuring in 2007. It suggested that that with effective strategy under highly conservative assumptions, the cost saving could be as high as US\$2 billion for the country;
  - A modeling of the similar project in Burkina Faso showed that IDSP project was cost effective or even cost saving. The cost effectiveness was \$23 per meningitis case averted (25<sup>th</sup>: US\$ 30, 75<sup>th</sup>: cost saving) and \$98 per death averted (25<sup>th</sup>: US\$ 140, 75<sup>th</sup>: cost saving)(Z. Somda, 2010).

**Greater efficiency gains could have been achieved.** Clearly more attention could have been given to the disease hot-spots such as tribal group concentrated areas so as to achieve greater efficiency. Infectious diseases tend to concentrate among the vulnerable or poor segments of the population in both rural and urban settings. The project might also have been able to achieve its objectives sooner had it not taken three years to prepare and eight years for implementation. Despite of different country environments, similar system in Chinatook about five years to be set up to achieve a national-wide coverage<sup>8</sup>, while at least urban centers in India still awaited to be covered by or integrated within the IDSP systems. Other countries also significant improved their IDSP systems within a shorter period of time. In Eritrea, the completeness of reporting case-based data from the healthcare centers to the next high level increased from 50 percent to 93 percent between 2000 and 2003. In Burkina Faso, the timeliness of surveillance reporting, especially data on epidemic-prone diseases, increased from 71% in 2000 to 99% by the end of 2004.

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<sup>8</sup>In China, the web-based disease surveillance and response system cover all townships, and even more than 80 percent of villages, identified notifiable diseases can be reported at village and township level on the same day. Tally of daily occurrence of infectious diseases has been automated and the system can generate outbreak alert automatically. The system is GIS-enhanced. The design and implementation of the system was started in 2003 after the SARS outbreak, and was completed in 2008.

## Annex 4. Bank Lending and Implementation Support/Supervision Processes

### (a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
<b>Lending</b>			
Peter F. Heywood	Senior Health Specialist	SASHN	Team Leader
Rashmi Sharma	Social Development Specialist	SASDA	
K. Sudhakar	Senior Health Specialist	SASHN	
Nira Singh	Program Assistant	SASHN	
Mam Chand	Consultant	SASHN	
Hugo Diaz-Etchevehere	Lead Operations Officer/ Economist	SASHD	
Varalakshmi Vemuru	Senior Social Development Spec	SDV	
Ruma Tavorath	Senior Environmental Specialist	SASDI	
Rachel Beth Kaufmann	Senior Public Health Specialist	SASHN	
Laura M. Kiang	Operations Officer	SASHN	
Ian P. Morris	Senior Human Resources Specialist	SACIN	
Abdo S. Yazbeck	Consultant	SASHN	
Gandham N.V. Ramana	Senior Health Specialist	SASHN	
James Herm	Consultant	SASHN	
Kurien Thomas	Consultant	SASHN	
Sanjay Chopra	Consultant	SASHN	
Shashank Ojha	Senior e-Government Specialist	TWICT	
Mohan Gopalakrishnan	Senior Financial Management Specialist	SARFM	
<b>Supervision/ICR</b>			
Anne M. J. Bossuyt	Operations Officer	SASHN	
Claire Broome	Consultant	SASHN	
Cornelis P. Kostermans	Senior Health Specialist	SASHN	Team Leader
Gandham N. V. Ramana	Senior Health Specialist	SASHN	Team Leader
Bela Verma	Program Assistant	SARPS	
Preeti Kudesia	Senior Health Specialist	SASHN	Team Leader
Patrick Mullen	Senior Health Specialist	SASHN	Team Leader
Manvinder Mamak	Senior Financial Management Specialist	SARFM	
Manoj Jain	Financial Management Specialist	SARFM	
Emanuele Capobianco	Health Specialist		Team Leader
Satya N. Mishra	Social Development Specialist	SASDI	
Vibhuti Narang Khanna	Program Assistant	SASDA	
Sangeeta Carol Pinto	Operations Officer	SASHN	
Somil Nagpal	Health Specialist	SASHN	Team Leader
Senapati Balagopal	Procurement Specialist	SARPS	
Ajay Ram Dass	Program Assistant	SASHN	
Mam Chand	Consultant	SARPS	

Isabella Anna Danel	Sr Public Health Spec.	SASHD	
Nagaraju Duthaluri	Senior Procurement Specialist	SARPS	
Michael Maurice Engelgau	Sr Public Health Spec.	SASHN	
Mohan Gopalakrishnan	Sr Financial Management Spec.	SARFM	
Maria E. Gracheva	Senior Operations Officer	SASHN	
Peter F. Heywood	Consultant	EASHD	
Roderick Oliver Kennard	Consultant	ECSSD	
Vijay Kumar	Consultant	SASHN	
Shanker Lal	Senior Procurement Specialist	SARPS	
Arun Manuja	Sr Financial Management Spec.	SARFM	
Juan Bautista Morelli	Consultant	MNSSD	
Mohinder S. Mudahar	Consultant	SASDA	
Shubhendu Mudgal	Consultant	SASHN	
Shashank Ojha	Senior e-Government Specialist	TWICT	
Norman Bentley Piccioni	Lead Rural Development Spec.	SASDA	
Om Prakash	Consultant	SASDT	
Ranjan Samantaray	Sr Natural Resources Mgmt. Spec.	SASDA	
J. GouriNathSastry	Consultant	SASHD	
Nira Singh	Program Assistant	SASHD	
Mandava VenkataSubbaRao	Consultant	SASDA	
Kishanrao Suresh	Consultant	SASHN	
RumaTavorath	Senior Environmental Specialis	SASDI	
Kurien Thomas	Consultant	SASHD	
VaralakshmiVemuru	Senior Social Development Spec	SDV	

**(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)
<b>Lending</b>		
FY02		208.81
FY03		216.69
FY04		126.84
FY05		-4.04
FY06		0.00
FY07		0.00
FY08		0.00
<b>Total:</b>		548.30
<b>Supervision/ICR</b>		
FY02		0.00
FY03		0.00
FY04		0.00
FY05		86.64
FY06		93.70
FY07		87.96

FY08		160.39
FY09		182.12
FY10		280.82
FY11		136.90
FY12		94.80
<b>Total:</b>		1123.33

**Annex 5. Beneficiary Survey Results**

No beneficiary survey was conducted.



## **Annex 6. Stakeholder Workshop Report and Results**

The workshop was initiated with the inaugural address of Dr L. S. Chauhan, Project Director, IDSP who first welcomed all delegates and participants. He informed the participants that the objective of IDSP is to identify disease outbreaks and initiate appropriate and adequate response in time. Identifying and adding necessary skills to those already available within the project and their strengthening, for meeting this objective, is an important priority. Success stories and experiences must be shared for the larger benefit of learning and understanding issues, gaps or challenges. Information Technology is one of the most important components of IDSP. The project builds on cooperation from various teams so that issues can be resolved. The 12<sup>th</sup> five year plan, envisages a greater involvement of medical colleges and private sector in the IDSP.

Participant introductions were called for.

Dr Chauhan highlighted two weaknesses of the IDSP which required participant deliberation. Firstly, strengthening the public health laboratories and the scope of work of the microbiologists posted at these laboratories—specifically is the microbiologist expected to make visits to the field including PHCs, CHC and other centers of care, as samples for outbreak investigation may have to be sourced from the field at times? The second issue pertained to authority and operational mobility of the District Surveillance Officer (DSO) in the field, which currently is very low in the program. By enhancing presence of DSOs, epidemiologists and the data manager in the field, data collection, reporting and data quality is bound to improve. Similar arrangements could be replicated at higher levels of hierarchies, in addition to the mandatory capacity building and training.

Dr. Shiyong Wang, Senior Health Specialist, spoke on Disease Surveillance in the context of South Asia, and shared his understanding of global systems of disease surveillance and those in some Indian states. He highlighted the relevance of – context, globalization and IT. Since, many diseases have their genesis in animals; the approach should also consider transmission of diseases in animals and ecological transmission through infected animals, which will give a better picture of risks and determinants. In view of the alerts for terrorist attacks of biological nature, the international framework developed in 2005 expects member states to improve capacity. One of the components of capacity building is surveillance. The disease specific traditional surveillance system underwent a structural change to become a multi-component based generic model, increasing the coverage of the surveillance using IT. Real time data gathering and analysis is a possibility for the future compared to the present periodic reporting trend. Information flow, from vertical approach must evolve into a horizontal flow. Partnerships with other sectors must be explored. Automation on surveillance is now modeled to capture change in travel patterns, thus leading to higher prediction of diseases. Community based participatory disease surveillance system in India, done by ASHAs is a strategy quite popular and innovative. Sub-typing with ways to trace back to the source of

the disease is also being explored. Thus, the range of surveillance systems varies from a broad based approach to pin-pointed mechanisms. As the diseases may not spread uniformly across populations, the goal is to identify high risk areas, which makes it a risk based surveillance system, which also is a cost effective method. Both concentration of the epidemic and the evidence of its repetition must be measured for effective solutions—this is the building block of epidemiological intelligence. Key messages being communicated are: include using disease surveillance not only for detection of the disease but also for prevention and control; improve not only the coverage but also the depth of surveillance program; link information to action towards response & preparation; and build public health partnerships that improve health in general. Having a national public health human resources development plan, including developing state level and sub state level public health cadre, will strengthen initiatives at the grassroots level. India's joining the Global Disease Surveillance network is certainly most recommended. Using technologies like rapid testing methods, PCR; assuring quality assurance in the routine; ensuring bio-safety standards; and project sustainability, are other areas that can be addressed.

Dr Sampath Krishnan from WHO, appreciated World Bank's support to IDSP for the capacity development of professionals in disease surveillance. He highlighted the importance of being a part of the global disease network, especially the establishment of World Health Hubs-- a platform for integration of IDSP with the work done on zoonotic disease, which the project supported. Citing the 1994 outbreak, he informed that global case definitions essential for comparability and harmonization were not even followed. He insisted that risk factor determinants are also important for further development of IDSP.

Dr Kiran, the SSO from Uttarakhand presented on human resources in IDSP in Uttarakhand. She mentioned that there were two specific challenges:—qualified human resources for IDSP and their remuneration from existing health care resources, and absence of public health institutes to support the program, Uttarakhand being a relatively new state. Solutions included engaging professionals on contractual basis on vacant posts and approval from the executive committee for relaxation of the minimum qualification criteria for appointment to IDSP. She counted training and report submission to appropriate officials, development of field visit checklists for epidemiologists, tasking and making pharmacists accountable for collection of OPD surveillance reports which is shared widely on her team's achievements. Comments from participants included taking government into confidence, initiating a positive drive to retain various cadres of human resources in IDSP, parity in pay scales across programs, and inter program cooperation, for e.g.: between IDSP and the national vector borne disease control program (NVBDCP) to maximize program benefits.

Ms. Pandita from National Informatics Center apprised the participants of the IT skeleton of IDSP and NIC's contribution to maintaining the IDSP portal as well as installation of Local Area Network (LAN) and computers at 800 sites. Future plans included integrating a Geographic Information System (GIS) layer in the portal, use of mobile technology, complementary email interface, upgrading of existing lease lines, strengthening of e-

learning services, training of end users, and maintenance of servers and software. Comments from participants included need for identifying a nodal person at state level/sub-state level to provide support to the IT system of IDSP. The solution as recommended was disclosing contact information of state coordinator and district information officer on the IDSP site. The road ahead included strengthening of bandwidth at the district level through a phase wise, cost-effective upgrading. Linking of state information management system to IDSP, data sharing and exploring ways to help private medical practitioners report were important goals identified for pursuing.

A representative from the Andhra State Surveillance Unit explained use of mobile technology in IDSP. He highlighted the fact that mobile telephony is a low investment, high reach and easy operability option. SMSs can be sent even at 20% signal strength; mobiles are a sound option in hilly areas; and have a low energy requirement-- making them a solution of choice. Mobile usage calls for only a 30 minute training of users. SMS based reporting of disease surveillance data is currently decentralized up to the district level. Data flows directly from the point of generation to the central server. The peripheral units could concentrate on prevention and response and less on consolidation and entry of data. This model was piloted in Prakasam district of Andhra Pradesh in August 2008, demonstrated to World Bank support mission and later evaluated by PHFI and based on positive findings expanded. The challenges faced were timeliness and completeness of data; limited resources available to address delays in reporting from the peripheries; irregular feedback from all levels --SMS information not reaching the DSU level, unit wise; and inability to upload this information into the IDSP portal at the DSU level as SMS data is stored in the server at state level. Future areas worth exploring are feasibility of transmitting data directly from field, and extending remuneration to the persons reporting IDSP data. NIC officials mentioned that with the installation of the SMS Gateway servers, SMSs to IDSP are free of cost to sender.

**Dr. H. K. Chaturvedi, National Institute of Medical Statistics** provided updates on NCD surveillance. He informed that considering the growing emphasis on NCDs in the last decade, a study had been undertaken in seven states of India with the support of the World Bank, National Institute of Medical Statistics, and regional resources centers to assess the prevalence of risk factors in different age groups, across genders and geographical habitation. 50 PSUs from rural and 50 from urban areas were covered under the study, including 50 households from each of the PSUs, thereby, making it a study across 5000 households. Quality was ensured with homogenous training, uniform monitoring and consistent data collection mechanisms. Regional resource centers checked data quality at 10% of the PSUs as part of the quality assurance protocol.

Key findings from the study were that tobacco as a risk factor was prevalent or rather confined amongst the male respondents. Mean age of initiation of smoking was 19-20 years in almost all the states. Mean age of cessation of smoking was 29-34 years. Smokeless tobacco responsible for many oral cancers has a high prevalence. Alcohol, as a contributing risk factor, has a higher pattern of use in males. There is high variation between states for the quantity of alcohol consumed weekly and the mean age of starting to consume alcohol is around 23-25 years. Fruits and vegetables consumption is low in

rural areas. 2-3 days is the number of days fruits are consumed per week, however vegetables intake is higher than that of fruits. Both in rural as well as in urban areas, risk of NCDs increases with reduction in intake of fruits and vegetables. Physical activity remains low in urban areas compared to rural areas. 40-50% of the population remains in pre-hypertensive range, while 15-20% come in the bracket of hypertension combining stage I & II. Surprisingly, in some states, prevalence of hypertension in rural areas is more than in urban areas. Overweight is more an issue in south Indian states. It was also emphasized that periodicity of conducting such surveys should be planned and is vital.

Dr Kamala Singh briefed the participants on the evolution of disease surveillance and initiation of case based root cause analysis. The link between operationalization of a rapid response teams (RRTs) and reduction in outbreak cases where these were deployed was clearly noted. RRTs have also supported mapping of diseases. Effort was made to capture the validity of cases in a given time period. The age wise prevalence was color coded. Measurement of underreporting and efforts to limit the spread of certain diseases like Hepatitis C was made in identified districts. In 2011, of the 36 outbreaks reported, 13 were assessed to be water borne, 11 air-borne and remaining were virus transmitted. Appropriate response and control was initiated, for instance replacement of leaking water pipes in line with the recommendations of the study. The functional surveillance system was responsible for such policy level decisions.

Dr Khare from NCDC stated that under the aegis of the World Bank project, strengthening of an influenza laboratory network was a key activity. Influenza as a disease was quite neglected until the recent avian influenza outbreak. It was felt that having a strong laboratory support across the country is vital for outbreak management and development of a preparedness action plan. World Bank support through IDSP was extended for both the human as well as animal influenza outbreaks. The support was finalized on 6<sup>th</sup> Dec, 2006 and approval came by the end of 2007. Planning and coordination, strengthening of public health surveillance including laboratories and epidemic response, improving access to emergency medical care were the main areas of World Bank support under the human health component. IDSP initiated the survey on avian influenza, which included clinical and laboratory surveillance. Human health surveillance was found linked to animal health surveillance. A multi-site biological surveillance network of 10 laboratories and 2 reference/national laboratories was established. This equipped the country to measure prevalence of H1N1 influenza by geographical regions and also in the analysis of avian influenza strains. Successful efforts were made to attach laboratories of various states with the national laboratories, with the exception of Orissa. Currently, there exist 12 laboratories in this network. Two reference laboratories have been added to the list while the laboratory at ICMR is excluded since they use own funding for operations.

As per guidelines, MoUs were signed by the laboratories. Major equipment including real time PCR was installed. Quality was assured; reagents supplied centrally by NCDC such that tests for pandemic as well as seasonal influenza could be performed. The functional elements envisaged earlier under this program such as development and implementation of specimen transport policy with a lead time of 4-6 hours from the time of collection of

sample to drop at the laboratory was achieved. The communication system among the laboratories under the IDSP network was strengthened and mechanisms for information sharing established at all levels. Lab surveillance database including anti-viral database was established and is available for public health decision making. All labs have been functional since 2009 and helped address the pandemics of 2010. Although funds are provided by the disease surveillance program, in case of a shortfall, the project was used to bridge gaps. At present, 11 of the 12 identified laboratories are engaged in avian influenza surveillance and are regularly reporting on performance. Though every year new epicenters of avian influenza are coming up, adequate mechanisms under NCDC are in place. Outbreak of H5N1 in crows, however, is at present not under the purview of any specialized agency.

NCDC itself has initiated influenza surveillance at two sites to confirm swine flu and influenza 'B'. Various large medical institutions like PGI-Chandigarh, JIPMER, Pondicherry, have been submitting the reports of surveillance activities to NCDC. A challenge experienced by laboratories is that of procurement of reagents. Participants inquired of the roll out of the annual influenza surveillance plan, which mandates a practice of collecting five samples per site from three sites per week. Participants were informed that the influenza surveillance plan is retained in the 12<sup>th</sup> five year plan, and hence practices mandated will continue.

A representative from a private corporate hospital, which has been collaborating with IDSP since 2009 mentioned that their association with the program began during the 2009 influenza outbreak and has continued since then. Their three hubs for data generation are- Laboratory, OPD records and inpatient clinical records. Since information is captured using Health Management Information Systems (HMIS), it is easy to pull out required data. Data is sent to IDSP in the prescribed format, along with the positive samples, although the reporting from the OPDs is clinician dependent and may not cover 100% of the cases. Challenges highlighted included reluctance of private hospitals to collaborate with IDSP which was hypothesized to be due to limited approachability of the national nodal agencies managing disease surveillance.

The representative from the department of Preventive and Social Medicine (PSM), Medical College, Nagpur, mentioned that their unit is involved in laboratory surveillance. In addition, their department has executed six training programs on surveillance and participated in the NCD risk factor surveillance initiative. Trainings included sensitization programs for local, block, district level health bodies and health workers. The trainees were categorized into eight groups based on their jurisdiction and scope of work. Trainers were also categorized into three groups based on the targeted level of training-- state, district or sub-district level. Quality assurance in the training program was ensured with senior faculty members acting as trainers in a pre-determined faculty/trainer ratio of 1:4. The training curriculum covered a wide range of topics--from introduction to surveillance to epidemiology, reporting, specimen collection and other relevant components of IDSP. Training modules included outbreak case studies and field assignments as well. The need for hands on field based training was emphasized. Clarifications regarding data capture, feedback, quality of surveillance and training were

sought by participants and discussed. It was agreed that knowledge and motivation are key drivers for the trainings. It was also put forth that the training institutions should demonstrate their practical competence towards surveillance activities, first at their own institutes before taking on the role of trainers. Establishing linkages with neighboring states, especially those working on outbreak management was a strategy that was also proposed.

The representative from the West Bengal SSU shared case studies that they had dealt with. This included problems of data reporting/data identification, communication and such. Corrective strategies adopted included segregation of data using codes based on various stages of reporting (like new, follow-up, and final) and methods to improve clarity in response and communication. It was demonstrated that incorporation of appropriate data filters and sorting methods made analyses more meaningful and less cumbersome. Innovative successful practical experiences like that of “pulse-cleaning of water bodies” (weekly cleaning of all house-hold water storing sources was highlighted. Regular involvement of ASHAs was key to successful outbreak surveillance. The state recommended that IDSP format for data labeling be used by all states for capturing data as this would enhance both accuracy and specificity. It was also clarified that in their IDSP reports, the date of onset of symptoms is being reported. Speaking on the laboratory network and experiences from Tamil Nadu, the SSU from Tamil Nadu informed that initially the reporting system comprised L-1 (block), L-2 (District) and L-3(state) level reporting. The district level laboratories were the backbone of the laboratory network in Tamil Nadu. In 2008, the L1-L2-L3 system was changed and with the support of NCDC, a new approach was introduced. This included – involvement of medical colleges, disease surveillance and inclusion of district laboratories. The reporting form was modified to carry information like – where to send the samples, contact addresses and contact numbers. A reimbursement mechanism was introduced for medical colleges- the actual test cost for investigation of samples was reimbursed to them. The district priority laboratories are mandated to conduct field visits, as well as pick up samples from the diarrhea wards of the district hospitals. This improved the utilization of the priority laboratories and reduced the probability of large scale outbreaks. The possibility of requesting financial assistance from NRHM to meet the costs of integrated Medical Colleges, should IDSP not be able to meet all costs, was also discussed.

Dr Somil Nagpal, Task Team Leader for the IDSP from the World Bank explained the information requirements from SSUs with respect to financial management and financial reporting mandated by the World Bank.

Dr Sukumaran shared the Kerala experience and explained how local government bodies were involved in disease surveillance in Kerala. He informed that involving Panchayati Raj institutions is a corollary to the strategy of decentralized administration. Transfer of funds, functions and functionaries to the local government including those at village, block and district levels, is an important component of this strategy. These bodies are closely associated with the local public health system. Projects on communicable disease surveillance and control amongst others, have since 1997 been envisaged as a “people’s planning campaign”. These are evaluated by the district expert committee, ratified by the

state committee, which results in the release of funds for the approved projects. Other projects include a five year comprehensive health plan for NCDs & Communicable Diseases (CDs), Samagra (involvement of PRIs in prevention of CDs), establishment of a State Disease Control and Monitoring Cell (SDCMC) wherein experts from medical colleges are engaged in communicable disease response and preparedness, and a month long Road Show to sensitize community on vector control and water borne disease control. The participants agreed that strategies and institutions have to be built to bring the community closer to the realization of health.

## **Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR**

### **HUMAN HEALTH COMPONENT**

#### **Introduction**

Integrated Disease Surveillance Project (IDSP) was launched by the Minister of Health & Family Welfare in November 2004 for a period upto March 2010. The project was restructured and extended up to March 2012. From April 2010 to March 2012, World Bank provided funds for Central Surveillance Unit (CSU) and 9 States (Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Uttarakhand and West Bengal). Domestic funding was available for the rest of 26 remaining states in the Country. The project is expected to be continued in the 12th Plan with domestic budget as IDSP under NRHM (National Rural Health Mission) with an outlay of Rs. 851 Crore. Annual outlay for 2012-2013: Rs. 63 Crore (Domestic Rs. 60 crore, EAC Rs. 3 Crore) has been approved.

#### **Major Achievements**

1. Surveillance units have been established at all States and District Headquarters (SSUs, DSUs). Central surveillance Unit (CSU) is established and integrated in the National Centre for Disease Control;
2. Training of State/ District Surveillance teams (Training of Trainers) has been completed for all 35 States /UTs;
3. IT network has been established by connecting 776 sites at all States /Districts HQ and premier institutes in the country for data entry training, video conferencing and outbreak discussion;
4. A portal under IDSP has been established for data entry and analysis, to report outbreaks and to download reports, training modules and other material related to disease surveillance ([www.idsp.nic.in](http://www.idsp.nic.in)). Presently, more than 90% districts in the country report weekly surveillance data through portal. The weekly data gives information on the disease trends and seasonality of diseases. Whenever there is rising trend of illness in any area, it is investigated by Rapid Response Team to diagnose and control the outbreak. Data analysis and actions are being undertaken by respective States/District Surveillance Units;
5. On an average 30 outbreaks are reported every week by the States to CSU. A total of 553 outbreaks were reported and responded to by the States in 2008, 799 outbreaks in 2009, 990 outbreaks in 2010, 1675 outbreaks in 2011 and 335 outbreaks in 2012 (up to March). Earlier only few outbreaks were reported in the country by the State/UTs. This is an important public health achievement;
6. Media scanning and verification cell was established under IDSP in July 2008. It detects and shares media alert with concerned State /Districts for verification and response. A total of 1758 media alerts were reported from July 2008 to 31<sup>st</sup> March



2012. Majority of the alerts were related to diarrheal diseases and vector borne diseases;

7. A 24×7 call center was established in February 2008 to receive disease alerts all across the country on a toll free telephone number (1075). The information received is provided to the States/ Districts surveillance units through email and telephone for investigation and response. The call center was extensively used during 2009 H1N1 influenza pandemic and dengue outbreak in Delhi in 2010. About 2.7 lakh calls have been received from beginning till March, 2012, out of which more than thirty five thousand calls were related to Influenza A H1N1;
8. Fifty priority district laboratories are being strengthened in the country for diagnosis of epidemic prone diseases. These labs are also being supported by a contractual microbiologist to manage the lab and an annual grant of Rs 2 lakh per annum per lab for the reagents and consumables. By the end of the Project, 35 labs in 24 States have been equipped;
9. In the nine priority states supported by the Project, a referral lab network has been established by utilizing the existing 65 functional labs in the medical colleges and other institutes and linking them with adjoining districts for providing diagnostic services for epidemic prone diseases during outbreaks. Informed by the project's practice, the plan has been developed and will be implemented in the remaining 26 States/ UTs;
10. Eleven laboratories have been strengthened and made functional under IDSP for Avian/ H1N1 influenza surveillance; Recruitment of contractual manpower under IDSP has been decentralized in May 2010, so that the State Health Societies recruit them at the earliest. About 301 Epidemiologists, 60 Microbiologists and 23 Entomologists have joined in States/ Districts by March 2012. States have been requested to expedite filling up the remaining contractual positions.

### **Lessons Learnt**

- States giving high priority to public health and with strong leadership from the local Governments have implemented IDSP better. The State Health Secretary/MD, NRHM/DHS etc should monitor the IDSP frequently and regularly;
- Most of the State/District Surveillance Officers for IDSP have many additional responsibilities which negatively affected the project implementation and sometimes delays project activities. States should make sure full time and dedicated SSOs/DSOs;
- Steps need to be taken for increasing coordination between Department of Health Services (DHS) and Department of Medical Education (DME);
- There is a need for full participation of Medical Colleges in the implementation of activities such as:
  - Data collection, analysis and reporting
  - Training
  - Lab support – utilization of labs for diagnosis during outbreaks
  - Members in rapid response teams
- There has been short supply of key human resources (epidemiologists, entomologists, microbiologists) at district levels;

- Currently weekly disease surveillance data are collected from primary health care units and inpatient wards of secondary and tertiary care facilities. Information from OPD will now be a priority for future surveillance system development;
- The capacity of public health laboratories in most states/districts is weak. About 350 district public health labs need to be strengthened and also linked to about 190 medical colleges/referral labs under the 12th Five year Plan. In addition to a microbiologist, further provision of laboratory staff (1 senior laboratory technician, 1 junior laboratory technician, 1 laboratory assist cum DEO and 1 laboratory attendant) is proposed to be stationed at each District Public Health Laboratory.

### **Best Practices**

- Compilation of disease outbreaks/alerts is done on weekly basis and the weekly outbreak report generated by the CSU is shared with all key stakeholders every week including the Prime Minister's Office;
- Epidemiologists monitor the status of receipt of weekly surveillance data, analyze data on a sample basis, and share the analysis with state surveillance units to promote similar analysis at the state and district levels;
- Regular video conferencing sessions are organized to monitor project implementation status, discuss reporting issues and seek clarifications on discrepancies in data such as sudden increase in the number of reported cases and outbreak investigations, including actions taken;
- Extensive training material has been developed and many apex institutions have been trained as trainers, forming a large pool of trainers;
- Establishment of 24X7 call center and scanning of media for unusual health events has proved to be an effective supplementary tool in the early detection of public health threats;
- Frequent monitoring of the implementation of IDSP by the World Bank, NRHM Common Review Mission and internally by the Ministry/NCDC;
- Financial rules and regulations conforming to the World Bank norms have been established and followed rigorously.

### **Proposal for 2012-2017**

All activities being undertaken presently under IDSP are proposed to continue as Integrated Disease Surveillance Program (IDSP) run by NCDC under National Rural Health Mission (NRHM) in the 12<sup>th</sup> Five-Year Plan.

#### *Objectives*

- To strengthen/maintain a decentralized laboratory based IT-enabled disease surveillance system for epidemic prone diseases to monitor disease trends and to detect and respond to outbreaks in early rising phase through trained Rapid Response Teams.
- To establish a functional mechanism for inter-sectoral co-ordination to tackle the zoonotic diseases.

*Proposal in brief:*

- All support to states/districts health societies including additional contractual staff given under IDSP will continue in the 12<sup>th</sup> Plan.
- The Program will be totally funded through domestic budget;
- Roles and responsibilities of state/district surveillance officers will be further defined so that they own the programme;
- OPD data will be collected from major hospitals including medical college hospitals;
- All data to be reported and managed through portal only (currently, they use e-mail as well as portal for this purpose);
- “P” form will be revised to collect data on morbidity as well as mortality;
- The call centre will be popularized among the community, especially among local leaders, to get early information about potential outbreaks;
- Absence of public health laboratories continues to be the weakest link. About 350 district public health labs will be strengthened and also linked to about 190 medical colleges/referral labs under the 12th Five year Plan. This will help in improving the quality of data and outbreak investigations;
- Case based surveillance is proposed to be started in 30 sentinel centres for vaccine preventable childhood illnesses;
- Recruitment of a veterinary (consultant) at each state surveillance unit to strengthen coordination between animal and human health sectors to control zoonotic diseases;
- In addition to a microbiologist provision of lab staff (1 senior r laboratory technician, 1 junior laboratory technician, 1 laboratory assistant cum DEO and 1 laboratory attendant) at each District Public Health Lab.

## **ANIMAL HEALTH COMPONENT**

The ICR mission would like to document sincere thanks to DADF for its arrangement for the field visit to the states of Kanartaka and West Bengal, as well as the meetings with the ICR team. By the time of this report is finalized, there has been no ICR report prepared by the DADF.

## **Annex 8. Comments of Co-financiers and Other Partners/Stakeholders**

WHO country office involved with disease surveillance in the country even before the IDSP project was launched. In fact, WHO along with INCLEN were involved in designing the project, assisting the states in development of state PIPs, development of training strategies, development of the operations manual and other preparatory activities including various operations research projects for the implementation of IDSP in the country. WHO had continuing physical presence at NCDC and carried out field visits to states for hand holding during the roll out of the project. WHO has been a partner in the joint review missions of the World Bank. This project was the priority project of the Communicable Disease Support team of WHO country office for Health Systems strengthening.

A few WHO perspectives on the IDSP project including future plans are outlined below:

1. The project has firmly established a very well defined structure for reporting and feedback for priority infectious diseases and outbreaks in the country right up to the village level. This is an important prerequisite of the International Health Regulations 2005 implementation. All SSOs and DSOs are the focal points for the IHR at state and district levels respectively;
2. Significant improvement in capacity building at all levels of health functionaries from sub-centers upwards have been achieved;
3. An impressive IT infrastructure including an online portal is available from district upward for uploading of data and would be expanded to the block and PHC level in the future. Those data are on the public domain of the IDSP website. The system also has video conferencing facilities for live discussions and trainings of health functionaries;
4. Improvement in laboratory capacity has been slow. The public health laboratory networking is likely to meet the requirement of quality outbreak detection and laboratory confirmation;
5. The system has demonstrated its effectiveness and robustness during the response to human influenza pandemic in 2009 in meeting the emergency needs during the crisis;
6. IDSP generated data has been regularly informing the Prime Minister's Office on disease outbreaks in the country through the e-newsletter;
7. The IDSP has highlighted the future needs for epidemiologists, microbiologists and entomologists at district level. Integration of IDSP into the NRHM II will sustain and strengthen the system, especially for manpower and funding availability;
8. The information from IDSP has been used by policy makers for policy and strategic planning for the 12<sup>th</sup> Health Development plan;

9. The future integration with National Polio Surveillance Project, the surveillance component of National Health Programs, establishment of NCDC branches at State level (presently 8 likely to increase to 20), creation of Regional Offices of Health and Family Welfare (presently 18, may be increased to all states), involvement of all medical colleges and EIS training would enhance the surveillance system capacity and strengthen overall health systems in the country.

## Annex 9. Explanation on Rating of Achievement of PDO

The Implementation Completion and Results Report Guidelines (updated on October 5, 2011) have been followed for assessment of the rating of achievement of the PDO given that the project was restructured twice. The rating results for each restructuring have been factored into the final rating and matched with total disbursements made at the point of each restructuring against the total final disbursement figure of US\$26.49 million.

		<b>Original PDO 2004-2007</b>	<b>Revised PDOs 2007- 2010 (1<sup>st</sup> restructuring)</b>	<b>Revised PDOs 2010- 2012 (2<sup>nd</sup> restructuring)</b>	<b>Overall</b>
<b>1</b>	<b>Rating</b>	MU	MU	S	
<b>2</b>	<b>Rating value</b>	3	3	5	
<b>3</b>	<b>Total disbursed US\$ million</b>	8.82	13.7	3.97	26.49
<b>4</b>	<b>Weight (total disbursed/final disbursed amount of US\$26.49 million)</b>	33%	52%	15%	100%
<b>5</b>	<b>Weight value (2 X 3)</b>	0.99	1.56	0.75	3.4
<b>6</b>	<b>Final rating</b>				MU

**Note:** MS stands for moderately satisfactory; MU stands for moderately unsatisfactory.

## Annex 10. List of Supporting Documents

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