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IDA/SecM2007-0036

January 31, 2007

Closing Date: Tuesday, February 13, 2007

FROM: Vice President and Corporate Secretary

**India - Integrated Disease Surveillance Project
to include Avian Influenza Control and Human Pandemic Preparedness
and Response Activities
under the Global Program for Avian Influenza and Human Pandemic
Preparedness and Response (GPAI)**

(Restructuring Credit)

1. Attached is a Technical Annex on a proposed restructuring credit to India for an Integrated Disease Surveillance Project, to include Avian Influenza Control and Human Pandemic Preparedness and Response Activities, under the Global Program for Avian Influenza and Human Pandemic Preparedness and Response (GPAI).

2. In accordance with the procedures for APLs, this restructuring credit has been approved in principle by Management. In the absence of requests from three or more Executive Directors for Board consideration of this grant (to be communicated to the Vice President and Corporate Secretary by close of business **Tuesday, February 13, 2007**), Management's approval will become effective as of said date.

3. The Executive Directors last discussed the joint IBRD/IDA/IFC Country Assistance Strategy for India on August 26, 2004 (R2004-0170[IDA/R2004-0208; IFC/R2004-0182]). The Chairman's Concluding Remarks were distributed as R2004-0170[IDA/R2004-0208; IFC/R2004-0182] /2.

4. Questions on these documents should be referred to Mr. Epworth (ext. 89504) or Mr. Ramana (New Delhi: 5785+117).

Distribution:
Executive Directors and Alternates
President
Bank Group Senior Management
Vice Presidents, Bank, IFC and MIGA
Directors and Department Heads, Bank, IFC and MIGA

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Report No: T7689-IN

TECHNICAL ANNEX

ON A

PROPOSED RESTRUCTURING

OF THE

INTEGRATED DISEASE SURVEILLANCE PROJECT

TO INCLUDE AVIAN INFLUENZA CONTROL AND HUMAN PANDEMIC PREPAREDNESS AND RESPONSE ACTIVITIES

UNDER THE

GLOBAL PROGRAM FOR AVIAN INFLUENZA AND HUMAN PANDEMIC PREPAREDNESS AND RESPONSE (GPAI)

January 10, 2007

Human Development Sector
India Country Management Unit
South Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective June 2004)

Currency Unit	=	Rupee
Rupee 45.06	=	US$1
SDR 1	=	US$1.44989

FISCAL YEAR
April 1 - - March 31

ABBREVIATIONS

ADMAS	Animal Disease Monitoring and Surveillance
AH	Animal Health
AHC	Animal Husbandry Commissioner
AHD	Animal Husbandry Department
AI	Avian Influenza
CDC	U.S. Centers for Disease Control
CDDL	Central Disease Diagnostic Laboratory
DEA	Department of Economic Affairs (Government of India)
DADF	Department of Animal Husbandry, Dairying and Fisheries (Govt. of India)
DAH&VS	Department of Animal Husbandry and Veterinary Services
DGHS	Director General of Health Services
DI Lab	Disease Investigation Laboratory
DOC	Day-old chick
ELISA	Enzyme Linked Immunosorbant Assay
FAO	Food and Agriculture Organization
GIS	Geographic Information System
GPS	Global Positioning System
GOI	Government of India
HPAI	Highly Pathogenic Avian Influenza
HQ	Headquarters
HRD	Human Resources Development
HSADL	High Security Animal Disease Laboratory
ICAR	Indian Council of Agricultural Research
ICMR	Indian Council of Medical Research
ICU	Intensive Care Unit
IEC	Information, Education and Communication
IDSP	Integrated Disease Surveillance Project
ISRO	Indian Space Research Organization
IVRI	Indian Veterinary Research Institute
JS	Joint Secretary
MoA	Ministry of Agriculture
M&E	Monitoring and Evaluation
MoF&E	Ministry of Forestry and the Environment
MOHFW	Ministry of Health and Family Welfare

NADEC	National Animal Disease Emergency Committee
NGO	Non-Governmental Organization
NICD	National Institute of Communicable Diseases
NIPC	National Influenza Pandemic Committee
OIE	Office Internationale des Epizooties (World Organization for Animal Health)
PPE	Personal Protection Equipment
RDDL	Regional Disease Diagnostic Laboratories
RRT	Rapid Response Team
SADEC	State Animal Disease Emergency Committee
WHO	World Health Organization

Vice President:	Praful C. Patel
Acting Country Director:	Fayez S. Omar
Sector Director:	Julian F. Schweitzer
Sector Manager:	Anabela Abreu
Task Team Leader:	G.N.V. Ramana

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INDIA

INTEGRATED DISEASE SURVEILLANCE PROJECT-

SUPPORT TO INDIA'S COUNTRY PROGRAM FOR PREPAREDNESS, CONTROL AND CONTAINMENT OF AVIAN INFLUENZA

TECHNICAL ANNEX FOR RESTRUCTURED CREDIT

South Asia

SASHD (with SASAR)

Date: December 6, 2006 Country Director (Acting): Fayez Omar Sector Manager/Director: Anabela Abreu (SASHD)/ Gajanand Pathmanathan (SASAR) Lending instrument: SIL (restructuring)		Team Leaders: G N V Ramana (SASHD) and Martien Van Nieuwkoop (SASAR) Sectors: Health (50%); Animal Production and Agro-Industry (50%) Themes: Natural Disasters Management (P); Other Communicable Diseases (P); Health Systems performance (P):Rural Policy and Institutions (S); Other Environment and natural resources management (S) Environmental screening category: Partial Assessment Safeguard screening category: B	
Financing Data: (US $ Million)			
	A. New Financing	B. Additional Financing	C. Existing Financing (restructuring)
Project ID(s):			P073651-Integrated Disease Surveillance Project
Financing type			Credit [X]
Amount (for HPAI related activities):			32.63
Proposed terms:	IDA standard		Existing
Implementation period:			FY07-FY09
Expected effectiveness date:			10/28/2004(A)
Expected closing date:			03/31/2010
Borrower:			Government of India
Responsible agency:			Ministry of Health & Family Welfare with Department of Animal Husbandry, Fisheries and Dairying
Total IDA/IBRD Financing (A.+B.+C., US$M): 32.63			

Financing Plan (US$M)						
Source		Local		Foreign		Total
Borrower Total IBRD/IDA Trust Funds Others Total		23.85 23.85		8.88 8.88		32.63 32.63
Estimated disbursements (Bank FY/US$M)						
	2006	2007	2008	2009	2010	2011
Total IBRD/IDA (Derive from the tables) Trust Funds		17.45	9.54	5.64		

Does the project or new component require any exceptions from Bank policies? ***Ref. Section D.7*** Have these been approved by Bank management?	No
Are there any critical risks rated "substantial" or "high"? ***Ref. Section C.4***	Yes
Does the project (and/or new components, as applicable) meet the Regional criteria for readiness for implementation? ***Ref. Section D.7***	Yes

Development objective ***Ref. Section B.2*** To minimize the threat in India posed to humans by Highly Pathogenic Avian Influenza infection and other zoonoses from domestic poultry and prepare for prevention, control and response to an influenza pandemic in humans

Short description *[one-sentence summary of each component]* ***Ref. PAD B.2***

1. *Human Health*: Builds on ongoing integrated disease surveillance and supports upgrading of laboratories with information networks for influenza surveillance, and urgent human resource development to improve outbreak response for Influenza.
2. *Animal Health:* Strengthening disease surveillance and diagnostic capacity and efforts aimed at outbreak containment and control.
3. *Public Awareness and Coordination:* Supports communication and education of the general public and at-risk communities, as well as support for project management and monitoring and evaluation.

Which safeguard policies are triggered, if any? ***Ref. Section D.6***
Proposed restructuring does not trigger additional safeguards policies beyond Environmental Assessment (OD 4.01) and Indigenous Peoples (OD 4.20) that are currently triggered under the on-going Project

Significant, non-standard conditions, **if any**, for: It is understood with GOI that once actual HPAI-related expenditures incurred under the on-going Project are known, the need for additional financing would be assessed so as to ensure full achievement of original project development objective.
Ref. Section C.5

	A. New Financing	B. Additional Financing:	C. Existing Financing:
Approval: Loan/credit effectiveness: Covenants applicable to project or component implementation:			07/28/04 (A) 09/23/04 (A)

A. STRATEGIC CONTEXT AND RATIONALE

1. GLOBAL AND NATIONAL ISSUES

1. Global Situation. Influenza is an acute viral disease of the respiratory tract caused by influenza viruses A, B or C. These A, B and C viruses are antigenically distinct and there is no cross immunity between them. While all three influenza viruses may affect humans, in lower animals and birds, influenza A viruses are of primary concern. Influenza A viruses are divided into subtypes based on two glycoproteins (haemagglutinin and neuraminidase antigens) present on the surface of the virus. There are 16 haemagglutinin (H) antigens (1 to 16) and 9 neuraminidase (N) antigens (1 to 9).

2. Each century has witnessed an average of three pandemics of Influenza occurring at intervals ranging from 10 to 50 years, starting without warning and spreading rapidly worldwide causing illness of unprecedented proportions. The great influenza pandemic of 1918-1919 caused illness in more than 25% of the total population, with an estimated 40-50 million deaths within a year. The pandemics in 1957 and 1968 were caused by mild viruses, but still killed 1-4 million people.

3. The current epidemic of Highly Pathogenic Avian Influenza (HPAI) was first detected on 12 December 2003 in the Republic of Korea. The increasing number of outbreaks of HPAI caused by influenza A virus type H5N1 in several South East Asian countries (since 2003) and more recently in Europe and North Africa have raised serious global health concerns. To date about 200 million poultry have either died or have been destroyed. According to OIE, 53 countries have reported avian influenza until 5th September 2006. In humans, according to WHO, there were 247 cases of avian influenza with 144 deaths (WHO September 19, 2006). The maximum number of deaths has been reported from Viet Nam, Indonesia, Thailand and China and potential social and economic disruption is unprecedented. Economic losses resulting from Avian Influenza in Asia alone have already exceeded US$ 10 billion. Despite the control measures, the disease continues to spread in most of the countries affected, causing economic losses, threatening the livelihoods of poor livestock farmers, compromising entrepreneurship and poultry production, affecting international trade and market opportunities.

4. The persistence of HPAI since 2003 has fuelled warnings that a global pandemic is imminent and inevitable for the following reasons:

- The epidemics caused by avian influenza are affecting progressively a larger number of countries with evidence for spread to previously unaffected countries. The epidemic is spreading geographically within the countries and affecting larger number of intermediate hosts.
- The strain of H5N1 is highly pathogenic, associated with very high case fatality rates.
- There is evidence for animal-to-animal transmission and occasionally animal to human transmission but no clear case of human-to-human transmission of the disease.
- Influenza virus is highly unstable and its behavior is unpredictable. There are concerns about the re-assortment of the virus and mutations into a new strain with a potential for human to human transmission.

- Influenza pandemics during the 20th century have been devastating with millions of deaths.

5. Avian influenza viruses are not easily transmitted to humans, but this can change due to mutations or genetic re-assortment (mixing of human and animal influenza genes). Continuous transmission of avian influenza and gradual expansion of the host range and the geographical spread increase the possibility of influenza pandemic emerging in the near future.

6. Situation and Response in India: India moved into Phase II HPAI Pandemic Alert with the outbreaks of H5N1 Influenza among domestic fowl in several intensively managed organized poultry farms in Nawapur in Nandurbar District in Maharashtra and Uchchal in Surat District of Gujarat. The occurrence of the disease in India is reported to have started on January 27, 2006. India was one of the 13 countries (in order of reporting: Iraq, Nigeria, Azerbaijan, Bulgaria, Greece, Italy, Slovenia, Iran, Austria, Germany, Egypt, India and France) that have reported their first cases of H5N1 infection in birds since the beginning of February 2006.

7. Though random sero-surveillance of poultry across the country and of migratory birds in their nesting habitats in water bodies was in force from 2001 as an early warning mechanism for HPAI in India, the outbreaks in Nawapur, Maharashtra initially escaped notice and were actually brought to official recognition through local alerts of large scale mortality among caged birds in organized poultry farms in Nawapur, Maharashtra and Uchchal, Gujarat beginning the last week of January and continuing through most of February. On confirmation of HPAI (H5N1) outbreak by the High Security Animal Disease Laboratory (HSADL), Bhopal, on February 18, 2006, the Central and State Governments and the Local Authorities swung into action with alacrity and stamped out the infection in this area by the end of February through: (i) strict and mandatory zoo-sanitary measures; (ii) culling and destruction of in-contact as well as all susceptible poultry (in organized farms as well as backyards), in-contact feed stocks and eggs within a radius of 0-10 km; (iii) public health measures such as active surveillance of all families in the area by house to house search, isolation and hospitalization of all suspected human cases; (iv) awareness campaigns; and (v) restriction of movement of human beings and live poultry / poultry products in and out of the infected zones. Following an intensive surveillance of in-contact personnel, households and labor force, the Authorities (Ministry of Health and Family Welfare) have now concluded that there were no cases of HPAI (H5N1) infection among human beings in the area.

8. HPAI (H5N1) again broke out among free ranging indigenous fowl in backyards in several villages (Marul, Savda, Hated and Salva) of the Jalgaon District of Maharashtra, spread over an area of nearly 150 km2, officially recognized on March 14, 2006. Here again the outbreak of the disease was noticed on account of local alerts of high mortality rates among the free ranging fowl in backyards in villages starting from the end of February and confirmed as HPAI (H5N1) by the HSADL, Bhopal on the 14th of March. Vigorous Control and Containment procedures were set in motion and culling of backyard fowl, destruction and disposal of all susceptible species of poultry, back yard as well as farm flocks, contaminated feed stocks and eggs, in areas 0-10 km radius around all foci of infection were carried out.

9. While the outbreaks in groups of villages in Jalgaon reported on 14th March were brought under control, serum samples from other villages in the area (Varad, Paldhi, Bhadgaon

and Parola) and from villages across the border in Madhya Pradesh (Ichchapur, Burhanpur District) sent to the HSADL tested positive on March 28th. This campaign was widened to a larger number of villages in the Jalgaon district (Pachora, Mehunbare, Nandra, Mohida, Muktainagar, Salbardi, Kamkheda, Pimpri, Vitava, Sakali, Weghari, Nandgaon and Bodarde) after new samples tested positive on April 4-5, 2006. Three other villages (Janave, Jalgaon, Ichkheda; all in Jalgaon district) were included in the campaign after some samples originating from this location were reported positive on April 18, 2006.

10. The control measures adopted in all the outbreaks were stamping out of entire poultry population including destruction of eggs, feed, consumables, litter and other infected materials around 10 Km. area surrounding each outbreak location, restrictions on movement of poultry, poultry products and personnel to and from the area of outbreak, disinfection and cleaning up of the infected premises etc. A total of 1,044,509 birds have reportedly been culled (Surat district in Gujarat: 91,886; Nandurbar and Jalgaon districts in Maharashtra: 323,585 and 616,195 respectively; Burhanpur district in Madhya Pradesh: 12,843). Following the last outbreak reported on April 18, 2006, final cleaning up and disinfection process was completed on 7 May, 2006. In all cases of outbreaks in Maharashtra, Gujarat and Madhya Pradesh the state governments have paid compensation on the spot for back yard birds destroyed as well as to commercial operators upon completion of the cleaning-up and disinfection process.

11. Suspected human cases isolated and hospitalized, in-contact personnel, labor force and households under surveillance in the area have all tested negative for H5N1 infection. Rapid response teams and State / Central authorities have ensured compliance of all mandatory zoo-sanitary / public health measures.

12. Following Article 2.7.12.4 of the OIE Terrestrial Animal Health Code (2005), which states that a country may regain its status as an avian influenza-free country three months after a stamping-out policy (including disinfection of all affected establishments) is applied, provided that surveillance in accordance with prevailing guidelines has been carried out during that three-month period, India notified OIE accordingly on August 11, 2006. Since November 24, 2005 up until this notification, the HSADL in Bhopal has tested a total of about 75,000 samples. Despite analysis conducted by HSADL the source of the outbreak/origin of the infection remains inconclusive, although migratory birds are on top of the likely suspects.

13. Preparatory Actions taken by the Authorities: The Government of India established a Joint Monitoring Group on January 27, 2004 under the chairmanship of the Director General of Health Services consisting of officials from the Ministry of Health & Family Welfare, Indian Council of Medical Research, National Institute of Communicable Diseases, Delhi, World Health Organization and the representatives of the Department of Animal Husbandry, Dairying and Fisheries to monitor the situation and recommend appropriate actions. The Joint Monitoring Group is meeting regularly. Technical guidelines on clinical management, laboratory and public health measures have been drawn up and the group is jointly monitoring for evidence of H5N1 in the country.

14. The Ministry of Home Affairs has been requested to keep vigil on the movement of poultry/related articles through the security agencies in the borders. Similarly, other concerned

Ministries like Shipping (movement of poultry/related articles through the ports), Environment and Forests (unusual deaths of birds in the sanctuaries etc.) have been alerted.

15. The National Institute of Communicable Diseases, Delhi has been identified as the nodal agency to investigate any suspected cases/ outbreak among the human population and the laboratories of Indian Council of Medical Research (National Institute of Virology, Pune) and National Institute of Communicable Diseases, Delhi have been identified for laboratory diagnosis of human influenza. A special issue of 'CD Alert', a monthly newsletter of National Institute of Communicable Diseases, on Avian Influenza (Bird Flu) has been published and widely circulated to all States and Union territories for sharing of information.

16. Under the aegis of ICMR, an initiative to study the strains of Human Influenza, age group affected and seasonality in India through surveillance has been launched. Five centers have been identified for this project; (i) All India Institute of Medical Sciences, (ii) Entero Viral Unit, Kolkata, (iii) Regional Medical Research Centre, Dibrugarh, (iv) King Institute, Chennai and (v) National Institute of Virology, Pune. Initial training has been completed. Essential equipments and consumables have been procured. WHO is also sending the requisite kits. The laboratory of NICD has also been strengthened to take up such activities.

17. The Ministry of Environment & Forests, Bombay Natural History Society, Wetland International and similar interested groups have been alerted to carry out surveillance and monitor the migratory and other wild birds for any unusual sickness or mortality. The wild life personnel and representatives of various other bird watching groups are being trained by DADF to collect suitable material for surveillance through laboratory examination. Droppings and other clinical or suspected material of migratory/wild birds is to be collected and sent to the designated laboratory for the purpose of proper diagnosis. In the event of unusual deaths in migratory/wild birds, written instruction has been given to staff by Ministry of Environment & Forests to transport appropriate material to the identified laboratory for diagnosis.

18. Random sample surveillance in domestic poultry has been carried out for the last four years. Surveillance has been intensified in poultry farms located near ground water bodies/sanctuaries identified by the Ministry of Environment & Forests as being visited by migratory/wild birds for their winter nesting.

19. The laboratory identified for the purpose of diagnosis and also surveillance is the High Security Animal Disease Laboratory (HSADL) located at Bhopal with Indian Council of Agricultural Research (ICAR). All birds imported from HPAI free counties are subjected to quarantine and screening against possibility of introduction of the disease through these birds. There is a total ban in place against import of poultry, poultry products other identified related products from countries which are continuing with HPAI or had exposure in recent times.

The Directorate General of Health Services published in December 2005 a "Contingency Plan for Management of Human Cases of Avian Influenza". Similarly, the Department of Animal Husbandry, Dairying and Fisheries published in November 2005 an "Action Plan for State Animal Husbandry Departments in Respect of Bird Flu". Both contingency plans have been prepared in close collaboration and as per the standard guidelines WHO and FAO respectively. Although training of personnel was continuing at the time when the first HPAI outbreak was

confirmed on February 18, 2006, concerned GOI Departments did have a clear roadmap on how to go about launching an effective response when the need of doing so presented itself. According to WHO and FAO, implementation of these contingency plans

20. Besides the above-mentioned contingency plans, GOI, through the Joint Monitoring Group, has prepared a Country Program for Preparedness, Control and Containment of Avian Influenza. This Program was presented by GOI at the Global AI Conference in Beijing in January 2006. It consists of seven components, including: (i) planning and coordination; (ii) surveillance and laboratory support; (iii) IEC; (iv) strengthening hospital systems; (v) outbreak control program; (vi) development of human resource capacities; and (vii) strengthening quarantine facilities. Additional investments required for support have been estimated at about US$ 74.4 million equivalent.

21. A comprehensive communication strategy has been prepared jointly by the MOHFW and DADF, in partnership with UNICEF and WHO as a part of India's contingency plan to respond to the AI pandemic threat. The overarching objective of this strategy is to protect human health, especially among families engaged in backyard poultry farming, from AI. The strategy involves focused communication approaches for communities at risk, building communication skills of front-line workers and ensures consistent political and social commitment. A road map for its implementation has been prepared after carrying out the preliminary work.

2. RATIONALE FOR BANK INVOLVEMENT

22. India launched the Integrated Disease Surveillance Project (IDSP) with support from the World Bank in November 2004. This project aims to improve 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 project will cover all the states and Union Territories (UTs) in a phased manner by 2009 with an estimated total cost of Rs. 4083 million. It plans to establish disease surveillance units at the central, state and district levels, using information technology for communication and data analysis. The diseases included under regular surveillance include malaria, acute diarrhoeal disease (including cholera), typhoid, tuberculosis, measles, polio, road traffic accidents, plague, meningo-encepahlitis/ respiratory distress, Heamorrhagic fevers, and other undiagnosed conditions (causing death /hospitalization. Sentinel surveillance includes HIV/HBV, HCV, Water quality, Outdoor air quality. Regular periodic surveys include NCD risk factors like Obesity, Physical inactivity, Blood Pressure, Tobacco and alcohol use etc. Provision is also made for surveillance of state specific diseases (not exceeding five in a state). Under the "Unusual Clinical Syndromes" category, diseases like SARS and Avian Influenza can be covered under the Project. This point was reiterated and confirmed during Negotiations with the Government and recorded in the Minutes.

23. Following a request from DEA received on January 19, 2006 to support India's Country Program for Preparedness, Control and Containment of Avian Influenza, the Bank has been working with GOI and other relevant stakeholders to define its contribution in a manner aimed at maximizing value-added, while ensuring that specified efforts complement possible support to India's Country Program from other sources. In response to a letter from DEA received on

February 27th, 2006 concerning how to go about defining possible Bank support, it was agreed and confirmed through a communication from the Bank to DEA, dated March 7, 2006, that the on-going Integrated Disease Surveillance Project (IDSP) would be the primary vehicle for delivering such support. This is in view of: (i) the strong linkages between the nature of the Project and the orientation of India's Country Program for Preparedness, Control and Containment of Avian Influenza; and (ii) the role of Ministry of Health as both the executing agency of IDSP and as nodal agency for India's Avian Influenza (AI) preparedness and control efforts.

24. GOI's plan to respond to the threat posed by AI fits well with the overall objectives of IDSP. The plan aims to minimize the threat posed to humans by HPAI as a part of preparation for the prevention, control and response to influenza pandemic. Through the strengthening of laboratory services, use of information technology, revamping of surveillance and human resource development, it is proposed to address the problem of transmission of AI to humans. The proposal to include seasonal influenza surveillance will contribute to influenza pandemic preparedness and response. The strengthening of laboratory networks will also be very useful in investigating other viral syndromes, especially seasonal influenza, and unusual outbreaks. Furthermore, supporting India's AI preparedness plan will provide a unique opportunity to strengthen cross-sector coordination for addressing zoonotic diseases, which are posing new and growing challenges in the 21st century.

25. This restructuring will be done under the frame work of Global Program for Avian Influenza Control and Human Pandemic Preparedness and Response (GPAI)

B. PROJECT DESCRIPTION

1. PROJECT DEVELOPMENT OBJECTIVE AND KEY INDICATORS

26. The existing Project Development Objective of IDSP is *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.*

27. For the purposes of the AI component to be added to the Project, and in view of the integration of a more explicit animal health dimension in the activities of the project, along with the incorporation of the Department of Animal Husbandry, Dairying and Fisheries as an executing agency of the Project, a supporting Development Objective is proposed along the following lines: *to minimize the threat in India posed to humans by Highly Pathogenic Avian Influenza infection and other zoonoses from domestic poultry and prepare for the prevention, control and response to an influenza pandemic in humans.*

28. Key aspects of overall performance of AI-related activities under the Project will be assessed using the following additional outcome indicator:

Evidence of improved effectiveness of participating animal and public health services in detecting and diagnosing HPAI infection and, once confirmed, limiting the spread of an HPAI outbreak and consequent pandemic in India. This will be measured by:

- Establishment of a surveillance system covering backyard poultry, commercial poultry farms and nesting/breeding habitats of migratory birds.
- Ability of animal health departments and IDSP rapid response teams at district level to investigate at least 90% of suspected AI outbreaks within 24 hrs

2. FINANCING INSTRUMENT

29. Support to India's Country Program for Preparedness, Control and Containment of Avian Influenza will be provided under the ongoing Integrated Disease Surveillance Project (Cr.3952 IN) by creating a separate AI Component and including the Department of Animal Husbandry, Dairying and Fisheries as a new executing agency under the Project. Proposed Bank financing to India's Country Program for Preparedness, Control and Containment of Avian Influenza is estimated at US$32.63 million while GOI will be providing additional US$32.26 million for activities not covered under the Credit such as provision of anti retroviral drugs, medical care, compensation for culling, vaccination of birds and honorarium for reporting at gram panchayat level.

30. Given that it is difficult to quantify with precision required resources for the implementation of India's Country Program for Preparedness, Control and Containment of Avian Influenza, and considering the uncertainties concerning available financing from other sources in support of this Program, use of the Integrated Disease Surveillance Project as the primary vehicle for AI support provides more flexibility. After exact expenditures mobilized for AI purpose are known, supplemental financing could be made available to IDSP to compensate the Project for the additional costs associated with AI preparedness and control that were not envisaged at the time of Project preparation (in order to enable the IDSP to achieve its original objectives).

31. All the components with respect to animal health that are included in the technical annex will be funded by IDSP. The compensation for the culled birds, animal feed destroyed will not be covered by the Bank project. For the human health, the project already supports integrated disease surveillance. The additional inputs will therefore cover laboratory strengthening for surveillance of viral diseases, computer hardware and connectivity for improved information exchange with laboratories, and training. The project will also provide additional financing required for implementing the AI communication strategy. The project will not cover supply of anti-virals which are already stockpiled by GOI, strengthening of the hospitals, and vaccines. However, details of these components are included in the technical annex for human health to reflect the overall national approach.

3. PROJECT COMPONENTS

32. The additional component to the Project, *Support to India's Country Program for Preparedness, Control and Containment of Avian Influenza*, will be divided into three parts,

including: (a) human health (b) animal health; and (c) public awareness and coordination support.

A. Human Health

33. The overall scope of the human health component (additional to existing IDSP) will include (i) Strengthening of Public Health Surveillance including rapid response (ii) improving access to anti viral drugs *and* emergency medical care. Out of these Strengthening of Public Health Surveillance will be financed by the Bank through IDSP as it fits in the project's development objectives and GOI will be financing the remaining objectives.

I. Strengthening Public Health Surveillance and Laboratory Capacity. Standard case definitions for suspected, probable and confirmed case of Avian Influenza would be adopted to ensure uniformity across the country. Formats designed for IDSP would be used and suitably modified, wherever required for surveillance. In case of confirmed cases in poultry, active screening of exposed and at-risk population would be carried out for required duration. Three main components are proposed. These include the following:

A *1*.1 Improvement in Laboratory Network: It is intended to strengthen laboratory surveillance network under IDSP for diagnosis of human seasonal and avian influenza and pandemic influenza for effective prevention and control. The overarching objective of this component is to improve surveillance of viral pneumonia and influenza like illness and strengthen capacity of laboratory network under IDSP for diagnosis of human influenza (seasonal and avian) and pandemic influenza and other emerging infectious diseases through laboratory strengthening and human capacity building.

A *1*.2 Health information and communication: Software for Disease Surveillance is being developed under IDSP. However, it may take a few months for it to be fully operational. A rapid information system would be piloted and later linked to IDSP system. Information technology tools and telecommunication services would be used for information flow, data analysis and feedback. Since quick and effective communication is the key for success of AI prevention, it is proposed to use the country wide network which has appropriate bandwidth. This network to be financed under IDSP will be utilized for data transmission, training and teleconferencing.

A *1*.3 Strengthening Capacity for Rapid Response: The 6-day training program of District and State Surveillance Teams would be suitably modified to include Avian Influenza. Training of medical officers, laboratory technicians and health workers would also include topics on Avian Influenza. Specific training program for laboratory personnel handling samples of suspected cases would also focus on bio-safety issues. One round of training for Rapid Response Teams (RRTs) is already covered with support from WHO and IDSP. The second round sensitization trainings for state level RRTs are planned in the project. This will involve training around 100 professionals in 4 batches. In addition, special trainings will also be provided for two L4 laboratory staff included in the network (both 10 laboratories supported under the project and 5 ICMR labs) covering aspects such as use of Polymerase Chain Reaction (PCR) testing, biomedical waste management, external quality assurance protocols and specimen transfer. Similarly, training will be

provided for all 30 sentinel sites proposed to be included for flu surveillance (2 sites per each L4 lab) covering aspects such as specimen collection and transfer. Both NICD and National Institute of Virology will be offering these trainings programs for respective states attached to them. The existing protocols for acute respiratory triage and referral will be updated and incorporated in the training of hospital staff.

II Improving access to anti viral drugs and emergency medical care: Improving access to antiviral drugs and emergency medical care is a part of strengthening of the health system. GOI is financing this component through domestic budget.

A *II.*1 Anti-Viral Drug therapy and vaccination policy: Use of anti-viral drugs will be integral part of containment. GOI has stockpiled anti-viral drugs following WHO guidelines for targeted population. Safeguards would be in place to prevent inappropriate use of drugs. Guidelines would be published and disseminated on Drug Therapy and will be used to train physicians, nursing staff and other personnel. Current National policy on Immunization has not included regular seasonal influenza vaccination. However, the proposed influenza surveillance will help India to evolve appropriate policy suitable for the country's needs.

A *II.*2 Medical Services: The GOI is also financing inputs to strengthen capacities of selected medical facilities for optimal services in the event of a pandemic. This component would support essential facilities for management of cases, drugs, vaccines and other medical inputs.

B. Animal Health

34. HPAI related investments for animal health under India's Country Program for Preparedness, Control and Containment of Avian Influenza have been divided into two categories, including: (i) strengthening disease monitoring and surveillance; and (ii) control and containment. Project support for animal health related activities under India's country program is organized along these lines, with a primary focus on monitoring and surveillance.

B.I. Strengthening Disease Monitoring and Surveillance: Proposed monitoring and surveillance related investments under India's Country Program are consistent with the principles defined in OIE guide lines for Surveillance of Avian Influenza: Appendix 3.8.9: Article 3.8.9.1, 3.8.9.2 and 3.8.9.3. They also follow guidelines and directions as formulated under the Bank supported Global Program on Avian Influenza, which emphasizes the need for: (i) improving animal health information flow among relevant agencies; (ii) detection, reporting and follow-up of reported cases; (iii) public and community-based surveillance networks; (iv) routine serological surveys and epidemic-surveillance; and (v) improving diagnostic laboratory capacity. Project support for strengthening disease monitoring and surveillance is particularly geared towards: (i) refining the resolution of the surveillance system with the aim to detect possible AI outbreaks as closest as possible to the source; and (ii) strengthening laboratory diagnostic capacity with the aim to minimize required time to confirm suspected AI outbreaks.

35. As far as refining the resolution of the surveillance system is concerned, the Project will support a number of activities and initiatives, including: (i) training of 70,000 animal health

professionals and 4,000 wildlife technicians to carry out random surveillance; (ii) establishment of a participatory disease intelligence constituency by providing training to a total of 120,000 community representatives aimed at increasing capacity on the ground to detect symptoms of HPAI and other diseases in domestic poultry; (iii) roll-out of satellite mapping of bird sanctuaries, water-bodies and wet lands; (iv) establishment of GIS-based animal disease surveillance and information system as a tool to manage the massive random sero-surveillance program effectively; and (v) deployment of ELISA kits for anti-body detection in the field, thereby reducing the massive flow of samples sent for testing in the respective laboratories.

36. As far as strengthening laboratory diagnostic capacity is concerned, the Project will support: (i) upgrading of six central and regional disease diagnostic laboratories to BSL3 laboratories; (ii) upgrading of 23 state/university laboratories to BSL2 laboratories; and (iii) establishment of one new BSL4 laboratory. This would be coupled with effective networking of laboratories and realignment of the responsibilities of the national laboratory network for diagnosis and active surveillance by decentralizing certain laboratory functions, especially as far as sero-monitoring of serum samples from wild birds and domestic poultry is concerned. This strategy would be combined with plans to establish an additional BSL 4 laboratory so that the workloads on the existing BSL4 laboratory are rationalized and the time for reporting after the receipt of the suspect material is reduced. For this purpose minimum capacity for undertaking various activities related to HPAI diagnosis for various levels of laboratories in the national network have been worked out (see Annex for details).

B.II HPAI Outbreak Control and Containment: India's containment and control strategy for HPAI outbreaks in domestic poultry follows OIE / FAO Guidelines and was formulated with the active participation of the FAO Country Office in New Delhi. The DADF, Ministry of Agriculture, Government of India has issued these guidelines to the State Governments and the State Departments of Animal Husbandry to set-up their own control and containment arrangements in line with these guidelines. The Project would specifically provide support in two areas: (i) training of rapid response teams; and (ii) strategic reserves of equipment. As far as training of rapid response teams is concerned, it is envisaged that each district will have one such team. Each team would consist of 32 vaccinators, 58 cullers, 14 foggers and 100 local administration personnel including veterinary professional and para-vets, totaling 204 persons per team. With 602 districts in the country, training would involve a total of about 123,000 people. The provision of strategic reserves of equipment would include PPE, fogging machines and vaccination equipment and would be maintained at a level to control up to 30 outbreaks/year.

B III Vaccination for birds and compensation for culling: Although included in India's Country Program, the Project would not provide support for vaccinations of birds and compensation payments for culled birds. In fact, despite the provisions in the Program to vaccinate poultry in 3-10 km radius from the source of the outbreak, vaccination of poultry as a control intervention has not yet been deployed by Indian authorities. Instead, culling of birds has been carried out in a radius of 10 rather than 3 km as originally envisaged. As far as compensation is concerned, rates have been fixed at market levels prior to the outbreak (Rs.40/adult bird; Rs.30/broiler; Rs.10/chick<10 weeks) with backyard farmers being paid on the spot and commercial farmers after completion of cleaning-up activities. This system has worked well without major complaints. Given the large number of relatively small payments and in view of readily

available resources for this purpose at the State levels, it is considered that involvement of the Project in this particular aspect of India's Program would not generate sufficient value-added.

C. Public Awareness and Coordination Support

37. *C.I Public Awareness:* This component aims at promoting public awareness, particularly oriented towards high-risk groups like animal health workers, poultry workers, live bird markets, poultry meat handlers, laboratory personnel etc. Support would be provided for the development of communication strategies, development of prototype materials through various media and dissemination costs. Sensitization workshops for various stakeholders would also be undertaken under the project.

38. The Information, Education, Communication (IEC) program is to be planned and mounted jointly by all the stake holder ministries / departments. In collaboration with UNICEF and WHO, the DADF and MOH&FW have developed a plan for strategic communication. The overarching objective of this strategy is to prevent spread of avian flu from animals to humans. Focused communication approaches and capacity building initiatives are planned particularly targeting families engaged in backyard poultry farming. By developing a composite strategy for both animal and human influenza, GOI aims to address all key aspects of prevention, preparedness and systematic response across the country. In addition to the Bank project, UNICEF, WHO and other UN agencies will support GOI to implement an extensive campaign and intensive outreach initiatives to achieve the desired behavior change in communities. Specifically, the communication will aim to: (a) Empower families and communities with appropriate knowledge and skills on safe healthy and hygiene behaviors and how to protect themselves and their children from bird flu and its consequences through appropriate social distancing measures; (b) Support the communication response and skills of front line workers such as veterinary extension workers, accredited social health activists, anganwadi workers, auxiliary nurse midwifes, teachers and doctors; (c) Ensure consistent political and social commitment at state, district and village levels through effective advocacy and supporting partnerships with poultry industry, international organizations and other government departments, especially ministry of environment and forests,

39. *C. II Coordination Support:* As far as public health related aspects of support to India's Country Program Preparedness, Control and Containment of Avian Influenza are concerned, the Project would continue to provide support to the Central Surveillance Unit in the Ministry of Health and Family Welfare. As far as the animal health aspects are concerned, the Project would support the establishment of a Bird Flu Cell in DADF. Both the Central Surveillance Unit and Bird Flu Cell would coordinate closely with the Joint Monitoring Group on Avian Influenza and work closely with the respective State committees for the purposes of Project implementation. They would also take charge of M&E arrangements and take the lead on a number of HPAI-related policy and strategic issues that have been identified following the recent outbreak in India (see Lessons Learned for details).

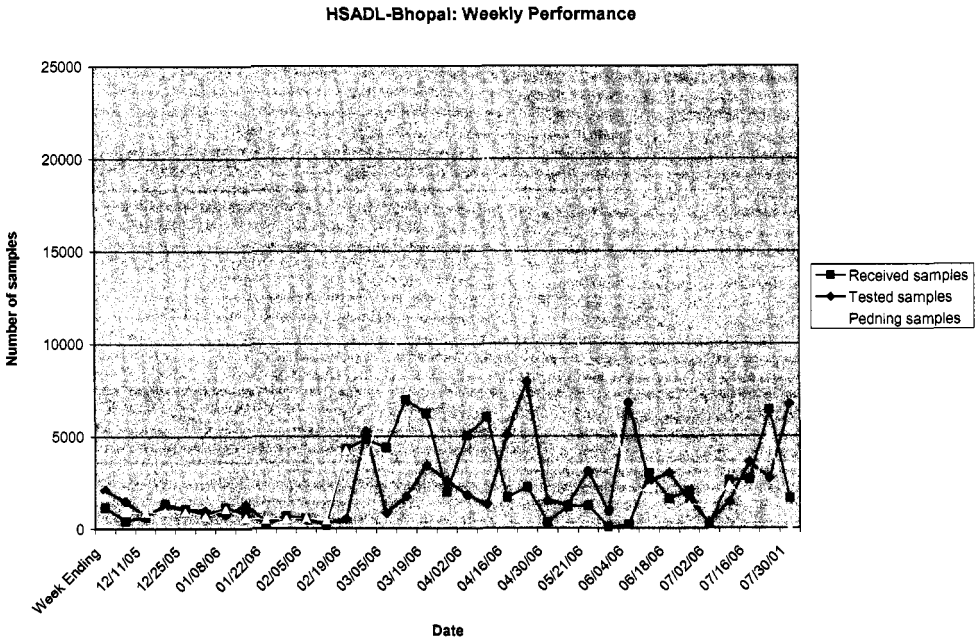
4. LESSONS LEARNED AND REFLECTED IN THE PROJECT DESIGN

40. In view of accumulated experience over the last few months following the HPAI outbreaks in Maharashtra, Gujarat and Madhya Pradesh, a number of issues have emerged that call for renewed emphasis or inclusion of additional items in India's Country Program for Preparedness, Control and Containment of Avian Influenza. These issues were identified and discussed as part of the recently completed Third IDSP Review Mission and subsequently communicated to the GOI on June 7, 2006. They include:

(a) The origin and spread of the virus are yet to be known, which implies that surveillance efforts are in essence chasing a black box. There is a need to conduct an epidemiological survey, including sending of selected samples to regional network laboratories and to OIE/FAO reference laboratory for sharing of test results.

(b) Up until now outbreaks have been picked-up following suspicious deaths of relatively large number of birds, thereby suggesting that a more refined surveillance system would be required to pick up signals of possible outbreaks at a much earlier stage. Proposals to more systematically involve communities, deploy surveillance of migratory birds and domestic poultry existing along water bodies, and establish an animal disease surveillance information system therefore need to be pursued with utmost urgency.

(c) The capacity of High Security Animal Diagnostic Laboratory, Bhopal has turned out to be a critical constraint resulting in relatively long lead times before test results become available and outbreaks can be formally confirmed (see figure below). In order to deal with this situation, there is an immediate need to involve more laboratories at regional and state levels to undertake preliminary tests /or to empower field teams with test kits for basic screening purposes. Recent experience clearly demonstrates that the proposed laboratory upgrading efforts are a centerpiece of India's Country Program for Preparedness, Control and Containment, but besides upgrading at the regional level improvements in existing BSL2 laboratories may be required.



(d) The recent outbreak has clearly put the spotlight on the rather poor bio-security conditions that prevail on poultry farms in the outbreak areas and possibly elsewhere. Surveillance and control efforts in the absence of adequate compliance with minimum bio-security measures would be ineffective. There is a need for a carrot-and-stick approach that would encourage self-regulatory mechanisms among private sector to improve on-farm bio-security.

(e) There is a need to have a closer look at institutional arrangements. In this context, it appears that effective control of H5N1 cannot be the responsibility of the government alone and that systematic involvement of the private industry and partnership with the community through local self government with responsibility for all stakeholders will be crucial. The envisaged update of the contingency plans could be seen as an opportunity to define in more detail the division of responsibilities and contributions among the government, private sector and communities in HPAI preparedness, control and containment. Likewise, coordination at the state level between the Public Health Departments and Animal Husbandry Departments is quite intense when an outbreak occurs, but appears to level off when the immediate threat is brought under control. In this respect, there is a need to ensure more systematic coordination and communication at the state and district levels between the two departments, possibly through including the AH department in surveillance committees and defining joint responsibilities for improving on-farm bio-security. Communication through regular information exchange should be ongoing including times when there are no outbreaks.

(f) One of the strategies is to minimize the opportunities for human infections. This is proposed to be done through adoption of social distancing measures, risk identification and management and risk communication. This is an important strategy which would require partnerships with private sector, communities and other important stakeholders. The different segments have to develop an ownership for success in the program. An appropriate strategy would require consultations with stakeholders and their involvement

right from the planning stage. The strategy should be elaborated with specific budget and identified gaps.

(g) Surveillance has to be very strong and effective to contain or delay the spread of the epidemic at source. The model for seasonal influenza surveillance should consider sentinel surveillance, and involvement of hospitals in surveillance since they are likely to get a large load of cases and have the capacity for collection of samples and transporting them. Some of the hospitals can perform serological screening. Current efforts in surveillance comprising of house to house visits are very labor intensive. Various options need to be considered so that the workforce deployed is not overstretched and at the same time the quality is not compromised. This component is a necessary input into the proposed information technology proposal.

C. IMPLEMENTATION

1. PARTNERSHIP ARRANGEMENTS

41. The international community and the World Bank can play a key role in the response to AI, especially at the country level where there is a need to develop an overall framework to guide national action plans that can be the basis for government and donor support. Such a framework should address both animal and public health aspects as well as economic impact. The overall design of the Project has been formulated with direct input from FAO and WHO staff based in Delhi, India. Inputs from the US Agency for International Development (USAID) assessments and technical assistance visits have also helped to form the overall program.

42. India is receiving support on the technical content of an Avian Influenza response from key technical agencies -- WHO for public health and FAO/OIE for animal health. For example, FAO has a regional Technical Cooperation Programs (TCPs) in the South Asia Region, in which India participates. The program's primary objective is to strengthen the capacity for generating and sharing HPAI disease intelligence and emergency preparedness planning. The program's interaction with India will, among other activities, target improved knowledge of migratory birds' role in HPAI transmission, strengthened laboratory capacity for HPAI diagnosis, and support for further refining of India's Program for Preparedness, Control and Containment of Avian Influenza. Technical support for human component will be provided by WHO.

2. INSTITUTIONAL AND IMPLEMENTATION ARRANGEMENTS

Project Oversight and Coordination

43. A National Program for Preparedness, Control and Containment of Avian Influenza was prepared by Government of India to prevent and contain Avian Influenza in the country. This Program is being updated based on implementation experiences of controlling recent Avian Influenza outbreaks. The Central Ministry of Health and Family Welfare is the Nodal Ministry for dealing with all Biological Disasters including Avian Influenza / Influenza Pandemic.

44. For coordination and policy guidance in the control and containment of HPAI the GoI has set up:

(a) National Influenza Pandemic Committee (NIPC) with the Secretary MOH&FW as the chairperson and with Secretary DADF; DGHS; DG ICMR; Director NICD; AHC; and JS Disaster Management MOH as Members and the Additional Secretary (DG) MOH&FW as Convener

(b) Joint Monitoring Group on Avian Influenza, including DGHS MOH&FW and the AHC MOA, Members.

(c) The NICD and the HSADL-Bhopal have been identified as the nodal laboratories for investigation and confirmation of Human and Avian Cases of HPAI (H5N1), respectively

(d) State Level Influenza Pandemic Committees: with the State Health Secretary as Chairman.

45. The DADF has in addition set up a number of Committees to review and monitor HPAI, including:

(a) National Animal Disease Emergency Committee (NADEC) with Secretary DADF as Chairman;

(b) State Animal Disease Emergency Committee (SADEC) with the State Secretary (AH) as Chairman;

(c) An Expert Group on Avian Influenza to review the global situation and steps to be taken to prevent ingress of disease with the AHC (Chief Veterinary Officer of the country), as the Chairman;

(d) A Committee with the AHC as the Chairman to interact with the poultry industry on a regular and sustainable basis; and a Committee with the AHC as the Chairman and with representation from the poultry industry, to formulate and promote the IEC Campaign on the animal health side.

Human Health Component and Public Awareness

46. The existing implementation arrangements for IDSP will continue for the human health component.

Animal Husbandry Component

47. Implementation of proposed animal health related activities under the Country Program for Preparedness, Control and Containment of Avian Influenza would be coordinated by a dedicated Bird Flu Cell in DADF under the overall guidance of the Joint Secretary of Animal Husbandry, Dairying and Fisheries and with appropriate linkages to established Committees/Task Forces/Expert Groups under the Country Program both at the national and state level. The Bird Flu Cell would be composed of technical experts as well as financial management and procurement officers, with qualifications acceptable to the Bank, in order to effectively deal with the entire range of operational aspects associated with Program implementation. The Bird Flu Cell would integrate appropriate M&E expertise in order to allow for effective specification of outcomes on the ground, both in quantitative and qualitative terms on the basis of agreed outcome and intermediate indicators. In addition there could be a need for short term support (accounts personnel) to the regional laboratories for acting as implementing

units for all the State level activities such as training and civil works. In order to establish the Bird Flu Cell within a short period of time, DADF has indicated that it would hire contractual staff at prevailing market rates.

3. MONITORING AND EVALUATION OF OUTCOMES/RESULTS

48. Monitoring: Support would be provided to enable project monitoring and impact evaluation assessments. Two types of M&E are envisaged. First, the CSU in MOHFW and the Bird Flu Cell in DADF would collect relevant data from their ministries and other implementation agencies and then compile them into semi-annual progress reports focusing on output indicators and the status of physical implementation by component and use of project funds. For some output indicators, specific surveys will need to be conducted to obtain data for this purpose. These would be financed by the Project. As for the financial reports (noted above), the CSU would be responsible for consolidating the ministerial progress reports into an integrated project monitoring report.

49. Impact evaluation reports: The aim of evaluation is to find out whether the interventions are effective or the program is having the desired impact. The evaluation will include both quantitative and qualitative aspects. It would be done after two years and at the end of the Project using a combination of population and facility based assessment using independent evaluators. The quantitative aspects will rely on new Project information systems and surveys implemented as part of the various components of the project, currently existing data sources, and primary evaluative data collection efforts. The goal of the qualitative aspect of the evaluation will be to document perceptions of program managers, staff, patients, and local and national leaders. Qualitative information will be collected using site-visit interviews, focus groups, and respondent surveys.

4. SUSTAINABILITY, CRITICAL RISKS AND POSSIBLE CONTROVERSIAL ASPECTS

50. Sustainability: Critical to the sustainability of the Project would be the continuous ownership of this initiative by the various stakeholders, coupled with strong political support and the availability of an adequate flow of financial resources to carry out project activities. In addition, institutional sustainability would be ensured by: (i) strengthening of programs to maintain public awareness of the threat of avian influenza and other rapidly spreading infectious diseases; (ii) sustained surveillance and prevention and control activities, particularly in high risk regions; (iii) strengthened country capacity to manage at national and local levels the risk factors associated with the spread of avian influenza and other infectious diseases; and (iv) effectiveness of programs to control the spread of avian influenza from birds to the general population.

Critical risks

Risk	Rating	Mitigation Measure
From Outputs to Objective		
Decline in political commitment to AI and to the threat of a global influenza pandemic.	M	Support for inter-country collaboration through ongoing information exchanges, dialogue, and mobilization of international commitment and resources.
Intervention activities not effective in containing the **spread** of Avian Influenza from birds to the human population.	S	Project activities will strengthen response capacity in selected priority areas in the short- and medium terms and lay the foundations for a broader-based strategy, including awareness and communication campaigns, which will be critical to containing the spread of a global influenza pandemic. Interventions would be phased and carefully monitored, allowing for modifications and redesign as needed. Good M&E to flag emerging issues
Inadequate or lack of multi-sector participation	M	NIPC, Joint Monitoring Group on Avian Influenza and corresponding State Committees overseeing the program selected to be representative and given visibility; annual work programming transparent.
Bird flu cell does not have sufficient authority, leadership, and capacity to take leading role in AI prevention and control.	M	Careful monitoring of leadership and project management during project implementation; technical assistance and training.
Strong central commitment does not translate into action on the ground.	M	Implementation mechanisms explicitly address state decision making; communication and advocacy strategies include decentralized authorities as targets.
From Components to Outputs		
Lack of laboratory capacity for prompt diagnosis and surveillance	M	Laboratory capacity building is a specific sub-component of both the animal health and human health components
Inadequate institutional capacity to manage project and perform effectively	M	Capacity building and institutional development integrated into project design with emphasis on decentralization and partnerships.
Lack of sufficient quantity of drugs and other medical inputs needed to address the needs of the general population during a pandemic	M	Existence of domestic capacity to produce anti-viral drugs. Coordinate with other international organizations such as WHO to access international antiviral stockpile with donations from the pharmaceutical industry.
Financial resources not accessible in a timely manner, weak procurement management	M	Rapid disbursement procedures and simplified public sector procurement in accordance with OP for emergency operations. In addition the bulk of the project activities will be implemented at the central level.
Lack of timely and predictable access to expert advice and technical support	M	Project activities are designed and implemented with leading multilateral agencies such as FAO and WHO.
Low priority given to public accountability and transparency in program management	M	Publication of audit results and achievements; transparency in decision and resource allocation.
Inadequate capacity for planned surveillance, surveys and monitoring and evaluation	M	Technical assistance and partnership between local organizations and international institutions will be provided. M&E plan will include information on instruments for data collection, agencies responsible and a detailed time table
Controlling the spread of the pandemic may expose the government to criticism for the curtailment of civil rights due to the adoption of quarantines and other related measures.	M	Project will support advocacy and coalition building to sensitize key groups including policy makers and the media. This will be complemented by carefully designed mass communication campaigns to build support for the project among the wider population.
Overall Risk Rating:	M	

Risk Rating - H (High Risk), S (Substar l al Risk), l (Modest Risk), N (Negligible or Low Risk)

Possible Controversial Aspects: The Project will support the implementation of immediate responses to an influenza pandemic -- the classic "social distancing measures"-- such as quarantine, bans on mass gatherings, and travel restrictions that may be politically sensitive and socially controversial. This means that dialogue and compromises are needed among different stakeholders, backed by a well-designed communication strategy. A high degree of political commitment to preventing and controlling the spread of infectious diseases such as an influenza pandemic would be needed for managing controversies that will undoubtedly arise.

5. LOAN/CREDIT/GRANT CONDITIONS AND COVENANTS

51. It is understood with GOI that once actual HPAI-related expenditures incurred under the on-going Project are known, the need for additional financing would be assessed in a realistic manner so as to ensure that the project will fully achieve its original development objective.

D. APPRAISAL SUMMARY

1. ECONOMIC AND FINANCIAL ANALYSES

52. In India the value of output from poultry sector was nearly US$ 3 billion in 2004-05, and the sector provides direct and indirect employment to over 3 million people. The sector has been growing at a rate of 10% to 15% annually for the last few years.

53. On the trade front, poultry exports from India currently form a miniscule portion (US$ 80 million only) of its total poultry production. The avian influenza epidemic has come at a time when India was eyeing a much higher export of poultry after the Indian Commerce Minister succeeded in persuading Japan to allow exports of frozen chicken from India. With Japan accepting the certification and importing chicken, India had been hoping to make inroads into other countries as well.

54. Other stylized facts of Indian poultry industry are:

- Indian poultry industry has two main outputs: eggs and poultry meat. India produced 41 billion eggs and 1.84 billion kg of meat in 2004-05. Indian poultry industry has 1.87 billion poultry birds (1.7 billion boiler birds used for meat and 170 million layer birds used for producing eggs during their reproductive period).
- The overall domestic consumption of eggs and poultry meat in India is still low especially in rural areas where around 70% of the population lives.
- About 70% of the poultry industry in India is in the organized sector and the rest in the informal sector. However, growth of organized poultry industry is largely in the western and southern regions of India. Only a few farms have been able to achieve international standards for producing poultry meat. This limits India's ability to meet increasing international demand for processed poultry meat.
- Indian poultry meat market is dominated by live bird sales. Around 95% of total demand for poultry meat is in terms of live birds; only 5% of poultry meat is actually processed.

Because of this feature of Indian poultry meat market, there is a real danger of the avian flu spreading to different locations unless strong measures are taken to contain it.

55. An epidemic of bird flu would cause large economic losses to the poultry industry. When demand for poultry abruptly shrinks due to a bird flu scare, price tends to come down. Price declines are given an additional push because farmers and traders (especially those in close proximity to the affected regions) try to sell their stocks at reduced margins rather than risk the disease hitting their farms. Once the existing stocks are sold, new production of poultry slows down. Thus the value of output in the poultry industry declines because of both lower prices and lower quantities produced and sold.

56. In addition, economic losses would also occur in other industries that either provide inputs to the poultry industry, such as producers of bird feed, or are "downstream" from the poultry industry, such as transportation and marketing up to the point where the product reaches the consumer. There may also be negative spillovers into the tourism industry.

57. Furthermore, if the epidemic expands into the human population, society would suffer further losses in terms of medical costs, lost earnings and of course lives.

58. Estimating the monetary value of these various categories of losses in the case of a hypothetical epidemic requires a number of assumptions. And, in order to estimate the economic benefits arising from the planned interventions, assumptions also need to be made concerning how much of a difference these interventions would make in terms of reducing losses to society.

59. For this Technical Annex, some illustrative calculations of losses averted on account of the planned interventions have been made. Details are given in Annex. Under conservative assumptions, the estimated averted loss from implementing an effective strategy against Avian Influenza is about US$1.9 billion. This estimate corresponds to a single episode of avian influenza epidemic lasting between 18 and 52 weeks. Losses averted would be much higher if measured over a longer period of time, to the extent that the disease returned periodically.

2. TECHNICAL

60. India's contingency plans have been subject to a rapid assessment by the Bank, which was published in January 2006 (and included in the Project Files). India's Country Program for Preparedness, Control and Containment of Avian Influenza has been endorsed by WHO and FAO. Proposed support under IDSP to India's Country Program has been defined in close consultation with WHO and FAO.

61. A further analysis of the emerging issues as specified in the section on Lessons Learned, suggests that the critical factors determining the effectiveness of India's AI preparedness and responsiveness appear to lie particularly in the upstream segments of the defined Country Program, including: (i) more refined and precise surveillance; (ii) faster laboratory testing response times; (iii) improved on-farm bio-security; (iv) better understanding of underlying causes and spread of the virus; and (v) more effective partnerships with relevant stakeholders. A better handle on these factors will enable India to increasingly deal with the virus at its source,

thereby reducing: (i) risk of human infections; (ii) economic losses in the poultry sector; and (iii) Program implementation costs due to reduced need for culling with associated compensation payments. It is in line with these considerations that proposed Bank support through IDSP has been defined.

3. FIDUCIARY

62. *Procurement.* The new activities in the restructured IDSP would include *inter alia* civil works and equipment purchase for up-gradation of the regional laboratories, development of GIS, and training for various departmental staff and District/ Block/Gram Panchayat functionaries at the State level. A detailed Procurement Plan, covering the first 18 months of implementation of these activities has been prepared and is presented in Annex. Procurement for AI component shall be initiated using the procedures agreed in the procurement plan. However in case of any emergency situation, faster procurement methods such as Direct Contracting and Limited International Bidding (LIB) will be considered provided such request is received from GOI with justification.

63. *Financial Management*: Avian Flu project has two broad components, the Human Component and the Animal Component. The activities under the Human Component (which is approx US$ 5 million) include procurement of equipments and consumables for 10 identified institutions across the country, training and strengthening of information systems. These activities including procurement will be centralized and will be carried out by the existing central Project Management Unit created for the IDSP, while the training etc will be carried out by National Institute of Communicable Diseases (NICD). The PMU has necessary finance staff who are familiar with the Bank's financial management requirements.

64. The Animal health Component will be implemented by the Departments of Animal Husbandry, Dairying and Fisheries (DADF) within the Ministry of Animal Husbandry. The approx cost of this component is US$ 28 million. A separate Bird Flu Cell will be created within the DADF to implement the project. About 80% of the expenditures, primarily procurement of equipment for strengthening of 23 labs across the country will be managed centrally by the Bird Flu Cell, while the balance will be implemented by the 23 identified labs. The broad activities under the project would include civil works and equipment purchase for up-gradation of the regional laboratories, development of GIS, IEC and training for various staff and District/ Block/Gram Panchayat functionaries at the State level.

65. The Bank project will not finance any compensation for culling or procurement of vaccines or honorarium to individuals/ GP for reporting of outbreaks.

66. Financial Management Assessment:

The financial management assessment focused on the DADF which is a new implementing entity. It was agreed that the Bird Flu Cell (as a Project Management Unit- PMU) within the Dept of Animal Husbandry would be strengthened to include two consultants - one Procurement officer and one Finance officer. These would be on contractual basis co-terminus with the project implementation. In addition there could be a need for short term support (accounts personnel) to

the regional laboratories for acting as implementing units for all the State level activities such as training and civil works. The setting up a fully functional Bird Flu Cell including finance staff is a legal covenant.

67. *Budget and Funds Flow arrangements:* Based on the proposed implementation arrangements the budget provision would be made (after EFC approval) in the budget of DADF to facilitate the flow of funds. The following arrangements were agreed:

68. *Civil Works*: this would be required at the 6 regional labs and at the proposed new lab. The procurement process would be initiated by the respective regional labs and based on the progress of works and submission of bills by the regional labs, payment would be made directly released to the contractors by the Bird Flu Cell.

69. *Procurement of equipments/ computers/software for GIS*: This activity would be centralized and will be carried out by the Bird Flu Cell in order to achieve efficiencies in consolidated procurement. The procured equipments would be delivered to the regional labs.

70. *Training*: Funds for training will be advanced (based on approved training plan/ schedule) to the respective nodal officer at the regional labs who would render accounts to the PMU/PAO- Pay & Accounts Office. It was confirmed that this is the current practice being adopted and that the regional labs would be able to manage this activity across the states in the region.

71. The above arrangement would ensure that the funds would flow to the implementing agencies (labs) quickly, avoid delays in budget and funds flow constraints at the State treasury level and ensure quick rendering of accounts and financial reports.

72. *Accounting & Audit Arrangements*: As activities will be carried out either by the Bird Flu Cell or by way of advances to the regional labs (who in turn will render accounts, including bills to the PMU/PAO) the accounting function could be centralized in the Bird Flu cell (including monitoring of advances) and the audit of the same could be carried out by the CAG. The terms of reference for audit consented to by the CAG for the IDSP would be extended to the Animal Husbandry Component also. In addition to the existing audit reports the Bank will receive a separate audit report on the Avian Flu - Animal Component of the project from the Bird Flu cell. This will be monitored in ARCS. There are no pending audit reports under the on-going IDSP.

73. *Financial Reporting & Disbursement Arrangements*: The financial reporting (reporting format and frequency etc) – six monthly FMR and disbursement as per the traditional re-imbursement method based on submission of Statements of Expenditure will be followed. The two PMUs would separately submit reimbursement claims and FMR to the Bank.

4. SOCIAL

74. No additional social safeguard will be triggered as a result of the proposed amendment to IDSP for the purposes of support to India's Country Program for Preparedness, Control and Containment of Avian Influenza. However, in case of outbreaks, the impact of the mandatory

culling of poultry and the consequent threat to livelihoods needs to be mitigated. For this purpose, a number of measures has been and/or are being put in place by GOI and Reserve Bank of India to deal with the financial fall-out, including: (i) compensation of Rs. 40 per culled bird paid to affected farmers, which is closely in line with on-going market rates prior to the first reported outbreak; (ii) although originally not envisaged in the Contingency Plans, compensation is being considered for other destroyed items, including eggs and feed; (iii) granting of a one-time reduction of four percentage points in the interest payment liability on the bank loans of all types taken by poultry farmers; (iv) a moratorium of one year on payment of principal and interest; (v) conversion of working capital into term loan payable over three years; (vi) rescheduling of term loans availed by poultry farmers over an additional period of two years from the agreed tenor of the term loan; and (vii) permission to draw additional working capital after conversion of working capital into term loan. These measures will provide the social safeguards and are likely to enhance participation of the communities in the control efforts. In order to be able to detect HPAI outbreaks as closely to the source as possible, thereby preventing the spread of the virus and consequently reduce associated financial losses, it is foreseen under India's country program to include village representatives in surveillance efforts, who will be paid a premium for each detected and confirmed case of HPAI infection.

5. Environment

75. The existing Environmental Management Plan of IDSP is generally adequate given the envisaged new activities to support to India's Country Program for Preparedness, Control and Containment of Avian Influenza. In addition, the Technical Annexes for Animal Health related activities under the program (as included in the Project Files) are quite comprehensive and clearly: (i) detail required bio-safety measures; (ii) specify various categories of waste and their management, including water quality issues; and (iii) cover sanitation, Personal prophylaxis Equipment, as well as arrangements for the health and safety of workers. In view of envisaged laboratory construction and up-gradation activities, the EMP will be updated and contractual documents will contain provisions to deal with the management of construction waste in accordance with Bank procedures.

6. Safeguard Policies

76. The proposed amendment of IDSP for the purpose of HPAI-related activities does not trigger additional safeguard policies beyond the existing ones, including Environmental Assessment and Indigenous Peoples.

7. Policy Exceptions and Readiness

77. The proposed amendment of IDSP for the purposes of HPAI-related activities does not seek any policy exceptions.

E. FINANCIAL TERMS AND CONDITIONS.

78. The proposed amendment of IDSP for the purposes of HPAI-related activities does not alter the financial terms and conditions of on-going Bank support for IDSP.

ANNEXES

ANNEXURE I: RESULTS FRAMEWORK AND MONITORING

INDIA- NATIONAL DISEASE SURVEILLANCE PROJECT
SUPPORT TO INDIA'S COUNTRY PROGRAM FOR PREPAREDNESS, CONTROL AND CONTAINMENT OF AVIAN INFLUENZA

Project Development Objective	**Project Outcome Indicators**	**Use of Project Outcome Information**
To minimize the threat in India posed to humans by HPAI infection and other zoonoses in domestic poultry and prepare for the control and response to an influenza pandemic and other infectious disease emergencies in humans.	• 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.	• To determine the effectiveness of the project during implementation and make corresponding changes if needed. • To assess the extent to which the project objective has been achieved.
Intermediate Outcomes	**Intermediate Outcome Indicators For Each Component**	**Use of Intermediate Outcome Monitoring**
I. Human Health Component		
Component A *Strengthening Public Health Surveillance and Laboratory Response*	• At least 90% of suspected AI outbreaks investigated within 24 hrs by the district authorities	Quarterly reports and external evaluations
Component A.*I*.1. *Improvement of laboratory network*	• At least ten L4 public health laboratories strengthened under the project at BSL 3 level are able to undertake (a) preliminary reporting of AI outbreaks within 4 days; (b) test ten samples for viral etiology per month (c) able to test proficiency panels correctly and (d) follow required biomedical waste management procedures; • Two L5 public health laboratories qualify as National reference laboratories with BSL 3 practices and are able to undertake virus isolation following standard international protocols; • Number of sentinel sites complying with bi-	

	weekly (winter) and monthly (summer) reporting on seasonal influenza occurrence; • National Reference Laboratories through MOH share monthly reports with state health departments summarizing compiled results of national influenza surveillance.	
Component A.*I*.2 *Health Information and communication*	• India establishes an effective seasonal influenza surveillance system as per flu-net standards	
Component A.*I*.3 *Strengthening capacity for Rapid Response*	• Number of laboratory staff trained and reorientation of Rapid Response Teams in all high risk states	
II. Animal Health Component		
Component I.A: *Strengthening Disease Surveillance and Diagnostic Capacity –* • Better understanding of the probable causes and spread of HPAI outbreak is attained. • More refined surveillance system is operational • Increase laboratory capacity for rapid diagnosis is put in place.	**Component I.A:** • Results of epidemiological survey of all future major outbreaks are available; • Surveillance system in place covering backyard poultry, commercial poultry farms and nesting/breeding habitats of migratory birds. • Community involvement in surveillance activities is increased. • At least 90% of suspected AI outbreaks are investigated within 24 hours by district authorities. • Diagnosis is decentralized as reflected in the percentage of samples handled by laboratories other than HSADL-Bhopal.	**Component I.A:** To verify satisfactory and timely progress in minimizing the time required for the confirmation of an HPAI outbreak.
Component I.B: *Outbreak Containment and Control* • Better trained and better equipped rapid response teams are in place.	**Component I.B:** • Proportion of district rapid response teams that have participated in simulation exercises. • Improved responsiveness as indicated by required time for completion of culling and cleaning operations after confirmation of an HPAI outbreak.	**Component I.B:** To verify satisfactory and timely progress in minimizing the time required for stamping out confirmed HPAI outbreaks.

Intermediate Outcomes	Intermediate Outcome Indicators For Each Component	Use of Intermediate Outcome Monitoring
III. Public Awareness and Coordination Support Component		
Component III.A: *Public Awareness* – • Coordinated communications process involving Ministry of Health, Department of Animal Husbandry and others addressing information /communication needs of priority audiences, during pre-pandemic and pandemic A-I phases; • Informed at-risk communities adopting safe health practices, reporting, and contributing to outbreak control actions; • Educated citizenry, aware of the impact and social containment measures needed if AI escalates across pandemic phases.	**Component III.A:** • Communication strategy and plan in place highlighting actions by participating ministries and agencies to mobilize communities and promote advocacy to contain AI pandemic, generate social trust and credibility; • Evidence of consistent communication to promote reporting of outbreaks, fast response and an uninterrupted social dialogue; • Improved awareness among high risk populations especially households with backyard poultries, meat handlers in wet markets and health care workers regarding: (a) prompt reporting of sick/dead birds; (b) social distancing measures to be taken during outbreaks, and (c) seek prompt treatment during flu outbreaks	**Component III.A:** To verify satisfactory and timely progress in, raising public awareness and minimizing the risk of panic induced behavioral responses.
Component III.B: *Program Coordination* – • Coordination across sectors is effective. • Coordination and management of project implementation and M&E activities carried out in a professional manner	**Component III.B:** • Inter-institutional and multi-sectoral coordination arrangements in place • Representatives of Department of Animal Husbandry included as members of state and district surveillance committees; • Bird flu cell in DADF is operational .	**Component III.B:** To verify satisfactory and timely progress in coordination across sectors and program efficiency.

Progress Assessments of Results and arrangements for results monitoring

		Target Values					Data Collection and Reporting		
Project Outcome Indicators	**Baseline**	**2006**	**2007**	**2008**	**2009**		**Frequency and Reports**	**Data Collection Instruments**	**Responsibility for Data Collection**
• Evidence of improved effectiveness of participating animal and public health services in detecting and diagnosing HPAI infection and, once confirmed, limiting the spread of an HPAI outbreak and consequent pandemic in India	0 human AI cases No human pandemic	Contain spread and number of cases No human pandemic	Contain spread and number of cases No human pandemic	Contain spread and number of cases No human pandemic	Contain spread and number of cases No human pandemic		Semi-annual progress reports	Progress reports, spn missions	MoH, DADF, Central Surveillance Unit, Bird Flu Cell
Intermediate Outcome Indicators									
I. Human Health Component									
Component A • A. Strengthening of public health surveillance system including rapid response	Slow response of district health authorities in responding suspected AI outbreaks	District health authorities initiate investigation of suspected AI outbreaks within 24 hrs in states of AP, Gujarat, Maharashtra and Tamil Nadu	50% of suspected outbreaks investigated within 24 hrs.	75% of suspected outbreaks investigated within 24 hrs	90% of suspected outbreaks investigated within 24 hrs		1st and 2nd semi-annual reports	State progress reports, supervision missions	Central Surveillance Unit (CSU),National Institute for Communicable diseases
• A.*I*.1.Improvement of laboratory network	Specimen Transport Policy	Finalized	Implemented by high risk districts	Implemented by all districts	Implemented by all districts				
	Number of L4 (BSL2) laboratories able to achieve agreed performance	None	2	5	10		Quarterly	Progress reports of L4 labs, Sup. Missions	Central Surveillance Unit

Project Outcome Indicators	Baseline	Target Values					Data Collection and Reporting		
		2006	2007	2008	2009		Frequency and Reports	Data Collection Instruments	Responsibility for Data Collection
	parameters for national influenza centers								
	Number of L5 (BSL3) able to achieve agreed performance parameters for national reference labs	1	1	2	2		Quarterly	Progress reports of L5 labs, Sup. missions	Central Surveillance Unit
• A. *I.*2. Health Information and communication	No influenza surveillance system in place		At least 10 sentinel surveillance sites collect a minimum of 10 respiratory samples/month	At least 20 sentinel surveillance sites collect a minimum of 10 respiratory samples/month	At least 30 sentinel surveillance sites collect a minimum of 10 respiratory samples/month		Quarterly	Progress reports from L4 labs	Central Surveillance Unit
	No feedback from reference labs to states and L4 labs	Standard formats for quarterly feedback prepared	At least 50% of states receive quarterly feedback	Feedback to states/L4 labs for all quarters	Feedback to states/L4 labs for all quarters		1st and 2nd semi-annual reports	Spn mission	Central Surveillance Unit
• A.*I.* 3. Strengthening capacity for rapid response	Induction training for 35 State Rapid Response Teams (RRT)	Number of staff trained and re-orientation of State RRT	L4 lab staff: Orientation of coordinators from all 10 L4 labs Reorientation: RRT of all High risk states	L4 lab staff: Decentralized orientation for staff in 10 labs by coordinators Reorientation: RRT of all remaining states	Annual Reorientation for all L4 Lab staff and RRT		1st and 2nd semi-annual reports	Spn mission	Central Surveillance Unit
I. Animal Health Component									
Component I.A: • Epidemiological survey to detect causes and spread of HPAI outbreak	Not available		Results available				Final survey report	Survey	DADF, PIU, FAO

		Target Values					Data Collection and Reporting		
Project Outcome Indicators	**Baseline**	**2006**	**2007**	**2008**	**2009**		**Frequency and Reports**	**Data Collection Instruments**	**Responsibility for Data Collection**
• National surveillance system had adequate coverage	Not in place		20,000 samples/year	20,000 samples/year	20,000 samples/year		semi-annual reports	Progress reports, spn missions	BSL3/4 Labs, DADF, PIU, spn mission
• Community involvement in surveillance activities put in place	Not in place	Not in place	40,000 village workers trained/year	40,000 village workers trained/year	40,000 village workers trained/year		semi-annual reports	progress reports, spn missions	SADEC, DADF, PIU, spn mission
• Lead time for availability of diagnostic results significantly reduced	Lead time	20 days	10 days	5 days	3 days		semi-annual reports	progress reports, spn missions	BSL3/4 labs, DADF, PIU
• Laboratory diagnosis decentralized to BSL3 and BSL2 labs	Cumulative total: BSL4: 1 BSL3: 0 BSL2: 0	Cumulative: BSL4: 1 BSL3: 0 BSL2: 7	Cumulative: BSL4: 1 BSL3: 3 BSL2: 8	Cumulative: BSL4: 2 BSL3: 6 BSL2: 8	Cumulative: BSL4: 1 BSL3: 6 BSL2: 23		semi-annual reports	progress reports, spn missions	DADF, PIU, spn. mission
Component I.B: • Emergency supplies procured and available at strategic locations in the field;	Limited	Limited	Supplies for 112,808 staff and 602 teams procured and deployed				1st and 2nd semi-annual reports	progress reports, spn mission	DADF, PIU, spn mission
• Participation of district rapid response team in simulation exercises	Not organized	Not organized	50% of districts teams	75% of district teams	100% district teams		semi-annual reports	progress reports, spn missions w/FAO	DAF, PIU, spn mission
	No feedback from reference labs to states and L4 labs	Standard formats for quarterly feedback prepared	At least 50% of states receive quarterly feedback	Feedback to states/L4 labs for all quarters	Feedback to states/L4 labs for all quarters		1st and 2nd semi-annual reports	Spn mission	Central Surveillance Unit,
• Strengthening capacity for rapid response	Induction training for 35 State Rapid Response Teams (RRT)	Number of staff trained and re-orientation of State RRT	L4 lab staff: Orientation of coordinators from all 10 L4 labs	L4 lab staff: Decentralized orientation for staff in 10 labs by	Annual Reorientation for all L4 Lab staff and RRT				

Project Outcome Indicators	Baseline	Target Values					Data Collection and Reporting		
		2006	2007	2008	2009		Frequency and Reports	Data Collection Instruments	Responsibility for Data Collection
			Reorientation: RRT of all High risk states	coordinators Reorientation: RRT of all remaining states					
III. Public Awareness and Coordination Support Component									
Component III.A: • Research-based risk communication strategies and products, responding to the needs of priority audiences, are developed;	Pandemic Influenza National Action Plan revised to include a draft National Strategic Risk Communication Plan (NSRCP)	Strategic communication plan completed and media agency hired	Messages piloted and communication strategy implemented	Mid term review and updating of communication strategy	Implementation of updated Communication strategy		Quarterly reports in 1st year; semiannual reports thereafter	semiannual reports	Bird Flu Cell, Central Surveillance Unit
• Awareness among high risk population	No focused strategy to enhance awareness of high risk populations		Messages with specific focus on high risk groups: households with backyard poultries, meat handlers in wet markets and health care workers	Evidence of improved awareness regarding (a) prompt reporting of sick birds; (b) social distancing measures; and (c) need to seek prompt medical care for flu symptoms during outbreaks	Implementation of updated strategy				
Component III.B: • Meetings between health officials and animal husbandry officials are held on a regular basis both at the	Meeting frequency	Meeting frequency	Meeting frequency	Meeting frequency	Meeting frequency		Semi-annual reports	Progress reports, meeting minutes	Central Surveillance Unit, MOHFW, Bird Flu Cell, DADF

		Target Values					Data Collection and Reporting		
Project Outcome Indicators	**Baseline**	**2006**	**2007**	**2008**	**2009**		**Frequency and Reports**	**Data Collection Instruments**	**Responsibility for Data Collection**
central as well as at the state and district levels									
• Animal husbandry officials included as members of state and district surveillance committees.	Not included	Included in high risk states	Included in all states and districts	Regularly attend the review meetings			Semi-annual reports	Progress reports, meeting minutes	
• Program progress reports, financial monitoring, procurement and disbursement reports, audits, management and financial reports prepared and submitted periodically	Bird Flu Cell functioning	Bird Flu Cell staffed and fully operational	Bird Flu Cell maintains staff and is fully functional	Bird Flu Cell maintains staff and is fully functional	Bird Flu Cell maintains staff and is fully functional		Semi-annual reports, quarterly FMRs, annual audits	Semi-annual reports, quarterly FMRs, annual audits, spn missions	MOHFW, DADF, Central Surveillance Unit, Bird Flu Cell
• Methodology defined and monitoring and evaluation periodically undertaken	MARA CEU and MOH PIU with M&E capacity	Detailed surveys completed	Detailed surveys completed	Detailed surveys completed	Detailed surveys completed		Semi-annual, mid-term and final reports,	Progress reports, Final Evaluation Report	MOHFW, DADF, PIU

ANNEXURE II: DETAILED PROJECT DESCRIPTION

India Avian Influenza Pandemic Preparedness Plan

Government of India has prepared a comprehensive plan to prevent and contain Avian Influenza in the country. The Plan is being updated based on implementation experiences of controlling Avian Influenza outbreaks in poultry sector in three States (Maharashtra, Gujarat and Madhya Pradesh) in India.

A high level steering committee has been set up to take decisions on interventions in emergency situations. It would also monitor activities taken in the event of outbreaks. A co-ordination committee has been set up with representation from Departments of Health & Department of Animal Husbandry and other stakeholders to ensure integration and coordination of various activities under the Project. A joint monitoring group was established with Director General of Health Services as its chairperson in January 2004. Similar mechanisms have been established in different states of the country. A number of legal, policy and regulation issues that are relevant to the effective containment of avian influenza will be addressed. These issues include notification of the disease in animals and humans, bio security measures and bio safety norms in the organized, unorganized sectors, market places, health institutions and back yard poultry. These also include compensation policy, compartmentalization and zoning, and regulatory aspects relating to drugs, and vaccines. Provisions have also been made in the contingency plans to establish crisis management committee under Secretary Health and Family Welfare, National, state, district influenza pandemic committee and joint monitoring groups at all levels. The plan recognizes the need for coordination between the Ministry of Health and Department of Animal Husbandry. Others like the representative from the ministry of environment and forestry, ministry of home etc are co opted as members when required.

The additional component to the Project, *Support to India's Country Program for Preparedness, Control and Containment of Avian Influenza*, will be divided into three parts, including: (a); human health (b) animal health; and (c) public awareness and coordination support.

A. Human Health

The country plan for control and containment of Avian influenza on the human side aims at (1) reducing the morbidity and mortality due to influenza and (2) decrease the social disruption and economic losses.

World Health Organization in 2005 has reviewed the classification system prepared in 1999 for phasing various stages of the pandemic development/progress. The same has been adopted by Govt. of India for harmonization of classification, for delineating the activities, roles and responsibilities.

India has adopted WHO phasing of Influenza pandemic presented below:

Period	Phase	Description
Inter Pandemic period	1	No new influenza virus sub types have been detected in humans. An influenza virus sub type that has caused human infection may be present in animals, the risk of human infection or disease is considered to be low.
	2	No new influenza virus sub types have been detected in humans. However, a circulating animal influenza virus subtype poses a substantial risk of human disease.
Pandemic Alert Period	3	Human infection/s with a new sub-type but no human to human spread or at most rare instances of spread to a close contact.
	4	Small cluster/s with limited human-to-human transmission but spread is highly localized, suggesting that the virus is not well adapted to humans.
	5	Larger cluster/s but human-to-human spread still localized, suggesting that the virus is becoming increasingly better adapted to humans, but may not yet be fully transmissible (Substantial Pandemic risk).
Pandemic Period	6	Pandemic Phase: Increased and sustained transmission in general population
Post pandemic period		Return to inter pandemic period

Presently, India is in Phase 2 of Pandemic alert Period. Based on the above WHO guidelines, India has prepared a national pandemic preparedness plan with the following objectives:

- ❖ Reduce opportunities for human infections
- ❖ Strengthen the early warning system
- ❖ Contain or delay spread at the source
- ❖ Reduce morbidity, mortality and social disruption
- ❖ Conduct research to guide response measures

The salient features of the said plan focus on the following activities

- ❖ Strengthen Public Health Surveillance including rapid response
- ❖ Improve laboratory network
- ❖ Health information and communication
- ❖ Strengthen capacity for rapid response
- ❖ Improving access to antiviral drugs and emergency medical care
- ❖ Increase public awareness and coordination support
- ❖ Research

The India-Integrated Disease Surveillance Project

India has launched the Integrated Disease Surveillance Project (IDSP) with support from the World Bank in November 2004. This project aims to improve 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 project will be covering all the states and Union Territories (UTs) in a phased manner by 2009 with total cost of Rs. 4083.6 million. It plans to establish disease surveillance units at the central, state and district levels, train RRT to detect and respond to outbreaks, strengthen laboratories and use information technology for communication and data analysis. This infrastructure is proposed to be utilized for disease surveillance of human Avian influenza also.

The Project addresses common communicable diseases and risk factors of non-communicable diseases. Following diseases of public health importance are included for support under the Project:

(i) Regular Surveillance:		
Vector Borne Disease	*: 1.*	*Malaria*
Water Borne Disease	*: 2*	*Acute Diarrhoeal Diseases (Cholera)*
	: 3.	*Typhoid*
Respiratory Diseases	*: 4.*	*Tuberculosis*
Vaccine Preventable Diseases	*: 5.*	*Measles*
Diseases under eradication	*: 6.*	*Polio*
Other Conditions	*: 7.*	*Road Traffic Accidents*
Other International commitments:	*: 8.*	*Plague*
Unusual clinical syndromes	*: 9.*	*Menigoencephalitis/Respiratory Distress Hemorrhagic fevers, other undiagnosed conditions (Causing death / hospitalization)*
(ii) Sentinel Surveillance	*: 10*	*HIV/HBV, HCV*
	: 11	*Water Quality*
	: 12	*Outdoor Air Quality*
(iii) Regular periodic surveys		
NCD Risk Factors	*: 13*	*Obesity, Physical inactivity, Blood Pressure, Tobacco & Alcohol use etc.*

(iv) State Specific Diseases (Not exceeding five in a State)

Under the "Unusual Clinical Syndromes" diseases like SARS and Avian Influenza can be covered. This issue was reiterated during the negotiations with the World Bank.

The proposal to utilize the infrastructure for the response to the threat posed by AI fits well with the overall objectives of IDSP. It is proposed to minimize the threat posed to humans by HPAI as a part of preparation for the prevention, control and response to influenza pandemic. It is an opportunity for the strengthening of sectoral coordination in addressing zoonotic diseases, which are posing, new and increasing challenges during the 21st century. Through the strengthening of laboratory services, use of information technology, revamping of surveillance and human resource development, it is proposed to address the problem of transmission of AI to humans. The problem of seasonal influenza will also be addressed thus contributing to the inputs into influenza pandemic preparedness and response. The proposed strengthening of laboratory networks will be very useful in investigating other viral syndromes and unusual outbreaks.

Project components

Component A: Human health

The overall scope of the human health component (additional to existing IDSP) will include (i) Strengthening of Public Health Surveillance including rapid response (ii) improving access to anti viral drugs and emergency medical care. Out of these Strengthening of Public Health Surveillance will be financed by the Bank through IDSP as it fits in the project's development objectives and GOI will be financing the remaining objectives.

A.1 Strengthening Public Health Surveillance and Laboratory Capacity

Standard case definitions for suspected, probable and confirmed case of Avian Influenza in conformity with WHO recommendations have been developed and would be adopted to ensure uniformity across the country (See attachment for case definition). Formats designed for IDSP would be used and suitably modified, wherever required for surveillance. In case of confirmed cases in poultry, active screening of exposed and at-risk population would be carried out for required duration. For routine surveillance, new diseases like AI are covered under "Unusual Clinical Syndromes". When there are confirmed outbreaks in poultry, active surveillance among those who are exposed and at risk population is proposed for a period of 3 weeks after last reported case.

A *1*.1 Improvements in the Laboratory Network

It is intended to strengthen laboratory surveillance network for diagnosis of human seasonal and avian influenza and pandemic influenza for effective prevention and control. The overarching objective of this component is to strengthen capacity of laboratory network under IDSP for diagnosis of human influenza (seasonal and avian) and pandemic influenza and other emerging infectious diseases through laboratory strengthening and human capacity building. Specific objectives include:

- To develop and implement a rapid and safe specimen transport policy and strengthen laboratory communication
- To strengthen the validity of laboratory results by establishing a practical and feasible quality assurance system within the framework of IDSP laboratory network
- To develop and operationalize a functional laboratory surveillance network at the peripheral, intermediate, regional, national and international level through exchange and sharing of information and clinical material
- To ensure availability of reliable and comprehensive laboratory surveillance data through establishing a sound laboratory specimen and data management system for critical decision making and maintenance of a national strain repository
- To monitor anti-viral drug resistance for evidence based drug policy and case management
- To ensure effective public health action through provision of laboratory support to sound field research for investigation of disease transmission and dynamics.

Expected Outcomes

- Specimen transport policy developed and implemented
- Strengthened communication systems in laboratories under IDSP network
- Functional quality assurance programme for L4 and L5 laboratories
- Mechanism for information and specimen sharing established and functional at all levels including with WHO Collaborating Centres
- Laboratory surveillance data base (including anti-viral drug resistance) established and available for Public Health decision making
- National influenza strain repository established

Inclusion criteria for L4 Regional Reference Laboratory

- Facility and experience for viral diagnosis including virus isolation
- Availability of Bio-safety level 2 facility with BSL 3 practices including waste management
- Participation in the quality assurance program of the proposed network
- Adequate number of trained microbiologist and/ or virologists and other supportive staff
- Accessibility and connectivity within and outside the assigned region
- Adequate IT and communication facility
- Infrastructure for storage and handling of kits/ reagents and biologicals.
- Commitment to participate in the IDSP network under a MoU.

It is proposed to have two L5 and 10 L4 laboratories operational by 2008. Network of Laboratories and their roles are given as an attachment. It is expected that the laboratories in the network will perform real time PCR assays while more advanced diagnostics, including viral isolation will be done at NIV and NICD.

The expected roles and responsibilities of different laboratories proposed to be included under AI surveillance are presented in Technical Annex G (in project files).

To ensure intensive surveillance and for higher quality data it is expected that information on influenza like illness will be collected from each selected site (one site in each state and union territory) on a weekly basis. Specimens will be collected from a systematic sample of influenza like illness patients for investigation. A plan will be developed to systematically analyze and disseminate the results derived from the sentinel sites. This would help in decisions regarding the use of seasonal vaccine.

A. *1.2* Health Information & telecommunication

Software for Disease Surveillance is being developed under IDSP. However, it may take a few months for it to be fully operational. A rapid information system would be piloted and later linked to IDSP system. Information technology tools and telecommunication services would be used for information flow, data analysis and feedback. Since quick and effective communication is the key for success of AI prevention, it is proposed to use the country wide network of Indian Space Research Organization (ISRO) which is being financed under IDSP. This network will be utilized for data transmission, training and teleconferencing.

A.*1*.3 Strengthening Capacity for Rapid Response

In view of urgent need, Rapid Response Teams were specifically trained for Avian Influenza. The 6-day training program of District and State Surveillance Teams would be suitably modified to include Avian Influenza. Training of medical officers, laboratory technicians and health workers would also include topics on Avian Influenza. Specific training program for laboratory personnel handling samples of suspected cases would also focus on bio-safety issues. One round of training for Rapid Response Teams (RRTs) is already covered with support from WHO and IDSP. The second round sensitization trainings for state level RRTs are planned under the project. This will involve training around 100 professionals in 4 batches. In addition, special trainings will also be provided for L4 laboratory staff included in the network (both the labs supported under the project and 5 ICMR labs) covering aspects such as use of Polymerase Chain Reaction testing, biomedical waste management, external quality assurance protocols and specimen transfer. Similarly, training will be provided for all 30 sentinel sites proposed to be included for flu surveillance (2 sites per each L4 lab) covering aspects such as specimen collection and transfer. Both NICD and National Institute of Virology will be offering these trainings programs for respective states attached to them.

A.*2*. Improving access to anti viral drugs and emergency medical care (to be financed by GOI)

A.*2*.1 Vaccination

Current National policy on Immunization has not included regular seasonal influenza vaccination. The development of a policy on influenza vaccination is a very important part of the contingency preparedness plans. The surveillance for seasonal influenza is necessary since vaccine for influenza infection is based on the circulating virus strains and the country has to develop the capacity to monitor the strains. The proposed influenza surveillance will help India to evolve appropriate policy suitable for the country's needs.

A.*2*.2 Anti-Viral Drug therapy

Use of anti-viral drugs will be integral part of containment. GOI has stockpiled anti-viral drugs following WHO guidelines for targeted population. Safeguards would be in place to prevent inappropriate use of drugs. Guidelines would be published and disseminated on Drug Therapy and will be used to train physicians, nursing staff and other personnel. Current National policy on Immunization has not included regular seasonal influenza vaccination. However, the proposed influenza surveillance will help India to evolve appropriate policy suitable for the country's needs.

A.*2*.3 Medical Services

The GOI is also financing inputs to strengthen capacities of selected medical facilities for optimal services in the event of a pandemic. This component would support essential facilities for management of cases, drugs, vaccines and other medical inputs.

Attachment 1

India – National Influenza Pandemic Committee

Constitution

1. Secretary, Ministry of Health & Family Welfare	Chairman
2. Secretary, Department of Animal Husbandry and Dairying	Member
3. Director General of Health Services	Member
4. Director General, Indian Council for Medical Research	Member
5. Director, National Institute of Communicable Diseases	Member
6. Animal Husbandry Commissioner	Member
7. Joint Secretary, Ministry of Home Affairs	Member
8. Additional Secretary, MOHFW	Member

Terms of Reference:

1. To establish institutionalized mechanism for policy development for Avian Human Influenza.
2. Inter-sectoral command and control
3. Coordination with international agencies
4. Formulating advisories on technical matters
5. Activate the contingency plan

Attachment 2

Case Definition of Avian Influenza

Suspected Case

1. Fever (body temperature of 38 degree Celsius or higher);
2. In addition to one of the following symptoms: muscle ache, cough, abnormal breathing or suspected pneumonia by physician
3. With history of : Direct contact with infected/dead births in the past 7 days or occurrence of unusual death of birds in the community within the past 14 days or contact with a pneumonia patient or another patient suspected of avian influenza

Probable Case

The above mentioned symptoms of suspected case and

- Preliminary test shows infection of influenza group A, but cannot yet be confirmed whether it is influenza from humans or birds
- Respiratory failure
- Death

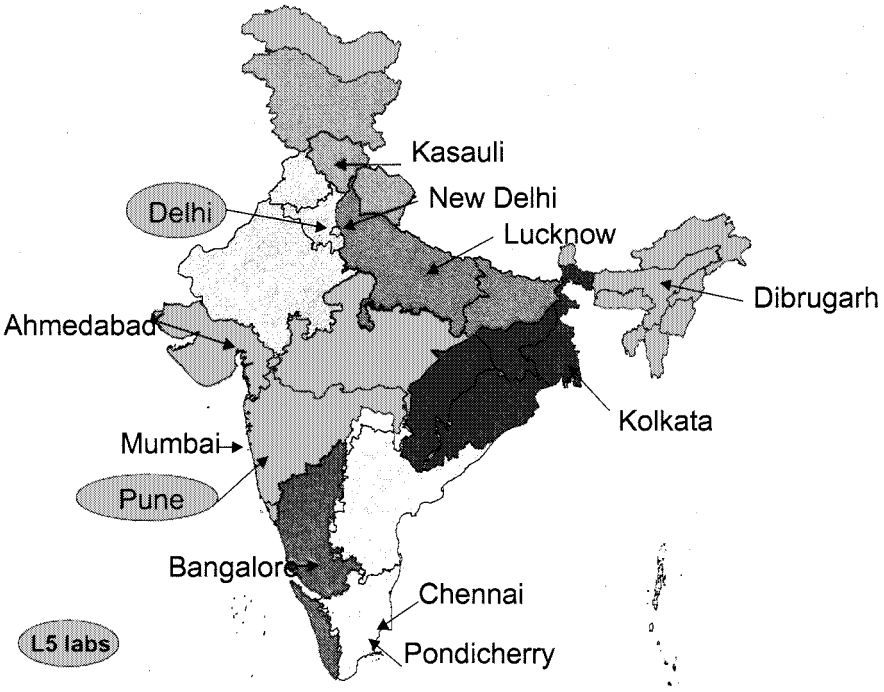
Confirmed case

Suspected/probable case with final PCR test or virus isolation showing H5 strain of influenza group A, which is a bird strain

***Note**: Diagnosis of suspected and probable cases can be changed if confirmation tests show that the patient's infection was caused by other factors.*

Attachment III

List of Laboratories and networking



Proposed Network of Reference Laboratories for Surveillance of Avian Influenza in India Including exiting ICMR network (Marked in RED)

North zone
CRI Kasauli
SGPGI Lucknow
IGMC Shimla
AIIMS New Delhi

South zone
JIPMER Pondicherry
KEPM Chennai

South zone
IPM Hyderabad
Trivandrum Med College
NIMHANS Bangalore

East zone
RMRC Dibrugarh
NICED Kolkata

East zone
GMC Bhubneshwar

West zone
Haffkines Mumbai
BJ Med College Pune

NICD Delhi

NIV Pune

B Animal Health Component

B. 1 Strengthening Disease Monitoring and Surveillance

Proposed monitoring and surveillance related investments are consistent with the principles defined in OIE guidelines for Surveillance of Avian Influenza: *Terrestrial Animal Health Code 2005*, Appendix 3.8.9: Article 3.8.9.1, 3.8.9.2 and 3.8.9.3. They also follow guidelines and directions as formulated under the Bank supported Global Program on Avian Influenza, which emphasizes the need for: (i) improving animal health information flow among relevant agencies; (ii) detection, reporting and follow-up of reported cases; (iii) public and community-based surveillance networks; (iv) routine serological surveys and epidemic-surveillance; and (v) improving diagnostic laboratory capacity.

In line with this, an eight nine point approach to monitoring and surveillance of: (i) free ranging, foraging indigenous fowl and duck in the backyards; (ii) caged birds in organized poultry farms large and small; and (iii) wild and migratory birds are listed below:

1. Surveillance program for migratory birds backyard poultry around wetlands and along flyways.
2. Surveillance program for commercial poultry.
3. Satellite mapping of bird sanctuaries, water bodies and wetland areas.
4. Development of GIS based database on migratory / water birds and their habitats.
5. Strengthening laboratory infrastructure and field operations for early disease detection.
6. Building up a participatory disease intelligence constituency of village level animal health workers
7. Training

B.1.1. Surveillance for Migratory Birds and Backyard Poultry around Wetlands and along Flyways

Surveillance activities for migratory birds and backyard poultry will be organized around some 200 wetlands, representing important nesting/breeding habitats of migratory birds, as well as along major flyways. Frequency and duration of surveillance needs to be fixed at monthly intervals for a period of three years respectively. Focus will be on detecting unusually high mortality. Deployment of commercial ELISA kits for antibody detection will be integrated in the surveillance program. State DAH&VS appoint a Special Officer for bird flu surveillance in the state with counterparts in district veterinary offices.

B.1.2. Surveillance: Commercial Poultry Farm Flocks

Surveillance activities in commercial poultry farm flocks are organized in a manner that takes into account the following points, as emphasized and covered in proposed training efforts:

(a) HPAI Surveillance program in private sector poultry industry should be mandatory with focus on detecting unusually high mortality.

(b) Deployment of commercial ELISA kits for antibody detection will be integrated in the surveillance program.
(c) Inventory of all Registered Commercial Poultry Farms should be included in a state database.
(d) Reporting of unusually high mortality should be made mandatory.
(e) Sample collection and lab testing should be the prerogative of the state ELISA/DI lab.
(f) Bird flu vaccination should be banned in all commercial poultry farms.

B.1.3. Satellite Mapping of Bird Sanctuaries, Water Bodies and Wetlands

Bird sanctuaries, water bodies and wetland areas have unique Bio and Eco systems. These are usually the most ideal habitats for nesting of migratory birds; and they are invariably long term tenants in a location often spread over centuries, as generations after generations of migrating flocks tend to return to the same location for wintering. Association of bird flu with migratory birds adds a new dimension to these habitats in terms of their relevance to national economy as well as public health. It has now become important to know which bird species bring bird flu and from where and also to understand the dynamics of migratory bird wintering process as also the use of habitat resources for other economic pursuits. Topography of habitats such as stagnant water, in and out flows, vegetation and natural / indigenous bird populations in them etc have to be logged and mapped. There is also need to create a national database on bird sanctuaries, water bodies and wetlands which are migratory bird habitats.

Satellite mapping during pre / early / mid / late migration into habitats provide nesting density and changes that follow post migration. Spatial and temporal aspects of habitats is best provided by satellite mapping and they help to create GIS maps, databases and biodiversity catalogues of migratory bird habitats. Collaboration will be sought with experts on migratory birds like Wetlands International or Zoological Survey of India.

B.1.4. Development of GIS based Animal Disease Surveillance and Information System

The DADF currently does not have a disease information system other than the manually operated disease outbreak reporting and analysis traditionally followed by the AH Departments of the Central and State Governments. In order to work the massive random surveillance program under the Program effectively, it is essential to establish a nation wide, dynamic, information system and network electronically enabled, GIS based and GPS centric. The entire animal disease intelligence / information system using GIS format depends on satellite imagery to a very large extent. The DADF therefore has to structure a disease surveillance and containment program using satellite imagery / GIS Data Systems.

The Network should link the Nodal Animal Health Group responsible for HPAI Control and Containment in the DADF, the State AH HQs / state HPAI Project Directors, State Level Disease Investigation Laboratories, the 5 RDDLs, and the CDDL, the four quarantine centres of the DADF, Wild Life wing of the MoF&E, Zoological Survey of India, the Bombay Natural History Society; and with the PD-ADMAS as the Epicentre. The Antrix Corporation / ISRO is discussing this issue with the DADF and has already provided a proposal for a system involving Satellite imagery of water bodies and wet lands, mapping of the land corridors beneath the major fly ways, a GIS based, GPS enabled, animal disease intelligence / information system including

equipping the system and training and running in the system over a three year period. This should also include the geospatial location of poultry farms, villages with poultry to tract and predict the progress of disease from its origin to develop effective control strategies.

B.1.5. Strengthening Laboratory Infrastructure for Early Disease Detection

Strengths and weakness of the existing laboratory system. In India there is only one BSL 4 laboratory which is capable of handling the diagnosis of Avian influenza. Since the declaration of the first outbreak, a large number of samples are being sent to this laboratory resulting in a back log of a large numbers of samples. Consequently, there is delay in testing of samples, which hamper the effectiveness of control and containment measures on the ground. Though there are six regional disease diagnostic laboratories in the country, these laboratories are not able to handle the avian influenza infected samples due to lack of disease containment facilities.

Strengths of the existing system include:

(a) Capacity to test exists within the country.

(b) Huge infrastructure, including: (i) 26,717 veterinary hospitals/polyclinics or dispensaries in the public and private sector, 28,195 veterinary aid centers, including mobile dispensaries; (ii) 250 disease diagnostic laboratories; (iii) a premier , more than 100 year old Indian Veterinary Research Institute (IVRI), Izatnagar, Uttar Pradesh for conducting research and to monitor the quality of vaccines and biologicals; (iv) Charan Singh Institute of Veterinary Health, Baghpat, UP; (v) a BSL 4 containment High Security Animal Disease Laboratory (HSADL), Bhopal; (vi) a Central Disease Diagnostic Laboratory (CDDL) at IVRI; (vii) five Regional Disease Diagnostic Laboratories (RDDLs) at Pune, Kolakata, Guwahati, Bangalore and Jalandhar; and (viii) 33 veterinary institutes, generally at least one in each state.

(c) Availability of Human Resource/ professionally qualified veterinarians-nearly 30,000 veterinarians and 70,000 para-vets employed by the Government.

(d) Experience in sero surveillance and eradicating rinderpest, contagious bovine pleuro pneumonia, African horse sickness etc.

(e) Several national programs, including: (i) schemes-preparedness for HPAI, (ii) a national program for the eradication of 'Rinderpest', and control program for 'Foot and Mouth disease'; (iii) professional efficiency development program responsible for regulation of veterinary practices, and registration of veterinary practitioners; (iv) unit for veterinary statistics collects and collates data; and (v) control of other diseases of zoonotic and economic importance.

(f) Highly motivated active private poultry sector - laboratories, pharmaceuticals and vaccine production units.

Weaknesses of the existing system include:

(a) Lack of functioning network of disease diagnostic laboratories.

(b) Only one disease containment laboratory (HSADL, Bhopal).

(c) Six regional disease diagnostic laboratories in the country, which are not able to handle the avian influenza infected samples due to lack of disease containment facilities.

(d) Lack of trained manpower in epidemiology.

(e) Non utilization of highly qualified and trained human resources available in the Veterinary Colleges/Universities and lack of systematic linkages with the network of laboratories (such as veterinary colleges and universities).
(f) Role of veterinary institutions and their current involvement in poultry and their current capacity to contribute to implementation of contingency plans is unclear.
(g) Lack of information on the specific plans for involvement of the laboratories at the regional levels and in the private sector.
(h) The details of system for surveillance are not available.
(i) Under- financed poultry sector and laboratory system.
(j) Non availability of quality diagnostic reagents and kits within the country.
(k) Large number of water bodies and 115 bird sanctuaries in the country requires the active involvement of Department of Environment and Forests.

Establishment and Management of Avian influenza (AI) diagnosis in the laboratory network. HSADL, Bhopal, has a staff strength of 13 scientists and can handle about 3,000 samples a week, which is indeed a credible output considering the nature of RT-PCR tests and possibly, reconfirmation of results. This capability is bound to be inadequate if the Avian flu escalates.

To overcome the shortcomings of the laboratory testing system and to improve the system, it is necessary to establish an additional BSL 4 Laboratory and utilize all the well established laboratories by networking them and decentralizing the activities related to diagnosis of HPAI. The primary goal of such network is to detect and identify newly emerging epidemic variants in a timely manner. The goal of surveillance in birds is to complement the human surveillance network, to understand the ecology of influenza viruses that are relevant to human and animal health and to determine the molecular basis of host range transmission and spread in new hosts. The long-term goals are to identify molecular markers of viruses that can transmit between species especially to mammals including humans.

A well-organized network of diagnostic laboratories forms the basis for the successful surveillance of respiratory viruses and other infectious diseases. The clinical specimens taken from animals are an important source of data for surveillance.

There is an urgent need to network at least some of the existing 250 disease diagnostic laboratories which would help to decentralize the diagnosis of AI. This would enable to get quicker results in case of emergencies. Prior to networking, it would be prudent to look into the strengths and weaknesses of these laboratories to discharge their mandate effectively and provide corrective measures. The following are the strengths and weaknesses are observed with Regional Disease Diagnostic Laboratories (RDDLs).

Strengths of RDDLS
(a) Good state level regional laboratory network within the state.
(b) Availability of sufficient infrastructure, land, buildings and equipment etc.
(c) Fairly good financial support from govt. of India.
(d) Some of the labs are ISO 9001 certified.
(e) CDDL (IVRI) is very strong and can lead the RDDLs well by providing training, Manuals, guidance, reagents etc.

Weaknesses of RDDLS

(a) Some of the RDDLs are not independent and located in the same premises as that of Vaccine manufacturing institute.
(b) RDDLs are not following stringent biosafety level 2 precautions, including inadequate supervision on waste disposal and laboratory practices with respect to the biosafety issues and good microbiological techniques.
(c) Lack of training to manpower on Biosafety.
(d) Requirement for exclusive committed staff for implementing the biosafety procedure
(e) Placement and Transfer policy of the government is affecting the functioning due to transfer of trained manpower and posting of persons with irrelevant qualifications and training. RDDL functioning is not exclusive. There is an overlap of RDDL function with state level function of the institutions where the labs are located.
(f) Problem of logistics in some places.

OIE/FAO encourage countries/regions to develop a laboratory network that would facilitate the local testing of specimens to decrease turn-around time for diagnostic test results while increasing overall testing capacity. This network should be coordinated through the newly established OIE/FAO network (OFFLU) that could recommend appropriate testing methods, provide training to laboratory personnel, supply quality reagents, and collaborate with OIE/FAO Reference Laboratories.

It may be possible to analyze the samples for diagnosis of Avian influenza in the RDDLs and some of the well established Veterinary colleges. In order to do so, there is an urgent need for networking of laboratories and re-fixing the responsibilities of the National laboratory network for diagnosis and active surveillance. Doing so would require the RDDLs to be upgraded to be able to process the samples having live virus while ensuring the bio-safety. These laboratories can undertake sero screening and reduce the workloads on HSADL. In addition, there are laboratories established by private sector also. It may be worthwhile to consider accrediting some of the University disease investigation laboratories (after evaluation) to maximize the decentralization of diagnosis to get quicker results in case of emergencies, provided that these meet the minimum capacity for undertaking various activities related to Avian Influenza diagnosis as specified for the various levels of laboratories in the national network (see Technical Annex B in Project Files).

In the long run, HSADL and PD_ ADMAS, Bangalore can join hands to develop and field validate an indigenous software based ELISA Kit - which would certainly find immense use in long term national sero-monitoring and surveillance program targeting migratory flyways, wintering migratory and resident water birds, ducks and geese and others (backyard and commercial poultry). Also, this is a basic necessity if the Program is going in for the use of 'sentinel birds' to locate 'H5N1 infected' bird sanctuaries, water bodies and wet land areas to confirm their sero-conversion and to establish 'carrier status' of Indian water birds.

To overcome the spoilage of specimens during transportation, timely testing of the samples for quick results the sample flow should be worked out within the laboratory network for easy management and quality assurance. The routing of samples might depend on significance of diagnosis. The samples may be submitted to different levels of laboratories as indicated in Annex VI. A representative number of negative and all positive samples must be submitted to

National Reference laboratory (HSADL, Bhopal) to verify false positives and false negatives and for further reconfirmation. In line with international obligations, the National Reference Laboratory needs to send selected samples to regional network laboratory and to OIE/FAO reference laboratory for validation of results.

Laboratory techniques for diagnosis of HPAI. The current outbreaks of avian Influenza A (H5N1) in India and the apparent endemicity of this subtype in the poultry in Southeast Asia require increased attention to the need for rapid diagnostic capacity to enable to contain the spread of the disease. Detection of influenza A virus infections is commonly carried out by direct antigen detection, virus isolation, or detection of influenza-specific RNA by reverse transcriptase – polymerase chain reaction (RT-PCR). The optimal specimens for avian influenza A virus detection are tracheal and cloacal swabs (or feces) taken from live birds or of feces, lung lavage, and pooled samples of organs from dead birds. All manipulation of specimens and diagnostic testing should be carried out following standard bio-safety guidelines. The strategy for initial laboratory testing of each specimen should be to diagnose influenza A virus infection rapidly and exclude other common viral respiratory infections. Required procedures for influenza diagnosis are detailed in Technical Annex D (in project files)

Cost of Equipment, Reagents and Consumables Required for diagnosis of Avian Influenza. In the country program on animal health it is proposed to upgrade the existing 6 RDDLs including CDDL to the BSL 3 level to enable to cope up with the increased work load on diagnosis and surveillance and monitoring, and early warning system. In addition it is also proposed to establish one more BSL 4 laboratory to facilitate increased surveillance. Keeping the proposed country program in view, the inventory of equipment, reagents and consumables along with cost estimates is prepared and provided in Technical Annex E (in project files).

B.1.6. Participatory Disease Intelligence Constituency

Community participation, particularly participation of village women en masse in the disease information campaign against HPAI can best be attained by creating a constituency of village representatives, including lady livestock link workers of which there are one for every cluster of 5 villages in the country. Village representatives would be trained to detect symptoms of Avian Influenza and other diseases. Training will be in situ (villages) in batches of 20 for duration of one day. Training will be imparted to them by the state Animal Husbandry departments in every state, over 75,000 of them in 2006/07. The cost of the training will be Rs. 500 per person, including the IEC kit received at the end of training, as a one time grant.

Village representatives, estimated at about 120,000, will be the government's village intelligence force, transmitting information on diseases to the nearest Animal Husbandry institution on a day to day basis: the Participatory Disease Intelligence Constituency. If it is decided to launch vaccination of backyard poultry at some point, these Village Representatives could play an important role in carrying out this program.

B.1.7. Training.

Training activities involve Animal Health Professionals, Wild Life Technicians, Village representatives, Rapid Response Team and Laboratory personnel. As far as Laboratory personnel is concerned, the following category of technical staff are required in disease diagnostic laboratory depending on the level of lab i.e. district, state, regional and National, including: (i) scientific staff: microbiologist (Virologist/Immunologist), pathologist, epidemiologist, bio-statistician etc; and (ii) technical / supporting staff: laboratory technician, laboratory attendant, supporting staff for laboratory upkeep, animal attendants and engineering personnel for maintenance of equipment and bio-safety facilities (BSL3 & BSL 4). The training required can be considered mainly in three areas depending on the job requirement of the personnel, including: (i) training in laboratory diagnostic technologies; (ii) Laboratory bio-safety; and (iii) Laboratory bio-security. Training details, including cost estimates, are provided in Technical Annex F (in project files).

B.2: HPAI Control and Containment

India's containment and control strategies for HPAI outbreaks in domestic poultry follows the OIE / FAO Guidelines and were formulated with the active participation of the FAO Country Office in New Delhi. The DADF, Ministry of Agriculture, Government of India has issued these guidelines to the State Governments and the State Departments of Animal Husbandry for micro planning and getting ready their own control and containment set up. A multi Departmental Coordination Committee, chaired by the state Secretary for Animal husbandry, oversees the operations and coordinates the containment activities, while the District Committees chaired by the District collector working with the District Veterinary Officer executes the containment program. All through the containment operations the state / district Public Health Teams are present in the Infected Zone and take care of the house to house surveillance for identifying human infections / suspected infections if any.

B.2.1. Control Program (financed from counterpart funds)

The Plan provides for Rapid Response teams of Veterinary Professionals supported by Para Vets in the Department of AH, skilled workers for Culling / Killing of birds, workers for disinfection, sanitation, burying killed birds / burning in-contact bird feed, stock piles of eggs and other materials, disposal of accumulated bird litter and scores of other tasks that accompany a control and containment operation which lasts in ordinary cases of outbreaks some 10 -15 days until the all clear is sounded.

Culling / killing and zoo-sanitary measures were enforced in both the infected zone of 0-3 km of the infection site (foci) as well as in the surveillance zone of 3-10 km beyond the infected zone. All movement of birds, poultry products, eggs, feed, litter and in-contact personnel are restricted (frozen in effect) in both zones until the all clear is sounded. Disinfection / fumigation of infected premises / material conclude the operations.

B.2.2. Rapid Response Teams (RRT)

The National Control and Containment plan proposes training and equipping one Rapid Response Team (RRT) for each district in the country: there are 602 districts together in all the states and union territories and so 602 RRTs will be needed. Each RRT will have: Vaccinators 32; Cullers 58, Foggers 14; Local Administration Personnel including Veterinary Professionals and Para Vets 100; totalling to: 204 Persons; Training Duration including Simulation Exercise: 1 Day.

B.2.3. Strategic Reserves of Equipment

The Program proposes strategic reserves of essential equipment for stock piling, including PPE, Fogging Machines and Vaccination Equipment. Quantities are based on the assumption of 30 outbreaks per year. In the second and third year the requirement will only be PPEs, in view of envisaged repeat use of Fogging Machines and Vaccination Equipment.

B.2.4. Vaccinations (financed from counterpart funds)

The Program proposes vaccination for containment of the disease in the surveillance zone of 3-10 km in outbreak situations. The GoI has stock piled a few million doses of killed vaccine, even though actual vaccination has not been used as a containment measure in outbreaks. So far GoI has made a policy decision on the use of vaccination as part of its containment strategy, as some countries have successfully used vaccination for total control of the HPAI incidence, although up until now has not deployed this option in practice. China has made extensive use of Recombinant Vaccines developed nationally, which have also been made available to OIE and the UN.

On the vaccine development front, several countries including United States, United Kingdom, China, Korea and many others have for sometime been working on development of Avian Flu vaccines both for poultry and humans. Though human vaccine is claimed to be partly successful, the recombinant H5N1 poultry vaccine developed by China is targeted to cover the entire poultry population of that country. Good performance claims have also been made by Korean groups using avirulent H5N2 based vaccine, a closely related virus of HPAI virus. In India already a prototype vaccine has been developed at the HSADL, Bhopal which provided protection to about 90% of challenged birds under experimental conditions.

Avian Flu spread is best restricted by a combination of effective surveillance, timely culling, and mass vaccination with autogenously H5N1 killed vaccine (Indian virus isolates) starting from the declared 'surveillance zone' and then extending to the rest of the 'infected district' and the state. The 'surveillance zone' must be vaccinated last to serve as an indicator of presence / absence of perceptible virus activity around the confirmed infection foci.

The advantages of killed vaccines include: (i) temporary protection for a few months only, but greatly restricts spread of disease; (ii) slows / stops the spread of the virulent virus as vaccination reduces susceptibility to natural infection; and (iii) vaccinated birds shed less virulent virus, so decreases contamination of the environment and decreases risk of human infection. If used strategically, vaccination compliments stamping out strategy.

Disadvantages of using killed Vaccine include: (i) virulent virus can pass through vaccinated birds; (ii) risk of human infection in backyard production system and at production plant exists; (iii) infrastructure for vaccine production has yet to be created and risk of virulent virus escape from production facility cannot be ruled out. In view of this, use of killed vaccine should be restricted to infected states for the present. Manufacture of the Vaccine requires BSL 3 or 4 Vaccine Production Facility.

B2.5. Compensation for Slaughter of Poultry / Destruction of contaminated Feed / Egg Stocks (financed from counterpart funds)

DADF has drafted an action plan for compensation to be paid in the event that culling of poultry and destroying them becomes necessary during control and containment of HPAI outbreaks. The policy is to pay a rate of Rs.40 per adult bird, Rs. 30/broiler and Rs. 10 for chicks less than 10 weeks old that are actually culled and killed by the RRTs. These rates are almost identical to market prices.

Market price of an indigenous bird from the back yard is slightly higher than the market price of broilers and currently the price for a desi bird for meat is Rs.100. Farmers however have no grouse about the compensation rate as they invariably bring a flock of birds made up of birds of all ages for culling: the adults among them being about a third in number. So the whole flock valued at Rs.40 per bird and for all birds culled from his flock is a fair rate of compensation. Also the policy of paying a flat rate avoids all ill will and disputes at the culling site, as compensation is uniform and universal.

DADF calculates the compensation fund based on the sound principle of poultry population density in the infected district. Using the density in the district, the DADF calculates the bird population within the 10 km radius of infected and surveillance zones. As there is considerable variation between states and within states, between districts in the density of poultry population, the population density of the infected district is the most appropriate basis for calculation.

In the case of the organized poultry farms compensation is based on actual numbers culled. However the estimated compensation fund does not capture the population density in these farms as farms are not evenly distributed in the state or the districts. So to be more realistic, the DADF should calculate the fund on the basis of the district poultry population density first; and then double it to adjust for the distortion caused by organized farms.

Under the Program the compensation fund was originally set at Rs. 6.36 Crore and now stands to be modified to Rs.12.72 Crore. Based on the experience of the outbreaks that are now under containment, the modified figure surely is justifiable.

On the basis of the regulatory measures proposed under the Program it seems appropriate to bring in an element of moral hazard in compensation payments to organized poultry farms. For instance, compensation might be linked to farms' compliance with established bio-security norms as reflected in corresponding certificates issued and maintained by industry representatives.

Another aspect to be considered would be some form of Registration of all poultry farms. It would surely be possible to include in the Registration fee a small contribution to an Industry Driven Permanent Compensation Fund. This will make the Industry more open to disease reporting and will enable them to cooperate with the Authorities in matters of Public Goods.

C Public Awareness and Coordination Support

C.1. Public Awareness and information

The most effective measure to control the spread of infection is to limit the contact of the infected person with the public. The plan includes social distancing measures in the event of outbreak. It is proposed to promote public awareness particularly the high risk groups like animal health workers, poultry workers, laboratory personnel etc. Communication strategy has been developed by the GOI in collaboration with WHO and UNICEF. A roadmap to further develop and implement the strategy during 2006 has been prepared. Prototype material has to be developed and used through the right media mix, It is proposed to involve the various stakeholders. The aim is to promote public awareness particularly high-risk groups. Support would be required for development of communication strategies, development of prototype material through various media and dissemination costs. Sensitization workshops for various stakeholders would also be undertaken under the project.

The Information, Education, Communication (IEC) program is to be planned and mounted jointly by all the stake holder ministries / departments. The DADF / MoE&F / MoH&FW have developed a communication strategy in a joint action group to match the contingencies of the AI situation based on the following elements: (i) the right level of awareness in order to avoid panic; (ii) the need to instill confidence based on sound information; and (iii) to build up capacities and resources to identify possible outbreaks and to mount appropriate response.

In line with this orientation, the IEC program has specified: (i) stake holders and audiences; (ii) definition and sequencing of contingencies; and (iii) listings and prioritization of communication needs. This would be followed by activity implementation within the given time lines. The stake holders/audiences include poultry industry, poultry consumers, pharmaceutical industry, food processing / hospitality / and tourism sectors, migratory / wild bird sector, general public, government departments, international organizations, NGOs, Media and parliamentarians. Contingency levels include five phases: (i) absence of outbreak; (ii) suspected outbreak; (iii) confirmed outbreak; (iv) human infection; and (v) pandemic.

Key initiatives include outreach to at least 2,000 live poultry markets in about 700 cities and wild fowl trade points in selected towns; audio visual on good practices; TV / Cinema / Radio Spots for Audiences; monitoring web / print media through weekly reports; advocacy kits for media, stake holders and key implementers, parliamentarians, conservationists, press advertisements / foreign language communication. The proposed scheduling runs up to December 2006

Sub Component C.2. Coordination Support

The project would be implemented through the management structure created under IDSP. However, in case of out-breaks the surveillance committees would be required to meet more frequently to monitor the situation and take appropriate actions. The importance of monitoring

and evaluation has been recognised in the contingency plans. A monitoring committee headed by the Director General of Health Services has been constituted and it meets regularly to review the situation. The performance indicators to monitor the laboratory surveillance and the programme implementation have been developed.

As far as the animal health aspects are concerned, the Project would support the establishment of a Bird Flu Cell in DADF. Both the Central Surveillance Unit and Bird Flu Cell would coordinate closely with the Joint Monitoring Group on Avian Influenza and work closely with the respective State committees for the purposes of Project implementation. They would also take charge of M&E arrangements and take the lead on a number of HPAI-related policy and strategic issues that have been identified following the outbreak in India in 2006.

ANNEXURE III: BUDGET

Year-wise Cost of Human Health Component for Avian Influenza under IDSP

S.No.	Components	Rs. Million				US$ Million
		2006-07	2007-08	2008-09	Total	
	Non-recurring Components					
1	Strengthening of Laboratory Surveillance					
	National Institute of Communicable Diseases, Delhi	10	11.06	-	21.06	0.47
	10 L-4 Laboratories	-	106.75	-	106.75	2.37
2	Prototype material, guidelines, manuals	-	5	-	5	0.11
	Sub-total - Non-recurring Costs	10	122.81	-	132.81	2.95
	Recurring Components					
	Recurring Costs of Laboratories Services					
3	National Institute of Communicable Diseases, Delhi	-	6.88	6.88	13.76	0.31
4	National Institute of Virology, Pune *		6.53	6.53	13.06	0.29
5	10 L-4 Laboratories	-	13.87	13.87	27.74	0.62
6	4 ICMR Laboratory Network *		5.56	5.56	11.12	0.25
7	Sensitization Workshops for stakeholders	-	3	2	5	0.11
8	Operational Costs	-	2.5	2.5	5	0.11
	Sub-total - Recurring Costs	-	38.34	37.34	75.68	1.68
	Grand total(Non-recurring + Recurring component)	10	161.15	37.34	208.49	4.63
	GOI contribution (emergency medical relief)	40	40	10	90	2.00

*** Note:** Funds will be released ICMR Head Quarters in New Delhi to meet the recurring expenditure for ICMR Influenza surveillance network (NIV, Pune and 4 Laboratory Network).

Animal Health Component

Sl.No.	Activity	Unit	Unit Cost Rs.	Quantity			Total Quantity	Costs in Rs. Crore			Total Cost	Total Cost	Source of Funds
				2007	2008	2009		2007	2008	2009	Rs.Crore	US $Mln	
A.Pre-Outbreak Preparedness, Planning & Coordination													
A1	Disease Surveillance												
A1.1	Capacity Building: WL Technical Personnel	Trainees Number	1650	4000	--	--	4000	0.66	0.00	0.00	0.66	0.15	WB
A1.2	Capacity Building: Veterinary Personnel (Vets & Paravets)	Numbers Vets 30000 Paravets 40000	1829	70000	--	--	70000	12.80	0.00	0.00	12.80	2.84	WB
A1.3	Participatory Disease Intelligence Training of village workers	Trainees	500	40000	40000	40000	120000	2.00	2.00	2.00	6.00	1.33	WB
A 1 4	Epidemiological survey	Study		1				0.22			0.22	0.05	WB
A2	Disease Intelligence												
A2.1	Upgrading C&RDDL: BSL3	Numbers	Rs.6.00 Cr	6	--	--	6	36.00	0.00	0.00	36.00	8.00	WB
A2.2	New National Laboratory BSL4	Numbers	Rs.15 Cr	1	--	--	1	2.00	10.00	3.00	15.00	3.34	WB
A2 3	Upgrading BSL2 Labs	Number	Rs. 0.22	7	8	8	23	1.57	1.82	1.82	5.17	1.15	
A3	Animal Disease Surveillance Information System: Satellite Imagery / GIS/ Data Network	System	Lump Sum	1	1	1	1	7.50	3.25	3.25	14.00	3.11	WB
A4	Data management & Networking	System	Lump Sum	1	1	1	1	0.29	0.00	0.00	0.29	0.06	WB
A5	IEC Development of Material &Dissemination	Package	Lump Sum	--	--	--	--	1.50	1.0	0.5	3.00	0.68	WB
A6	Surveillance: Migratory Birds & Poultry												
A6.1	Creation of Basic Facility for sample / specimen collection : Migratory Birds & Cold Chain for transport	Migratory Bird Habitats	Rs.0.212 Cr (per Habitat for 3 Yrs)	200	200	200	200	1.68	1.37	1.37	4.42	0.98	WB
A6.2	Surveillance of Poultry:	No. Serum Samples / Year	Yr.1: Rs.175 Yr 2 & 3: Rs.159 Per Sample	20,000	20,000	20,000	60,000	1.75	1.59	1.59	4.93	1.09	WB
B	**Supporting an Outbreak Containing Plan (Funding Sources: Different from above)**												
B1	Capacity Building: Rapid Response Teams in Districts including training costs, training materials including PPE: 122808 persons Country Wide	Teams (204 persons per Team)	Rs.0.18 Cr Per Team for I exercise	602	--	--	602	11.87	0.00	0.00	11.87	2.64	WB
B2	AI Control Program												
B2.1	Compensation for Birds / Eggs / Feed (Destroyed) **	Out breaks among	Rs.0.07 Cr per Outbreak	30	30	30	90	4.24	4.24	4.24	12.72	2.82	GoI

		Poultry											
B2.2	Vaccination in 7 Km Buffer Zone	Outbreak among Poultry	0.16 Cr per Outbreak	30	30	30	90	4.74	4.74	4.74	14.22	3.15	GoI
B2.3	Strategic Reserves of Equipment, PPE, etc	Package	Yr 1: Rs.2200 Yr 2 / 3 Rs.333	30	30	30	90	14.53	0.66	0.66	15.85	3.53 (*1.57*)	GoI *WB*
C	Bird Flu Cell	Experts		11	11	11		1.78	1.38	1.39	4.57	1.01	WB
D	Honorarium for reporting at GP level							6.40	6.50	6.60	19.50	4.33	GoI
	Total							111.53	38.55	31.16	181.24	40.26 (28.00)	(WB)

ANNEXURE IV: ECONOMIC ANALYSIS

Introduction

In India the value of output from poultry sector was nearly US$ 3 billion in 2004-05, and the sector provides direct and indirect employment to over 3 million people.[1] If we take the value of the entire poultry industry including the investments made in the industry, we get the worth of the industry. The poultry industry in India is estimated to be worth anywhere between US$ 6 and 7 billion. The sector has been growing at a rate of 10% to 15% annually for the last few years.

On the trade front, poultry exports from India currently form a miniscule portion (US$ 80 million only) of its total poultry production.[2] The avian epidemic has come at a time when India was eyeing a much higher export of poultry after the Indian commerce minister succeeded in persuading Japan to allow exports of frozen chicken from India. With Japan accepting the certification and importing chicken, India has been hoping to make inroads into other countries as well.

Other stylized facts of Indian poultry industry are:

- Indian poultry industry has two main outputs: eggs and poultry meat. India produced 41 billion eggs and 1.84 billion kg of meat in 2004-05.[3] Indian poultry industry has 1.87 poultry birds (1.7 billion boiler birds used for meat and 170 million layer birds used for producing eggs during their reproductive period).

- The domestic consumption of eggs and poultry meat in India is still low especially in rural areas where around 70% of the population lives.[4]

- About 70% of the poultry industry in India is in the organized sector and the rest in unorganized sector.[5] However, growth of organized poultry industry is largely in the western and southern regions of India. Only a few farms have been able to achieve international standards for producing poultry meat. This limits India's ability to meet increasing international demand for processed poultry meat.

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[1] Economic Survey 2005-06; exchange rate used is US$1 = Rs. 50.

[2] Exports of eggs, egg powder and poultry meat has shown a significant increase over the last few years. Poultry exports increased from US$ 10 million in 1999-00 to US$ 80 in 2004-05. Farmers themselves export eggs and egg products worth US$ 60 million annually while large corporates export more value added products worth another US$ 20 million.

[3] Average boiler bird weighs 1.6 kg. Assuming the recovery rate to be 72%, the output of boiler meat is 1.84 billion kg (1.6 billion * 1.6 * 0.72). India is the world's fifth largest producer of eggs and 14th largest producer in terms of poultry meat.

[4] A rural resident consumes only 15 eggs and 400 grams of poultry meat annually compared to 100 eggs and 1200 grams poultry meat consumed by a resident in urban areas.

[5] The poultry industry in India could broadly be categorized under three groups: (a) large organized sector under intensive system (some with over 100,000 birds) consisting of about 60,000 farms; (b) small sector with 25-250 birds consisting of around 100,000 farms; and (c) very small back yard farms raising less than 25 birds that supplement the family income and provide additional food for the family.

- Indian poultry meat market is mostly a wet market i.e., dominated by live birds sale. Around 95% of total demand for poultry meat is in terms of live birds; only 5% of poultry meat is actually processed. Because of this feature of Indian poultry meat market, there is a real danger of the avian flu spreading to different locations unless strong measures are taken to contain it.

Typically, market price of a poultry bird includes the price of the chick, cost of inputs that has gone into raising the chick such as feed intake, pharmaceuticals, labor, marketing and distribution costs, profit margins of the farmers, agents etc. When demand abruptly shrinks due to a bird flu scare, price tends to come down. In such an event, reduced demand is not the only factor for reduction in prices. Prices also come down due to anxious sale of poultry by the farmers and traders (especially close proximity to the affected regions) who try to sell the stock at reduced margins rather than risk the disease hitting their farms or incurring additional cost of maintaining the stock in the face of uncertain market conditions. This cumulative decline in prices reduces the value of output, and this leads to an immediate loss to those engaged in the industry (depending on how the risks are shared). Depressed price delays fresh investments, which in turn reduces supply of poultry. Reduced supply tends to restore poultry price and the industry momentarily reaches new equilibrium, which is characterized by reduced demand, reduced supply and price closer to the initial price (pre-avian flu price). An implication of this analysis is that price recovery is not a good indicator of recovery of the industry. Moreover, when demand gets eventually restored, supply is slow to respond given the nature of this industry.

In estimating the direct economic loss due to avian flu, there are two ways of going about it. One way is to start from the loss of *value addition* at the poultry farms and then take explicit account of loss to the supporting industries both upstream (mainly, chicken feed industry and pharmaceutical industry) and downstream industries (marketing and distribution industry) due to reduced demand for their services/inputs. Another way is to start from the *value of output* of the poultry sector. This value of output would incorporate the value addition by the farm sector as well as price charged by the supporting sectors for their services/inputs to the poultry sector. So, in the latter way of calculating the loss, we do not need to take explicit account of loss to the supporting industries. Here we follow the latter approach.

The loss of value added within the poultry industry, including that in the allied industries, is perhaps best captured by the loss in the value of output of poultry industry. In estimating the loss, we allow for the fact that demand for the poultry substitutes such as fish, lamb, pork etc. tends to go up and, to that extent, the industries producing these substitutes tend to partially make up for the loss that poultry industry suffers.

Avian Flu in India

The first avian flu outbreak was reported on February 18, 2006 in Nandurbar district in Maharashtra. A few days later, it was reported in the Surat district in Gujarat. There were around 1 million birds in Nandurbar district and around 0.15 million birds in Surat district.[6] A good number of these birds have been culled. About a month later, Jalgaon district in Maharashtra reported an outbreak of avian flu. All the 100,000 birds in this district were slaughtered. The epidemic so far appears to be contained and localized. But there is a veritable chance of its spreading to other parts of the country as well as to human beings.

Even though the epidemic is so far contained, the effects of it are already being felt by the poultry industry. The economic cost of the epidemic is both *direct* and *indirect. Direct cost* includes the cost to the poultry (and the allied industries) captured by loss of value of poultry output, cost of culling and destroying the high risk poultry (which includes wages to the workers engaged in culling, safe disposal of the killed birds, and sanitizing the area). From a country's perspective, compensation paid to farmers for bird loss merely constitutes transfer payment from government to the farmers and therefore, does not enter the analysis. However, if government levies fresh taxes in order to raise revenue for paying compensation then the cost of raising the taxes should enter the analysis. In the present analysis we assume no fresh taxes imposed by government to pay compensation. The *indirect costs* include cost to the tourism industry and the value of lost human lives.

In the current situation, if we assume that the value of output was eroded by 20% for a period of 6 weeks, then the loss to the industry comes to around US$ 70 million (0.2 * US$ 3 billion * 6/52). Besides this loss, there is the cost of culling birds, and the cost of safe disposal of the birds and sanitizing the area. Although in the present situation the number of birds that are culled is not more than 500,000, in the event of having to cull all the birds in these districts, the cost would be US$ 1 million (1.25 million birds @ 50 cents).[7] So, the total cost would be US$ 71 million. There are no indirect costs either in terms of its effect on tourism industry or loss of human lives due to the flu.

Beginning from the current situation, two likely scenarios that can emerge in future:

Scenario 1 (Optimist Scenario): spread of avian flu remains contained, perhaps affecting a few more areas but remaining localized; there may be a limited spread of flu from birds to humans coming directly in contact with affected birds; no effect on tourism industry

Scenario 2 (Pessimist Scenario): avian flu becomes widespread with the flu spreading from humans to humans resulting in loss of human lives; tourism industry too gets affected significantly

We work out the likely economic costs under both these scenarios below. The costs are from society's or country's perspective.

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[6] The two affected states namely Maharashtra, and Gujarat have 10.8% (8.9 and 1.9% respectively) of total poultry birds in the country.

[7] We assume the cost of culling birds, their safe disposal and sanitization of the area to be 50 cents per bird.

As the avian flu spreads to a few more regions sequentially, which we consider to be the *optimist scenario*, there will be two effects running in opposite direction. While reduced demand for poultry products would tend to increase direct economic loss, those involved in the poultry industry would start moving into other livestock products and this would tend to contain the economic loss. If the flu hits 2 new areas and later spreads to 2 more areas, we assume the net effect of the two forces mentioned above to result in the value of poultry output eroding by 30% for about 18 weeks. The loss to the industry would be around US$ 312 million (0.3 * US$ 3 billion * 18/52). Loss due to culling, safe disposal, and sanitation may be around US$ 3 million. In this scenario, we assume no loss to tourism industry, [8] and a loss of a few human beings, who come in direct contact with the affected birds, would still be relatively negligible. Total loss in this scenario could be around US$ 315 million.

In the *pessimist scenario*, the flu epidemic becomes widespread and there is human-to-human transmission, resulting in loss of human lives. In this situation, the value of output would reduce substantially say to 50% for fully one year or US$ 1500 million. Cost of culling, destroying and sanitizing the area would be around 15 million. If tourism industry experiences reduction in foreign tourists by 25%, the loss may well be around US$ 875 million. Besides tourism, the other major source of indirect costs is in terms of loss of human lives. The likely impact of an HPAI pandemic on unprotected humans was derived using WHO estimates of human-to-human transmission: (a) 30 percent of unprotected humans are likely to be affected, (b) one tenth of them will require hospitalization, and (c) one and a half percent of all human infection cases will be fatal. Supposing 30 percent of Indians are unprotected then the size of the population that is likely to be affected would be 9% or about 90 million. Of this, 9 million would require hospitalization and about 1 million people would risk losing their lives. Even if we just take the cost associated with those who lose their lives (disregard costs of those who fall sick) the amount turns out to be huge: assuming average productive life to be 15 years, value of human loss at per capita income of US$500 per year, loss of 1 million people would be US$ 7.5 billion (15 years * $ 500 * 1 million). In this scenario the indirect economic loss far exceeds direct economic loss.

Any of the two scenarios can emerge in future even when an effective strategy to deal with avian flu is in place. However, the optimist scenario is more likely to happen if the strategy in place is really effective (probability = 0.8). In such a case, the probability of pessimist scenario occurring is very low (0.2). On the other hand, if there is no effective strategy in place, the probability of pessimist scenario becomes high (probability = 0.6) and that of optimist scenario becomes low (0.4).

[8] So long as the epidemic is localized it is unlikely to affect inbound tourists into the country. But this may be a dimension to reckon with if the epidemic becomes widespread.

Table below presents the economic loss associated with these two scenarios.

(Amount in US$)

	Optimist Scenario (Loss: 30% of value of output for 18 weeks)	**Pessimist Scenario** (Loss: 50% of value of output for 52 weeks, and the epidemic expands into the human population)
1. Direct Loss		
(i) Loss in value of output of poultry	312 Million	1500 Million
(ii) Cost of culling, safe disposal, and sanitizing the area	3 Million	15 Million
2. Indirect Loss		
(i) Loss to Tourism Industry	-----	875 Million
(ii) Loss of Human lives	-----	7500 Million
3. Total Loss	315 Million	9890 Million
4. Probabilities		
(i) with effective strategy	0.8	0.2
(ii) without effective strategy	0.6	0.4

Thus:
With effective strategy the expected loss is: US$ 2,230 Million (315*0.8+ 9890*0.2)
Without effective strategy the expected loss is: US$ 4,145 Million (315*0.6 + 9890*0.4)

The cost saving with effective strategy under highly conservative assumptions could be as high as US$ 1,915 Million (US$ 4,145 Million less US$ 2,230 Million).

To prevent the avian flu turning into a catastrophic event, the government of India is already trying to develop a strategy in terms of surveillance system and rapid response. The Bank's support should bring the "third party effect" in improving the effectiveness of the government's strategy. Even if the effectiveness of the strategy reduces probability of pessimistic scenario from 0.8 to 0.6, it still yields sizable benefits.

ANNEXURE V: DOCUMENTS IN PROJECT FILE

A. Government of India

- DEA request for World Bank assistance for New Global Program to deal with Avian Influenza (January 19, 2006).
- Contingency Plan for Management of Human Cases of Avian Influenza.
- Action Plan for State Animal Husbandry Departments in Respect of Bird Flu.
- Country Program for Preparedness, Control and Containment of Avian Influenza.
- Notification to OIE declaring India free from avian influenza (dated August 11, 2006)
- Avian Influenza information from website of Department for Animal Husbandry, Dairying and Fisheries at: www.dahd.nic.in/birdflue.htm

B. Bank

- India: Avian Flu: Rapid Assessment of adequacy of Contingency Preparedness Plan (January, 2006).
- Management letter and aide-memoire of IDSP implementation review mission (June 7, 2006)
- Technical Annex A - Bird-Flu Monitoring Information System
- Technical Annex B- Laboratory capacity requirements for networking
- Technical Annex C - Guiding principles for highly pathogenic avian influenza surveillance and diagnostic networks in Asia (2004
- Technical Annex D - Procedures for Influenza Diagnosis
- Technical Annex E - Technical Specifications of Laboratory upgrading plan and corresponding cost estimate
- Technical Annex F - Training Specifications
- Technical Annex G - Expected Roles and Responsibilities of Different Laboratories Proposed to be Included under AI Surveillance
- Technical Annex H – Composition and TORs of National Influenza Pandemic Committee
- Technical Annex I – Case Definition of Avian Influenza
- Technical Annex J – Laboratory Strengthening for Human Influenza Surveillance under IDSP: Cost Specifications
- Procurement Plan – Animal Health Related Activities
- Procurement Plan – Human Health Related Activities