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PROJECT PERFORMANCE ASSESSMENT REPORT

ARMENIA

**AVIAN INFLUENZA PREPAREDNESS PROJECT
(IDA-41780, TF-56629, TF-58076)**

June 26, 2012

IEG Public Sector Evaluation
Independent Evaluation Group

Currency Equivalents (annual averages)

(Exchange Rate Effective as January 1)

Currency Unit = AMD

2004	US\$1.00	AMD553
2005	US\$1.00	AMD458
2006	US\$1.00	AMD416
2007	US\$1.00	AMD342
2008	US\$1.00	AMD306
2009	US\$1.00	AMD363
2919	US\$1.00	AMD374

Abbreviations and Acronyms

AHIF	Avian and Human Influenza Facility
APL	Adaptable Program Loan
ARSP	Agriculture Reform Support Project
CDC	United States Centers for Disease Control and Prevention
CDCP	Center for Disease Control and Prevention (Armenia)
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GPAI	Global Program on Avian Influenza
HPAI	Highly Pathogenic Avian Influenza
H5N1	Avian Influenza A virus, subtype H5N1 (another subtype is H1N1)
ICR	Implementation Completion and Results Report
IEG	Independent Evaluation Group
NADSS	National Animal Disease Surveillance System
OIE	World Organization for Animal Health
PAD	Project Appraisal Document
PASV	Research Analytical Center
PCR	Polymerase Chain Reaction
PIU	Project Implementation Unit
PPAR	Project Performance Assessment Report
QAG	Quality Assurance Group
UNICEF	United Nations International Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

Fiscal Year

Government: January 1 to December 31

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Contents

Principal Ratings.....	v
Key Staff Responsible.....	v
Preface.....	vii
Summary.....	ix
1. Background and Context.....	1
Country Background.....	1
Disease and Project Context.....	2
Related World Bank and Donor Support.....	4
2. Objectives, Design, and their Relevance.....	6
Objectives.....	6
Relevance of the Objectives.....	7
Design.....	8
Relevance of Design.....	10
3. Implementation.....	12
Planned vs. Actual Expenditure by Component.....	13
Implementation Experience.....	13
Implementation of monitoring and evaluation.....	14
Safeguards.....	14
Fiduciary.....	15
4. Achievement of the Objectives.....	15
Minimize the Threat Posed to Humans By HPAI Infection and Other Zoonoses in Domestic Poultry.....	15
Prepare for the Control and Response to an Influenza Pandemic and Other Infectious Disease Emergencies in Humans.....	21
Minimize the Threat from Other Livestock Diseases.....	23
The Counterfactual in Assessing the Achievement of Objectives.....	24
Other Unintended Outcomes.....	25
5. Efficiency.....	25
6. Ratings.....	27
Outcome.....	27
Risk to Development Outcome.....	28

This report was prepared by Ridley Nelson who assessed the project in February, 2012. The report was peer reviewed by Willem Jansen and panel reviewed by Denise Vaillancourt. Yezena Z. Yimer provided administrative support.

Bank Performance.....	30
Borrower Performance.....	32
Monitoring and Evaluation Quality	34
7. Lessons.....	34
References.....	36
Annex A. Basic Data Sheet.....	38
Annex B. Additional Documentation	41
Annex C. List of Persons Met.....	46
Annex D. Borrower Comments	47

Boxes

Box 1. The World Bank’s Global Program for Avian Influenza Control.....	5
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Tables

Table 1. Comparison of Objectives	6
Table 2. Project Cost by Component (US\$ million).....	13
Table B-3. The three pandemics of the last century	42

Figures

Figure B-1. Human Cases of the Disease Around the World.....	43
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Principal Ratings

	<i>ICR*</i>	<i>ICR Review*</i>	<i>PPAR</i>
Outcome	Moderately Satisfactory	Moderately Satisfactory	Moderately Satisfactory
Risk to Development Outcome	Moderate	Significant	Significant
Bank Performance	Moderately Unsatisfactory	Moderately Unsatisfactory	Moderately Unsatisfactory
Borrower Performance	Moderately Satisfactory	Moderately Unsatisfactory	Moderately Satisfactory

* The Implementation Completion and Results Report (ICR) is a self-evaluation by the responsible Bank department. The ICR Review is an intermediate IEG product that seeks to independently verify the findings of the ICR.

Key Staff Responsible

<i>Project</i>	<i>Task Manager/Leader</i>	<i>Sector Manager</i>	<i>Country Director</i>
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IEG Mission: Improving World Bank Group development results through excellence in independent evaluation.

About this Report

The Independent Evaluation Group assesses the programs and activities of the World Bank for two purposes: first, to ensure the integrity of the Bank's self-evaluation process and to verify that the Bank's work is producing the expected results, and second, to help develop improved directions, policies, and procedures through the dissemination of lessons drawn from experience. As part of this work, IEG annually assesses 20-25 percent of the Bank's lending operations through field work. In selecting operations for assessment, preference is given to those that are innovative, large, or complex; those that are relevant to upcoming studies or country evaluations; those for which Executive Directors or Bank management have requested assessments; and those that are likely to generate important lessons.

To prepare a Project Performance Assessment Report (PPAR), IEG staff examine project files and other documents, visit the borrowing country to discuss the operation with the government, and other in-country stakeholders, and interview Bank staff and other donor agency staff both at headquarters and in local offices as appropriate.

Each PPAR is subject to internal IEG peer review, Panel review, and management approval. Once cleared internally, the PPAR is commented on by the responsible Bank department. The PPAR is also sent to the borrower for review. IEG incorporates both Bank and borrower comments as appropriate, and the borrowers' comments are attached to the document that is sent to the Bank's Board of Executive Directors. After an assessment report has been sent to the Board, it is disclosed to the public.

About the IEG Rating System for Public Sector Evaluations

IEG's use of multiple evaluation methods offers both rigor and a necessary level of flexibility to adapt to lending instrument, project design, or sectoral approach. IEG evaluators all apply the same basic method to arrive at their project ratings. Following is the definition and rating scale used for each evaluation criterion (additional information is available on the IEG website: <http://worldbank.org/ieg>).

Outcome: The extent to which the operation's major relevant objectives were achieved, or are expected to be achieved, efficiently. The rating has three dimensions: relevance, efficacy, and efficiency. *Relevance* includes relevance of objectives and relevance of design. Relevance of objectives is the extent to which the project's objectives are consistent with the country's current development priorities and with current Bank country and sectoral assistance strategies and corporate goals (expressed in Poverty Reduction Strategy Papers, Country Assistance Strategies, Sector Strategy Papers, Operational Policies). Relevance of design is the extent to which the project's design is consistent with the stated objectives. *Efficacy* is the extent to which the project's objectives were achieved, or are expected to be achieved, taking into account their relative importance. *Efficiency* is the extent to which the project achieved, or is expected to achieve, a return higher than the opportunity cost of capital and benefits at least cost compared to alternatives. The efficiency dimension generally is not applied to adjustment operations. *Possible ratings for Outcome:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

Risk to Development Outcome: The risk, at the time of evaluation, that development outcomes (or expected outcomes) will not be maintained (or realized). *Possible ratings for Risk to Development Outcome:* High, Significant, Moderate, Negligible to Low, Not Evaluable.

Bank Performance: The extent to which services provided by the Bank ensured quality at entry of the operation and supported effective implementation through appropriate supervision (including ensuring adequate transition arrangements for regular operation of supported activities after loan/credit closing, toward the achievement of development outcomes. The rating has two dimensions: quality at entry and quality of supervision. *Possible ratings for Bank Performance:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

Borrower Performance: The extent to which the borrower (including the government and implementing agency or agencies) ensured quality of preparation and implementation, and complied with covenants and agreements, toward the achievement of development outcomes. The rating has two dimensions: government performance and implementing agency(ies) performance. *Possible ratings for Borrower Performance:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

Preface

This is the Project Performance Assessment Report (PPAR) for the Armenia Avian Influenza Preparedness Project (IDA-41780, TF-56629, TF-58076), approved on June 2, 2006. It was formally restructured on September 15, 2008 and closed on July 31, 2010 after a one-year extension. The project consisted of an IDA credit and two trust fund grants which totaled SDR 4.4 million (US\$6.25 million equivalent). One of the trust fund grants was co-financing of US\$0.8 million from a Japanese Policy and Human Resources Development (PHRD) grant, the other was from the multi-donor Animal and Human Influenza Facility Trust Fund of US\$2.00 million. There was parallel funding by the United States Agency for International Development (USAID) of US\$132,000.

The report was prepared by Ridley Nelson, IEG consultant. A mission was conducted in Armenia from February 20 to 29 in Yerevan, Syunik marz, and in an area outside Yerevan where commercial poultry farms operate. Interviews with a number of international agencies were conducted. The assessment is based on the project completion and appraisal reports, project restructuring documents, the Financing Agreement, a review of project files, and discussions with beneficiaries, Bank staff, government officials, nongovernmental organizations, institutions, donors, and private sector managers and staff. The cooperation and assistance of all stakeholders and government officials is gratefully acknowledged. Also acknowledged is the support of the World Bank Country Office in Armenia.

The assessment has three purposes: (i) to assess the extent to which the project achieved its intended outcome; (ii) to draw lessons of experience to help inform future engagement in zoonotic diseases; and (iii) to contribute to an assessment of the performance of a sample of a substantial group of Bank-funded avian influenza projects supported by grant funding with potential national and global program lessons.

Following standard IEG procedure, a copy of the draft PPAR was sent to the government for their review and comments. The comments received are included in Annex D and were taken into account in the text.

Summary

This report assesses the development effectiveness of the Bank supported Avian Influenza Preparedness Project (2006-2010) and draws the lessons of experience. The project was processed using Emergency Procedures (Operational Policy, OP 8.50). At the time of project appraisal Armenia had recorded no cases of avian influenza. However, cases had been reported in neighboring countries and there was a risk of transmission through bird migration and cross-border movement. At the time of the avian influenza threat in 2005, Armenia was largely unprepared to address this disease in both the animal and human health sectors. While there was some capacity within the Ministry of Agriculture and the Ministry of Health to address communicable diseases including zoonoses, there had been very limited cooperation between the two in the past.

The Armenia Avian Influenza Preparedness Project (IDA-41780 TF-56629 TF-58076) was approved on June 2, 2006. It was restructured on September 15, 2008 and closed on July 31, 2010 after a one-year extension. The project consisted of an International Development Association (IDA) credit which totaled SDR4.4 million (US\$6.25 million equivalent) and two trust fund grants totaling US\$2.80 million (US\$0.8 million from a Japanese Policy and Human Resources Development (PHRD) grant and US\$2.00 million from the new Animal and Human Health Facility Trust Fund). The project came under the Bank-managed Global Program for Avian Influenza (GPAI). There was parallel technical and other financial support from a number of international agencies and donors including the Food and Agriculture Organization (FAO), the World Health Organization (WHO), the World Organization for Animal Health (OIE), the United Nations Children's Fund (UNICEF), the United States Agency for International Development (USAID), and the United States Centers for Disease Control and Prevention (CDC). Many of these agencies contributed to the design of the intervention.

The original objectives of the project were to: *minimize the threat in Armenia posed to humans by Highly Pathogenic Avian Influenza (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.* The animal health element of this objective focused predominantly on avian influenza, although it allowed support for other zoonoses. The human health element focused predominantly on addressing the risk of a human influenza pandemic of avian origin, but it also allowed for support for other infectious disease emergencies. In 2008, the project was restructured to extend support to other livestock diseases since there was an outbreak of African swine fever. The revised objective was: *to minimize the threat in Armenia posed by the HPAI infection and other livestock diseases, and to prepare for the control and response to an influenza pandemic and other zoonoses or infectious disease emergencies in humans.* The main difference was that this objective allowed support for other livestock diseases.

The project achieved significant preparedness and minimization of the avian influenza threat and, after restructuring, reduction in threat of African swine fever with some response to brucellosis. However, there is limited quantitative evidence on outcomes due to weak monitoring and evaluation. Achievements included: the preparation of strategies, plans and operating procedures for disease response; establishment of diagnostic laboratories that substantially reduced the analysis time for both animal and human

samples; increased disease surveillance for both animals and humans; a multi-agency simulation exercise for practicing a response to avian influenza; enhancement of border surveillance to prevent entry of diseased animals or material or infected travelers; preparation for the establishment of a compensation fund for compulsory culling of animals during outbreaks to increase farmer incentives to report disease, although this was never completed; support for an awareness program targeted at the public in general and farmers in particular; a training program to enhance skills in disease diagnosis including serology, epidemiology, and many associated areas such as surveillance and data systems; development of a national data system to monitor disease outbreaks; a compensation program for an African swine fever outbreak; many studies; and enhanced coordination between the key ministries and other entities and between donors.

Shortcomings included: poor monitoring and evaluation; a failure to establish the compensation fund for avian influenza, although a comprehensive fund is under preparation for 2014; failure to resolve the carcass disposal issue following culling partly due to unforeseen environmental issues with incineration solutions; implementation problems with the African swine fever emergency compensation; failure so far to get the national data system operating with less than a six month time lag, still too slow to be of much value in a fast moving epidemic; limited surveillance of slaughter facilities; and some continuing risks in biosecurity on commercial farms from wild birds using waste heaps.

With respect to ratings, relevance of both the original and revised objectives is rated substantial. While combating avian influenza had not been part of the World Bank or government strategy prior to the threat, a coordinated “one health” strategy is now the approach for zoonoses and communicable diseases. Relevance of design to the original and revised objectives are both rated modest, mainly due to the tensions between the short-term emergency objectives and the long-term capacity building objectives within a single short emergency project. The achievement of both of the original objectives for animal and human disease elements was substantial, and modest for the additional objective to minimize the threat of other livestock diseases. Efficiency is difficult to assess given the lack of cost-effectiveness comparators and the range of projections in the literature about the probability and scale of economic and social impact from an outbreak. Efficiency is rated modest, mainly due to the inefficiency of surveillance due to the lack of a compensation fund, inefficiencies in the African swine fever compensation response, cost overruns and delays in construction of the Central Laboratory, and carcass disposal issues with implications for recent and long-term cost-effectiveness. Although not of economic relevance to Armenia, there was a potential global public good benefit. Project outcome under both the original and the revised objectives is rated moderately satisfactory. (It has proven impossible to separate the impact of the Bank supported interventions from those of other agencies).

Risk to Development Outcome is rated significant due to questions about sustainability, particularly budgetary resources, as the threat has receded, and partly due to the inherent uncertainty of the HPAI disease risk itself. Bank performance is rated moderately unsatisfactory. There were quality at entry weaknesses and a number of supervision weaknesses including one gap at a critical juncture of fourteen months between supervision reports. There was a failure to correct the known poor monitoring and

evaluation design. Borrower performance is rated, on balance, moderately satisfactory. While there were weaknesses including the compensation fund delay and barely satisfactory performance on the African swine fever compensation, overall the government made considerable strides during the short project period in building preparedness. The challenge now is not to let that preparedness weaken any further.

There are three lessons:

- **A three-year emergency project is appropriate for quickly building some surveillance, diagnosis, and response capacity to rapidly tackle an immediate threat but is unsuited to a deepening and broadening of institutional capacity for more systemic reforms.** An alternative would have been to launch a quick emergency project followed by an overlapping longer term institutional reform and capacity building project with the broader animal disease focus designed in a more measured way.
- **In projects aimed at preventing or preparing for a potential disease threat with an uncertain probability and magnitude of impact, the results frameworks need to anticipate how “success” will be measured -- both in the event that the anticipated threat materializes and in the event that it does not.** Indicators would need to measure changes in preparedness in terms of changes in the efficacy and the efficiency of surveillance, diagnosis, and control response to understand attribution of the results to the project’s interventions.
- **Failure to effectively manage communications can lead to unproductive panic, insufficient public knowledge, and erosion of faith in public authorities.** In the case of this project, while the early crisis awareness materials themselves were generally well conceived, there were some unexpected responses and some lessons. Carefully designed, timed and targeted public communication following established protocols and communication principles, drawing on professional communications skills, is likely to facilitate emergency response when there is little time to plan. There is an established science of communications that can be locally adapted and tested to ensure communications readiness and to develop national and sectoral strategies. In this case, the opportunity for a comprehensive communications strategy and capacity development for the future was not seized.

Caroline Hieder
Director-General
Evaluation

1. Background and Context

Country Background

1.1 The Republic of Armenia is a mountainous country in the Southern Caucasus between the Black Sea and the Caspian Sea. It has a population of some 3.2 million people and is the second most densely populated of the former Soviet Republics. There are more Armenians living abroad, sending in significant remittances, than there are living within its boundaries. Armenia has been a generally consistent economic reformer. This has enabled a steady increase in living standards over the past decade, although the shift from Soviet era policies has not been without major challenges.

1.2 After a period of transition-related recession in the early 1990s, the economy gradually recovered with growth averaging 5.3 percent annually over the period 1994 to 2000 and 12.1 percent annually over the period 2001 to 2008 (IMF 2012). This last acceleration resulted in significant poverty reduction gains and job creation. Between 1999 and 2008 the incidence of poverty fell from 56 percent to about 28 percent. Since the late 1990s Armenia has managed to reduce inflation significantly, stabilize its currency, and privatize most small and medium-sized enterprises. It has moved away from the large agro-industrial complexes of the Soviet era towards small-scale agriculture. Total debt is about 65 percent of gross domestic product (GDP). Foreign direct investment has increased considerably in the last decade. Armenia joined the World Trade Organization in January 2003. Governance is a significant issue. In 2011 Armenia was ranked 129 out of 182 globally in Transparency International's governance rating. In 2010, agriculture represented about 20 percent of GDP. Some 36 percent of the population lives in rural areas. Agricultural land is about 61 percent of total land area with forest area about 9 percent.

1.3 Communicable diseases in Armenia include, but are not limited to, influenza, tuberculosis, hepatitis, measles, rubella, typhoid, brucellosis, rabies, malaria, and a low incidence of sexually transmitted diseases. Human Immunodeficiency Virus (HIV) prevalence is estimated at 0.1 percent of the population between the ages of 15 and 49, and tuberculosis incidence is about 73 per 100,000 people. The maternal mortality ratio is estimated at 29 per 100,000 live births and infant mortality is 20 per 1,000 live births, down from 48 in 1990.

1.4 There are about 11 million poultry in Armenia, mostly chickens but some ducks, geese, guinea fowl, and turkeys. Approximately 70 percent of birds are kept by medium and small farms and by backyard farmers. Most large-scale commercial producers evolved as private businesses from previous Soviet era collective farms. Many still use the old collective farm buildings but most have been modernized inside. Generally, the commercial sector is considered lower risk for a highly pathogenic avian influenza (HPAI) outbreak, since biosecurity is generally fair to good and all have their own privately employed veterinary officer. However, the sector is by no means without biosecurity risk.

Disease and Project Context

1.5 Avian influenza, as the name suggests, is generally a disease of birds. However, the disease can also infect humans if they come into contact with infected birds. The H5N1 virus is deadly and has led to a high mortality in poultry and in humans. Avian influenza virus types generally do not readily replicate and transmit between humans. However a well-founded concern is that these viruses, including H5N1, could mutate to a form that is able to replicate in humans and spread easily among them. If this happened a pandemic could occur and lead to possibly high death tolls, as happened in 1918-19 with the ‘Spanish Flu.’ Anticipating the actual timing of an avian influenza pandemic is difficult as it would depend on when a virus acquired the ability to transfer easily among humans.

1.6 At the time of project appraisal in 2006, the continuing outbreaks of HPAI, which had started in 2003 in several Southeast Asian countries and spread to Central Asia, Europe, the Middle East, and Africa, had led to major negative impacts on the poultry industries of the affected countries. Economic losses to the Asian poultry sector alone were estimated at around US\$10 billion. Out of the 170 people known to have been affected by the disease at that time in seven countries, 92 had died. By 2005, HPAI was present in several neighboring countries and very close to the Armenian border with Turkey¹.

1.7 Armenia faces four broad threats from avian influenza:

- *The poultry risk.* The risk of outbreak of avian influenza in poultry with social and economic costs for agriculture within the country and, through cross-border transportation of poultry, bird flyways (migration patterns) and other means, with risks of causing an outbreak in other countries and thus having some element of global public cost in poultry. This is a risk where preemptive action such as information, surveillance, diagnosis, and response within the poultry sector is relevant.
- *The human from poultry risk.* The risk of an outbreak in poultry infecting humans with the additional risks of human morbidity and mortality but, by definition, no risk of subsequent human to human transmission. This is a risk where again preemptive action in the poultry sector is relevant but also where a modest amount of capacity is

¹ Since 2003, the number of outbreaks globally in domestic poultry shrank steadily from a peak of about 4,000 to about 300 in mid-2008. However, outbreaks rose again since then, although not to previous peak levels, reaching nearly 800 in 2010 - 2011. Since the start of 2011, a number of countries in Asia have experienced introduction of different avian virus types and variants, many involving wild birds (FAO 2011). The country HPAI data as of June 2012 is briefly as follows. Avian influenza is considered endemic in Egypt, Indonesia and Vietnam. Since the end of 2003, reported cumulative avian influenza outbreaks in poultry other than in Egypt and Indonesia have reached over 200 in the following countries: Vietnam (2,655); Thailand (2,141); Bangladesh (544); Romania (273); and Turkey (219). There are 44 other countries where less than 200 outbreaks have been reported, the majority of them reporting less than 20 outbreaks. The cumulative number of human deaths since 2003 as of June 2012 was: Indonesia 189; Egypt 168; Vietnam 123; China 22; Cambodia 21; and Bangladesh 3. In 2012 there have been no outbreaks in poultry reported yet outside South and East Asia and Egypt (OIE website data).

needed for information, surveillance, diagnosis and response for human infection, a modest amount because the number of infections from proximity to poultry is unlikely to be high, except in the poorer countries with greater poultry-human proximity.

- *The human to human risk locally.* The risk that a strain transmissible between humans emerges within Armenia. This risk is low but, if it did emerge, there would be large response needs in the human health sector. There would be both local costs and global costs.
- *The human to human risk globally.* The risk that a strain transmissible between humans emerges in another country, causing a pandemic that spreads to Armenia through entry of infected people. In Armenia, the likelihood that human-to-human transmission would arise from abroad is far greater than that it would develop within the country, given the relatively small population and the current high prevalence of avian influenza outside Armenia, such as in East Asia. Here, response would need to be largely in the human health sector and in many other sectors of the economy on a very large scale, including emergency and police services. There would be both local and global costs.

1.8 At the time of project appraisal in 2006, there had been no avian influenza outbreaks in Armenia but it was considered by the World Organization for Animal Health (OIE) and the Food and Agriculture Organization of the United Nations (FAO) that the country was faced with a serious threat. Armenia is on a major migratory bird flyway (the East Africa-West Asia Flyway and the Central Asia Flyway). There had been outbreaks in a number of neighboring countries including Turkey (within a few kilometers of the border), Azerbaijan, and Iraq, with earlier outbreaks in Russia and in Kazakhstan in 2005. In response, in January 2006, the government initiated a National Strategy for Avian Influenza and prohibited imports of poultry and poultry products from countries that had reported outbreaks. Transport was being compulsorily disinfected at border checkpoints and veterinary services were checking dead birds to identify the cause of death. Consumption of poultry products decreased, negatively impacting producers. This was particularly the case for large-scale enterprises marketing through urban stalls, which were the source of most commercial sales. There was less economic impact in the backyard poultry subsector with a higher level of subsistence consumption.

1.9 The Food Safety and Veterinary Service Inspection is the governmental veterinary administration with country-wide authority for implementing animal health measures, food safety controls and international veterinary certification. It is located in the Ministry of Agriculture and has five departments: Inspection of Animal Diseases and Surveillance Department; Food Safety Department; Veterinary Medicines, Feed, and Veterinary Inspection Department; Border Veterinary Inspection Points Coordination Department; and Legal Support and Information Department. At the regional level there are marz (equivalent to a province) Veterinary Offices handling food safety and veterinary inspection, and each marz has several District Veterinary Offices.

1.10 Armenia inherited an oversized healthcare system with a focus on specialized care. Following decentralization and a reconfiguration of public services at independence,

the operation and ownership of health services has been devolved to local governments for local medical services and to provincial governments for most hospitals. The number of hospitals has been reduced with the aim of rationalizing and increasing treatment in day care or outpatient settings. Many health facilities in rural areas still lack modern medical technology. There has been partial privatization of some health facilities. However, recently this process has slowed due to concerns about implementation and impacts on the poor. Financial sustainability has been a challenge. There are certain services for defined population groups that are free of charge but budget is a limiting factor. The Ministry of Health is responsible for human health. It is also responsible for regulatory functions covering pharmaceuticals; medical education and training; the basic benefits package; remuneration of healthcare workers; licensing of healthcare facilities; and the management of high technology equipment. A World Bank funded project, the Second Health Sector Modernization Project (2007), the second phase of an Adaptable Program Loan, is currently ongoing to strengthen the sector.

Related World Bank and Donor Support

1.11 At the time of appraisal, there were only two projects in the relevant sectors with some possible relevance to the project: the Health Modernization Project (2004-2010, \$29.4 million actual), the first phase of an adaptable program loan, and the Natural Resources Management and Poverty Reduction Project (2002-2009, \$17.25 million actual). The health project supported health reform in a number of areas of some value to communicable diseases response capacity, much of the support being in areas of institutional reform and strengthening but there was no specific focus on avian influenza since the threat came somewhat after appraisal of that project. The agriculture project had no avian influenza activity, and little relevance, being focused mainly on natural resources sustainability. The First Phase Health Modernization Project has been followed by a second phase operation approved in March 2007 (\$29.6 million, closing in 2014). In 2006, the Global Program for Avian Influenza (GPAI), a multi-country adjustable program loan was established (Box 1).

1.12 There were a number of other donors and technical agencies starting to support the response to avian influenza at the time of project appraisal, including the United States Agency for International Development (USAID), the European Union (EU), the United Nations Children's Fund (UNICEF), the World Health Organization (WHO), the Food and Agriculture Organization (FAO), and the World Organization for Animal Health (OIE). However, most of this was in the form of important early technical support and interaction with government on the threat, but with limited funding for implementation. Early in the threat government did not have sufficient information, but once it was convinced of the importance of the HPAI threat, it acted quickly. The government was closely involved in project preparation and remained committed.

1.13 The Bank-funded project became effective (with a considerable lag some three months after approval) sometime after several other interventions from the above donors were well underway, particularly the support from USAID. The Bank project was forced into the role of a gap-filling late-comer in an emerging complex mosaic.

Box 1. The World Bank's Global Program for Avian Influenza Control

The World Bank has developed a global facility through a multi-country adjustable program loan. The threat of a severe global human pandemic arising from mutation of the H5N1 virus caused great concern to the international community. Billions of dollars have been pledged for efforts to control avian influenza. The Food and Agriculture Organization (FAO), World Organization for Animal Health (OIE) and the World Health Organization (WHO) have committed to work together, realizing that both human and animal health sectors have a stake in tackling pathogens that can threaten both animal and human health and that responding to risks related to zoonoses requires a multi-sectoral and multi-institutional response. The World Bank agreed to provide financial support to the effort being undertaken through the international technical organizations and has provided assistance to more than 50 countries for dealing with avian influenza.

The Bank has two main mechanisms to support client countries in this area: the Global Program on Avian Influenza (GPAI) and the multi-donor Avian and Human Influenza Facility (AHIF). The Bank's Board of Executive Directors endorsed the GPAI in January 2006, and extended it in June 2009. The AHIF was created to assist developing countries in meeting financing gaps in their integrated country programs to minimize the risk and socioeconomic impact of avian and possible human pandemic influenza. In many cases, the facility co-finances projects under GPAI.

GPAI is a global horizontal Adaptable Program Loan that allows for the use of up to US\$1 billion (extended from the original amount of US\$500 million) under which individual countries can obtain separate loans/credits/grants (depending on country case) to finance their own national projects. The GPAI draws on an integrated approach developed in conjunction with FAO, OIE, and WHO. Countries can access funding to strengthen their veterinary and health services to deal with avian influenza outbreaks among animals, minimize the threat to people, and prepare for, and respond to, any potential human flu pandemic. GPAI operations are processed using emergency procedures, which allow quick preparation and approval. A country qualifies for support for an emergency project under the Program when it demonstrates its commitment and readiness to implement early detection and rapid response measures appropriate to the specific country conditions. Given the diversity in country conditions and capacity, a country request for assistance under the APL would be eligible for financing if it meets the following criteria:

For countries in endemic situations (for example, Cambodia and Vietnam) where new human infections are being detected, the country has prepared and is implementing an HPAI Control Strategy.

For newly infected countries (for example, Romania) with active avian flu among poultry but no human infection the existence of an appropriate program of rapid response, detection and containment measures

For countries at risk (for example, Armenia) with no outbreaks government commitment and appropriate plan of early detection and rapid response, including appropriate implementation and monitoring arrangements that the international agencies could support

For countries with very low income levels and very low capacity including Low Income Countries Under Stress special criteria and waivers would apply if a full-blown human pandemic were to materialize to ensure that assistance would be available if and when needed, even if the country itself would hardly be able to generate or mobilize any effective response.

In response to a request for assistance the Bank team working closely with key multilateral organizations such as FAO, OIE, and WHO would support a needs assessment and appraise the proposed response and the country's readiness for its implementation.

Note: OIE is an independent intergovernmental organization founded in 1924 with 178 members. OIE's mandate is to improve animal health worldwide. OIE's headquarters are in Paris and there are 11 regional offices. In 2004 OIE member countries approved the creation of a single list of diseases to be notified to OIE. First outbreaks of all listed diseases should be officially notified to OIE within 24 hours. For more on OIE see website: <http://www.oie.int/about-us/our-missions/> and FAO 2007b. For more on GPAI see World Bank 2005.

Source: GPAI sources.

2. Objectives, Design, and their Relevance

Objectives

2.1 As stated in the Project Appraisal Document (PAD p.5) and the Financing Agreement (p.3), the Project Development Objective was to: (i) *minimize the threat in Armenia posed to humans by HPAI infection and other zoonoses² in domestic poultry;* and (ii) *prepare for the control and response to an influenza pandemic and other infectious disease emergencies in humans* (World Bank 2006).

2.2 The Project Development Objective was amended in September 2008 to: (i) *minimize the threat in Armenia posed by the HPAI infection and other livestock diseases;* and (ii) *to prepare for the control and response to an influenza pandemic and other zoonoses or infectious disease emergencies in humans.*” This was a formal restructuring, but neither the Results Framework nor the indicators were changed and, for reasons that are still unclear, neither was the objectives statement in the supervision reports.

	<i>Animal Health</i>	<i>Human Health</i>
<i>Original Objective</i>	<i>(i) to minimize the threat in Armenia posed to humans by HPAI infection and other zoonoses in domestic poultry.</i>	<i>(ii) to prepare for the control and response to an influenza pandemic and other infectious disease emergencies in humans.</i>
<i>Revised Objective</i>	<i>(i) to minimize the threat in Armenia posed by the HPAI infection and other livestock diseases.</i>	<i>(ii) to prepare for the control and response to an influenza pandemic and other zoonoses or infectious disease emergencies in humans.</i>

Source: PAD/Legal Document

2.3 The difference between the original and the revised objectives is that the animal health objective adds “other livestock diseases,” whether they are a threat to humans or not (Table 1). Also, the “other zoonoses” referred to in the original objectives are no longer qualified as poultry-related, therefore including such diseases as brucellosis³. The main purpose of this revision at the time was to enable the inclusion of African swine fever. There had been an outbreak early in 2007. Moreover at that time the threat from HPAI appeared to be gradually declining. The human health objective after revision adds “other zoonoses” to the “infectious disease emergencies”. Overall, there was a broadening of objectives to reach beyond just HPAI.

²Zoonoses are infectious diseases in animals that can be transmitted to people. The natural reservoir for the infectious pathogen is the animal. Rabies and anthrax are examples of zoonoses .

³ Brucellosis is an infectious bacterial disease passed among animals which can infect humans mainly through contact with infected animals or consumption of animal products, and rarely through breathing in the organism. It causes flu-like symptoms and can cause long-lasting symptoms.

Relevance of the Objectives

Relevance of the Original Objectives

2.4 Neither the Bank nor Armenia had strategies for avian influenza prior to the emergence of the disease in 2003/4. The project files suggest that the threat, once recognized, was quite quickly accommodated as a priority in the jointly agreed lending program.⁴ An HPAI strategy and plan were developed and subsequently amended as part of the project and program.

2.5 In retrospect, there is a question about whether, even at appraisal, the original objectives should not have been more broadly formulated towards the wider range of diseases. According to one government official, even at the time of late preparation and negotiations there was discussion about the option to broaden the focus. However, the original poultry-focused objectives remained targeted predominantly at the one disease threat until the restructuring in 2008. This may indicate some lack of nimbleness on the part of the Global Program for Avian Influenza (GPAI) and the region. At the time Armenia's national ongoing dialogue on human diseases was already starting to look further into the future and attempting to optimize resources across multiple threats. There are benefits from an emergency focus in terms of concentration and rapid action but there may also be longer-term costs.

2.6 The Armenia FY 2009-12 Country Assistance Strategy (CAS), operative at the time of project closing, identified livestock diseases in general as an important issue to be addressed, specifying as one of the main targets the implementation of a national control program for brucellosis and other zoonotic diseases. The scope of the CAS thus included, but was not limited to, concerns about HPAI. The project was also substantially relevant to a global strategy of the Bank at the time supported in the form of the GPAI global program specifically set up for this purpose.

2.7 The original objectives were consistent with the World Bank Agriculture Action Plan 2010 – 2012 which has specific mention of avian influenza (p. 50) and also highlights the challenge of dense livestock populations for the risk of animal diseases and the associated (for some diseases) threat to humans (p. 49). It also was consistent with the World Bank health strategy (World Bank 2007). This has specific mention of avian influenza as a potential pandemic disease (p. 13) and notes the focus on donor harmonization in addressing avian influenza under Strategic Direction 5.

2.8 While there is no specific national communicable diseases strategy, the objectives are consistent with current overall health sector reform which focuses on institutional

⁴Notwithstanding the stated priorities, the probability of significant numbers of human influenza infections arising directly from poultry within Armenia is probably relatively modest for the following reasons: (i) Armenia's harsh winter reduces virus carryover. (ii) Few Armenian farmers live as closely with their poultry as many do in Asia. (iii) Few Armenian farmers keep ducks and geese, significant carriers and more likely to mix with migrating birds. (iv) It is rare in cities for consumers to buy live birds. (v) There is little movement of poultry across the border posts and where there is, it is almost entirely day-old chicks which have a low probability of being carriers. Nevertheless, there is always risk and origin is often difficult to forecast.

reform, devolution and capacity building with rationalization of services and a focus on services for the poorer households, but with gradual increases in cost recovery. It is also consistent with the still applicable national 2005 Action Plan for Avian Influenza Preparedness.

2.9 On balance, relevance of the original objectives is rated **substantial**.

Relevance of the Revised Objectives

2.10 The revised objectives broadened the focus to include zoonoses for all livestock, not just avian influenza and not just infectious disease in poultry. This was appropriate given that the threat from avian influenza had declined and the threat from other diseases, in particular African swine fever, had increased. The revised objectives were also more consistent with the 2009 CAS at closing than were the original objectives and with the country priority that was starting to move towards a coordinated, “one health” approach. In any case, the surveillance support and much of the laboratory support, even before the restructuring, had been relevant beyond HPAI alone. The relevance of the revised objectives is therefore also rated **substantial**.

Design

COMPONENTS

2.11 The project had four components:

2.12 **Animal Health.** (Appraisal Cost US\$5.6 million; Actual Cost US\$5.4 million). This was to support: the development of a national policy framework and strategic plan including design of an outbreak containment plan; updating of essential information on migratory birds; strengthening of animal disease surveillance and diagnostic capacity; veterinary services training; and restructuring the poultry sector to improve bio-security of backyard poultry.

2.13 **Human Health.** (Appraisal Cost US\$2.8 million; Actual Cost US\$4.1 million). This was to support: the enhancement of public health program planning and coordination and surveillance systems; the training of personnel; transport; information communications equipment and protective gear; technical assistance; improvement of laboratory networks; health information and telecommunication systems; development of guidelines and standard reporting forms; expanded seasonal flu vaccinations; antivirals for the highest risk groups; and supplies for intensive care units in infectious disease hospitals.

2.14 **Public Awareness and Implementation Support.** (Appraisal Cost US\$1.5 million; Actual Cost US\$1.0 million). This was to support: public awareness through information and communication services including research, design, implementation; a communications strategy; the education of vulnerable groups on preparedness; coordination and implementation support including the Inter-Ministerial Committee for

Avian Influenza and the committee Secretariat⁵; project implementation by the Agriculture Reform Support Project Implementation Unit (ARSP PIU) of the Ministry of Agriculture and the Project Implementation Unit of the Health Systems Modernization Project of the Ministry of Health. These PIUs were to handle procurement, financial management and Monitoring and Evaluation (M&E).

2.15 Support for Critical Imports. (Appraisal Cost US\$0.2 million; Actual Cost zero). This was to finance a list of critically needed imports necessary for a response program in the event that a human pandemic of avian influenza were to occur. It was to cover protective clothing/equipment, pharmaceuticals, vaccines, and medical and veterinary supplies and equipment.

MONITORING AND EVALUATION DESIGN

2.16 Monitoring and evaluation (M&E) design was weak. The Results Framework, as formulated in Annex 3 of the Project Appraisal Document, was of limited value for evaluation because there were no measures of preparedness beyond an output level. For example, there was no measure of how surveillance performance or laboratory performance in terms of speed or accuracy had changed, or how awareness in different target populations had changed. The intermediate outcome indicators were expressed in most cases simply as "evidence of timely and satisfactory progress toward delivery of (the component) outputs as compared to the original plan." While there were some 24 more specific indicators added, none of them had a date by which they were to be achieved and about 5 would have been difficult to measure. Of the 8 that specified output quantities "number of (items/people trained) achieved ..", only one indicated what the target number was, making measurement of achievement difficult. Many of the indicators were milestones such as the completion of a study, a policy, a plan, or an institutional arrangement, which to some extent fed into each other. Not setting a target timeframe for each of these left implementation and flow chart sequencing and monitoring unclear.

2.17 Arguably, an emergency project, with urgent short-term needs, should have even tighter and more specific deliverable milestones than a traditional project with a less critical timeframe. However, again it should be noted that this was an emergency project with some inevitable trade-off between thoroughness of preparation and early effectiveness. It was notable that communications and behavior change outcomes were not included among the indicators even though they were crucial to achieving the objectives. The Quality at Entry review of 2007 recommended a shift of focus towards outcomes. However, there seems to have been a lack of clarity about what the preparedness intermediate outcomes should be.

IMPLEMENTATION ARRANGEMENTS

2.18 The project was to be implemented by the Ministry of Agriculture and the Ministry of Health, coordinated by the Prime Minister's Office. There was to be an Inter-

⁵ Stakeholders included the Ministry of Finance and Economy, the Ministry of Territorial Affairs, the Ministry of Nature Protection, Ministry of Agriculture, the Ministry of Health, their diagnostic laboratories, civil society organizations, the private sector, and veterinary and farmer associations.

Ministerial Committee for Avian Influenza with members from all concerned ministries and entities including the Ministry of Territorial Administration and the National Police. The existing Project Implementation Units (PIUs) in the two ministries handling the existing sectoral projects, were used for fiduciary tasks. Each of the two ministries had a Project Coordinator who was to report to the Secretariat of the Committee. There were local committees planned at the marz level. By 2006, the government had drafted a National Strategy for Avian Influenza, the main implementation guidance document. The implementation structure was changed somewhat since avian influenza never entered Armenia and an Inter-Ministerial Task Force below the level of the committee functioned throughout as the main coordinating body. The Secretariat functioned but effectively only handled the communication component.

Relevance of Design

Relevance of Design to the Original Objectives

2.19 The original design of the project drew largely from the guidelines for the GPAI and from the Bank's OP/BP 8.50 for emergency projects. It also drew from a risk assessment carried out in early 2006 and on knowledge built up by donors and agencies including USAID, WHO, FAO, and OIE. While the haste of an emergency project appraisal can be expected to leave gaps or lack of definition compared to a non-emergency project, there were some significant design issues. These arose partly from the fact that this was a project that, despite being emergency-streamed, ventured beyond simply short-term emergency response. There was an issue with the choice of lending instrument.

2.20 An alternative formulation of instruments could have used separate overlapping but staggered projects, an emergency phase first followed by a more traditional investment or sectoral adjustment project for the medium to long term with broader institution building. The hybrid that hastily emerged shortchanged both the short-term and the longer term. The following are outlines of the results chains interpreted by IEG from the objectives and design for both the animal health objective (briefly, "minimizing the threat from poultry") and the human health objective (briefly, "preparing for an influenza pandemic"). No separate results chain is given for the revised objectives since it would be largely repetitive except that the disease focus for both animals and humans was broadened.

2.21 On the animal health objective results chain, the logic, as discernible from the results framework, was to develop a *strategy and plans* that would lead to: enhanced field *surveillance*, including border surveillance, to respond to cases quickly to reduce spread; better *diagnostic laboratory capacity* to ensure rapid diagnosis also to reduce spread; the *monitoring of breeding farms* to reduce the probability of disease spreading through the poultry chick supply chain; improved *coordination* with the health ministry and other agencies; the creation of an incentive for on-farm surveillance and reporting in backyard poultry by establishing a farmer *compensation fund*; *restructuring the backyard poultry industry* to reduce the risk of infection; *awareness raising* among farmers also to enhance surveillance and reporting; and *capacity enhancement* across a range of professionals and stakeholders to achieve better and faster diagnostic response, and *improved disposal* to

reduce the possibility of spread. These interventions were expected to contribute to the *adoption of recommended practices* by commercial and backyard poultry farmers and by distributors and vendors to lower the risk of disease introduction and spread.

2.22 The human health results chain logic was to develop a plan that would lead to: enhanced *surveillance*, including border surveillance to catch and respond to human cases quickly to reduce spread in the human population; better *diagnostic laboratory capacity* to ensure rapid diagnosis also to reduce spread; enhanced *intensive care and isolation* to respond to human cases to reduce spread and morbidity/mortality; improved *coordination with animal health services and other agencies* to ensure a more effective and efficient multi-sectoral response; *awareness* raising within the population, agencies, and professionals to aid in surveillance; and *capacity improvement* across a wide range of professionals and stakeholders to, again, enhance surveillance and response. All of these were expected to mitigate the risks and to improve Armenia's capacity to control and respond to human health emergencies.

2.23 One particularly weak *design element was in the plan* to restructure the backyard poultry sector to improve biosecurity. *It clearly was socially and financially totally impractical to shift some four and a half million poultry from traditional backyard to confined production systems.* If this had not been proposed, more detailed attention might have been given earlier to the participatory disease surveillance system, which was added too late on a pilot basis. Had HPAI entered Armenia, this would likely have been a critical component.

2.24 While the original intent to only address poultry compensation in an emergency context probably could have been achieved as an emergency program had HPAI entered Armenia, as it was for African swine fever, it is questionable whether it would have been realistic in three years to design and implement a full comprehensive compensation fund covering all livestock as is the intent now for 2014. This was the ultimate desirable goal; a quick single animal fund was simply a stopgap. Compensation funds are complicated because there are significant potential governance issues, moreover there are likely to be high costs later for starting off on the wrong foot. There may therefore be some advantages to the sector as a whole from the more measured approach being taken to develop a comprehensive scheme. It is also questionable whether it was realistic to expect mobile incinerators to work and to be environmentally acceptable. This was a theoretically appealing solution but with many unresolved environmental, logistical and economic questions.

2.25 The standard GPAI model was comprehensive and technically sound. It had input from technical international agencies and Armenia was probably capable of implementing a fairly comprehensive project. The elements of design unique to Armenia, and therefore most in need of local adaptation, were at a level of detail below the broad strategy and the three main components on animal health, human health, and awareness. They were in the necessary adaptations of the key elements of these, including particularly the design of the compensation fund, the local adaptations needed for carcass

disposal, and the need for local risk assessment⁶. Overall, given the emergency, it is concluded that the standard model, with somewhat hasty adaptation, was difficult to avoid.

2.26 On balance, the rating of relevance of design to the original objectives is **modest**.

Relevance of Design to the Revised Objectives

2.27 In response to the revised objectives, there were small revisions to the design. It moved towards covering other livestock diseases. Since surveillance was always largely focused on, and adapted to, whatever diseases emerged, this was not a substantial change. The main design changes were: extension of compensation and associated funding reallocation to African swine fever but largely following the already prepared procedures that would have been used for avian influenza; additional support for disease emergency management partly based on an updated needs assessment for the veterinary service including specialized vehicles; enhanced public health awareness; a broadening of training and epidemiology for the wider disease range; broadening of surveillance to African swine fever and brucellosis; and ensuring compliance with the Environmental Management Plan.

2.28 The revised design was relevant to the broadened objectives. It was strongly focused on the immediate challenge of African swine fever but included more attention to brucellosis. However, it failed to include the surveillance of the slaughterhouses and other livestock product processing plants which are a source of infection for some of the other non-avian influenza diseases such as brucellosis. This is one area where the relevance of design differs somewhat between the pre-and post-restructuring periods. Since there was a continuation of the original HPAI support, the rating of the relevance of the original design is a part of the rating of the revised design. Overall, relevance of design to the revised objectives is also rated **modest**.

3. Implementation

3.1 The project was approved on June 2, 2006, restructured in September 2008, and closed July 31, 2010, a year later than planned. Of the IDA Credit, SDR 3.49 million (US\$5.36 million equivalent) was disbursed and SDR 0.91 million (US\$1.30 million equivalent) cancelled at closing. The Japan PHRD co-financing grant (TF-56629) of US\$0.8 million was not fully disbursed and US\$0.11 million was cancelled. The Animal Health and Influenza Facility Grant (TF-58076) of US\$2.0 million was fully disbursed. The USAID grant of US\$132,000 was fully disbursed.

3.2 Implementation startup was helped by the existence of two already established PIUs, one in each of the line ministries. Both had experience with procurement. This was

⁶For example, it is not clear what is the relative risk between bird migration infection to poultry, versus border entry infection to poultry (by individual border post), versus internal disease spread from commercial waste heaps to poultry (by location), versus human airport entry infection to humans. However, these were things for which there was not time to thoroughly study ex ante if there was to be a quick response.

important for an emergency project. As the project moved into implementation there were a number of areas still requiring definition and agreement, particularly related to animal health. The first version of the Project Operation Manual was insufficiently focused on roles and responsibilities. While there were a number of activities that moved forward quite smoothly there were some that did not. This section focuses predominantly on the latter.

Planned vs. Actual Expenditure by Component

3.3 As is apparent from Table 2 below, one of the main differences in expenditure between the planned and the actual was that savings in several areas, including the critical import component that, in the absence of entry of HPAI was not needed, together with some additional funds contributed from the Avian Influenza Facility after appraisal, went to the human health component. This brought it to about 75 percent of the expenditure on animal health.

Components	Appraisal Estimate	Actual	Actual as a Percent of Appraisal
Animal Health	5.56	5.43	98
Human Health	2.75	4.06	148
Public Awareness and Implementation Support	0.91	1.02	112
Critical Imports	0.23	0.00	
Total Project Costs	9.45	10.50	111

Source: World Bank 2010b, p. 18

Implementation Experience

3.4 The poultry compensation fund was never established. While preparation and drafting of the statutes and guidelines was partly completed, legislation was never enacted. However, IEG mission discussions with Ministry of Agriculture officials suggested that there is still a serious intention to establish this fund under a broader Animal Disease Control and Compensation Fund.

3.5 The proposed national communications strategy was not prepared. In the absence of a strategy, awareness raising was somewhat ad hoc, although discussions with farmers suggested that there was generally satisfactory communication of avian influenza knowledge. The main implementation challenge for the communications component was that, since other agencies, mainly USAID and UNICEF, had started working with the agriculture and health ministries on communications before the Bank-funded project became effective, the project played a gap filling role.

3.6 The unrealistic plan for the restructuring of the backyard poultry subsector to shift to confined systems for biosecurity reasons was abandoned at an early stage following further study. The plans for safe disposal of animal carcasses were not implemented.

M&E implementation was weak, reflecting weakness in design and insufficient attention during the early period of supervision.

3.7 Finally, while the dominant ministry in the partnership was the Ministry of Agriculture, this does not appear to have resulted in significant coordination problems with the Ministry of Health. The benefits of having the two separate ministry-based PIUs with their specialized knowledge of their sector and already working on on-going Bank projects in this case seems to have outweighed the costs of ensuring coordination between the two entities. During the period of threat, while the proposed Inter-Ministerial committee, the more strategic coordination body, never met due to the lack of an HPAI outbreak, the Inter-ministerial Task Force was meeting almost daily and seems to have served the main role as the coordination body.

Implementation of monitoring and evaluation

3.8 The problems with the initial design of M&E continued through implementation because the weaknesses were not addressed. No M&E capacity or methodology was developed during implementation. The PAD had proposed recruitment of an M&E specialist but this was never implemented. However, there were a number of studies completed, one or two of which could be defined as evaluations of particular activities. (Studies that had evaluation value included the PASV (2009) African swine fever study and the ASPB (2008) study of wild birds.) The PAD's proposed surveys of outside experts to monitor the trend in Armenia's preparedness were never undertaken. An earlier 2006 Knowledge, Attitudes, and Practice survey was not repeated to assess the trend in knowledge and awareness changes. There was a certain amount of routine fiduciary reporting but of limited monitoring value. Outside of an M&E framework, there was quite a lot of record keeping, including for example the National Animal Disease Surveillance System for managing animal health data, which offers some trend data. There is also untranslated material on both animal and human health, for example, with San-Epid, that, if analyzed, might have been considered M&E material of some value. But this was never formally assembled and was not readily available at the time for disease response management. As might be expected with an emergency event, there was little pre-project baseline to allow any studies to show trends in achievement but the short length of the project period would have made trends difficult to measure.

Safeguards

3.9 The project was assigned Environmental Category B. The only safeguard applicable to the project was the Environmental Assessment (Operational Policy 4.01) safeguard. An Environmental Management Plan was approved in September 2006 and focused on public awareness against infectious agents, waste disposal of carcasses, and safe management of laboratory wastes.

3.10 Overall, the Environmental Management Plan functioned. A laboratory waste management plan emerged but rather late in the project. The use of this was evident during laboratory visits. However, during the African swine fever outbreak the disposal

of animal carcasses by at least some farmers was unsatisfactory (PASV 2009).⁷ The carcass disposal element of the Plan worked well in the sense that none of the planned carcass disposal activities through incineration were found environmentally acceptable but this was at some risk to bio-security as became apparent in the African swine fever outbreak. There are alternatives to incineration but these require close supervision and location is important. Public awareness aspects of the Plan were generally successful. Nevertheless, there remain some environmental/biosecurity risks that are covered later.

Fiduciary

3.11 Compliance with fiduciary requirements was satisfactory. There were no qualified audits, only some audit recommendations. Audits were provided on time. Procurement was carried out generally satisfactorily. The project files suggested that there were some problems with timing and sequencing of procurement related to commissioning of equipment that arose due to the unexpectedly slow renovation of the Central Veterinary Laboratory. In terms of the procurement mechanism itself, there were reported to be few problems mainly because Armenia's procurement rules were similar to the Bank's.

4. Achievement of the Objectives

4.1 There were two original objectives—one minimizing the threat of HPAI infection and other zoonoses in domestic poultry and the other preparing for the control and response to an influenza pandemic and other infectious disease emergencies in humans. A third objective was added to include other livestock diseases as part of the animal health objective. Annex B, Table B.2, provides IEG's assessment of achievement with respect to each of the project's key performance indicators. For this report, preparedness is defined, at the output level, as having the plans, systems, coordination, equipment and human capacity to identify and suppress outbreaks early and, at the outcome level, as showing evidence of rapid surveillance, diagnosis, response and the organizational systems that would minimize the social and economic impact *if* the disease strikes or *has* minimized it for diseases that have struck. Under each of the three objectives, outputs of strategy and plans, awareness raising, and surveillance and control are discussed followed by outcomes arising from each of these three categories. The first two objectives apply to assessing the original objective and all three will be considered in assessing the revised objectives.

Minimize the Threat Posed to Humans By HPAI Infection and Other Zoonoses in Domestic Poultry

4.2 While no HPAI outbreak or human pandemic occurred in Armenia, no convincing evidence was found to suggest that the lack of an outbreak can be attributed to the project

⁷ The original plan had been to incinerate carcasses in Bekkari pits (purpose-built concrete lined pits, see World Bank 2006 for design). However, this proved environmentally unacceptable. Further, mobile incinerators were too costly and faced regulatory restrictions. Disposal continues to be carried out through burial, an acceptable approach if done correctly. However, monitoring of carcass disposal during the ASF outbreak was not fully adequate posing the risk of spread of infectious material.

or program,⁸ although this is difficult to verify or refute.⁹ A survey of experts to assess readiness was proposed in the Project Appraisal Document. This was never implemented, reducing the avenues for performance assessment. Preparedness for a poultry avian influenza outbreak is given high weight in this assessment since stopping HPAI at its source is seen by all the concerned international agencies as the key to pandemic prevention.

OUTPUTS

4.3 **Strategy and Plans.** The strategy and plans were completed and provided a satisfactory basis for the project and led to improved standard operating procedures. Ministry staff believe that, should there be a renewed threat, the plans and associated documents would be a useful basis to enable quick gearing up to full response capacity. IEG agrees but with the important proviso that they be kept current and that there be sufficient resources.

4.4 **Awareness Raising.** Since the main aim of the project in Armenia, and of the global HPAI program, was preventing the disease in poultry, the predominant focus was rightly on communications related to animal health and those people in closest contact with animals. The awareness program, to which the Bank project contributed only a part, was aimed at inducing behavioral change in the management of poultry. Target groups included backyard and commercial poultry farmers and their families or employees, including children. Messages included cleanliness in handling live and dead birds, symptoms, action to be taken on finding dead birds, and reporting. Media included leaflets, TV and radio spots, training programs and children's puppet shows.

4.5 Under the Bank funded project itself, little of significance on awareness was implemented until early 2008. By that time USAID and UNICEF had made significant strides in developing the communication materials. Bank support helped to sustain this. An international consultant provided guidance. Awareness raising on African Swine Fever, and brucellosis followed later. IEG reviewed the brochures, leaflets and posters put out and found them to offer simple and clear messages with useful diagrams. Discussions with backyard poultry farmers in the field indicate that the publicity had some impact. Indeed, the local and international media attention may have caused excessive panic. One community veterinary officer estimated that some 60 percent of backyard farmers had slaughtered all their poultry as a result of the scare. Mission interviews with farmers indicated that the percentage in some locations may have been as high as 90 percent.¹⁰

⁸Throughout this report, unless otherwise indicated, the term project is used for the Bank funded project and the term program for the multi-donor interventions including the Bank project. It is impossible to tease out the differences between the Bank project achievement and the rest of the program.

⁹Some senior Ministry of Agriculture officials believe that the project, or at least the program as a whole, did prevent the incursion of avian influenza.

¹⁰ A main concern expressed by farmers was risking the health of their children or grandchildren. None of those interviewed could recall much detail of what they had heard about the symptoms of avian influenza in poultry but this is understandable, since the first of the awareness publicity had been about six years prior

4.6 The proposed National Strategic Risk Communication Plan was never prepared, but there were several useful consultancy contributions which offered some elements of strategy. A 2006 Knowledge, Attitudes, and Practices survey was conducted with support from UNICEF and USAID to guide the initial awareness program, however the proposed 2009 follow-up that would have allowed evaluation against the 2006 baseline was never carried out. This seems to have been partly due to the receding of the HPAI threat but also due to the overall weak management of M&E and lack of budget.

4.7 Notwithstanding the receding of the threat and the fact that earlier communications material was well designed, a communications strategy would have been helpful, and would still be helpful, to delineate clear future areas of institutional responsibility, message standards, performance standards, communication principles, training needs, and media relationship protocols.

4.8 **Surveillance and Control.** The project supported some 40 mobile surveillance and rapid response teams with vehicles, protective gear, and equipment. Several of these vehicles were seen during field trips and appeared to be still in use and in working order. They were used during the April 2007 African swine fever outbreak the control of which offers some evidence that surveillance was working¹¹. The equipment was also used in surveillance for brucellosis and other infectious diseases of livestock. But a peak pandemic demand was not met to test the full capacity of the system. In addition to active surveillance involving trained staff, at the time of the threat, telephone hotlines were set up for reporting by private citizens. (These are no longer operating due to the reduced threat.) Monitoring poultry breeding stock farms was planned and implemented under the project but only 40 percent were covered. Demonstrations (on disease identification, response and preparedness) on 2,000 backyard poultry farms were anticipated in the PAD but these were not carried out. This seems to have been partly due to the receding risk and concerns about overreaction. In slaughterhouses, there is reported to be limited surveillance and inspection although the majority of animals are from the more controlled commercial poultry sector and are therefore less likely to be diseased. A National Animal Disease Surveillance System (NADSS) was established. Prior to this project and program support there was limited data collection, aggregation, or analysis, although outbreak data was reported and assembled manually. Data is now entered into a computerized system and the analytical possibilities in livestock disease surveillance have been enhanced. However data entry lags.

4.9 The project and program modernized the Central Veterinary Laboratory and a Polymerase Chain Reaction (PCR) machine was installed.¹² At the marz level, 10

and, in any case, differentiating the symptoms of avian influenza from other diseases such as Newcastle Disease is difficult even for the trained professional.

¹¹ Note that surveillance is not synonymous with project monitoring and evaluation (M&E) although sustained surveillance data over time may be useful in project M&E.

¹²This turned out to be a challenging construction process, first, because of a delay with the technical design work to be carried out by USAID and then the emergence of a number of structural challenges in fitting modern equipment into an old building. In retrospect, it would probably have been cheaper to construct a new building but the structural challenges would have been difficult to foresee at the time of appraisal.

veterinary stations were upgraded.¹³ Aggregate performance figures in terms of throughput of tests at laboratories were not available. These would probably have little meaning because of fluctuations in demand for tests, and changes in livestock numbers over time.¹⁴ Mission observation suggests that the conditions in some of the laboratories prior to renovation were not conducive to well-controlled laboratory diagnostics. However, there is no aggregate evidence available that indicates changes in test accuracy over time, since few samples were subject to reference testing in the past as a baseline.

4.10 Enhancement of skills was an important element in both the animal and human health aspects, however it took until mid-2008 to fully get off the ground due to delays in development of the training plan. Related to animal health, some 20 training activities were completed, covering about 500 staff from the following categories: ministry, local government, community and marz level veterinarians, lab technicians, academics, students, police, mayors, governors, the media, Rapid Response team members, doctors, and farmers or farm managers. Workshops and training included compensation schemes; data management; biosafety; diseases and treatment; leadership for communication; the role of media; serology; parasitology, bacteriology and autopsy; brucellosis, including a workshop to finalize a brucellosis strategy; field diagnosis and control; and the overall simulation exercise and follow up workshop. For commercial poultry staff, mainly veterinary staff, the project and program supported general awareness and training aimed at better understanding symptoms and risk although the exact numbers were not available, since training had multiple audiences.

4.11 The proposed compensation fund was never established, although a significant amount of preparatory work in terms of operating procedures was completed. In the absence of clear farmer expectations about compensation, it is likely that publicly funded surveillance and controls would need to be increased. The failure to establish this fund, despite considerable preparation, including a study tour to Germany, is acknowledged by Ministry of Agriculture to be the biggest weakness of the project.¹⁵

4.12 The project supported the modernization and equipping of six border posts. The largest of these was Meghri on the border with Iran. The mission was unable to visit this due to weather risk, however the construction stages were viewed in photographs. It appears that the quality of construction was good. Evidence was provided of close

¹³This was mainly to improve the very primitive building services and conditions, some of which are still evident in portions of the buildings not renovated. The project generally provided heating, water supply, and gas supply, wall tiling, other structural improvements, and office furniture and equipment. In the case of six other supporting laboratories, some upgrading was undertaken.

¹⁴Interviews suggest that, at one laboratory, the peak capacity has increased steadily since before the renovation and new equipment. For brucellosis, for example, the approximate average for cattle blood tests is 25,000 per year, increasing at about 2% per year. For virus identification, the marz level laboratories only pack the samples for virus analysis (e.g. for suspected avian influenza) for sending to the central laboratory they do not do the analysis themselves.

¹⁵ Outstanding issues include the lack of animal registration, particularly with poultry, and the fact that much of the knowledge of local animal ownership lies with the community veterinarian only, leaving potential for local level collusion and corruption. Registration, particularly of larger animals, is particularly problematic in Armenia because the means testing for safety net support for the poor includes the number of livestock as one of the eligibility criteria. There is therefore an incentive to hide livestock.

supervision by the Bank. The proposed carcass disposal activity did not get off the ground largely due to environmental regulation conflicts, probably not spotted in advance due to hasty emergency project preparation.

OUTCOMES¹⁶

4.13 **Awareness Raising.** Based on individual interviews with some ten backyard farmers (about seventeen people including family members), four staff of commercial farms, and three veterinary officers in Syunik marz (one private), at the time of the HPAI threat, the awareness of a serious health threat to poultry and potentially to humans appears to have been raised significantly by the communications programs. As noted earlier, there was the over-reaction in slaughtering poultry that was not recommended in the communications materials. This may have been partly due to the relatively low percentage of income that came from these small poultry enterprises.¹⁷

4.14 On awareness at commercial farms, these have tighter biosecurity than backyard farmers. Each farm has its own veterinary officer and they have established routines of vaccination, often their own laboratory, disinfection troughs, and generally quite tight control over human entry and feed quality. As a result of the awareness program and project supported training, interviewees said that biosecurity on commercial farms was tightened at the time. Veterinarians were familiar with H5N1 symptoms.

4.15 **Surveillance and Control.** There have been two real tests of the surveillance and response system, the 2007 avian influenza simulation and the actual 2007 African swine fever outbreak (this is covered under the third objective). The field level simulation was reported by observers as successful and there was a follow-up learning workshop in 2008 to address issues, many of which were coordination issues between agencies, but some related to knowledge and skills gaps and equipment. Data on the change in surveillance speeds, quality and coverage was not available although it could probably be extracted by a study of day-to-day paper records. On the disease reporting mechanism, there has not been significant increase in speed simply because potential disease cases, even before the project, were generally reported up the line by telephone and still are. Use of the Internet has arguably improved the records (electronic records) for locations where Internet works. On laboratory analysis, previously, a sample would be sent away, generally to Russia, which, according to interviews, would often take between 10 days and 16 days.¹⁸

¹⁶ The mission attempted to find before and after or, ideally, with project and without project quantified evidence. This proved to be impossible, first because the disease never entered Armenia, second, because baseline data were not available, and third, because most disease threats exhibit large peaks and troughs so that surveillance effort and laboratory sample throughput are determined largely by changing needs rather than capacity.

¹⁷ Notwithstanding this overreaction in slaughtering, all producers who did so kept the carcasses for consumption so, had there been a more serious threat, biosecurity might have been compromised¹⁷. However, had there been a more serious threat, the communications materials and the messages put out by the community veterinarians, would have placed more emphasis on disposal. Overall, the impression was of a community of backyard farmers who had had a scare and were more than willing to follow recommended practices as and when necessary, at least those not largely dependent on poultry.

¹⁸ Had there been a global HPAI pandemic, it can be assumed that laboratories outside the country would have given priority to their own sample analyses.

It can now be done in four hours. This is highly significant because a delay of two weeks can enable a substantial spread of a disease.

4.16 It is difficult to assess the impact of border post improvement. It takes only one small piece of infected material or infected animal to cross the border and infect a farm animal within Armenia to transfer a disease. However, the threat is not always high. For example, in the case of Meghri, which had a major inspection structure added, practically no adult poultry cross the border in a year. The flow of larger livestock is in the other direction, a problem for the Iranian border post. There are a very small number of shipments of day-old chicks. These require veterinary certification to prove that the chicks are not infected. This post would seem to be relatively low poultry avian influenza risk. However, multiple small risks across all border points can aggregate to a significant total national risk.

4.17 The objective of the new National Animal Disease Surveillance System (NADSS) to achieve current and complete data for analysis and decision-making to support responses to has not yet been reached, although there has been significant progress. Reports are still coming in mostly by mail, although some may be first phoned in as a possible emergency. Some come electronically where Internet works. Data entry at the center currently lags by about six months, largely depending on one individual. It proved difficult to adapt the FAO TADInfo software; the system was not designed for poultry data. If there were to be a serious avian influenza outbreak, it seems improbable that, with the current lag, the data system could play its intended role. The department is well aware of this and is working to reduce the lag.

4.18 The outcome test on carcass disposal came towards the end of the project with the African swine fever outbreak were there were identified carcass disposal weaknesses (PASV 2009). This is discussed later under the third objective.

4.19 It was not possible to quantitatively trace the impact of the training programs but interviews suggested that most of those trained were still holding their positions and appreciated the knowledge gained about a new threat. Some concerns were expressed that the training was still insufficient, being either quite short, for example a workshop, or being not repeated often enough since then.

4.20 There were and remain four risks in commercial poultry not addressed or difficult to address. First, a study under the project by the Armenian Society for the Protection of Birds (2007) found waste heaps outside poultry units frequented by birds, particularly crows and gulls. This appears to be an area of risk. Second, the proximity of poultry buildings within farm perimeters presents a risk that is difficult to address, since the building layout is fixed. Third, a significant number of poultry farms lie close to water bodies frequented by migratory waterfowl. Fourth, an international observer with knowledge of the sector believed that actual biosecurity practices within commercial poultry units were not as good as was sometimes claimed.

4.21 Overall, coordination appears to have surpassed expectations. There was generally strong coordination between technical agencies and donors during the preparation of the proposals. Interviewees pointed to good coordination between the two

lead ministries with some believing that the coordination over HPAI had provided a stepping off point for wider and deeper coordination since then. The 2007 simulation was felt to have contributed to this.

4.22 **Rating.** An important question in rating this objective is whether the subsequent broadening of the objectives to include other livestock diseases detracted from achievement of the original, HPAI-focused, objective. On balance, the evidence from mission observations and discussions with government staff, particularly those in the laboratories and associated with surveillance, suggests that it did not. Considering the very low level of pre-project capacity, the increased speed of diagnosis, the strengthening of surveillance through borders and response teams, the increase in awareness, and accepting that, while lack of compensation readiness was a weakness, the broader compensation fund needed time to establish, the achievement of this animal health objective is rated, on balance, **substantial**.

Prepare for the Control and Response to an Influenza Pandemic and Other Infectious Disease Emergencies in Humans

OUTPUTS

4.23 **Strategic Plan.** A national strategic plan for improving public health surveillance and disease control was updated, consistent with WHO recommendations. The project cooperated with other agencies particularly the US CDC in the development of protocols, standardized forms and guidelines, and training on the use of these systems and procedures. This building block output was substantially achieved.

4.24 **Awareness Raising.** It is not possible to separate the animal health communications performance from human health since both were part of the same knowledge program although different materials targeted different audiences. Therefore, much of what was reported earlier on animal health applies here. As noted, the materials produced at the time were of good quality, although a communications strategy was not completed. Public knowledge was not measured against a baseline but based on interviews there appears to have been quite wide general knowledge of the threat and the need for cleanliness.

4.25 **Surveillance and Control.** The project provided equipment and building renovation to the public health institutions. Vehicles were provided to the Anti-Epidemic Inspectorate (San –Epid) and to regional centers responsible for state hygiene. Forty units including 30 mobile units for disinfection equipment were provided to San-Epid, the Center for Disease Control and Prevention (CDCP) and the Norq Infectious Diseases Hospital in Yerevan. The Norq Hospital received special equipment for patients including inhalers and nebulizers. Laboratory equipment was supplied to the Scientific Center of Forensic Medical Examination at the Ministry of Health.

4.26 Seven Sanitary Quarantine Posts were established or rehabilitated at land crossings and airports. Significant delays were experienced in some of the construction work due to long consultations among government institutions about requirements and specifications. The project provided 66,000 doses of seasonal influenza vaccines over the

period 2006 to 2009 for high risk groups and it provided a stockpile of antiviral drugs. The support provided proved of value during the H1N1 influenza outbreak. Three PCR laboratories were established with buildings renovated and equipment provided at the Center for Disease Control and Prevention, a regional San-Epid center in Sunyik marz, and at the Norq Hospital. As with the animal health objective, the simulation exercise was jointly implemented and was praised by participants as being key to their understanding of the coordinated actions needed.

4.27 A substantial training program in virus surveillance and control was provided for about 3,300 people. This was done in close cooperation with other agencies, particularly the United States' CDC. It covered protocols, standard forms, guidelines, surveillance, treatment, and epidemiology. The targeted trainees included infectious disease specialists, epidemiologists, general practitioners, pediatricians, family doctors, nurses, and laboratory staff. There was also training of trainers. There were a number of TA studies and assessments with TA specialists contributing to training.

OUTCOMES

4.28 **Awareness Raising.** In the absence of any follow up KAP survey to the original 2006 survey, no changes in knowledge, awareness and practice were measured.

4.29 **Surveillance and Control.** The generally effective response to H1N1, another strain of influenza but transmitted between humans, was quoted by government health officials as offering qualitative evidence of preparedness in the area of human health.¹⁹ One interviewee working on health noted that, prior to 2006, there had been virtually no capacity at all for communication across the animal and human health sectors. USAID played a role in initiating this, but the Bank-funded project helped to sustain it. The cooperation between agencies under the project and program was a precursor for a current joint program on brucellosis. The reported success of the simulation and the learning coming out of the 2008 workshop review of that simulation was considered by some interviewees to offer evidence that the response system for human health functioned. Some of the training under the program helped to support a sentinel surveillance approach that is now followed in sentinel locations. Weekly reports of acute respiratory and other disease symptoms are reported back and trends are monitored to spot anomalies.

4.30 While the project represented only a very small part of overall expenditure on health services in Armenia,²⁰ the intensive care and isolation facilities and equipment provided through the project and the overall program appeared to have enhanced capacity to respond to an HPAI outbreak. In the absence of an outbreak it was difficult to quantify

¹⁹As one example, in 2009 two infected people were identified by equipment at the Yerevan airport and treated at the infectious diseases hospital. Relatives and contacts were monitored until safe

²⁰ Although the human health component increased in size by approximately 50 percent, benefiting from additional funding and the reduced expenditure on critical imports, the approximately US\$4 million of actual expenditure over about 4 years was very small relative to the total size of the sector. It represented about 1 percent of the total annual state expenditure on health although as a percentage of communicable diseases expenditure it would be higher. As with the support for animal health, the project was to some extent a gap filling intervention.

the contribution but some of it was used during the H1N1 outbreak and the facilities have been used for other diseases. The majority of staff interviewed who worked in areas related to virus disease control had attended some form of training at the time although there was a demand for more particularly because the training had been some years ago. The health information and telecommunication system was strengthened with computers and equipment to enhance reporting and monitoring connectivity with the center and regional locations.

4.31 A number of government, international agency and Bank staff found the studies commissioned by the project of value, but it proved difficult to trace the impacts.²¹

4.32 **Rating.** On balance, achievement of this second, health-related objective was **substantial**.

Minimize the Threat from Other Livestock Diseases

4.33 The main question under this objective is the extent to which the restructured project minimized the threat posed by other livestock diseases and prepared for the control and response to other zoonoses affecting humans. These additional diseases were mainly African swine fever and brucellosis. However, the immediate main threat was from the first of these, which is not transferable to humans.

OUTPUTS

4.34 African swine fever provided an opportunity for testing surveillance and response systems for an important animal disease. (There were no results indicators established for measuring performance on diseases beyond HPAI). The findings of the PASV study (2009) suggested it was only marginally satisfactory. An international agency staff member characterized it as working reasonably well but with risks of farmers exploiting the payment process.²²

4.35 On awareness, however, there were weaknesses, not so much in the manner of communication but in the delayed decisions on terms of compensation to farmers. It took about two months before farmers (mostly in Tavush and Lori marzes) were clearly informed about the decision of government on compensation. This meant that there were no clear incentives in the critical early stages to report sick animals. Once the compensation rules had been decided the compensation committees and procedures came into play (PASV 2009).

²¹ International consultants completed a study entitled "Development of Armenian Public Health System - Needs Assessment Plan and Monitoring and Evaluation System for the Avian Influenza, HIV/AIDS and Other Public Health Threats". This proposed a number of changes in the public health system contributing ideas for the evolving program. It was considered useful. Supporting this study were more topic-specific studies including: (i) Proposal to Modernize the Public Health System of Armenia; (ii) Report on Legal and Regulatory Framework of the Armenian Healthcare System; (iii) Proposal for Establishing an Effective Public Health Laboratory Network in Armenia; (iv) Report on Strengthening the National Disease Surveillance System in Armenia; (v) Report on Elements for a Public Health Monitoring and Evaluation System; (vi) Curriculum for Training of Trainers on Avian Influenza Surveillance and Treatment.

²²For example, claiming for non-existent culled animals.

OUTCOMES

4.36 The main evidence on the outcome of this objective comes from the response to the African swine fever threat. The surveillance and diagnosis system in the African swine fever outbreak appears to have functioned largely as intended. The disease was spotted with surveillance and the assistance of local veterinary officers and it was reported up the chain of command according to the established protocols. Diagnostic tests were undertaken and the disease was confirmed. Culling was initiated. However, there were weaknesses in implementation. The PASV (2009) study found that approximately one third of households did not receive compensation for various reasons, in some cases this was due to errors by the household itself in carrying out their responsibilities or in completing the claim, in others it was due to failures in the administration. The compensation value was based on a rate that was one year out of date. Market prices at the time were estimated to be about 30 percent higher than the compensation paid. After the government had identified the disease, but before the decree on compensation, many farmers had hidden the incidence of sick or dead animals. This was a cause for nonpayment but would probably not have happened if there had been an established and publicized compensation system prior to the outbreak. Some weeks into the epidemic the decision was still awaited about who would be compensated and by how much. At the time of the survey, 70 percent of households with infected pigs confirmed receiving compensation. Approximately 60 percent of compensated households considered the compensation amount to be insufficient and about 35 percent of households considered the compensation procedure unfair. Problems identified included lack of coordination between regional and community commissions, arbitrariness, and poor execution of compensation mechanisms. The study suggests that, while the compensation system functioned to a modest degree there is still considerable room for improvement. The lessons learned are expected by the Ministry of Agriculture to be incorporated into the design of the proposed fund.

4.37 **Rating.** There were no results indicators for this new objective, and the project design was not updated to include additional activities that would be critical to minimize the threat to humans due to other livestock diseases. In the absence of the emergence of avian influenza, it was clearly useful for the response capacity in Armenia to be applied to some similar disease threats to maintain skills. Much was learned from the African swine fever outbreak. On balance, however, the achievement of the objective to minimize threats to humans from other livestock diseases is rated **modest**.

The Counterfactual in Assessing the Achievement of Objectives

4.38 The most likely scenario in the absence of the project (the counterfactual), is difficult to characterize because the project was aimed at minimizing a low probability threat with a wide range of plausible animal health and human health costs. At one extreme, even with the absence of the project, there would have been no avian influenza outbreak. This would have resulted in reduced costs of preparedness and reduced negative impact on poultry product demand. At the other extreme, the absence of the project and program might have led to an early avian influenza outbreak with very high economic and social costs to the economy of Armenia and, in the unlikely event that Armenia were to be the origin of a global avian influenza pandemic, resultant huge global

costs. The reality is likely to lie in some intermediate counterfactual in which, in the absence of the project, Armenia is less prepared and has to play catch-up on both the animal and human disease fronts either with only modest difficulty in the case of a modest outbreak or with substantial difficulty and with considerable animal and human costs and economic and social disruption in the case of a more aggressive outbreak. This review does not have the evidence to go beyond laying out this range of counterfactual possibilities since expert opinions have differed quite widely on the extent and severity of the threat.²³

Other Unintended Outcomes

4.39 There was an unintended cost, although arguably difficult to avoid, in the unnecessary slaughter of backyard poultry at the height of the scare, although these were mostly consumed. However, no evidence was found to indicate that the awareness materials had unnecessarily triggered this response although the lesson may be that in future threats materials should attempt, without down-playing the seriousness of the overall threat, to pre-empt such a precipitate backyard farmer response. Community vets are aware of this issue.

5. Efficiency

5.1 Assessing efficiency is difficult with no indicators to measure achieved preparedness, response, and control. A range of economic scenarios could be developed but would require many assumptions. As is shown in the range of rate of return scenarios in the Implementation Completion and Results Report (ICR), those with high levels of poultry losses and human morbidity and mortality give high economic rates of return. However, estimating the risk of occurrence of a disease in poultry that has not entered the country or that has not yet even evolved into a human to human transmissible form is speculative. The economic rates of return calculated in the ICR for 30 alternative scenarios range from 15 percent to 55 percent; the modal figure is about 30 percent. These estimates are reported here for information, but this assessment does not use them because the attribution linkage between the level of preparedness and these estimates is too difficult to establish.²⁴ Moreover, there are significant questions about whether the

²³ Exploring this a little further, IEG posed to some interviewees the hypothesis that Armenia may have reached a level of preparedness that could address a significant scale of outbreak of a poultry only risk or direct human infection from poultry risk, but that if there was a global pandemic of human to human transmission on a substantial scale, the enhanced level of preparedness would be overwhelmed, particularly on human health and public security. The most common view on this hypothesis was that there probably was a threshold beyond which the situation would be largely uncontrollable. However, it was also generally believed that the level of preparedness achieved to date, including particularly the laboratory facilities, the response plans, the agreed responsibilities and the already prepared awareness materials, still stood a good chance of at least reducing the severity of a catastrophic emergency. It was also noted that all countries, however prepared, would likely be overwhelmed by a historically unprecedented pandemic.

²⁴ The scenarios in the ICR are not inconsistent with WHO global scenarios applied to the country level. Some of the scenarios and coefficients applied appear generous on the benefit side, for example the base case with a severe outbreak every five years, with the first outbreak in 2011 (a year already now passed without an outbreak). However, there are also some assumptions that could be considered conservative in terms of the benefit stream, for example, a death rate for humans falling from 3 percent to 1.5 percent when there is certainly a possibility that mortality rates could be considerably higher in the "without project"

project established preparedness discussed above under the efficacy heading is being maintained now and can be expected to be maintained up to 2025. The ICR economic rate of return scenarios do not provide for any decline in preparedness over time yet there are significant doubts about budgetary resources²⁵ and skills.

5.2 It is important to point out that there is a significant potential global public good benefit from the operation that it is not a part of the benefit-cost analysis that applies to an investment by Armenia. Since the greatest risk that an infectious disease such as HPAI would cause substantial national costs lies in an epidemic originating outside the country, it follows that, for any one country, there is a potentially enormous global benefit from what would be a very low probability event of humanly transmissible HPAI arising within that country. Indeed, in this global aspect lay the main motivation of donors to collectively tackle the emerging HPAI threat on a coordinated global basis.

5.3 Outside such aggregate calculations of plausible net benefit streams, this report reviews specific evidence on cost-effectiveness and the efficient use of project resources.

5.4 There were several indications of enhanced efficiency. The broadening to other diseases, although mainly focused on one, seems likely to have enhanced efficiency by better utilizing investments such as surveillance and laboratory capacity, provided this capacity can be sustained. Renovated laboratories and equipment as well as vehicles were used for other types of diagnosis beyond avian influenza. The speed of laboratory analysis now that samples do not have to be sent outside the country allows more rapid control responses, thus preventing spread and reducing further the response costs. The coordination between the two ministries and the donors was strong, improving the efficiency of implementation. The project was partly gap filling. Judicious gap filling, if it is not too organizationally costly, is efficient because with modest incremental investment it completes existing investments that otherwise would be less productive. In several cases, for example, the Bank renovated laboratories and other donors provided equipment.

5.5 However, there were also some significant shortcomings. In the absence of a compensation fund, farmers, particularly smallholder farmers, are less likely to risk reporting diseased animals, thus negating some of the surveillance investment or requiring increased publicly funded surveillance and control and thus significantly higher response costs, decreasing cost effectiveness. The response to the African swine fever outbreak to which the project support was applied, exhibited significant inefficiencies in the functioning of compensation. For example, there was hiding of infected animals, failure to compensate, and there were significant biosecurity issues with carcass disposal, all these weaknesses potentially contributing to disease spread and reducing cost effectiveness. The Central Veterinary Laboratory costs were significantly higher than expected due to unanticipated structural challenges in fitting improved modern laboratories into an old building, possibly not as cost-effective as a laboratory built new,

situation.²⁴ Also conservative is the valuation of human mortality covering income loss but no notional losses for the suffering and social disruption.

²⁵ For example, the lack of budget even to do further pandemic response simulations, arguably the most valuable activity during the project period. Laboratories are short of reagents. Training has slowed.

although relative cost-effectiveness would depend on the alternative use of the existing structure.²⁶

5.6 Other factors also possibly reduced cost-effectiveness, but the effects are uncertain. The mission attempted to look at numbers of laboratory tests completed by time period as an indicator of efficiency. This proved to be unworkable, first, because the number of tests is partly a function of the disease threat, which fluctuates enormously over time from exogenous influences, and second, because, even for regional laboratories that handle only the more routine tests, such as for brucellosis, there are seasonal peaks and troughs in activity. Discussions in the field suggest that there remain significant operational constraints for marz-level laboratories due to limited budgets.

5.7 One cost potentially to be factored into an efficiency analysis is the costs to the poultry industry in terms of lost poultry market from the scare about avian influenza. This could be seen as partly attributable to the awareness raising.²⁷ This is difficult to quantify. Reduced purchase of poultry by households may be almost inevitable when disease awareness is raised by either national or international media, notwithstanding advice that eating adequately cooked poultry is not a threat to humans. However, it is a cost that arguably may be partly attributable to the project or program and thus relevant to cost effectiveness. In a similar vein is the issue of the quite high cost for Armenia and for farmers of the lost nutrition and/or market due to backyard farmers slaughtering unnecessarily. This cost could have been as high as \$20 million depending on assumptions.²⁸

5.8 On balance, efficiency is assessed as **modest** mainly on the grounds of the inefficiency of surveillance due to the absence of a compensation fund, the weaknesses in the African swine fever compensation response, the cost overruns and delays in the construction of the Central Laboratory, the carcass disposal issues with implications for both recent and longer-term cost effectiveness, lack of budgetary resources for continued readiness including for reagents and training, and the one year extension.

6. Ratings

Outcome

6.1 The project as approved had two objectives – first, to minimize the threat posed to humans by HPAI infection and other zoonoses in domestic poultry and second, to prepare for the control and response to an influenza pandemic and other infectious disease emergencies in humans. The restructured project had both of these objectives plus a third

²⁶ The Ministry of Agriculture (Annex D) noted that a new laboratory would have been more costly. While this is certainly possible it would have depended on the alternative use of that space.

²⁷ This figure is based on 7 million poultry. Most appear to have been consumed, but they were merely consumed somewhat earlier than the originally planned slaughter and thus at sub-optimal maturity or laying cycle. The lowered market demand would also impact the price applied. A full analysis would need to factor in the gains to, say, the pork or beef industry from a consumer shift via elasticity of demand shifts

²⁸ This is a difficult calculation..

one, namely to minimize the threat posed by other livestock diseases. Relevance of both original and revised objectives is rated substantial. While combating avian influenza had not been part of the World Bank or the government strategy prior to the threat, clearly the threat was real and remains real to this day. The relevance was quite quickly appreciated by the government once the parameters of the threat were laid out by technical agencies and donors. However, relevance of original and revised design is rated modest mainly due to the awkward mixing of short and long term objectives within the same short term emergency lending instrument.

6.2 On balance, the achievement of objectives is rated substantial for the animal and human health elements of the original objective and modest for the additional objective added at restructuring to reduce the threat of other livestock diseases. Overall, Armenia made significant progress from a low capacity base in a relatively short time in advancing preparedness for HPAI and, subsequently, for an initially narrow range of other diseases. However, the weaknesses in the achievement of objectives included: the failure to establish the planned compensation fund, notwithstanding preparation for it; demonstrated weaknesses with the African swine fever compensation; the failure to complete the planned communications strategy;²⁹ and carcass disposal issues.

6.3 Efficiency is difficult to assess given the lack of cost effectiveness comparators but is rated modest on balance due mainly to the concerns about the efficiency of the African swine fever response, including carcass disposal issues, the absence of a compensation fund, reducing the efficiency of surveillance, the higher costs of the Central Laboratory, and concerns about budgetary resources and skills maintenance as the threat has subsided.

6.4 Pulling together the results for relevance, efficacy, and efficiency, the outcome rating for the project under both the original and revised objectives is **moderately satisfactory**.³⁰

Risk to Development Outcome

6.5 The main risks lie in: the commitment, financial, and economic areas; the technical area; institutional risk; and, to a lesser extent, in the social area.

6.6 On *commitment, financial and economic risk*, there has been a loss of priority to avian influenza as the threat receded. To some extent this is inevitable as new priorities emerge in a dynamic disease environment, indeed, the broadening supported this shift. However, there is a significant risk that the preparedness achieved for avian influenza is

²⁹ The Ministry of Agriculture (Annex D) note that an informational strategy was prepared “within the frames of the Project and provided to the veterinary inspection”. However, the ICR also notes the lack of an overall communications strategy the intent of which, rightly, appears to have been broader, reaching well beyond veterinary inspection, for example bringing in such potential response interventions as social distancing.

³⁰ According to the IEG/OPCS harmonized evaluation criteria, when the objectives are formally revised, the project is assessed against the original objectives and against the revised objectives; the resulting two ratings are weighted by the share of the credit disbursed before and after restructuring. However, in this case, weighting the ratings is not needed since the ratings before and after the restructuring are the same.

being eroded. Budgets are tight,³¹ skills that were being enhanced through training are not being supported as intensively, no further simulation has been done, laboratories visited are short of resources,³² PCR labs do not have avian influenza kits, there is no compensation fund yet although it is anticipated for 2014, and there is no communications strategy.

6.7 However, the Bank is supporting an ongoing Health System Modernization Project (2007-14) which further strengthens human health institutions and response systems. Managers in the sector expect this to provide further support, some of which would be available if needed to help in dealing with a pandemic situation such as HPAI. On the animal health side, the broadening to other diseases is likely to have somewhat reduced risk by enabling complementarity in resource use across multiple diseases that do not all occur at the same time, in others words are not covariant. Also, there is an intent to sign the European Union Comprehensive Free Trade Agreement. There appears to be a significant incentive for Armenia to do this and on-going donor support would assist. Signing this would ensure alignment of both legislation and enforcement with the EU veterinary regulatory environment and, once achieved, would be something that Armenia would not want to lose. However, there is still a question about the availability of resources to meet these higher standards.

6.8 On *technical risk* to prevention and preparedness, six problematic areas noted by studies or in the opinions of knowledgeable interviewees are: (i) the close proximity of poultry housing sheds on commercial poultry farms, largely due to the inheritance of building layouts; (ii) waste heaps or improperly treated waste outside commercial poultry units; (iii) the migrating wild bird risk, but particularly the proximity of water bodies to commercial poultry units, for example, in the Mount Ararat plains; (iv) the fact that employees at commercial poultry units also often have their own backyard poultry;³³ (v) the risk of backyard poultry keepers either failing to slaughter when required to (less likely if their actual preparedness to slaughter during the last scare is any indication), or retaining the carcasses for consumption (more likely, as nearly all did).

³¹ Resource sustainability may be aided by increasing funding coming in for biosecurity work from the US Defense Threat Reduction Agency. While the amounts are not public, this may help to sustain up-to-date laboratory equipment and the funding to operate it.

³²For example, the laboratory at Goris faces shortages of reagents and uses most of the budget on vaccination for seven livestock diseases. Due to the shortage of reagents this lab can only do one test (brucellosis) rather than the three within its capability. The seven livestock diseases vaccinated against compares with twenty five during Soviet era times, suggesting a higher risk of disease which, in turn risks a higher cost reactive rather than preventative treatment. This in an environment of increasing livestock numbers. Vehicles for surveillance are in short supply. As a result of declining budgets and low fees, the Goris office has lost three community veterinary officers recently. (For community vets the fee scale for vaccinations, a main source of income, is based on the ratio of 1 head of cattle to 6 head of sheep/goats to 50 poultry. This relates more to the nutritional demands of the animal or value than to the time taken to vaccinate. It is clearly not possible to vaccinate 50 poultry that have to be caught and held in the same time as vaccinating a single cow standing in a stall. Payment, if it is to be controlled, should be more closely related to actual time taken.) At the Central Veterinary Laboratory, at the time of the mission, there were no kits for analysis of avian influenza for use with their PCR equipment.

³³ However, many commercial units disallow or discourage this, or offer free vaccination and disinfectant supplies to employees who do keep poultry.

6.9 On *institutional risk*, similarly to the commitment and financial risk, there is risk of dissipation of skills, knowledge and capacity. As noted, there has not been a simulation exercise since the original one in 2007. The mission was told that there was insufficient budget to do simulations since that time.³⁴ Since all such work is part of any surveillance response to a threat, it is unclear why extra budget should be required. Even desktop simulations have not been continued. Some laboratory staff held the view that levels of training were insufficient and that this was particularly important in a situation where there had not been opportunity to practice skills on the particular disease for some time. (Swiss Aid is currently supporting emergency health training in three marzes, but this is not related to avian influenza although some of the skills may be partly transferable.)

6.10 On *social risk*, there was some social impact among backyard farmers from the premature slaughter of poultry at the height of the scare, although most birds seem to have been consumed. With a real disease incursion, this would be a health risk. This could happen again in the absence of carefully crafted awareness messages, for which, as noted, a strategy available on the shelf would be valuable.

6.11 Overall, the risk to development outcome is rated as **significant**.

Bank Performance

QUALITY AT ENTRY

6.12 Due to the emergency at the time there was a need for rapid project design and appraisal. The standard GPAI model was applied with some adjustment for country circumstance. In the case of Armenia, the adjustments were not in the objectives or the three main components, they were at a lower level -- for example, the process and regulation of carcass disposal, the data system, the unique hospital and veterinary services needs (drawn from Armenia needs assessments), and the particular audiences for different awareness messages. It was almost inevitable that the haste to achieve preparedness would leave some elements not ready. As the ICR (p. 13) notes, several subcomponents envisaged in the PAD could not be implemented because they were inadequately prepared and appraised and were unrealistic or in violation of existing laws and regulations. The proposal to restructure the poultry sector to essentially halt free-running backyard poultry was surprising given the enormous disruption that would have been required, the impact on the poor, and the impracticality of enforcement. It is difficult to put such a decision down purely to haste. The environmental regulatory problems with the disposal pit (Bekari pit) construction and incinerators were arguably a result of inadequate preparation time.

6.13 One of the most important weaknesses in quality at entry was in the design of M&E. The main weakness was the lack of intermediate outcome indicators of preparedness.

³⁴ The Ministry of Agriculture (Annex D) note that the project supported simulations. However, IEG's point here is the lack of simulations *since* the project closed, a point noted during the mission by several observers and government staff.

6.14 The 2008 Quality Assurance Group review rated quality at entry moderately satisfactory.³⁵ Among the weaknesses identified, some of which seem rather demanding for an emergency project, with the benefit of hindsight IEG finds M&E and the sustainability and other risks of tackling longer-term issues in an emergency project as being the most important.

6.15 Based on a review of the PAD and respondent discussions, there is some question about whether, in design or supervision, there was a sufficiently clear view within the Bank about what the proposed "communication strategy" would actually contain or be intended to achieve, but TA studies on this topic offered promising directions.

6.16 While acknowledging the challenge of ensuring quality at entry in an emergency preparation and appraisal exercise, there were a number of quite serious weaknesses. On balance, this assessment rates quality at entry **moderately unsatisfactory**.

QUALITY OF SUPERVISION

6.17 It took three months from approval to effectiveness, a long lag for responding to an emergency. There were a number of significant issues with supervision. First, the hasty design should have called for a particularly strong effort in further developing the Results Framework and M&E mechanisms during the early phases of implementation. Second, there were considerable delays in the issuing of post-supervision mission Aides Memoire resulting in delays in follow-up. It took 10 months from the initiation of the restructuring proposal at the midterm review to amend and complete the Financing Agreement. Third, there was frequent change in task managers, passing from person A to person B to person C and then back to person A over the course of four Implementation Status and Results Reports (ISR) from ISR #3 to #6. Fourth, despite the shift in focus towards other livestock diseases including African swine fever, following the formal revision of objectives there was no change at all in the monitoring indicators. Also, there was no development of the required environmental monitoring indicators. Fifth, the fact that reporting was generally satisfactory for human health activities but not for the animal health activities suggests that the PIU for animal health may not have been sufficiently pushed by the supervision teams to prepare and deliver these reports. Sixth, there was a lack of realism in rating at some points in implementation with a fully satisfactory rating throughout on both Development Objectives and Implementation Progress dropping to the Moderately Satisfactory rating of outcome in the ICR.

6.18 Seventh, and perhaps the most serious lapse, between the fourth and fifth ISR there was a lag of 14 months, huge for a project originally planned for three years. This was a critical period in implementation needed to accelerate implementation of the then slow communications component and to achieve rapid response on the request for support for African swine fever. Indeed, management was so aware of this critical juncture that the manager's comments in the ISR called for a quick follow-up ISR prior to the end of the financial year, at that point only three months ahead. Yet, even after this request, a 14-month lag was allowed. The project team notes that, while this delay in the

³⁵The ICR (p. 13) incorrectly reports the QAE rating (of 2007) as moderately unsatisfactory. This was the original draft rating before the final version was completed in 2008.

formal ISR did indeed take place, there was frequent follow-up informally from the country office. There is evidence of this in the files. Nevertheless, formal supervision reports are important for management decisions. Eighth, the revised objectives were a significant redirection towards other livestock diseases yet the Results Framework was never amended. Moreover, the project development objective as stated in the ISR was never amended.

6.19 The mid-term review was generally thorough with a comprehensive aide memoire. It noted a number of positive aspects including the surveillance, the coordination, and a number of other elements of the animal and human response preparedness. It addressed the proposed broadening to other diseases, especially African swine fever and brucellosis, and the reallocation of funding that this would entail. It raised concerns about the public awareness component and the institutional setup of the Secretariat of the Inter-ministerial Committee on Avian Influenza, raising the possibility that it might recommend termination of support for the Secretariat unless substantial progress was made by the next supervision mission. This did improve. The mid-term review raised concerns about the need for the PIUs to follow up Bank missions' recommendations more proactively.

6.20 The supervision team, consistent with a shift in thinking within the Bank as the global situation unfolded, was able to see the project as a stepping stone towards something broader than simply emergency HPAI preparedness. The IEG mission also found evidence of generally successful collaboration with other donors, often not easy to achieve in practice even when there is an expressed intent to do so by all parties. Also, supervision was able to support generally satisfactory financial management, procurement and the disease related technical issues, the latter with the help of coordination with other agencies such as FAO, WHO, and OIE. The Bank supervision team was widely praised by borrower staff as being flexible and responsive and providing important technical input.

6.21 Overall quality of supervision is rated **moderately unsatisfactory**.

6.22 Overall Bank performance is rated **moderately unsatisfactory**.

Borrower Performance

GOVERNMENT PERFORMANCE

6.23 Once it was convinced of the importance of the HPAI threat, mainly through input from USAID, FAO, WHO, OIE, CDC, and, to some extent, the Bank, the government was closely involved in project preparation and remained committed to the project and its objectives through implementation. The borrower contribution was sustained and was 13 percent higher than the appraisal estimate. Sustained commitment was demonstrated when the government provided compensation funding for the pigs killed in the African swine fever outbreak although, as discussed earlier, this response was not without weaknesses. While the commitment to a high state of readiness for Avian Influenza appears to have declined, understandably due to the receding of the threat, the commitment to broadening the preparedness for other zoonoses, and thus for a broader,

arguably more robust preparedness, has grown. Nevertheless, there are concerns about the extent to which budgetary resources will continue to be provided to ensure sustainability of preparedness, whether it is for HPAI or the broader disease response.

6.24 According to a number of international observers, at the time of the threat, the government was able to bring together a number of ministries that had not previously spoken to each other. The Inter-ministerial Task Force, which at the peak of the threat was reportedly meeting every morning, was the main mechanism for this coordination. Most borrower staff involved said that it was an important experience for them to have contact with counterparts in other agencies for the first time.

6.25 Inability to implement the proposed compensation fund was a significant shortcoming, although, as noted, a comprehensive fund including some cost recovery is still planned. The substitution of a budget-funded African swine fever response in the absence of an established compensation fund was only partly effective.

6.26 Overall, government performance is rated **moderately satisfactory**.

IMPLEMENTING AGENCY PERFORMANCE

6.27 There were two implementing agencies, the Ministry of Agriculture and the Ministry of Health, with a proposed overarching Inter-ministerial Committee to coordinate the various players. Within each ministry there was a PIU, both of which had existed before the project and had been handling earlier Bank interventions.

6.28 According to most observers, both ministries worked well together. This newly developed cooperation has continued, for example with the current brucellosis response. Their respective PIUs performed generally satisfactorily. Based on audit reports, both handled their respective fiduciary aspects satisfactorily although audits offered some recommendations. Procurement was satisfactory following similar Bank and government procedures. A weakness in the Ministry of Agriculture was the failure to employ an M&E specialist, which contributed partly to the M&E weakness and poor progress reporting. Within the Veterinary State Inspection service of the Ministry of Agriculture, slow decision-making resulted in some delays. Neither the Ministry of Agriculture nor the State Veterinary Inspectorate was able to fully resolve the animal carcass disposal problem that emerged during implementation. This became more of an issue with the later African swine fever outbreak when substantial carcass disposal was needed.

6.29 The proposed umbrella Inter-ministerial Committee did not function throughout the project due to the lack of an HPAI outbreak. Since the objective of the project was to ensure preparedness and not simply to respond if and when an outbreak materialized, this raises questions about the interpretation of the role of that committee. However, the Inter-ministerial Task Force, operating at a decision-making level below the proposed committee, was generally considered to have done a good job on responding to emerging issues on an almost daily basis and on coordination between ministries and with donors. It was headed by a Deputy Minister of Agriculture and had representatives from key ministries and agencies including health, agriculture, nature protection, emergencies, and police. The Inter-ministerial Committee itself had a Secretariat but the only task it

handled was the management of the awareness and information subcomponent, which was slow to take off partly due to preparatory studies and issues of overlap with other programs.

6.30 Overall implementing agency performance is rated **moderately satisfactory**.

Monitoring and Evaluation Quality

6.31 The weaknesses in M&E design and implementation have been discussed earlier. Although this PPAR is not assessing the GPAI, it could be argued that the weak M&E in both design and implementation was partly attributable to insufficient attention and support for M&E from that program. Some of the design of indicators seems to have come from that source. A global program across many countries is the ideal opportunity for thorough design and follow-up in a specialized area such as M&E.

6.32 Given the weakness in design and implementation there was not much possibility for utilization. The main weakness was that there were no intermediate outcome indicators from the outset that measured preparedness or response capacity. What was missing was indicators that could measure preparedness at a level beyond mere outputs -- for example, measures of speed, accuracy and frequency of surveillance by animal and disease type, measures of laboratory analysis response times and accuracy from reference labs, measures of awareness and knowledge changes by different types of farmer, measures of skill changes of different levels of responders, and measures of changes in coordination practices. There was a need to think through what the outcomes would be in the case of the prevention of an epidemic and, in the absence of an epidemic, what the outcomes would be in terms of changes in preparedness.

6.33 Overall, the quality of M&E is rated **negligible**

7. Lessons

7.1 There are three lessons:

- **A three-year emergency project is appropriate for quickly building some surveillance, diagnosis, and response capacity to rapidly tackle an immediate threat but is unsuited to a deepening and broadening of institutional capacity for more systemic reforms.** An alternative would have been to launch a quick emergency project followed by an overlapping longer term institutional reform and capacity building project with the broader animal disease focus designed in a more measured way.
- **In projects aimed at preventing or preparing for a potential disease threat with an uncertain probability and magnitude of impact, the results frameworks need to anticipate how “success” will be measured -- both in the event that the anticipated threat materializes and in the event that it does not.** Indicators would need to measure changes in preparedness in terms of changes in the efficacy and the efficiency of surveillance, diagnosis, and control response to understand attribution of the results to the project’s interventions.

- **Failure to effectively manage communications can lead to unproductive panic, insufficient public knowledge, and erosion of faith in public authorities.** In the case of this project, while the early crisis awareness materials themselves were generally well conceived, there were some unexpected responses and some lessons. Carefully designed, timed and targeted public communication following established protocols and communication principles, drawing on professional communications skills, is likely to facilitate emergency response when there is little time to plan. There is an established science of communications that can be locally adapted and tested to ensure communications readiness and to develop national and sectoral strategies. In this case, the opportunity for a comprehensive communications strategy and capacity development for the future was not seized.

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Annex A. Basic Data Sheet³⁶

ARMENIA: AVIAN INFLUENZA PREPAREDNESS RESPONSE PROJECT PROJECT P099832 (LOAN IDA-41780, TF-56629, TF-58076)

Key Project Data (amounts in US\$ million)

	<i>Appraisal estimate</i>	<i>Actual or current estimate</i>	<i>Actual as % of appraisal estimate</i>
Total project costs	9.45	10.50	111.11
Loan amount	6.25	5.44	87.04
Cofinancing	0.80	0.69	86.25
Cancellation	—	—	—

Cumulative Estimated and Actual Disbursements

	<i>FY07</i>	<i>FY08</i>	<i>FY09</i>	<i>FY10</i>	<i>FY11</i>
Appraisal estimate (US\$M)	2.27	5.39	6.25	6.25	6.25
Actual (US\$M)	1.77	3.30	4.04	5.17	5.44
Actual as % of appraisal	77.97	61.22	64.64	82.72	87.04
Date of Final disbursement: December 2010					

Project Dates

	<i>Original</i>	<i>Actual</i>
Concept Note	02/15/2006	03/09/2006
Negotiations	03/01/2006	03/09/2006
Board approval	05/26/2006	06/02/2006
Signing	06/04/2006	06/07/2006
Effectiveness	06/15/2006	09/05/2006
Closing date	07/31/2009	07/31/2010

³⁶ Taken from the ICR. Note that there were some end-of-project cancellations of unused funds not recorded here that are discussed in the Implementation section (IDA US\$1.45 million; TF-56629 US\$110,239; TF-58076 US\$39,537).

Staff Inputs (staff weeks)

	<i>Staff Weeks</i>	<i>USD Thousands (including travel and consultant costs)</i>
Lending		
FY06	23.43	83.42
FY07	0.01	0.07
Total:	23.44	83.49
Supervision/ICR		
FY06	1.35	0.75
FY07	32.86	84.80
FY08	30.11	103.77
FY09	27.36	102.75
FY10	24.38	94.05
FY11	5.32	25.42
Total:	168.26	578.52

Task Team Members

<i>Names</i>	<i>Title</i>	<i>Unit</i>	<i>Responsibility/ Specialty</i>
Lending			
Mark R. Lundell	Lead Agricultural Economist	ECSSD	TTL
Frauke Jungbluth	Senior Agricultural Economist	ECSSD	TTL
Arusyak Alaverdyan	Operations Officer	ECSSD	Operations
Robert Bambauer	Animal Health Specialist	Cons.	Animal health
Enis Baris	Senior Health Specialist	MNSHH	Human health
Mario Bravo	Senior Communications Officer	EXTOC	Communications
Amy Evans	Safeguards Specialist	ECSSD	Safeguards
Artavazd Hakobyan	Operations Analyst	ECSSD	Operations
Susanna Hayrapetyan	Senior Health Specialist	ECSH1	Human health
ArmanVatyan	Senior Fin. Management Spec.	ECSO3	Financial management
Yingwei Wu	Senior Procurement Specialist	ECS ECA	Procurement
Supervision/ICR			
FraukeJungbluth	Senior Agricultural Economist	ECSSD	TTL
Brian G. Bedard	Senior Livestock Specialist	ECSSD	TTL, animal health
Mario Bravo	Senior Communications Officer	EXTOC	Communications
Amy Evans	Safeguards Specialist	ECSSD	Safeguards
Artavazd Hakobyan	Operations Officer	ECSSD	Operations
Susanna Hayrapetyan	Senior Health Specialist	ECSH1	Human health
ArmanVatyan	Senior Fin. Management Spec.	ECSO3	Financial management
Yingwei Wu	Senior Procurement Specialist	ECS ECA	Procurement
Gotz Schreiber	Economist	Cons.	Compensation Fund

Annex B. Additional Documentation

Influenza and Avian Influenza³⁷

Influenza viruses: Influenza in humans can be caused by type A, B or C viruses, with the former two causing most human infections. Influenza A viruses naturally infect humans, as well as such animals as birds, pigs, and horses. They generally cause yearly epidemics and, potentially, pandemics. Infections with influenza B virus are generally restricted to humans and cause epidemics more rarely.

Avian influenza in birds: Avian influenza is caused by A-type viruses that occur naturally among wild birds that usually do not exhibit symptoms. It is very contagious among birds. Infected birds shed the virus in their saliva, nasal secretions, and feces. Domestic birds such as chickens, ducks and turkeys can become infected through contact with infected wild birds, from other infected domestic birds, or through contact with dirt in cages, water, or feed that has been contaminated. Infection in domestic birds can result in either a low pathogenic form of the disease, which may go undetected because of mild, not very obvious symptoms (such as ruffled feathers or a drop in egg production) or a highly pathogenic form (where multiple organs are affected) that spreads rapidly. Mortality rates can reach 90 - 100 percent within 48 hours. An example of the latter is infection with the H5N1 virus. The subtypes differ based on differences in two main proteins on the surface of the virus (hemagglutinin [HA] and neuraminidase [NA]). There are 16 known HA subtypes and 9 known NA subtypes of influenza A viruses. Many different combinations of HA and NA proteins are possible. Each combination represents a different subtype.

Human infections with avian influenza viruses: H5N1 does not normally infect humans, but can infect humans who come in contact with infected poultry or contaminated surfaces. Symptoms of avian influenza in humans range from usual human influenza-like symptoms (such as fever, cough, sore throat, and muscle aches) to eye infections, pneumonia, severe respiratory diseases (such as acute respiratory distress), and other life-threatening complications. The symptoms and severity vary depending on the virus type. The highly pathogenic H5N1 virus that has recently been circulating in poultry does not as yet readily circulate in humans. However, where human infections have occurred in contact with infected poultry the virus has been deadly. As of March 16, 2011, the laboratory-confirmed human toll stood at 534 cases, including 316 fatalities, representing a case fatality ratio of 60 percent. However, this is likely to be an overstatement of the true fatality percentage since many less symptomatic cases are likely to be not reported.

Pandemic in humans with the avian influenza virus: Annual or seasonal influenza epidemics are caused by the previous seasons' viruses or by ones with slight antigenic changes. By contrast a pandemic is caused by an A virus that contains hemagglutinin (HA) for which there is no preexisting immunity, facilitating the virus's rapid spread throughout the world. Through re-assortment or mutation the virus could acquire the ability to replicate in humans and spread easily from person to person. Mutation occurs when a virus changes its

³⁷ Source for this information: USCDC 2010, McKibbin and Stoeckel 2006, United Nations and the World Bank 2010, World Health Organization 2005, Lazzari and Stohr 2004, Whitney and Monto 2006, Monto and others 2006, Petric and others 2006.

genetic makeup. This may allow it to transmit from person to person. This may also occur with re-assortment which occurs when two different viruses exchange genetic material. Re-assortment can occur if animals that are susceptible to both human and avian flu, such as pigs, become concurrently infected with both kinds of flu. The 2009 H1N1 pandemic was caused by a virus that emerged from pigs. H3N2, H1N1, and H2N2 are examples of avian influenza virus types that have, in the past, circulated among humans. Studies confirm that the 1918-19 Spanish flu likely originated from the re-assortment of avian and human viruses. Since the 1918 pandemic, the population of the world has grown 3-fold; therefore, if a new influenza A virus as lethal as the 1918 virus emerged, as many as 180–360 million people could die. The 1957 H2N2 and 1968 H3N2 pandemics also involved new influenza viruses generated by re-assortment events. Although they were less virulent than the 1918 H1N1 virus, they still caused significant morbidity and mortality. Both of these viruses resulted from re-assortment of a Eurasian wild waterfowl virus with a previously circulating human H1N1 virus.

Table B-3. The three pandemics of the last century

Pandemic date & common name	Area of Emergence	Influenza Type A Virus Subtype	Viral change	Estimated case fatality rate	Estimated attributable excess mortality worldwide	Age groups most affected
1918-19 "Spanish Flu"	Unclear	H1N1	Mutation from avian virus, in HA gene	2-3%	20-50 million	Young adults
1957-58 "Asian Flu"	Southern China	H2N2	Reassortment of 3 segments from avian virus (HA, NA, and polymerase protein) in combination with 5 genetic segments of the H1N1 virus	<0.2%	1-4 million	Children
1968-69 "Hong Kong Flu"	Southern China	H3N2	Reassortment of 2 segments from H2N2 virus replaced by H3 and polymerase protein	<0.2%	1-4 million	All age groups

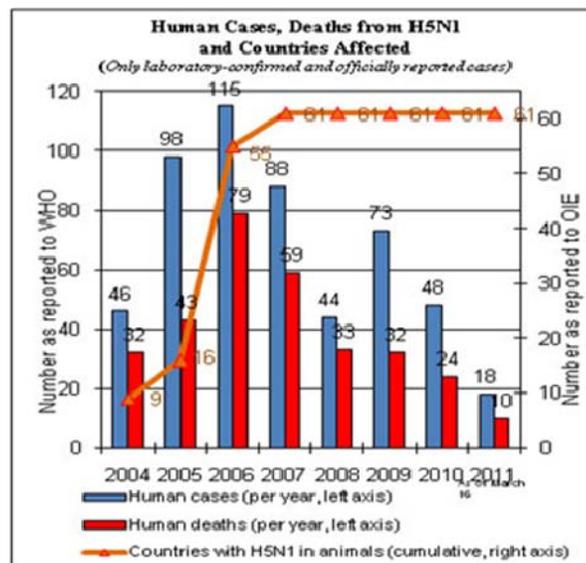
Source: USCDC 2010, McKibbin and Stoeckel 2006, United Nations and the World Bank 2010, World Health Organization 2005, Lazzari and Stohr 2004, Whitney and Monto 2006, Monty and others 2006, Petric and others 2006.

For a pandemic to occur from an avian influenza virus, three conditions would need to be met: (i) a new subtype would have to emerge for which there is little human immunity; (ii) it would have to infect humans and cause illness; and (iii) it would have to spread easily and sustainably among humans. To date the third condition has not been met because the virus has not improved its transmissibility among humans. The concern is that, with some re-assortment of genes (through co-infection with two viruses) or adaptive mutation (that could increase the capability of the virus to bind to human cells), this could occur. Resistance in

current virus strains to one of the two classes of available antiviral drugs as demonstrated in vitro has added to anxiety about controlling a pandemic if it does occur.

Between 2003 and 2008, 47 countries reported the highly pathogenic H5N1 form of avian influenza in their domestic poultry. H5N1 was first seen in a farmed goose in China in 1996. The first outbreak was recorded in Korea in December 2003 (World Bank 2008). By 2004 the virus had spread to several East Asian countries and by 2006 had reached several Asian, European and Middle Eastern and African countries. Unchecked trade and movement of infected poultry was one of the main triggers behind the spread of the lethal virus (FAO 2006). In the first three months of 2011, Bangladesh, Cambodia, Hong Kong, India, Japan, Korea, Myanmar, and Vietnam reported outbreaks. To date the virus has affected 61 countries (Figure B-1).

Figure B-1. Human Cases of the Disease Around the World



Source: <http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:20649058~menuPK:34480~pagePK:64257043~piPK:437376~theSitePK:4607,00.html>

<i>Indicator</i>	<i>Completion</i>	<i>Comment</i>
1. Assessment completed of Veterinary State Inspection service	Completed	
2. National Avian Influenza plan developed and adopted	Completed	
3. BSL 2+ standard attained in one lab	Completed	But agreed by IDA only needed to BSL 2
4. Self-assessment of veterinary services executed	Completed	
5. 100% monitoring of poultry breeding farms	Only 40%	
6. Emergency supplies procured and available in field	Supplies for 120 staff in 40 teams procured and deployed	
7. One mobile incineration unit and 16 bio thermal disposal holes completed	Not achieved	Due to unforeseen environmental issues. However, burning in farm pits still effective in many cases if inspected.
8. Unconfined backyard poultry farming addressed in 200 farms	Not achieved	
9. Compensation fund established	Not established	Now planned for 2014. Substantial preparatory activities were undertaken.
10. National strategic plans for public health prepared, approved and resourced	Completed	Questions about sustainability of resources over time
11. Increased surveillance capacity	100% marzes with capacity	However, capacity hard to measure and never tested with HPAI outbreak
12. At least two public health laboratories for influenza diagnosis rehabilitated	One lab capable of avian influenza diagnosis; one lab capable of PCR diagnosis of HPAI	
13. Number of health personnel trained in surveillance and control	2,300	No target set at appraisal
14. Increased health laboratory specimen capacity	Not formally recorded by labs and, in any case, no HPAI outbreak	However, in interviews, some mostly qualitative evidence of increased capacity.
15. Percentage of positive tests confirmed by reference laboratory	No outbreak to test	
16. Strategy for procurement of and access to human influenza vaccine	No formal written strategy but procurement of 66,000 doses and decisions made about who eligible	
17. Strategy for access to and use of antivirals	No formal strategy but pre-project stock level maintained (420 doses)	
18. Contingency plan for procurement of avian influenza vaccine if available	No new vaccine became available	
19. Cumulative incidence rate, HPAI	Not applicable, as HPAI did not occur in Armenia.	
20. % change in fatality rate, HPAI	Not applicable, as HPAI did not occur in Armenia	

Table B-2. Project Performance Against Indicators		
<i>Indicator</i>	<i>Completion</i>	<i>Comment</i>
21. Political and civic leadership organized around National Strategic Risk Communication Plan (NSRCP)	Partial. Action plan completed but not NSRCP	National Action Plan not revised to include National Strategic Risk Communication Plan
22. Research-based communication strategies and products developed	NSRCP not completed but significant communications implemented under parallel USAID project	
23. Awareness raising and behavior change interventions for population at risk using appropriate communications channels	Awareness raising completed, judged by IEG mission to be quite good quality	But this was done largely by USAID/UNICEF. A baseline but no follow-up Knowledge Attitude and Practice survey carried out to enable assessment of progress.
24/25. Communication strategies and products generating trust and credibility, and evidence of consistent communication and information technologies promoting reporting of outbreaks	Not known from any survey. Qualitatively, generally quite good general knowledge and trust found in IEG farmer interviews but recall issues since main communications program was at least six years ago	No NSRCP or KAP survey. There was some adverse fallout due to backyard farmers prematurely slaughtering birds. However, this was not recommended and no obvious fault in communications was seen to cause this.
26. Production and dissemination of informational products	Completed, observed by IEG to be of good quality	But much of this done by USAID and UNICEF
27. Methodology defined and M&E undertaken periodically	Methodology not clearly defined, no capacity established, no surveys undertaken, little reporting beyond routine and financial.	
<i>Source:</i> World Bank 2010b; IEG mission interviews.		
<i>Note:</i> Indicators were not changed at restructuring.		

Annex C. List of Persons Met

Ministry of Agriculture

Mr. Aghajanyan, Advisor, former Project Secretariat
Mr. Grigory Baghyan, Deputy Minister of Agriculture
Mr. Abraham Bakhchagulvan, Head, State Food Safety
Mr. Hovik Hakobyan, Head Vet Lab during implementation
Mr. Ashot Harutynian, Community Veterinarian, Goris
Mr. Gagik Khachatryan, PIU Director
Mr. Vardan Khastiyani
Mr. Armen Poghosyan, Deputy Minister of Agriculture
Ms. Sona Tarukyan, PIU staff in charge of avian influenza
Edgar Tokhsants, Head, Veterinary Sanitary and Phytosanitary Services Center, Goris, Sunyikmarz

Ministry of Health

Dr. Arminae, Republican Infectious Diseases Hospital
Mr. Ara Asoyan, Head, Republican Infectious Diseases Hospital, Yerevan
Dr. Nune Bakunts, Deputy, Sanitary and Hygiene Service, Old Nork
Dr. Ashot Danielyan, Central Veterinary Laboratory
Dr. Zara Gevorgya, Republican Infectious Diseases Hospital
Mr. Armen Hayrapetyan, National Office Against Tuberculosis, Former Project Coordinator, PIU
Dr. Bagrat Khachatryan, Central Veterinary Laboratory
Mr. Sergey Khachatryan, Deputy Minister of Health
Dr. Eduard Zardaryan, Republican Infectious Diseases Hospital

Donors

Gayane Nasoyan, Food and Agriculture Organization (FAO Yerevan)
Ms. Irina Papiieva, World Health Organization (WHO) office, Yerevan
Sofya Papyan, FAO
Mr. Emil Sahakyan, Communications Officer, United Nations Children's Fund (UNICEF) office, Yerevan

NGOs, Civil Society and Private Sector

Paruyr Asatryan, Private Agriculture Search and View (PASV)
Mr. Mamikon Ghasabyan, Armenian Society for the Protection of Birds, NGO
Mr. Onik Karutynian, Manager, Lusakert Poultry Farm
Mr. Martirosyan Samvel, Veterinary Officer, Getamej Poultry Farm
Mr. Meliksetyan Samvel, Deputy Manager, Finance Getamej Poultry Farm
Mr. Armen Sargsyan, Lusakert Poultry Farm
Suren Vardanyan, Private Veterinarian, Sarnakunk Village CARD Center

World Bank

Arusyak Alaverdyan, Operations Officer, Yerevan
Brian Bedard, Senior Livestock Specialist, Washington, DC
Gohar Gyulmyen, Chief Economist, Yerevan
Artavazd Hakobyan, Former Operations Officer, Yerevan
Jean-Michel Happi, Country Manager, Yerevan
Susanna Hayrapetyan, Senior Health Specialist, Yerevan

Annex D. Borrower Comments

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**MINISTER
 OF AGRICULTURE
 OF THE REPUBLIC OF ARMENIA**

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To Ms. MARTHA AINSWORTH
 Acting Manager
 Public Sector Evaluations
 Independent Evaluation Group
 The World Bank

SK/11/3171-12
 25.06.2012

Dear Ms. Ainsworth,

I would like to present comments of the Ministry of Agriculture of the Republic of Armenia on the "Avian Influenza Preparedness" Project Assessment report carried out by the World Bank Independent Evaluation Group:

Point 3.10

To mitigate and assess environmental risks it was planned to carry out impact assessment of environmental risks before the construction of Project provisioned Bekkarj pits, as well as procurement and installation of incinerators. The assessment reveals that environmental risks are rather high, therefore the construction of such incinerators and Bekkarj pits in Armenia as it was provisioned by the Project's impermissible. Therefore, the RA Government of Armenia found not purposeful the implementation of the abovementioned activities. Incinerators are not the only ways for carcass disposal during the outbreaks. There are also other means carried out.

Point 5.5

Central Veterinary Laboratory was renovated with existing financial resources according to the needs of modern diagnostic laboratory required for Armenia. Construction of a new laboratory would have cost more for several times which was not provisioned by the "Avian Influenza Preparedness" Project.

Point 6.2

Informational strategy was prepared within the frames of the Project and provided to the veterinary inspection.

Point 6.9

It was provisioned by the Project to implement desktop and field simulations. Food and Agriculture Organization of the UN has initiated and organized desktop simulations within the frames of its projects. Upon the agreement with the World Bank, the Project has directed all its resources to the implementation of field simulations in order to avoid duplications.

Sincerely Yours,

SERGO KARAPETYAN