World Bank

E1405

TURKEY AVIAN INFLUENZA AND HUMAN PANDEMIC PREPAREDNESS AND RESPONSE (AIHP) PROJECT

Environmental Management Plan

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ABBREVIATIONS

AI	Avian Influenza
AIHP	Avian Influenza and Human pandemic Preparedness and Response Project
BAT	Best Available Techniques
BSL	Bio-Safety Level
CEU	Central Executive Unit
EA	Environmental Assessment
EMP	Environmental Management Plan
EU	European Union
EWS	Early Warning System
FAO	Food and Agriculture Organization
GDPC	General Directorate of Protection and Control
HPAI	Highly Pathogenic Avian Influenza
HIV/AIDS	Human Immuno-deficiency
IBRD	International Bank for Reconstruction and Development (World Bank)
IDA	International Development Agency
LDCC	Local Disease Crisis Center
MARA	Ministry of Agriculture and Rural Affairs
MOEF	Ministry of Environment and Forestry
MOH	Ministry of Health
NPIAP	National Pandemic Influenza Action Plan
NDCC	National Disease Crisis Center
NGO	Non-governmental Organization
NZDC	National Zoonotic Disease Committee
OIE	World Organization for Animal Health
OP	Operational Manual (World Bank)
PCDD/Fs	Dioxins and Furans
PAH	Polycyclic Aromatic Hydrocarbons
PIU	Project Implementation Unit
PVC	Polyvinyl Chloride
SAB M	Public Information Communication Center (Ministry of Health)
SARS	Severe Acute Respiratory Sendrome
SPO	State Planning Organization
TF	Trust Fund
UNDP	United Nations Development Program
UNICEF	United Nations Children Fund
WAHIS	World Animal Information System
WHO	World Health Organization
WID	Waste Incineration Directive
VCRI	Veterinary Control Research Institutes

Introduction and Summary

1. The World Bank requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus improve decision making (OP 4.01, January 1999). The Bank favors preventive measures over mitigatory or compensatory measures, whenever feasible.

2. The Turkey Avian Influenza and Human Pandemic Preparedness and Response Project (AIHP) has been assigned World Bank environmental category B, since it involves moderate environmental impacts that can be managed during implementation of the project.

3. Although project activities supporting Avian Influenza (AI) prevention, preparedness and planning, and response and containment are not expected to generate significant adverse environmental effects, they do present a moderate environmental and human health risk from inadvertent spread of the AI virus and waste management. Overall the AI prevention and response-focused activities are expected to have a positive environmental impact, as the investments in facilities, equipment, and training for veterinary and public health service staff and laboratories will improve the effectiveness and safety over existing avian influenza handling and testing procedures by meeting international standards established by the World Organization for Animal Health (OIE) and the World Health Organization (WHO). This would be reinforced by the mainstreaming of environmental safeguards into protocols and procedures for the culling and disposal of animals during AI outbreaks.

4. This environmental management plan addresses the moderate adverse environmental effects of the Animal Health and Human Health Components. For these components, the EMP addresses zoonotic disease containment and waste management as pertain to disposal of special waste, emissions and materials at laboratories, and training for veterinary services workers, to include procedures for safe handling of AI materials, safe culling of infected and at-risk poultry and disposal of carcasses and infected materials. The EMP provides mitigation plans and monitoring plans to ensure appropriate attention to environmental issues, and tracking progress or problems in their management.

I. Global, regional and national sector issues

(a) Introduction

5. The continuing outbreaks of highly pathogenic avian influenza (HPAI), which begun in late 2003 in several Southeast Asian countries and have occurred more recently in Europe, have been disastrous to the poultry industry in the two regions and have raised serious global public health concerns. As of mid-April 2006, nearly 200 million domestic poultry had either died or been destroyed and over 194 people had contracted the infection of which 109 have died). Recent increases in the number of known cases of avian influenza (AI) transmission have raised concerns over the potential emergence of a pandemic, which could have devastating effects on human health and livelihoods.

6. At the same time, it is important to emphasize that there are many uncertainties about whether and when a pandemic might occur, as well as about its potential impact. Humans are not very susceptible to the disease, but if infected with the Asian H5N1 strain, they could exhibit a high case fatality rate. Despite control measures the disease continues to spread, causing further economic losses and threatening the livelihood of hundreds of millions of livestock farmers, jeopardizing smallholder entrepreneurship and commercial poultry production, and seriously impeding regional and international trade, and market opportunities. The rural poor, who rely for a larger share of their income on poultry, have been particularly hard hit with income losses.

7. It is impossible to anticipate when the next influenza pandemic may occur or how severe its consequences may be. On average, three pandemics per century have been documented since the 16th century, occurring at intervals of 10-50 years. In the 20th century, pandemics occurred in 1918, 1957 and 1968. An unparalleled toll of illness and death could result. Air travel might hasten the spread of a new virus, and decrease the time available for preparing interventions. Countries' health care systems could be rapidly overwhelmed, economies strained, and social order disrupted. Through interventions as proposed in this Project, and in collaboration with other national and international partners, it should be possible to minimize a pandemic's consequences in Turkey through advance preparation to meet the challenge.

(b) Socioeconomic Context

8. The recent epidemics or outbreaks of animal origin (e.g. SARS, avian influenza, Lassa virus, Ebola virus, Marburg virus, Nipah virus, West Nile virus) have demonstrated the potential and real global impact of zoonotic diseases on the health and well-being of the public, as well as the enormous humanitarian, socio-economic, and trade damage that this group of diseases can cause to both developed and developing countries. They have also underscored the important role of official veterinary and public health services in disease prevention and control, as well as the importance of strengthening the capacity of these services in compliance with the WHO and OIE international standards. The epidemics have also demonstrated that there is an urgent need for a global response to improve the local and regional preparedness and rapid response capacity to the threat from zoonotic disease.

9. Influenza is a zoonotic disease (animal to human transmission) of international importance because of the ability of the virus that causes the disease to mutate for a potential wide-scale human-to-human transmission. Outbreaks of influenza in humans occur annually, as a result of antigenic drift in the Influenza A virus with a severity that varies from year to year, but it is typically moderate to mild. Nonetheless, these outbreaks occur in all countries and exert an impact primarily through morbidity and reduced economic productivity because of illness. In contrast, severe influenza pandemics occur infrequently, as a result of antigenic shift, but have been unprecedented in the number of infections and deaths caused over a short time-period. The worst such event in the 20th Century, the Spanish Flu pandemic of 1918-19, had the highest mortality rate among healthy young people. Less severe pandemics occurred in 1957-58 and 1968-69, but still had high attack rates, high case fatality, and major impact on economic activity. The severity of these influenza pandemics resulted from infection with a sub-type of influenza virus to which humans had not been previously exposed and so had no

immunity. Such a new sub-type of influenza (known as H5N1) is currently causing large outbreaks in birds and domestic poultry in East and Central Asia and Europe, creating widespread concern that the risk of a new and potentially severe human pandemic is high[1].

10. Addressing economic and social impacts must be an integral part of a comprehensive response**.** A pandemic would have devastating economic and social consequences, including large-scale loss of livelihoods as well as lives. The potential economic costs of avian influenza are apparent in countries such as Vietnam, where impacts are already evident on the poultry sector, associated input and distribution channels, and the rural poor who rely on poultry for a larger share of their income. Even if a pandemic does not occur, there could be important socio-economic effects resulting from the response to the perceived risks. Countries confront choices in balancing preparation versus action since both imply economic costs. At least three types of economic costs or impacts should be considered under a human pandemic scenario: i) effects of sickness and mortality on potential output; ii) private preventive responses to an epidemic; and iii) public sector responses.

(c) Key Issues

11. A coordinated global response should involve three types of strategic activities: i) preventing the occurrence and spread of the disease in domesticated animals, thus lowering the virus load in the environment, ii) preventing and/or mitigating the effects of an outbreak in humans, and iii) in the event of a pandemic, helping affected populations cope with its effects. There is a need to formulate a global response based on a common vision for undertaking these three sets of activities. Such a vision should entail immediate measures while ensuring that these measures fit within a coherent longer-term strategy with respect to both animal and human health considerations. Key issues that have been identified include:

Prevention and control of avian influenza is multi-sectoral in nature. It involves many players, including those in the areas of health, agriculture, environment, economics, finance, and planning among others. At the country level, in particular, an integrated, multi and inter-sectoral response is needed based on shared objectives. Responses must address both the animal health and human health dimensions and also appropriate social measures (quarantines, transport restrictions, mass communication strategies).

The risk of a human pandemic is real. The H5N1 strain currently affecting several Asian countries has proven highly fatal to humans. The risk that a pandemic virus will emerge depends on opportunities for human exposure and infection, which will persist as long as the H5N1 virus continues to circulate in animals. With the present situation, the potential of the HPAI virus to become transmissible among humans needs to be a serious concern. If the virus adapts itself to human-to-human transmission, lives may be threatened on a large scale.

[1] Antigenic drift refers to a change in surface proteins of a given strain of influence virus in response to antibodies in human hosts who have been exposed to it. It occurs continually in both type A and B influenza strains, thus the reason to re-engineer the influenza vaccine on a regular basis to prevent seasonal outbreaks or epidemics. Antigenic shift refers to the re-assortment of the animal influenza strain with the circulating human strain in the process of moving from an animal to humans. This antigenic shift is more of a concern since when it occurs; it results in pandemics due to generalized susceptibility to infection in humans.

Avian Influenza virus is constantly evolving with unpredictable results. The HPAI viruses are of particular concern because they undergo constant genetic change that can have unpredictable results. The constant and rapid evolution of the virus necessitates a global approach to controlling the disease.

Market conditions have caused HPAI to spread rapidly. The conditions for the emergence and local spread of HPAI have been exacerbated by the intensification and concentration of livestock production in areas of high-density human populations. The danger of international spread of HPAI has increased by the dynamics of regional and international trade and the movement of people. A global approach to avian influenza, therefore, will have relevance to strategic control of other livestock diseases, including zoonoses. Nevertheless, country strategies developed and owned by the governments facing the threat of avian influenza should be the foundation of a global response.

The geographic coverage of a response should be determined by both immediate and anticipated needs. Asia is today the most affected region, but the disease is currently spreading to other areas of the world at an alarming rate and recent scientific evidence indicates that wild birds play a role in the spread of the virus from one country or region to another. The response should, therefore, combine control measures in countries where the virus has been already detected, with prevention measures in countries at risks (countries neighboring infected countries and/or in migratory bird fly way paths). A minimum level of preparedness is essential in all countries.

An appropriate balance between short and long-term actions needs to be taken. Immediate action is needed in a number of areas. The immediate to short-term objective is to reduce the risk to humans by preventing further spread of HPAI in those countries that are currently infected. The long-term vision of the strategy is to minimize the global threat and risk of HPAI in domestic poultry and humans, through progressive control and eradication of HPAI. Achieving this goal will diminish the global threat of a human pandemic, stabilize poultry production, enhance a robust regional and international trade in poultry and poultry products, increase human and food safety, and improve the livelihoods of the rural poor.

Global and regional aspects of the response need to be addressed and coordinated. Actions to secure borders and control international trade/travel in the event of a pandemic, as well as measures to limit the effects of disease transmission by migratory birds, are trans-boundary issues requiring regional and/or international coordination. Global and regional efforts should build on existing mechanisms such as the joint OIE/World Bank initiative for the Prevention and Control of Global Emerging and Re-emerging Diseases of Animal Origin, and the joint Global Framework for Progressive Control of Transboundary Animal Diseases (GF-TADs), a joint FAO/OIE initiative and regional organizations such as the Association of Southeast Asian Nations and South Asian Association for Regional Cooperation.

12. **The FAO/OIE's Global Strategy.** The long-term vision of the strategy prepared by FAO and OIE in collaboration with WHO is to minimize the global threat and risk of HPAI in humans and domestic poultry, through progressive control and eradication of HPAI, particularly that caused by H5N1 virus, from terrestrial domestic poultry. The global strategy will be implemented over three time frames: immediate to short (1-3 years), short to medium (4-6 years) and medium to long-term (7-10 years). During this period the spread of HPAI, mainly of the H5N1 strain, will have been progressively controlled in domestic poultry of all infected countries, and prevented from affecting those countries not currently infected, but at high risk. The strategy originally prepared to control HPAI in Asia is being revised by FAO and OIE to take into account the current spread on the disease outside Asia. The strategy will be complemented by more detailed country specific HPAI control plans. FAO/OIE have also issued specific recommendations for avian influenza and OIE has recently issued recommendations for each region, in addition to its standards and guidelines provided for the prevention and control of HPAI in animals.

13. **The Recommended Strategic Action Plan** prepared by **WHO** for Responding to the Avian Influenza Pandemic Threat lays out activities for individual countries, the international community, and WHO to prepare for a pandemic and mitigate its impact. The objectives of the plan correspond to the opportunities and capacities to intervene and are structured in three phases: (i) pre-pandemic – supporting the FAO/OIE's control strategy; increasing collaboration between animal and health services; strengthening EWS, (ii) emergence of a pandemic – containing or delaying spread at the source - and (iii) pandemic declared and spreading internationally – reducing morbidity, mortality and social disruption; conducting research to guide response measures . WHO has also prepared a global plan and guidelines for pandemic preparedness and is in the process of developing a model country plan that will allow countries to assess their state of preparedness and identify priority needs.

14. **The Bank** has developed a global facility through a multi-country adjustable program loan (MAP). In parallel, the Bank is discussing with the EU, WHO and FAO/OIE, and bilateral donors the establishment of a multi-donor trust fund (TF) that primarily supports country level activities in conjunction with a smaller and complementary role at the regional and global level.

(e) The regional dimension

15. Cases of avian influenza have already occurred in over twenty countries, including most recently in Western Europe, after having appeared in October 2005-January 2006 in Croatia, Romania, Ukraine, Greece, and Turkey. The earlier (mid-2005) Russian outbreak of HPAI H5N1 has to date affected more than ten administrative regions, beginning in the Ural Mountains and moving west to within 200 km of Moscow. In the first three weeks of August 2005, outbreaks in poultry of HPAI H5N1 were reported in four regions of northern and central Kazakhstan. Other countries in the Balkan region and the Caucasus have experienced outbreaks as well due to their proximity to two main flyways, the East Africa-West Asia Flyway, which crosses Turkey, and the Central Asia Flyway. Both flyways cross areas in North-Eastern Europe, where avian influenza in wild and domestic fowl has also been diagnosed.

(f) The national dimension

16. Up until January 2006, Turkey had experienced one outbreak of avian influenza, in the Manyas district of Balikesir province. This outbreak was detected on October 1, 2005 when three turkeys died in a flock of 1,800 turkeys being raised by a medium sized poultry contract farmer in an outdoor grazing environment facility three kilometers south of Manyas Lake. This lake is a natural habitat for migratory birds, which were abundantly present at the time. Most of the rest of the flock died over the next three days, during which time the district veterinary service and a private veterinarian working for the poultry sector developed the diagnosis of avian influenza. Dead and live animals were sent to the Bornova reference laboratory (in Izmir), which detected the presence of the H5 strain (through inoculation and subsequent death in embryonated eggs). The EU reference laboratory in Weybridge (UK) confirmed the presence of the AIHP H5N1 strain on October 13.

17. Sanitary measures had been promptly initiated by the provincial veterinary service on October 7, when a three kilometers protection zone was established with road signs and the presence of the military police. All backyard poultry (over 10,000 head) within the protection zone were culled between October 8-16, and compensation was granted by the private poultry industry itself to the affected farmers. Within the protection zone, there were also nine larger commercial holdings, seven of which were empty. The flock of almost 16,000 in the remaining two enterprises was slaughtered on October 9. In addition to the protection zone, a 10 km radius surveillance zone was established, which contained roughly 45,000 backyard poultry, and 10 active larger poultry farms with a stock of over 130,000 animals. Measure taken in the surveillance zone included a ban on the movement of live poultry, regulation of the transport of table and hatching eggs, prohibition of bazaar market trade of poultry and of hunting of wild birds, and an immediate local awareness campaign to instruct farmers to confine backyard poultry and avoid contact with wild birds.

18. Although the avian influenza outbreak was quickly contained, and there were no signs of any transmission to humans, the economic impact has been severe. Within two weeks of the outbreak, the consumption of poultry in Turkey (roughly 1.2 kilogram per capita per month) had dropped substantially and retail poultry prices had fallen by 30 percent. (The market capitalization of the traded Turkish poultry firms dropped by over 30 percent in the first week). This is partly owing to the fact that Balıkesir and the nearby regions of Bursa, İzmir, Manisa, and Sakarya account for over 40 percent of Turkey's broiler enterprises and poultry production. Egg production is similarly concentrated in these provinces, and its demand fell from 12 eggs per capita per month by a rate similar to that of poultry demand. As a result, the poultry and egg sector incurred losses of roughly US$ 0.9 million daily in October-December 2005. (Prior to the outbreak the GDP of the poultry and egg sector ranged US$ 1.2-1.5 billion annually)

19. In January 2006, a widespread outbreak occurred, starting initially in northeastern Turkey along the border areas with Georgia, Armenia, and Iran. This area is directly on the flight path of migrating birds (the so-called Central Asia Flyway) and sits between three large lakes: Sevan in the east (Armenia), Van in the eastern Anatolia (Turkey), and Urmia in the south (Iran). The initial outbreak in the provinces of Ardahan, Kars, Erzurum, Ağrı, Iğdır, and Van was met quickly with culling of over 50,000 birds (in the first week of January). In the

second week of January, the number of provinces reporting suspected or confirmed cases of AI in poultry rose quickly. As of mid-March, its presence was confirmed in 58 of Turkey's 81 provinces. Until April 12th, the laboratories confirmed the disease in 200 cases. However, the disease was fully contained in 154 of these. As of 12th it continues in 46 areas located in 15 provinces: Kocaeli in the Marmara Region, Edirne in Thrace Region, zmir in the Aegean Region, K rehir, Kayseri, Yozgat and Sivas in the Central Anatolia Region, Ordu, Rize, Sinop, Samsun, Tokat in the Black Sea Region, Kars, Erzurum, and Mu in the East Anatolia Region. To combat the intensification of the spread of AI, the Government of Turkey moved quickly ahead with the culling and the monitoring of any possible spread in the surveillance zones around villages in these provinces. A phone hotline was set up for people to report loose or sick poultry, and bazaar market trade of live poultry has been prohibited throughout the country. By mid-April, over 2.5 million birds had been culled in the imposed protection zones around villages with confirmed cases.

20. However, all these measures have not prevented the occurrence of animal to human transmission. As of April 19, there were 21 human cases, including four deaths, although many of those cases remained to be re-confirmed. Only 38 percent of the cases were female, and seventeen of the 21 patients were younger than 15 years old. The higher rate of disease incidence in children is believed to have occurred as a result of their being directly involved in slaughtering, plucking and cooking the chickens infected with the HPAI virus (H5N1 strain). Most of the cases were transferred to, and treated at, the University Hospital in Van. These cases were the first occurrence and death in humans from the H5N1 strain of AI outside of Asia. On the other hand, the case fatality rate in Turkey has been lower compared with other countries due to improved early case detection and effective treatment.

21. Almost all of the people with confirmed cases have a confirmed history of close contact with sick birds, and there is still no indication of human-to-human transmission. Those who had access to antivirals in the first 48 hours after having been diagnosed with Influenza-like-Illness (ILI) responded relatively well, though treatment of more severe cases necessitated the usage of ventilators to aid patients in breathing.

II. Project Development Objective and Project Components

22. The overall development objective of the project is to minimize the threat posed to humans and the poultry industry in Turkey by HPAI and other zoonoses in domestic poultry, and to prepare for, control, and respond to influenza pandemics and other infectious disease emergencies in humans. To achieve this, three areas would be supported by the project: i) prevention; ii) preparedness and planning; and iii) response and containment. Achieving these goals will contribute to diminishing the burden of disease and loss of productivity in Turkey, limiting the regional spread of AIHP, and enhancing economic and social prospects at the national, regional, and global levels.

23. The Project consist of the following three components: i) Animal Health, ii) Human Health, and iii) Public Awareness and Coordination support.

I. Animal Health Component

24. The Project will support activities to cover the needs in the short, medium or long-term, and ranging from prevention, to control and total eradication of HPAI, which have been based on an assessment of the particular conditions, constraints and possibilities in Turkey (including a rapid assessment of veterinary services and recent assessments of the poultry sector). These activities fall into the three main and seven sub-components described below and total US$ 30.86 million:

A. National policy framework and development of a national strategy sub-component

A1: Policy development and enabling environment. The Project activities' support will include strategy development and the improvement of the regulatory framework to address key policy issues and ensure that disease control, prevention and eradication measures are implemented in a uniform and effective way in accordance with OIE standards and guidelines. It will support definition of disease control options and reviews of existing regulations and policies and fund related policy studies, strategy development and dissemination workshops. The main outputs will be a detailed assessment of the capacity of its veterinary services and an integration of the AI contingency plans of the MARA and the MOH into a National AI Strategy. (US$ 0.59 million)

A2: Epidemiology and disease information systems. In this area, the Project will support epidemiological studies and surveillance programs to inform the improvement of disease control measures, which will be then adjusted and improved as new information becomes available. It will also support the linking of the laboratory information systems of Turkey's eight Veterinary Control Research Institutes (VCRIs) to the existing module of the World Animal Health Information System (WAHIS) maintained by the MARA General Directorate for Protection and Control (GDPC). This will better enable Turkey to participate in global disease information sharing, complying with their obligations as members of the OIE. Epidemiological studies will include a focus on scaling up the knowledge base of the Ministry of Environment and Forestry (MOEF) on movement of migratory birds in the main areas of their known transit. The disease information system will be linked with rapid and standardized methods of routine analysis of surveillance data in order to track important changes in the H5N1 situation and promptly supply this information to field personnel. (US$ 0.48 million)

B. Strengthening Disease Surveillance and Diagnostic Capacity Sub-component

B1: Strengthening Animal Disease Surveillance and Diagnostic Capacity. Project support in this area will aim at strengthening the capacity of the MARA's GDPC and its affiliated reference and regional diagnostic laboratories in detection, reporting and follow-up of reported AI cases. This will cover the formation and equipping of Bio-Safety Level 3 (BSL3) laboratories in Bornova and Pendik, as well as equipment (incubators, laminar flow cabins, etc.) for two regional laboratories (in Ankara and Konya). Consumables and reagents will be funded as needed for the implementation of the National AI Surveillance Program and for regional laboratories and Provincial Directorates of Agriculture linked to these laboratories for the execution of their relevant roles in the MARA AI Contingency Plan (rapid serological tests

and screening surveys and virological tests for confirmation and serotyping of AI strains). (US$ 2.85 million)

B2: Veterinary Services Training and AI Surveillance. Training will target the personnel of the MARA's GDPC, including those of the VCRIs and the affiliated staff in the Provincial Directorates of Agriculture, which will be expected to form the local Expert Groups of the Local Disease Crisis Centers (LDCCs). The focus of the training will be on screening, sampling, and test procedures to be applied in case of an outbreak, as well as on analyzing epidemiological data and performing risk assessments. Supported activities will also cover an initial self-evaluation of veterinary services, following OIE standards on quality and evaluation of veterinary services to meet international requirements. Increased risk-based AI surveillance activities will also be supported at the provincial and district levels, coordinated through the VCRIs. (US$ 2.01 million)

C. Outbreak Containment Plan

25. The sub-component will provide support to activities related to the implementation of the MARA Contingency Plan for Avian Influenza, which details the containment plan for AI outbreaks. The Contingency Plan details the roles of the National Diseases Crisis Center (NNDC) coordinated by the Head of the Animal Health Department of the MARA Protection and Control General Directorate, the Local Disease Crisis Centers (LDCCs) set up on the basis of Animal Health Sections of the Provincial Directorates of Agriculture, and the National and Local Expert groups. Section 8 of the Contingency Plan contains the operational manual for the containment plan. The sub-component will include the following activities:

C1: Targeting virus eradication at the source. In order to target the eradication of the disease at the source of infection, the Project will target the following activities: i) culling of infected and at-risk poultry and compensation to farmers and producing companies (at a reasonable market price); and ii) disposal of carcasses and potentially infective materials in a bio-secure and environmentally acceptable manner (through roughly 15 mobile incineration plants deployed to districts with AI outbreaks).(US$13.1million). Policies associated with virus eradication that the Government of Turkey has already introduced and would trigger in outbreak areas include: enhanced bio-security at poultry farms and associated premises, through bio-containment and bio-exclusion, and control of movement of birds and products that may be infected, including controls at the interface of infected/non-infected areas and border controls.

C2: Veterinary personnel safety. Due to the highly pathogenic nature of the HPAI virus to humans, particularly the Asian H5N1 strain, training of people in contact with live virus would be supported. This would include field workers involved in identification of the disease, farm workers involved in culling and disposing of manure, laboratory workers involved in virus isolation and diagnosis. Adequate resources would be allocated for training and equipment (bio-safety hoods and appropriate personal protective clothing). (US$ 2.85 million)

C3: Restructuring the Poultry Sector. Restructuring the poultry sector in Turkey will focus on the reduction of the practice of backyard poultry raising, improving the opportunity for

slaughtering of layers (and subsequent processing and rendering), and promoting manure management of backyard poultry that is in conformity with existing environmental regulations. Reduction of backyard poultry farming could take the form of banning such farming in protection bands around known areas of high prevalence of migratory birds and investments in improving bio-security (penning of animals and closing up of barns) in small contracted poultry farms. Since it would be extremely costly for the state to fund widespread programs for poultry sector restructuring, the introduction of restructuring modalities will be piloted under the Project with matching grants to be provided under a competitive proposal submission and award process (with at least 50% co-financing by private beneficiaries). (US$ 9.0 million).

II. Human Health Component

26. In the public health field, short-and long-term actions need to be taken and an appropriate balance struck between the two. While immediate steps can be taken to address the crisis, there is also a longer-term agenda given systemic shortcomings with respect to core public health functions. Work on both the short- and long-term fronts, therefore, needs to proceed in parallel, and efforts should be made to ensure that short-term responses are consistent with and contribute to proposed longer-term interventions. Setting priorities in both cases is essential.

27. Building an effective national public health response will require an enabling environment and the necessary resources to bring proven interventions quickly up to nationwide scale. Thus, the Project will help to operationalize some elements that are contemplated as part of the global strategic plan, expanding and intensifying the responses rapidly. As it is unlikely that the global spread of a pandemic influenza virus could be prevented once it emerges, the emphasis is on reducing its impact. Several tools will help achieve this aim: i) year-round surveillance; ii) effective and accurate methods of diagnosis; iii) social distance interventions; iv) vaccines (once they become available); v) anti-viral drugs; and vi) strengthened medical services. The interventions supported under the Project will be based on Turkey's epidemiological and programmatic needs, and well-assessed options for meeting them**.** The interventions will be grouped in three sub-components, totaling US$ 20.84 million.

A. Enhancing Public Health Program Planning and Coordination

28. The Ministry of Health (MOH) in Turkey has recently prepared a National Pandemic Influenza Action Plan (NPIAP). The NPIAP is very comprehensive in scope, with detailed sections on the context and epidemiological underpinnings of an eventual influenza pandemic, the current legislative and regulatory basis for intervention, vigilance through routine surveillance and its implementation arrangements, case finding and ascertainment through serological testing and virological subtyping, prevention through immunization, symptomatic case management with anti-viral drugs. Most importantly, the plan details how the emergency response will be coordinated, the logistics involved, the protocols and algorithms to be followed for surveillance, diagnosis, immunization and anti-viral therapy during inter-pandemic, pandemic alert and pandemic periods, and the means of communication and public

information. Finally, it provides a list of regional and reference laboratories and telephone numbers of those who are directly in charge of the operations.

29. The plan clearly indicates that the MOH will be in charge of command and control and that the current laws and regulations are sufficient for it to fully implement all aspects of the NPIAP. However, the NPIAP's focus on inter-sectoral cooperation and collaboration could be emphasized to go beyond a mere reference to MARA as a source of information during Inter-pandemic Phase II. There is also a need to estimate resource and training requirements for effective implementation and make the necessary arrangements that they are in place. Finally, the NPIAP should be subject to simulation exercises on a small scale to assess its implementability as a coordinated action and put to test the chain and command structure. The Project will help MOH to build its institutional capacity to command and control in a coordinated fashion with MARA the implementation of the NPIAP and assist the National Committee for the Control of Zoonotic Diseases, which has hitherto been a consultative entity, to become a truly functioning supra-ministerial coordinating agency between the two ministries and partnering with other sector representatives (Environment, Transportation, Interior, etc.). To this end, the proposed Project will support the following activities (US$ 14.88 million): equipping health personnel with protective gear and clothing, upgrading of drug storage facilities, and improving health information and telecommunication systems at MOH's Public Information Communication Center (SABIM) and the Crisis Management Center.

B. Strengthening of National Public Health Surveillance Systems

30. In Turkey, there is a functional Influenza surveillance monitoring committee and a well-defined protocol for surveillance in 10 health centers in each of the 14 sentinel provinces, including a case notification form for ILI and a template on how to collect and transport specimen to laboratories. The committee monitors case reports on a bi-weekly basis in winter and monthly basis in summer. Case ascertainment is made through virologic surveillance to report the number of clinical specimens tested for influenza and the number of positive results by virus type and subtype. According to the protocol, all specimens are to be sent to the two reference public health laboratories where virus isolation and typing could be made. It is not clear, however, whether the two BSL-2 laboratories will be able to cope with the increased demand in times of a pandemic. In addition, because of their location (Istanbul and Ankara) valuable time could be lost due to transportation of specimens from far away provinces. Cognizant of the limited laboratory capacity and potential of low supply of material for specimen collection, transportation and laboratory supplies, MOH intends to upgrade its network of seven regional public health laboratories to cope with the increased demand in case of a pandemic. To this end, the proposed Project will support the following activities (US$ 5.86 million): improvement of health information and telecommunication systems; simulation exercises of ILI case notification and ascertainment; improvements of laboratory networks; and, training.

C. Strengthening Health System Response Capacity

31. Non-pharmaceutical containment measures such as social distancing may contain pandemic spread and allow time for response measures. Therefore, the project will indirectly

support through the implementation of the NPIAP, "social distancing measures" -- such as quarantine, ban on mass gatherings and travel restrictions, backed up by a well-designed communication strategy. Additional preventive actions for health care workers involved in case detection, transportation and management such as distribution and use of protective gear and masks will be supported, along with increased awareness and promotion of community participation in slowing the spread of the pandemic. (US$ 0.1 million)

III. Public Awareness and Coordination Support Component

32. This component will support strategic communication activities for stakeholders and beneficiaries. Similarly, resources will be allocated for improved coordination between MARA's regulatory framework and contingency plans, and the MOH's NPIAP.

A. Public Awareness through Information and Communication Services

33. Support will be provided for the research, design, implementation and evaluation of an integrated communications strategy, addressing the needs of priority populations at the national, provincial and local levels. The strategy will elevate knowledge and promote behavior-change in populations at risk, to control the spread of the virus, prevent infection, foster timely reporting and support containment actions. At the same time, the strategy will educate vulnerable groups on preparedness plans and mitigation measures across pre-pandemic and pandemic phases. The communication strategy will incorporate measures called for in the Environmental Management Plan (EMP) for safe culling and disposal of backyard poultry (US$ 0.81 million).

B. Coordination Support

34. The multi-dimensional problems associated with HPAI infection necessitate collaboration from a wide range of stakeholders within each country, which in Turkey include: the State Planning Organization (SPO), the Undersecretariat of the Treasury, the MARA, the MOH, their associated diagnostic laboratories, NGOs and civil society organizations, and private sector companies and associations (e.g. large poultry production companies, farmers' associations, veterinarians and farmer involvement at the grass roots level). The sub-component will support activities to improve the effective coordination and collaboration among these stakeholders and to bolster project implementation and monitoring capacity at existing project implementation structures in the MARA and MOH.

B1. National Coordination

35. The National Zoonotic Disease Committee (NZDC) will serve as the venue for coordinating the national awareness activities described above. It will review the AIHP Project's annual work plans and ensure coordination and linkages across relevant agencies and international partners. In AI outbreak situations, the NZDC is in charge of triggering emergency responses by MARA and MOH, monitoring the actions taken, and coordinating public statements to the media. In this last area, the NZDC will be supported by a Public Information and Communications Specialist recruited by the MARA CEU.

III. Policy context

(a) IDA/IBRD Safeguards Policy

36. The World Bank requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus improve decision making (OP 4.01, January 1999). EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project. EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The Bank favors preventive measures over mitigatory or compensatory measures, whenever feasible.

37. EA takes into account the natural environment; human health and safety; social aspects ; and transboundary and global environmental aspects. It also takes into account the variations in project and country conditions; the findings of country environmental studies; national environmental action plans; the country's overall policy framework, national legislation, and institutional capabilities related to the environment and social aspects; and obligations of the country, pertaining to project activities, under relevant international environmental treaties and agreements. The Bank does not finance project activities that would contravene such country obligations, as identified during the EA.

38. The activities under the Project are not expected to generate any adverse environmental effects as they are focused largely on public sector capacity building and improved readiness for dealing with outbreaks of avian influenza in domestic poultry. However, the Project has been assigned World Bank environmental Category B, since it supports investments in incineration capacity for culled poultry. The EA process for the Animal Health Component of the Project is addressed through this EMP. The EMP covers the deployment of incineration capacity (mainly mobile but also potentially through stationary incineration units) and clean up of animal wastes of culled poultry by the local veterinary services supported under the Project. Key considerations to be taken into account during the EA process include:

- Generic initial screening to determine appropriate environmental assessment;
- Compliance with existing environmental regulations in Turkey;
- Analysis of alternatives;
- Public participation and consultation with affected people and organizations; and
- Disclosure of information.

(b) Turkish Legislation

39. ***Environmental legislation***. The Turkish laws regarding environmental protection take into consideration requirements of international conventions and treaties, and cover a wide

range of protective measures. Activities carried out under the project will conform to current laws in Turkey and sound environmental principles. The environmental laws and regulations relevant to the Animal Health and Human Health Components include the below:

- Environmental Law
- Soil Protection and Land Use Law
- Regulation for the Control of Soil Pollution
- Regulation for the Control of Water Pollution
- Regulation for the Control of Solid Waste
- Regulation for the Control of Hazardous Wastes
- Regulation for the Control of Medical Wastes
- Regulation for the Control of Industrial Air Pollution
- Regulation for the Control of Air Pollution Caused by Heating
- Assessment and Management of Environmental Noise
- Regulation for the Control of Excavation Soil, Construction and Debris Waste
- Animal Health and Constabulary Law
- Regulation for Animal Health and Constabulary

40. *Environmental Law (Law No. 2872)*. The purpose of this law is to protect and improve the environment which is the common wealth of all citizens; to use and protect the land and natural resources in rural and urban areas; to prevent pollution of water, soil and air; to arrange the regulations and precautions to improve and assure the health, civilization and living standards of current and future generations by protecting the plant and animal population and the natural and historical wealth of the country, in accordance with the economical and social development targets with respect to the legal and technical principles.

41. *Soil Protection and Land Use Law (Law No. 5403).* The purpose of this law is to protect the soil by preventing its loss by natural or artificial ways and losing its characteristics, its improvement, and in accordance with sustainable development with environmental priorities, to determine the principles and basics that will provide usage of land in a planned manner. This law incorporates the methods and principles related with the determination, and classification of land and soil resources in accordance with the scientific principles, preparation of land use plans, evaluation of social, economic and environmental dimensions during the protection and development periods with participatory methods, prevention of out of purpose and wrong usages, definition of responsibilities, duties and liabilities for the development of methods that will assure the protection

42. *Regulation for Control of Soil Pollution (published in the Official Gazette dated 31.05.2005, No. 25831).* The purpose of this Regulation, prepared in accordance with Article 8 of the Environmental Law and Articles 2 and 9 of Legislation No.443 on the Establishment and Duties of the Ministry of Environment, is to introduce the principles of taking adequate measures to prevent the pollution of soils as the recipient media, take necessary measures for

the use of mud from water treatment facilities and use of compost in soil and to remove pollution, in harmony with sustainable development targets. This Regulation includes the technical, administrative principles and penal sanctions on activities causing soil pollution and discharge, disposal, and leakage of hazardous materials and wastes to soil, and the use of mud and composts occurring as a result of the treatment of domestic and industrial wastes in a manner that does not cause harm to soil, plants, and humans.

43. *Regulation for the Control of Water Pollution (published in the Official Gazette dated 31.12.2004 No. 25831).* The purpose of this Regulation is to introduce the legal and technical principles required for the prevention of water pollution in line with sustainable development targets in order to assure the protection of the country's underground and surface water resource potentials, to assure its usage with the best practices, and prevention of water pollution in line with the economic and social development targets. This regulation covers the monitoring and supervision modes and principles for the prevention of water pollution, the planning principles and penalties related to discharge of waste water and discharge permits, planning principles and penalties related to the protection of water quality, and the quality classification of water media and utilization purposes.

44. *Regulation for the Control of Solid Wastes (published in the Official Gazette dated 14.03, 1991 No. 20814, the amended version published in the Official Gazette dated 25.04.2002 and No. 24736).* The purpose of this Regulation is; to forbid disposal of all kinds of wastes and waste products directly or indirectly to the recipient medium in a way that will harm the environment, their storage, transport, disposal, and other similar activities, to prevent damage from pollutants that cause permanent impacts on air, water and soil related to animal and plant generation, natural resources and ecological balance by removing consumption materials that might negatively effect the environment under a certain discipline, and to determine, implement and develop the principles, politics and programs on this issue. This regulation includes the principles on the collection, handling, recovery, revaluation, disposal and overpowering of the domestic solid wastes disposed from the houses in residential areas, vegetal waste disposed from the parks, gardens and green areas, large solid wastes, industrial and commercial solid wastes which are not hazardous but showing domestic solid waste characteristics, treatment mud obtained (disposed) from the domestic waste water treatment facilities , industrial treatment facility mud which are in the hazardous waste class, excavation soil and construction debris. The provisions of this regulation shall not be applied for harmful and hazardous wastes that are produced by private and/or official institutions and real persons which causes harm to human health depending on its type, nature and quantity, cause water, air and soil pollution, include flammable and explosive materials, and those that might carry disease microbes.

45. *Regulation for the Control of Hazardous Wastes (published in the Official Gazette dated 14.03.2005, No. 25755.*) This Regulation was prepared based on the Articles 8, 11 and 12 of the Environmental Law and Article 3 of the Basel Treaty on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal that was published in the Official Gazette dated 15.5.1994 No. 21935. The purpose of this Regulation is to arrange the legal and technical principles to determine the principles, politics and programs for the; prevention of direct or indirect disposal of the hazardous materials to the recipient medium in a

way so as to harm human health and the environment during the period starting from their production up to the final disposal, assuring control of their production and handling, forbidding their import and controlling their export, ensuring the required technical and administrative standards for their management, minimizing their production at the source, if the production is unavoidable then disposing them to the location closest to their production place, establishment of sufficient disposal facilities and controlling these facilities for their compatibility with environmental health, and ensuring their management in harmony with the environment.

46. Regulation for the Control of Medical Wastes (published in the Official Gazette dated 22.07.2005, No.25883). This Regulation was prepared based on Articles 1, 3, 8, 11 and 12 of the Environmental Law and Articles 1,2 and 9 of the Law on the Establishment of Ministry of Environment and Forestry published in the Official Gazette dated 1.5.2003 and No. 4856. The purpose of this Regulation is to regulate the procedures and principles for the identification and implementation of principles, policies, programs and legal, administrative, and technical principles related to: a) the prevention of the discharge of medical waste, from production to disposal, directly or indirectly into recipient media in a manner that may cause harm to the environment or humans, b) the separate collection at the source, transport in the facility, temporary storage, transport and disposal of medical waste from production to disposal. This Regulation covers the principles related to wastes produced as a result of the activities of medical institutions which are detailed in Annex 1 and the separate storage where they are produced, temporary storage, transport and disposal of the wastes detailed in Annex 2.

47. Regulation for the Control of Industrial Air Pollution (published in the Official Gazette dated 07.10.2004, No.25606) The purpose of this Regulation is to; control all types of emissions to the atmosphere in the form of fumes, dust, gas, vapor, and aerosols produced from as a result of industrial and power production activity, ; to protect the humans and their environment from the dangers from pollution occurring in the air ; to mitigate and prevent the occurrence of the negative effects that impact on the public and neighborly relations due to air pollution in the environment. In order for the Regulation to achieve its aim, the clauses of the Regulation cover preliminary permits, permits, conditional and partial permits required for the establishment and operation of the facility, in order to prevent air pollution in the impact area of the facility, examination and determination of the emissions from the facility, and the facility, fuels, production of raw materials and products, their utilization, storage and transport.

48. Assessment and Management of Environmental Noise (published in the Official Gazette dated 23.12.2003, No. 25325.) The purpose of this Regulation is; to determine the principles and criteria for combating the impact of exposure to environmental noise in order to develop an environment that does not harm individuals' physical and mental health, and their peace and quiet. This Regulation: covers the principles and criteria related to environmental noise that people are impacted by at ongoing or completed construction areas, parks or other areas in settlement areas which are quiet and sensitive to noise (hospital, school and similar) and other noisy building concentrations and areas, and damage in buildings that is caused by vibration. It does not cover sound levels of transport vehicles, tools, equipment and machinery used

outdoors and for domestic use, related determinations and evaluations, and the principles for workers subject to noise and vibration levels in work places covered by the Labor Law No.4857 dated 10/6/2003 adequate measures required protecting workers from health and safety risks arising from exposure to noise, particularly from those risks related to hearing. Without prejudice to the more strict and special measures mentioned in this Regulation, the provisions of the Safety and Health at Work Regulation are also applied.

49. *Regulation on the Control of Excavation Soil, Construction and Debris Waste (published in the Official Gazette dated 18.03.2004, No. 25406).* The purpose of this Regulation is to arrange the technical and administrative principles and general rules to be followed regarding excavation soil and construction and debris wastes to reduce the amount at the source initially, collection, temporary storage, handling, recovering, utilization and disposal in a way so as to not harm the environment. This Regulation includes the principles on the collection of excavation soil and construction and debris wastes where the source and content are identified in detail, including whether they are a result of human activity or natural disasters and to be stored separately in their production places, their temporary storage, recovery, evaluation, and disposal.

50. *Animal Health and Surveillance Law (Law No. 3285)* the purpose of this Law is; to provide the protection against diseases that might be spread from the animals and animal materials to humans and animals, and to assure the fight against the infectious animal diseases.

51. *Regulation for Animal Health and Surveillance (published in the Official Gazette dated 15.03.1989, No. 20109*). This Regulation has been prepared to determine the principles and methods to ensure protection against diseases that might be spread from the animals and animal materials to humans and animals, and the fight against the infectious animal diseases. This Regulation includes the activities that shall be carried out to protect animal health, fight against infectious diseases, and to take all measures on this issue, to arrange and inspect the animal movements inside of the country, transport of animal materials, import and export of animals and animal products with regards to animal health.

52. Although Turkey is still in the process of harmonizing its laws with the EU, the Government has already adopted the general principles of the Animals By-Products Directive 1774/2005 2003 and the Directive 94/2205 on Community Measures for the Control of Avian Flue and its predecessor, Directive 92/40/EEC.

(c) WHO and FAO/OIE Guidelines

53. The strategies for AI containment and response by the *WHO and FAO/OIE* are reviewed briefly in the section on global and sector issues above. More information on these guidelines is presented in Annexes 1 and 2.

IV. Project Region

54. The project will be implemented throughout Turkey, as it is fully possible that AI will appear in wild birds, domestic poultry or the human population in all areas of the country.

V. Environmental Impacts by Component

55. Activities under AI projects are not expected to generate significant adverse environmental effects as they are focused largely on public sector capacity building and improved readiness for dealing with outbreaks of avian influenza in domestic poultry. These prevention-focused activities are expected to have a positive environmental impact as the Project's investments in facilities, equipment, and training for laboratories will improve the effectiveness and safety over existing avian influenza handling and testing procedures by meeting international standards established by the OIE. This would be reinforced by the mainstreaming of environmental safeguards into protocols and procedures for the culling and disposal of animals during AI outbreaks. In addition, whatever waste is generated in laboratory facilities will be managed using existing national guidelines.

(i) ***Animal Health***: Equipment, refurbishing and training for reference and regional diagnostic laboratories to include key environmental issues in zoonotic disease containment and waste management as pertain to special waste, emissions and materials; training for veterinary services and other workers to include procedures for safe handling of AI materials; safe culling of infected and at-risk poultry and disposal of carcasses. Formal compensation for culled animals should target owners/primary beneficiaries (e.g., specifically including women if they are the primary backyard producers). Poultry sector restructuring addressing both backyard and commercial poultry production, to focus on the reduction or restriction of backyard poultry raising, improving the opportunity for slaughtering of layers (and subsequent processing and rendering), and promoting manure management of backyard poultry. Reduction of backyard poultry farming could take the form of banning such farming in protection bands around known areas of high prevalence of migratory birds and investments in improving bio-security (penning of animals and closing up of barns) in small contracted poultry farms.

(ii) ***Human Health***: Equipment, refurbishing and training for reference and regional diagnostic laboratories to include key environmental issues in zoonotic disease containment and waste management

(iii) ***Public Awareness and Coordination Support***: No environmental issues, but an important component for design and delivery of communications tools for good hygiene, safe culling and disposal of animal carcasses, waste management.

56. Mitigation Measures for Animal Health Component (Annexes 6 A-E). In Turkey, the existing animal carcass disposal method is digging of burial pits and use of quick lime for sanitization. Of particular concern is the risk to groundwater particularly from poorly sited pits. The Project aims to address this limitation in order to build capacity to deal with wastes by incineration, the preferred non-burial method (Annex 5).

57. The Project will support the purchase of mobile incinerators. Some minor construction work will be required for construction or rehabilitation and expansion of impermeable hardstanding and the catchment and containment of disinfectants used in the sanitization of the equipment. The scope of the potential impact will be modest and will most likely only involve the laying of hardstanding and catchment tanks or minor modifications to existing structures (Table 1). The MARA will ensure that the Government's standards requirements for these constructions meet the Bank's requirements and policies.

58. The incineration facilities will be procured in compliance with the EU Animal By-products Directive and the process will be operated within established guidelines drawn from published documents in other countries. The key emissions to the air from operation of the incinerators are odor, particulate matter, hydrogen chloride, nitrogen oxides, sulphur dioxide, carbon monoxide, volatile organic compounds (from methane to polycyclic aromatic hydrocarbons (PAH)), and dioxins and furans (PCDD/F). There will also be noise when the incinerator is operating. In addition, there is also risk from airborne release of virus as the dead poultry are loaded into the incinerator. The key actions of mitigation are to ensure that the formation of harmful substances is avoided through operation of the incinerator at the design temperatures and combustion air supply. The burning of materials e.g. polyvinyl chloride (PVC) materials that could lead to the formation of harmful substances when burnt will be avoided.

Table1. Potential environmental issues arising from operation of mobile incinerators

Category	Potential Negative Impacts	Level of Significance
Hardstanding isolation and catchment	• Rivers and Lakes Ecology • Protected areas • Geology and Soils • Landscape/Aesthetics • Land Acquisition • Loss of Crops, Fruit Trees and Household Infrastructure • Noise pollution during refurbishment	Moderate Low Low Low Low Low Moderate
Incinerator Flue gasses	• Rivers and Lakes Ecology • Protected areas • Geology and Soils • Landscape/Aesthetics • Land Acquisition • Loss of Crops, Fruit Trees and Household Infrastructure • Noise pollution during operation • Air quality	Low Low Moderate Low Low Moderate Low Moderate

Ash handling and disposal to land	• Rivers and Lakes Ecology • Protected areas • Geology and Soils • Landscape/Aesthetics • Land Acquisition • Loss of Crops, Fruit Trees and Household Infrastructure • Noise pollution during operation • Air quality	Low Low Moderate Low Moderate Low Low Low
Wash down and sanitization	• Rivers and Lakes Ecology • Protected areas • Geology and Soils • Landscape/Aesthetics • Land Acquisition • Loss of Crops, Fruit Trees and Household Infrastructure • Noise pollution during operation • Air quality	High Low Moderate Low Low Moderate Low Low

59. The key emissions to water from the incineration processes arise from the water and disinfectants that are used in the sanitization of the incinerator and the vehicle used in transport and the slaughter of poultry. There is also a risk from fuel spillage during transport and on site commissioning of the facility or overflow of fat from the incinerator. The key actions of mitigation are to provide training and working materials to the incinerator operators, drivers and other personnel, and to ensure that sites are prepared in advance with hardstanding and catchment and containment for disinfectants. Emissions to groundwater are to be controlled under the Turkish *Regulation for the Control of Water Pollution (published in the Official Gazette dated 31.12.2004 No. 25831).*

60. Best Available Techniques (BAT) assessment supports the use of high environmental performance smaller incinerators to be deployed on farms as an alternative to the transport of material to centralized fully Waste Incineration Directive (WID/EU) compliant high capacity incinerators. These units were able to meet the same emission standards as employed in the WID. The shortage of incinerator capacity in Turkey and the greater transport distances required to major centers where large incinerators could be built gives further strength to this as BAT.

61. Decision capacity for the mitigation measures; operation, maintenance and monitoring of the process will be fulfilled through training and capacity building in this area. The environmental management plan matrix has been populated with hazard and mitigation actions. This assessment is presented at Annex 6B.

62. Disposal of animal carcass and infected materials by burial. Burial as animal carcass disposal method is permitted as Derogation according to Article 24 of the EU Animal By-Products Directive 1774/2003, if the competent authority rejects transport to the nearest incineration or processing plant because of the danger of propagation of health risks or because

a widespread outbreak of an epizootic disease leads to a lack of capacity at such plants. The method is also accepted in other countries (Australia, Canada) with due attention to factors such as the amount of material for disposal, location of the burial site, proximity to water catchment areas, soil characteristics, etc. The mitigation measures, which address the pollution of the groundwater from poorly sited pits this risk, are presented in Annex 6A.

63. Properly sited and constructed burial pits are valid disposal options in Turkey, particularly prior to availability of the mobile incinerators to be provided under the project, or if the quantity or location of material to be disposed of exceeds the capacity or availability of the incinerators. The Project aims to address the risks of inadvertent spreading of the virus during disposal of carcasses by burial through: i)) training of veterinary services staff in proper handling of potentially infected materials; ii) training for responsible local administrations, farmers and commercial poultry workers on proper burial pit construction and operation; iii) provision of quick lime, and iv) ensuring guidance is provided from the local administrations regarding siting of burial pits to avoid groundwater contamination. The Law No. 3285 and its related regulation hold the municipality and the village council responsible for designating an area for burying dead or killed animals that have to be far away from residential areas, water sources and highways.

64. *Use of disinfectants*. Contamination to surface and groundwater from use of disinfectants necessary for sanitization of infected premises will be mitigated by i) promoting use of least toxic appropriate disinfectants (soaps and detergents), and ii) providing training to veterinary services personnel, poultry growers and workers on measures to limit use of toxic disinfectants and prevent untreated drainage or runoff into surface or groundwater systems.

65. *Laboratory waste management*. Reference and regional diagnostic laboratories (Bornova, Pendik, Etlik, Konya, Adana, Samsun, Erzurum and Elaz□) will be refurbished/rehabilitated and the staff will be trained on key environmental issues in zoonotic disease containment and waste management as pertain to special waste, emissions and materials. The mitigation measures will address laboratory waste management and safety (Annex 3, 4 and 6E). Strengthening Animal Disease Surveillance and Diagnostic Capacity Sub-component (B1) involves also some construction work for the laboratories that will have minor impact on the physical environment. The MARA and/or MoH will ensure that the Government's standard requirements for these constructions meet the Bank requirements and policies.

66. <u>Mitigation measures for Human Health Component</u>. The main environmental issues for this component are connected with laboratory environmental management systems under Sub-component B1 (Table 2). The Project will address laboratory waste management by basing training and upgrades to laboratory infrastructure and equipment on guidelines such as "International Best Practice in Safety of Research laboratories" developed by the US National Institute of Health (Annex 4 and 6 E).

Table 2. Potential environmental issues arising from rehabilitation of laboratories

Category	Potential Negative Impacts	Level of Significance
Laboratory refurbishment and modernization	• Rivers and lakes ecology • Protected areas • Geology and soils • Landscape/aesthetics • Land acquisition • Loss of crops, fruit trees and household infrastructure • Noise pollution during refurbishment	Low Low Low Low Low Low Moderate

67. Improvement of Laboratory Networks Sub-component (B1) involves some construction work including rehabilitation and upgrading that might have an impact on the physical environment (Table 2). However, the scope of the potential impact generally be modest and most likely involve modifications to existing buildings. MARA will ensure that the Government's standard requirements for these constructions meet the Bank requirements and policies.

VI. Monitoring

68. The environmental monitoring and operation guidelines for the incineration facilities are based upon published guidelines for facilities up to 1 ton per hour capacity. Extracted information relevant to Turkey is shown at Annex 7B. These were developed to monitor performance and emissions from incineration plant designed to destroy animals according to the EU Animal by-Products Directive 1774/2005 2003. The WID gives emissions monitoring guidelines for incineration facilities with a capacity of more than 1 tone/hour. For lower capacity incinerators, the countries determine their own emission limits in accordance with their national regulations. For reference, the emission limits used in the UK are presented in Table 3. The mobile incinerators envisaged for Turkey will have a capacity of less than 1tonne/ hour and monitoring will be done according to the prevailing Turkish air pollution legislation that has already been harmonized with EU.

69. In the EU Directive 94/2005 on Community measures for the control of avian influenza, Article 48 requires that the cleansing, disinfection and treatment of holdings and any materials or substances contaminated or likely to be contaminated with avian influenza viruses are carried out under official supervision in accordance with: i) the instructions of the official veterinarian; and ii) the principles and procedures for cleansing, disinfecting and treatment set out in Annex VI of the directive (Annex 8).

70. The Turkish government has adopted the general principles of the Directive and its predecessor Directive 92/40/EEC within its strategic response. These guidelines and the legal statutes for the Turkish response provide clear and functional environmental/social issues monitoring and evaluation roles and responsibilities, and provide monitoring indicators in order to measure the success of the mitigation measures. The monitoring indicators include the maintenance of the operating temperatures of the incinerator facilities to that will ensure that

the destruction of harmful products of combustion. This will demonstrate that the incinerator is operated correctly and in a way that minimizes harmful emissions (Table 4).

Table3. Reference emission limits, monitoring and other provisions based on UK regulations for small incinerators.

Row	Determinant	Emission limits/provisions	Monitoring	Monitoring frequency subject to para 5.14
1	Total particulate matter	100 mg/m^3	Indicative monitoring and recording Manual extractive test	Continuous Annual
2	Hydrogen Chloride (excluding particulate matter	100 mg/m^3 as total carbon	Manual extractive test	Annual
3	Carbon monoxide	100 mg/m^3 as an hourly average 150 mg/m^3 for 95% of all measurements, determined as 10 minute averages, in any 24 hour period	Quantitative monitoring and recording Manual extractive test	Continuous Annual
4	Sulphur dioxide	300 mg/m^3 or limit sulphur in fuel oil to 0.2% ww until 1 Jan, 08 and 0.1%ww after 1 Jan, 08	Manual extractive tests Or for fuel oil limit-certificate from supplier	Annual On change of supplier
5	Organic compounds excluding particulate matter	10 mg/m^3	Manual extractive tests	Annual manual extractive tests
6	Organic carbon in ash	1% carbon	See ash monitoring protocols	See ash monitoring protocols
7	Oxygen	Minimum 3% and average 6% by volume	Measure at or after the end of retention zone in secondary chamber Measure at same location as annual manual extractive tests	Continuous Concurrently throughout annual manual extractive tests
	Oxygen		Measure at same location as annual manual extractive tests	Concurrently throughout annual manual extractive tests

71. Monitoring of carcass and animal waste disposal by burial is covered in Annex 7A. As has been demonstrated successfully in a number of countries, the risks associated with disposal by burial can be successfully mitigated if the process is well monitored.

72. Monitoring of the interception of liquid run off from disinfecting and wash down of the incineration facilities, containers and vehicles is required to demonstrate that biocide contaminated water is intercepted and that none is able to enter ground water via soak away or surface drainage (Annex 7 B).

Table 4. Summary of control techniques[2]

Source	Substance	Control techniques
Flue gas	Odor	Good combustion temperature
	Particulate matter	Good combustion if necessary abate emissions
	Particulate matter	Good combustion
	Sulphur oxides	Limit sulphur in fuel oil abate if necessary
	Carbon monoxide	Good combustion
	Hydrogen chloride	Abate if necessary
	Volatile organic compounds	Avoid combusting precursors. Good combustion
	Dioxins	Avoid combusting precursors. Good combustion
Ash	Particulate matter	Contain

73. Monitoring of laboratory safety, waste management and laboratory rehabilitation indicators include staff training, renovations and installation and safe operation of equipment that ensure the satisfactory completion of training and laboratory renovations to avoid spreading the virus during operations (Annex 7 E).

VII. Institutional Arrangements and Budget

74. The Central Execution Unit (CEU-of the Agricultural Reform Implementation Project) in the MARA and the Project Implementation Unit (PIU-responsible for the Health Transition Project) in the MOH are responsible for ensuring adequate budget for procurement of services, goods and works for implementation of the EMP mitigation and monitoring measures, and for supervision. The operation, monitoring and control of animal waste incinerators are devolved to the local provincial administration. This will involve receiving the results of continuous process monitoring to be provided by the incinerator operating team and carrying out annual manual extractive tests for each unit as in Table 4. CEU and PIU are responsible for monitoring compliance with the EMP; budget is provided for overall project monitoring, including environmental compliance, under Component 3. Budget for implementation of the EMP mitigation measures is provided to MARA and MoH under the Animal Health and Human Health Components of the project.

VIII. Public Consultation Arrangements

75. The draft EMP has been publicly disseminated in Turkish by CEU through the Ministries of Agriculture and Rural Affairs (MARA) and Health (MOH) by posting on the

Ministries' websites. An initial review meeting was held on April 26, 2006 with MARA, MOH and MOEF and initial reactions and comments on draft EMP were taken.

76. The CEU organized and conducted a public briefing and consultation on the draft EMP on May 4, 2006 (Annex 9). The place, time and purpose of the consultation were announced on the government websites a week in advance of the meeting. In addition to the public announcement of the meeting, invitations (announcing the place, time and purpose of the meeting, and the website addresses where the draft EMP can be accessed) were sent to environmental and poultry NGOs, commercial poultry growers, farmers associations, local officials from regions prone to AI, Ministries of Agriculture, Health and Environment and Forestry and other relevant government agencies, local representatives of international organizations including the World Bank, EU, United Nations Children's Fund (UNICEF), United Nations Development Program (UNDP), FAO, WHO and US Agency for International Development (USAID) (a total of 39 agencies).

77. The draft EMP was revised after the meeting to take into account inputs from the consultation, as appropriate. The final version of the EMP will be made publicly available in Turkey, provided to the World Bank, and used by the government agencies in the implementation of the project.

Annex 1

Summary of the FAO and the OIE Global Strategy for the Progressive Control of Highly Pathogenic Avian Influenza (HPAI)

1. **Vision and goal.** The long-term vision of the strategy is to minimize the global threat and risk of HPAI in humans and domestic poultry, through progressive control and eradication of HPAI, particularly that caused by H5B1 virus, from terrestrial domestic poultry in Asia. Achieving this goal will diminish the global threat of a pandemic, stabilize poultry production, enhance a robust regional and international trade in poultry and poultry products, increase human and food safety, and improve the livelihoods of the rural poor.

2. **A phased approach**. The global strategy will be implemented over three time frames: immediate to short (1-3 years), short to medium (4-6 years) and medium to long term (7-10 years). During this period the spread of HPAI, mainly of the H5N1 strain, will have been progressively controlled in domestic poultry of all infected countries of Asia, and prevented from affecting those Asian countries not currently infected, but at high risk.

3. The immediate to short-term objective is to reduce the risk to humans by preventing further spread of HPAI in those countries that are currently infected by H5N1.

4. Over the medium to long-term (7-10 years), a more focused approach to HPAI will be mounted to progressively eradicate the disease from the remaining compartments of infected domestic terrestrial poultry in the region. The medium-to-long term strategy will consider all control measures, including vaccination, zoning and compartmentalization as defined in the OIE Terrestrial Animal Health Code. For the long-term success of this strategy, restructuring of the poultry sectors in the region will need to be seriously considered.

5. To prevent the threat of HPAI from spreading to avian influenza-free countries, the long-term strategy supports the development of active surveillance programs and emergency preparedness plans for non-infected, at risk countries. The application of OIE standards relating to the international trade of poultry and poultry products will further assist in preventing the spread of HPAI virus across continents.

6. **Capacity building**. Inadequate capacity in many countries is the principal limiting factor for effectively and quickly stamping out and controlling infectious diseases. Thus, the strategy suggests building a strong and sustainable human and physical resource capacity in the countries, to respond in a more effective and timely manner in stamping out not only HPAI outbreaks, but also other newly emerging infectious zoonotic and trans-boundary animal diseases. Capacity building will be wide ranging and include all aspects of disease control as well as policy development and socio-economic impact analysis.

7. **Strategic research.** The global strategy recognizes that the dynamics of the current rapid spread and persistence of HPAI remain unclear. Therefore, the strategy will facilitate

strategic research to investigate the epidemiology of avian influenza, evaluate the efficacy of vaccines in domestic ducks to reduce the virus shedding in domestic duck reservoirs, and work in close collaboration with regional and international advanced research institutions to promote the development of improved vaccines and rapid diagnostic tests. Risk analysis of various poultry production systems and along marketing chains will be carried out to better target effective disease control.

8. **Implementation.** Implementation will be at the national, regional and international levels. At the national level, well-defined country specific projects will be formulated, which will be underpinned by the formation of sub-regional HPAI support units. Through these units, sub-regional disease diagnosis and surveillance and socio-economic and policy analysis networks will be established. These sub-regional networks will provide the lead in the development of harmonized technical standards and regional policies related to the management of live animal movement, compensation plans, capacity building, disease reporting requirements and long term planning to restructure poultry sectors.

9. At the international level, coordination of the national programs and sub-regional networks will be under the umbrella of GF-TADs (global framework for the control of trans-boundary animal diseases), a joint FAO/OIE initiative. The international coordination will provide technical backstopping to the sub-regional networks and national programs, promote international cooperation, and mobilize and coordinate resources for HPAI control.

10. **Partners.** The main partners in implementation of the strategy will be infected and non-infected at-risk countries, and regional organizations, all of which are committed to controlling trans-boundary animal and zoonotic diseases. Given the zoonotic nature of the HPAI, and the complex interface between farming systems, livestock trade, food safety and public health, a strong international partnership among FAO, OIE and WHO will be continued. A number of other partners will be involved, important among these would be the private sector, NGOs, and regional national agriculture extensions systems (NARES).

11. **Resources.** The implementation of the strategy will require funding to support the national, regional and international HPAI control programs as outlined above.

Framework for Implementation

12. A Framework for Implementation has been developed by FAO/OIE, promoting national, regional, and international initiatives. It includes the following:

National initiatives:

- Development of a National Strategy for each country specific to its own conditions. It would address farming systems, presence/absence of ducks, presence of human cases or not, trade orientation, implementation capacity, and wildlife migration patterns;
- Preparation of contingency and emergency preparedness plans;
- Development of economic impact and policy frameworks;

- Prevention of avian influenza to non-infected at-risk countries through awareness, reporting, and early detection; and
- Improvement in epidemiological information on source of infection and transmission dynamics in farming system and marketplaces.

Regional initiatives:

- Standardization of diagnosis and reporting techniques among countries;
- Sharing of disease information between countries;
- Development of a regulatory framework for management of animal movements; and
- Promotion of adherence to OIE guidelines to facilitate regional trade.

Global initiatives:

- Strengthening of partnerships (FAO, OIE, WHO, UNDP, donors);
- Support for global networks (OIE Global Service Center supported by WB/DGF and donors);
- Support for sub-regional networks -- OIE/FAO epidemiology collaborating centers and Avian Influenza Network (OFFLU);
- Further development of control strategies for trans-boundary animal diseases (utilizing the GF-TADs mechanism);
- Development of a Global Early Warning System (FOA/OIE/WHO);
- Coordination of research on improved tools for avian influenza control;
- Provision of global vision for avian influenza control; and
- Mobilization of resources through donor liaison and advocacy.

Annex 2

Summary of the World Health Organization (WHO) Strategy

1. The strategic plan lays out activities for individual countries, the international community and WHO to prepare for a pandemic and mitigate its impact. The objectives of the plan correspond to the opportunities to intervene and are structure in the following three phases:

Phase - Pre-Pandemic:

(i) *Reduce opportunities for human infection.* An immediate priority is to halt spread in poultry to reduce human exposure to the virus. More intensive collaboration is needed between the animal and health sectors. Communication activities targeting stakeholders, particularly rural poultry holders, should be strengthened. Workers carrying out the culling of poultry must be protected against infection by clothing and equipment.

(ii) *Strengthen the early warning system.* To assess risks to public health and guide protective measures, information is needed on the extent of influenza infection in animals and humans and on circulating viruses. National surveillance systems must be improved urgently in potentially affected countries. When outbreaks in animals occur, active human case detection should be pursued by a coordinated animal-human health team.

Phase - Emergence of a Pandemic:

(iii) *Contain or delay spread at the source.* Aggressive containment measures such as isolation and prophylactic use of antiviral drugs may slow pandemic spread and allow time for response measures. An international stockpile of antiviral drugs for an emergency response should be established, starting with a stockpile for targeted early use.

Phase – Pandemic Declared and Spreading Internationally:

(iv) *Reduce morbidity, mortality, and social disruption*. Although mass vaccination is the preferred intervention, serious issues related to the time lag between emergence of the virus and vaccine production as well as production capacity constraints must be addressed. Anti-viral supply and production capacity are also limited. Therefore, the main responses in the immediate term should be classic "social distancing measures" such as quarantine, bans on mass gatherings, and travel restrictions, backed up by a well-designed communication strategy. For the longer term, options with industry to improve antiviral and vaccine capacity need to be explored.

(v) *Conduct research during pandemic*. Research is needed for policy development and adjustments for current and future epidemics. The main elements include: assessing the

epidemiologic characteristics; monitoring the effectiveness of the interventions; and evaluating the medical and economic consequences.

Recommended Strategic Actions

2. In view of the immediacy of the avian influenza threat, WHO recommends that all countries undertake urgent action to prepare for a pandemic. Advice on doing so is contained in the recently revised *WHO global influenza preparedness plan* (2005) and a new *WHO checklist for influenza pandemic preparedness planning (2005).* Table 1 describes the phases of increasing public health risk associated with the emergence of a new influenza virus subtype that may pose a pandemic threat, and the overarching public health goals under each phase.

Table 1: Phases of Increasing Public Health Risk Associated with the Emergency of a New Influenza Virus Subtype that May Pose a Pandemic Threat

PHASES	OVERARCHING PUBLIC HEALTH GOALS
Interpandemic period	
Phase 1. No new influenza virus subtypes have been detected in humans. An influenza virus subtype that has caused human infection may be present in animals. If present in animals, the risk of human infection or disease is considered to be low.	Strengthen influenza pandemic preparedness at the global, regional, national and sub-national levels.
Phase 2. No new influenza virus subtypes have been detected in humans. However, a circulating animal influenza virus subtype poses a substantial risk of human disease.	Minimize the risk of transmission to humans; detect and report such transmission rapidly if it occurs.
Pandemic alert period	
Phase 3. Human infection(s) with a new subtype, but no human-to-human spread, or at most rare instances of spread to a close contact.	Ensure rapid characterization of the new virus subtype and early detection, notification and response to additional cases.
Phase 4. Small cluster(s) with limited human-to-human transmission but spread is highly localized, suggesting that the virus is not well adapted to humans.	Contain the new virus within limited foci or delay spread to gain time to implement preparedness measures, including vaccine development.
Phase 5. Larger cluster(s) but human-to-human spread still localized, suggesting that the virus is becoming increasingly better adapted to humans, but may not yet be fully transmissible (substantial pandemic risk).	Maximize efforts to contain or delay spread, to possibly avert a pandemic, and to gain time to implement pandemic response measures.
Pandemic period	
Phase 6. Pandemic: increased and sustained transmission in general population.	Minimize the impact of the pandemic.

a. The distinction between phase 1 and phase 2 is based on the risk of human infection or disease resulting from circulating strains in animals. The distinction is based on various factors and their relative importance according to current scientific knowledge. Factors may include pathogenicity in animals and humans, occurrence in domesticated animals and

livestock or only in wildlife, whether the virus is enzootic or epizootic, geographically localized or widespread, and/or other scientific parameters.

b . The distinction between phase 3, phase 4 and phase 5 is based on an assessment of the risk of a pandemic. Various factors and their relative importance according to current scientific knowledge may be considered. Factors may include rate of transmission, geographical location and spread, severity of illness, presence of genes from human strain (if derived from an animal strain), and/or other scientific parameters (Source: WHO 2005).

3. In order to accomplish the public health goals described for each phase, WHO recommends strategic actions that can be undertaken to capitalize on each opportunity to intervene. Given the many uncertainties about the evolution of the pandemic threat, including the amount of time left to prepare, a wise approach involves a mix of measures that immediately address critical problems with longer-term measures that sustainably improve the world's capacity to protect itself against the recurring pandemic threat.

4. The strategic actions are:

Reduce opportunities for human infection, including:

- Support to the FAO/OIE control strategy;
- Intensify collaboration between the animal and public health sectors;
- Strengthen risk communication to rural residents; and
- Improve approaches to environmental detection of the virus

Strengthen the early warning systems, including:

- Improve the detection of human cases;
- Combine detection of new outbreaks in animals with active searches for human cases;
- Support epidemiological investigation;
- Coordinate clinical research;
- Strengthen risk assessment;
- Strengthen existing national influenza centers throughout the risk-prone regions; and
- Give risk-prone countries an incentive to collaborate internationally.

Contain or delay spread at the source, including:

- Establish an international stockpile of anti-viral drugs;
- Develop mass delivery mechanisms for anti-viral drugs; and
- Conduct surveillance of antiviral susceptibility.

Reduce morbidity, mortality and social disruption, including:

- Monitor the pandemic in real time;
- Introduce non-pharmaceutical interventions;
- Use of antiviral drugs to protect priority groups;

- Augment vaccine supplies;
- Ensure equitable access to vaccines; and
- Communicate risks to the public.

Conduct research to guide response measures, including:

- Assess the epidemiological characteristics of an emerging pandemic;
- Monitor the effectiveness of human interventions; and
- Evaluate the medical and economic consequences.

Annex 3

Guidance on the Bio-Safety Levels for Laboratories

	Bio-Safety Level		
REQUIREMENTS OF THE LABORATORY	**2**	**3**	**4**
A) Laboratory siting and structure			
1. Not next to known fire hazard	Yes	Yes	Yes
2. Workplace separated from other activities	Yes	Yes	Yes
3. Personnel access limited	Yes	Yes	Yes
4. Protected against entry/exit of rodents and insects	Yes	Yes	Yes
5. Liquid effluent must be sterilized		Yes and monitored	Yes and monitored
6. Isolated by airlock. Continuous internal airflow		Yes	Yes
7. Input and extract air to be filtered using HEPA or equivalent		Single on extract	Single for input, double for extract
8. Mechanical air supply system with fail-safe system		Yes	Yes
9. Laboratory sealable to permit fumigation		Yes	Yes
10. Incinerator for disposal of carcasses and waste	Available	Yes	Yes on site
B) Laboratory facilities			
11. Class 1/2/3 exhaust protective cabinet available	Yes	Yes	Yes
12. Direct access to autoclave	Yes	Yes with double doors	Yes with double doors
13. Specified pathogens stored in laboratory	Yes	Yes	Yes
14. Double ended dunk tank required		Preferable	Yes
15. Protective clothing not worn outside laboratory	Yes	Yes	Yes
16. Showering required before exiting laboratory			Yes
17. Safety Officer responsible for	Yes	Yes	Yes

containment			
18. Staff receive special training in the requirements needed	Yes	Yes	Yes
C) Laboratory discipline			
19. Warning notices for containment area	Yes	Yes	Yes
20. Laboratory must be lockable	Yes	Yes	Yes
21. Authorized entry of personnel	Yes	Yes	Yes
22. On entering all clothing removed and clean clothes put on		Yes	Yes
23. On exiting all laboratory clothes removed, individual must wash and transfer to clean side		Yes	
24. Individual must shower prior to transfer to clean side			Yes
25. All accidents reported	Yes	Yes	Yes
D) Handling of specimens			
26. Packaging requirements to be advised prior to submission	Yes	Yes	Yes
27. Incoming packages opened by trained staff	Yes	Yes	Yes
28. Movement of pathogens from an approved laboratory to another requires a license	Yes	Yes	Yes
29. Standard Operating Procedures covering all areas must be available	Yes	Yes	Yes

(Source: OIE)

Annex 4

International Best Practice in Safety of Research Laboratories[2]

Procurement / Transport
⊠Minimize acquisition / quantity of hazardous materials, minimize storage time needed ⊠Identify mechanism of waste disposal before acquisition ⊠For chemicals, have Material Safety Data Sheets (MSDSs) accessible/confine deliveries to areas that are equipped to handle them (and train relevant personnel) ⊠Ensure container is intact and appropriately labeled (US regulations detail how hazardous materials have to be identified, packaged, marked, labeled, documented and placarded) ⊠Transport in appropriate (secondary) containers ⊠Use triple packaging system for infectious and potentially infectious substances ⊠Adhere to international air transport regulations
Storage / Management
⊠Inventory should have name as printed on the container ⊠For chemicals: include molecular formula for further identification and to provide a simple means of searching chemicals; include CAS (Chemical Abstract Service) registry number for unambiguous identification of chemicals despite the use of different naming conventions ⊠Source ⊠Size of container ⊠Hazard classification, as a guide to safe storage, handling, and disposal ⊠Date of acquisition, to ensure that unstable chemicals are not stored beyond their useful life, and storage location *Procedures* ⊠Dispose of materials anticipated to not be needed within a reasonable time frame ⊠Use approved containers; make sure storage containers remain intact and sealed ⊠Dispose of chemicals prior to expiration date, monitor reactive chemicals ⊠Replace deteriorating labels before information is obscured or lost ⊠Follow regulations for safe storage in stockroom or lab ⊠Avoid storing chemicals on bench tops or lab hoods ⊠Store volatile chemicals in ventilated cabinet (near hood) ⊠If ventilation is not required, store in closable cabinet or on shelf with lip to prevent sliding ⊠Do not expose stored chemicals to heat or direct sunlight ⊠Observe all precautions regarding the storage of incompatible chemicals ⊠Provide vented cabinets beneath hoods for storing hazardous materials

[2] US National Institutes of Health

- Use chemical storage refrigerators for storing chemicals
- Have fire protection system (sprinklers)
- Follow storage limits for flammable and combustible liquids
- Restrict access to storage facility

Protocols / Facilities for Use in Research

- Wear and use appropriate personal protection materials to minimize exposure
- Wash hands
- Reduce the possibility of creating splashes or aerosols
- Contain in biological safety cabinets operations that generate aerosols
- Use good housekeeping
- Use mechanical pipetting devices
- Promptly decontaminate work surfaces
- Never eat, ring, smoke, handle contact lenses, apply cosmetics, or take medicine in the lab
- Take special care when using sharps
- Keep lab doors closed when experiments are in progress
- Use secondary leak-proof containers to move or transfer cultures
- Decontaminate infectious waste before disposal
- Post appropriate warning signs
- Mark emergency equipment, maintain it, inspect it; list telephone numbers to call in case of accident
- Control access
-

For Radioisotopes

- Use only in designated areas
- Allow the presence of essential staff only
- Use personal protective equipment
- Monitor personal radiation exposures
- Use spill trays lined with disposable absorbent materials
- Limit radionuclide quantities
- Shield radiation sources
- Mark radiation containers with the radiation symbol, including radionuclide identity, activity, and assay date
- Use radiation meters to monitor working areas, protective clothing, and hands after completion of work
- Use appropriately shielded transport containers
- Remove radioactive waste frequently from the working area
- Maintain accurate records of use and disposal of radioactive materials
- Screen dosimetry records for materials exceeding the dose limits
- Establish and regularly exercise emergency response plans
- In emergencies, assist injured persons first

- Clean contaminated areas thoroughly
- Write and keep incident reports

For Animal laboratories

- Require good microbiological techniques
- Establish policies and protocols for all operations and for access to vivarium
- Establish appropriate medical surveillance program and supervision for staff
- Prepare and adopt safety or operations manual
- Post warning signs
- Decontaminate work surfaces after use
- Use appropriate biological safety cabinets or isolator cages; handle and decontaminate animal bedding and waste materials appropriately
- Transport material for autoclaving or incineration safely, in closed containers
- Treat, report, and record injuries

Training of Personnel

Employer develops Chemical Hygiene Plan containing (models available from U.S. government and from some professional societies)

Employee information and training about the hazards of chemicals in the work area:
- How to detect their presence or release
- Work practices and how to use protective equipment
- Emergency response procedures

Circumstances under which a lab operation requires prior approval from the institution
Standard operating procedures for work with hazardous chemicals
Criteria for use of control measures
Measures to ensure proper operation of fume hoods and other protective equipment
Provisions for additional employee protection for work with select carcinogens and toxins
Provisions for medical consultations and examinations for employees
Labs should establish their own safety groups at the department level (include students and support staff)
Labs should provide training in safety and waste management for all lab workers, including students in laboratory classes
Labs should incorporate institutionally supported lab and equipment inspection programs into their overall health and safety programs
Review exit / evacuation routes
Know how to report fire, injury, chemical spill, or summon emergency response
Know first aid
Know location and use of emergency equipment such as safety showers and eyewashes
Know location and use of fire extinguishers and spill control equipment (have appropriate kits readily available)

Lab personnel should establish ongoing relationships and clear lines of communication with emergency response teams

Include information on safe methods for highly hazardous procedures commonly encountered by lab personnel that involve:

- Inhalation risks
- Ingestion risks
- Risks of percutaneous exposures
- Bites and scratches when handling animals
- Handling of blood and other potentially hazardous pathological materials
- Decontamination and disposal of infectious material

Segregation / Triage of Waste

- Multihazardous waste – goal is reduction of waste to a waste that presents a single hazard.
- Consider frequency and amount of waste generated; assess risk
- Identify / characterize waste:
    - Physical description
    - Water reactivity
    - Water solubility
    - pH and possibly neutralization information
    - ignitability / flammability
    - presence of oxidizer
    - presence of sulfides / cyanides
    - presence of halogens
    - presence of radioactive materials
    - presence of biohazardous materials
    - presence of toxic constituents
- Minimize waste's hazards
- Determine options for management of hazards
- If appropriate, take steps to neutralize waste or render it non-hazardous
- When possible, select a single management option
- Establish procedures for dealing with unstable waste, or waste that requires special storage or handling
- Store safely:
    - Designated room or facility modified to contain the waste (with ventilation and effluent trapping)
    - Protect workers
    - Minimize risk of fire or spill
    - Minimize radiation levels outside of area

- Consider compatibility of materials being accumulated (e.g., aqueous and non-aqueous waste should be separated)

- Give particular attention to the handling or cleaning of radioactive laboratory ware, and to the proper disposal of sharps.

  - Non-contaminated (non-infectious) waste can be reused or recycled or disposed of as general waste
  - Contaminated (infectious) sharps – collect in puncture-proof containers fitted with covers and treated as infectious; autoclave if appropriate
  - Contaminated material for decontamination by autoclaving and thereafter washing and reuse or recycling
  - Contaminated material for direct incineration

Disposal

No activity should begin unless a plan for the disposal of hazardous waste has been formulated

- Use appropriate disposal method for each category of waste
- Use appropriate containers
- Label and securely close waste containers
- Separate wastes as appropriate

For low level radioactive waste, options include

- Storage time for decay and indefinite on site storage,
- Burial at a low-level radioactive waste site,
- Incineration, or
- Sanitary sewer disposal

For biological waste, options include

- Disinfection
- Autoclaving
- For liquidsdisposal in sanitary sewer putrescible waste disposed of by incineration needles and sharps require destructiontypically by incineration or grinding

Collection and storage of waste

- At satellite area near lab:

  - should be clearly identified, ventilated if necessary
  - determine whether to recycle, reuse, or dispose
  - hold here for less than one year; when containment volume limits

reached, move to central accumulation area – package appropriately

- At central accumulation area:
    - separate according to compatibility, commingle solvents when appropriate
    - label clearly, store in appropriate containers
    - limit storage time to 90 days
    - Ensure that employees are trained to handle waste materials as well as contingency planning for emergencies
    - When transporting, make provisions for spill control in case of accident; have internal tracking system to follow movement of waste
    - Ensure that all necessary records have been generated (Quantities and identification of waste generated and shipped; Documentation and analyses of unknown materials; Manifests for waste shipping as well as verification of waste disposal; Any other information required to ensure compliance and safety from long-term liability)
- Disposal options:
    - Incineration – is method of choice for most wastes, but is most expensive
    - Normal trash – only where appropriate, must be clearly identified and appropriately labeled
    - Sanitary sewer – not commonly used; solutions must be aqueous and biodegradable, or low toxicity inorganics – make sure sewer doesn't drain into water supply inappropriate for waste disposal, and make sure waste is highly diluted
    - Release to the atmosphere – not acceptable; fume hoods must have trapping devices to prevent discharge to atmosphere

- If hazardous and non-hazardous wastes are mixed, entire waste volume must be treated as hazardous
- Preparation for transport to a treatment, storage, and disposal facility (TSDF)
- Waste generator must obtain assurance (in terms of documentation, permits, records) that provider is reliable

For infectious material

- Decontaminate, autoclave, or incinerate in lab
- Package appropriately (for incineration or for transfer to another facility for incineration)
- Protect against hazards to others to those who might contact discarded items

ANNEX 5

COMPARISON OF DISPOSAL METHODS FOR ANIMAL WASTES GENERATED FROM AVIAN INFLUENZA OUTBREAKS

DESCRIPTION	ENVIRONMENTAL CONSIDERATIONS	SAFETY CONSIDERATIONS	ADVANTAGES/ DISADVANTAGES
OPTION 1: BURIAL IN A PIT			
Decomposition of dead birds/ carcasses and other wastes through biological degradation in a pit and involves: Excavation of a burial pit Placing carcasses in a deep burial pit • Covering carcasses and other wastes with soil (about 40 cm) to: (i) prevent carcasses from rising out of the pit, (ii) prevent scavengers digging up carcasses, (iii) help filter out odors, and (iv)absorb the fluids of decomposition. Adding an unbroken layer of slaked lime [$Ca(OH)_2$] to protect carcasses from being uncovered by carnivores and earthworms after pit closure (lime should not be placed directly on carcasses because in wet conditions it slows, and may prevent, decomposition) Closing the pit to ground level with soil (at least 2 meters of soil is required in total)	Site Selection Considerations: • Distance to watercourses, bores, and dug wells • Height of watertable (the base of the pit must be at least 1 m above the watertable) • Slope of the land at the burial site to the nearest watercourse (drainage to and from the pit) • Soil permeability • Distance to human settlements and public lands (including roads) • Prevailing wind direction (for odor emission) • Availability of space for temporary storage of excavated soil • Accessibility of the burial site by digging equipment (e.g. excavator) Burial Site Inspection: Three (3) months after closure, inspection of the burial site to identify any potential problems (e.g. seepage) and take corrective measures. Transportation-Related Waste/Wastewater Treatment: • Any wastewater generated from cleaning/disinfection of vehicles/ containers should be disinfected	Use of personal protection equipment (PPE) to ensure personnel hygiene and safety of personnel working at the site Availability of emergency response measures and equipment for safety breaches (e.g. availability of first aid and rescue equipment if the personnel falls into the pit) Established and documented cleaning/disinfection procedures Availability of cleaning/ disinfection supplies/equipment Personnel training on personnel hygiene and safety measures Transportation of Carcasses/Wastes to an Environmentally Suitable Site: If carcasses and other contaminated materials need to be transported to an off-site for disposal, then: • The vehicles must be leak-proof and covered • The vehicles and external surfaces of containers should not leave the culling area without first being thoroughly cleaned/ disinfected • The vehicles and internal, external surfaces of containers should be cleaned/ disinfected after unloading carcasses and other wastes at the environmentally suitable site	Advantages: • Safe disposal if environmental conditions are met • Risk of disseminating the virus to other sites can be avoided if burial can be done on site • Low cost Disadvantages: • Likely to be affected by surface water, groundwater, soil or topographical conditions • If transportation to an environmentally suitable site is required, then: (i) increased the risk of disseminating the virus to other sites, (ii) higher costs for transportation and associated mitigation measures • Risk of groundwater contamination if site selection is not appropriate

DESCRIPTION	ENVIRONMENTAL CONSIDERATIONS	SAFETY CONSIDERATIONS	ADVANTAGES/ DISADVANTAGES
	before discharge. • Any waste generated during loading and unloading of vehicles as well as cleaning/disinfection of vehicles/containers should be safely disposed		
OPTION 2: OPEN AIR BURNING (CREMATION)			
This method is based on destruction of infective pathogens, animal carcasses and other wastes through thermal destruction in open air. It involves: • Digging trenches, which act as air vents • Placing pyre (wood) on top of trenches (upwind, at right angle to the prevailing wind direction) • Placing carcasses and other wastes at the opposite side • Pouring fuel (e.g. kerosene) onto carcasses, other wastes and pyre and starting fire (adequate supply of fuel must be at the site to ensure complete cremation).	Site Selection Considerations: Potential adverse impacts of heat, smoke or odor on nearby people, infrastructure (structures, underground and aerial utilities, roads, etc.) and environment (e.g. trees) Accessibility of equipment to construct and maintain the fire and for delivery of fuel and carcasses The ashes should be buried and the site should be restored Waste Pretreatment/Containment: To avoid emission of dioxins or furans during cremation, carcasses should not be pretreated with a chlorine-bearing disinfectant or should not be contained in PVC bags. For the same reason, no other material destined for cremation should contain chlorine-bearing chemicals	Maintaining adequate fire break around the pyre (consult local fire brigades or residents for advice) Use of PPE to ensure personnel hygiene of personnel working at the site Availability of emergency response measures and equipment for safety breaches (e.g. availability of first aid equipment and availability of fire fighting equipment and personnel and if fire spreads around) Established and documented cleaning/disinfection procedures Availability of cleaning/ disinfection supplies/equipment Personnel training on personnel hygiene and safety measures	Advantages: • Cremation is not affected by surface water, groundwater, soil, and topographical conditions • Low cost, compared to incinerator option Disadvantages: • Infective pathogens may not be effectively destroyed if combustion of carcasses and wastes is incomplete, especially under adverse atmospheric conditions (wind, precipitation) • It is not possible to easily verify that all infective pathogens are destroyed in the incomplete combustion process • Air emissions from open air burning (PM, CO_2) • Disposal of ash from cremation requires consideration for surface water, groundwater, soil and topographical conditions • Expensive than option 1 (burial)
OPTION 3: COMPOSTING			
This method is based on thermal deactivation of the virus and decomposition of carcasses, litter and other contaminated organic wastes	Site Selection Considerations: • Must be done at the affected farm in a secure area not accessible by other animals (such as birds,	Use of PPE to ensure personnel hygiene of personnel working at the site Availability of emergency response measures and equipment for safety breaches	Advantages: • Effective for manure and litter waste • Can be undertaken within

DESCRIPTION	ENVIRONMENTAL CONSIDERATIONS	SAFETY CONSIDERATIONS	ADVANTAGES/ DISADVANTAGES
through aerobic biological degradation. Success of composting depends on: (i) proper nutrient mix [carbon-to- nitrogen (C:N) ratio of 20:1 to 35:1; carbon-to-phosphorus (C:P) ratio of 100:1 to 150:1 is desirable); (ii) moisture (40-60%); (iii) temperature (55-60°C), and (iv) pH (6.5-7.2). Composting involves: • Piling carcasses with other bulky contaminated or non-contaminated material, such as wood chips, saw dust, straw bedding, to allow for proper aeration and covered with a biological filter (not whole plastic) without pressing or compacting. Piling should not exceed about 3.5 m in width and 2 m in height. • Collecting and treating any runoff water from the decomposing material • Keeping the wastes in place for several weeks (while a temperature of 55-60°C is attained within 10 days) • After several weeks as temperatures decrease to about 45-50°C, mixing the material within the pile without pressing (Properly decomposing material should be dark in color with minimal foul odor.) • Using the compost solely on the land for animal production.	rodents, cats, or dogs) • Proximity to residential areas and water sources (must be away)	Established and documented cleaning/disinfection procedures Availability of cleaning/ disinfection supplies/equipment Personnel training on personnel hygiene and safety measures	sheds or otherwise on site to avoid the risks of disseminating the virus through transport • No transportation cost <u>Disadvantages</u>: • Maintaining optimum temperatures for many days in cold climate areas/seasons may not be possible (or may be costly) • Infective pathogens may not be effectively destroyed if ideal conditions are not achieved • Risk of disseminating the virus if the composting area is not effectively secured/isolated • It may not be possible to easily verify that all infective pathogens are destroyed
OPTION 4: INCINERATION (FIXED)			
This method is based on thermal destruction of infective pathogens, carcasses and other wastes in an incinerator. It involves:	<u>Site Selection Considerations</u>: • Should not be in a floodplain • Distance to human settlements • Human settlements upwind of	Use of PPE to ensure personnel hygiene of personnel working at the site (incinerator operators must change their PPE before handling animal carcasses and other wastes)	<u>Advantages</u>: • Complete destruction of infective pathogens • Over 95% waste reduction

DESCRIPTION	ENVIRONMENTAL CONSIDERATIONS	SAFETY CONSIDERATIONS	ADVANTAGES/ DISADVANTAGES
• Transporting carcasses and other wastes to the incineration site • Cleaning containers and vehicles transporting carcasses and wastes, with treatment of the resulting wastewaters • Incinerating carcasses and other wastes (using fuel and air) at a high temperature • Transporting incineration residues (bottom ash/slag and flyash) to the disposal site and disposal at the sanitary landfill	the prevailing wind direction (for odors before incineration and emissions from incineration) Technology Requirements: • Incinerator at a minimum temperature of 850°C and with a minimum residence time of 2 seconds. Temperature must be measured and recorded. • Incinerator equipped with an auxiliary burner that can be switched on when the temperature falls below 850°C • Incinerator automatic feed system connected to temperature measurement • Site security and inaccessibility by animals (such as birds, rodents, insects and other vermin) • Storage areas for animal carcasses and other wastes as well as incineration residues must be covered. These areas must be labeled and designed and operated to prevent accidental releases of polluting substances to the environment. Storage capacity provided to collect contaminated stormmwater and wastewater from spillage or firefighting • Transportation of bottom ash/slag and flyash in closed containers to prevent environmental releases • Disposal of bottom ash/slag and flyash in a sanitary landfill	Established and documented cleaning/disinfection procedures Established and documented emergency response procedures Availability of cleaning/ disinfection supplies/equipment Availability of emergency response equipment (e.g. first aid, fire fighting) Personnel training on personnel hygiene/cleaning, safety and emergency response measures Regular inspections of the environment and equipment, with documented inspection schedules and results Transportation of Carcasses/Wastes to the Incineration Site: When carcasses and other contaminated materials are transported to the fixed incineration site, then: • The vehicles must be leak-proof and covered • The vehicles and the external surfaces of containers should not leave the culling area without first being thoroughly cleaned/disinfected • The vehicles and internal/external surfaces of containers should be cleaned/ disinfected after unloading carcasses and other wastes at the incineration site. Transportation of Incineration Residues to the Disposal Site: • The vehicles must be covered The vehicles and containers should not leave the incineration area without first being thoroughly disinfected	Disadvantages: • Complex technology which may be imported to the country • High investment cost • High operating cost (especially fuel cost) • Some spare parts may need to be imported (cost and downtime of incinerator in case of AI outbreak) • High level of operator training • Scrutinized administrative requirements (recordkeeping, etc.) • The incineration facility may be too far from the location with the AI outbreak, requiring extensive transportation of carcasses and other wastes with infective pathogens, resulting in: (i) increased risks of disseminating the virus to other sites, and (ii) higher costs for transportation and associated mitigation measures. Air emissions from the incinerator (PM, SO_2, CO_2)

DESCRIPTION	ENVIRONMENTAL CONSIDERATIONS	SAFETY CONSIDERATIONS	ADVANTAGES/ DISADVANTAGES
	Waste Pretreatment/Containment: To avoid emission of dioxins or furans during incineration, carcasses should not be pretreated with a chlorine-bearing disinfectant or should not be contained in PVC bags. For the same reason, no other material destined for incineration should contain chlorine-bearing chemicals		
OPTION 5: INCINERATION (MOBILE)			
This method is based on thermal destruction of infective pathogens, animal carcasses and other wastes in an incinerator. It involves: • Transporting the mobile incinerator to the culling site • Incinerating carcasses and other wastes (using fuel and air) at a high temperature • Transporting incineration residues (bottom ash/slag and flyash) to the disposal site and disposal at the sanitary landfill	Technology Requirements: • Incinerator at a minimum temperature of 850°C and with a minimum residence time of 2 seconds. Temperature must be measured and recorded • Incinerator equipped with an auxiliary burner that can be switched on when the temperature falls below 850°C • Incinerator automatic feed system connected to temperature measurement • Storage areas for animal carcasses and other wastes as well as incineration residues must be covered. These areas must be ventilated, labeled, and designed and operated to prevent accidental releases of polluting substances to the environment. • Transportation of bottom ash/slag and flyash in closed containers to prevent environmental releases • Disposal of bottom ash/slag and flyash in a sanitary landfill Waste Pretreatment/Containment:	• Use of PPE to ensure personnel hygiene of personnel working at the site (incinerator operators must change their PPE before handling animal carcasses and other wastes) • Established and documented cleaning/disinfection procedures • Established and documented emergency response procedures • Availability of cleaning/ disinfection supplies/equipment • Availability of emergency response equipment (e.g. first aid, fire fighting) Personnel training on personnel hygiene/cleaning, safety and emergency response measures	Advantages: • Complete destruction of infective pathogens • Over 95% waste reduction • Avoids the need to transport the infective pathogens, carcasses, and other wastes to the incinerator (i.e. reduced risk of disseminating the virus to other sites compared to the fixed incineration case) Disadvantages: • Complex technology which may be imported to the country • High investment cost • High operating cost • Some spare parts may need to be imported (cost and downtime of incinerator in case of AI outbreak) • High level of operator training • Scrutinized administrative requirements (recordkeeping, etc.) • Transportation of the mobile incinerator to the culling site is associated with: (i) the risk of exposing the incinerator (i.e. the investment) to damage/total loss in case of an accident (contributed by

DESCRIPTION	ENVIRONMENTAL CONSIDERATIONS	SAFETY CONSIDERATIONS	ADVANTAGES/ DISADVANTAGES
	To avoid emission of dioxins or furans during incineration, carcasses should not be pretreated with a chlorine-bearing disinfectant or should not be contained in PVC bags. For the same reason, no other material destined for incineration should contain chlorine-bearing chemicals		poor road conditions, severe weather, etc.), and (ii) high transportation cost of the incinerator to the culling site • Accessibility of the culling site by the mobile incinerator Air emissions from the incinerator (PM, SO_2, CO_2)

Annex 6 A

MITIGATION PLAN- Carcass and Waste Material Disposal by Burial

Phase	Hazard	Mitigation Measure	Costs per location		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	Operate	Supervise	Operate	
1) Set up of the site							
Location of site	Indirect and direct pollution of water	Base of pit minimum 5 m above the water-table and 100m from water supply or well; Local administration certifies soil characteristics suitable for burial	N/A	N/A	Local administration, PDA; PDEF	Local administration, PDA	
Excavation	Direct pollution of water Dust	Not into water table Minor works Suppression with water	N/A	USD 200	Local administration, PDA; PDEF	Local administration, PDA	
Disposal of soil	Loss of soil quality	Use as overfill	N/A	USD 100	Local administration, PDA; PDEF	Local administration, PDA	
Secure site	Transfer of virus to humans or animals	Fencing	USD 50		Local administration, PDA; PDEF	Local administration, PDA	
2) On site operations							
Transport of dead and slaughtered	Emission of virus to air	Sealed covered container Short transport distances; dispose on site if feasible		USD 100	Local administration, PDA; PDEF	Local administration, PDA	

Phase	Hazard	Mitigation Measure	Costs per location		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	Operate	Supervise	Operate	
birds and waste materials		Operator training and supervision					
	Emission of virus & body fluids from dead stock	Sealed covered container	USD 50	N/A	Local administration, PDA,PDE	Local administration, PDA	
	Emission of virus on transport vehicles	Disinfectant used at recommended rates Use of appropriate sprays for wash down Operator training and supervision	USD 20	N/A	Local administration, PDA,PDE	Local administration, PDA	
	Contamination of personnel	Mechanical handling Operator training and supervision Disinfecting procedures Protective gear	USD 100	N/A	Local administration, PDA,PDE	Local administration, PDA	
Unloading of dead poultry	Leaching of fluids Release of virus to air	Operator training and supervision Use of mechanical loader Carcasses in bags	USD 100		Local administration, PDA,PDE	Local administration, PDA	
Burial of dead poultry	Release of virus to air during or after burial Contamination of personnel	Operator training and supervision Cover carcasses with 400mm soil first, then apply lime, then complete filling Cover with minimum 2 m soil	USD 50		Local administration, PDA,PDE	Local administration, PDA	

Phase	Hazard	Mitigation Measure	Costs per location		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	Operate	Supervise	Operate	
		to ground level, plus overfill Disinfecting procedures					
Temporary storage for culled birds accumulated between transport runs	Leaching of fluids Groundwater pollution Release of virus to air Rupture of storage units Rodent contact	Enclosed building Shelter from weather Operator training and supervision. Minimal storage times. Impermeable surfaces.	N/A	N/A	Local administration, PDA,PDE	Local administration, PDA	
Birds may not be effectively killed	Serious animal welfare issues. Virus spread form escaped poultry	Supervision and monitoring Slaughter Operator Training	N/A	N/A	Local administration, PDA	Local administration, PDA	
3) Clean up of infected premises							
Disposal of waste from infected premises	Disinfectants contaminate surface and groundwater Influenza virus release Odour	Minimal transport distances. Covered loads Use appropriate disinfectants Avoid drainage to watershed Operator training and supervision	N/A	N/A	Local administration, PDA,PDE	Local administration, PDA	
Hold solid waste for the sanitary period of 42 days.	Transmission of Influenza virus by air, water, vermin	Marked and fenced dedicated area Covered heaps Impermeable surfaces Hold for sanitary period	N/A	N/A	Local administration, PDE	Local administration,	

Phase	Hazard	Mitigation Measure	Costs per location		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	Operate	Supervise	Operate	
Use of disinfectants on the surfaces of the infected premises	Biocides toxic to aquatic fauna from drainage and surface run off	Block or intercept the flows in drains to surface or groundwater. Collect and store the diluted disinfectant and organic material for the sanitary period of 42 days Operator training and supervision	USD 20	N/A	Local administration, PDA,PDE	Local administration, PDA	

Annex 6 B

MITIGATION PLAN- Carcass Disposal by Incineration

Phase	**Hazard**	**Mitigation Measure**	**Cost** **Costs per village except ***		**Institutional Responsibility**		**Comments (e.g. Secondary impacts)**
			Install	**Operate**	**Supervise**	**Operate**	
1 Set up of the facility							
Location of unit	Indirect and direct pollution of water	Use existing hardstanding if available, minimum 10 m from water or drain. 100m from water supply or well	$8000 *per cluster of villages		Local administration	MARA.	
Hardstanding construction	Pollution of water from run off	Provide lined catchment	N/A	N/A	Provincial government	MARA	
Excavations	Direct pollution of water Dust	Not into water table Minor works Suppression with water	N/A	N/A	MARA	Contractors	
Disposal of soil	Loss of soil quality	Spread top soil on land	N/A	$200	MARA	Contractors	
Supply of materials	Environmental burden of extraction and transport	Local supply where possible	N/A	N/A	MARA	Contractors	Environmental burdens from manufacture of concrete small areas
2. On site operations							
Transport of	Road traffic emissions	Short travel for slaughtered	N/A	N/A	Local	Local	Major

Phase	Hazard	Mitigation Measure	Cost Costs per village except *		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	Operate	Supervise	Operate	
slaughtered birds	from Fuel use	livestock			administration PDA, PDEF	administration PDA,	advantage of mobile incinerator
	Emission of virus to air	Sealed covered container Short transport distances Operator training and supervision	N/A	N/A	Local administration PDA, PDEF	Local administration PDA,	
	Emission of virus & body fluids from dead stock	Sealed covered container	$200	N/A	Local administration PDA, PDEF	Local administration PDA,	
	Emission of virus on transport vehicles	Disinfectant used at recommended rates Use of appropriate sprays for wash down Operator training and supervision	N/A	$10	Local administration PDA, PDEF	Local administration PDA,	
	Contamination of personnel	Mechanical handling Operator training and supervision Disinfecting procedures	N/A	N/A	Local administration PDA, PDEF	Local administration PDA,	
Unloading of dead poultry	Leaching of nutrients Groundwater pollution Release of virus to air	Operator training and supervision Impermeable hardstanding Use of mechanical loader Close transfer Carcasses in bags	N/A	N/A	Local administration PDA, PDEF	Local administration PDA,	
Temporary	Leaching of nutrients		$1000	N/A	Local	Local	

Phase	Hazard	Mitigation Measure	Cost Costs per village except *		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	Operate	Supervise	Operate	
storage for culled birds accumulated between burning runs	Groundwater pollution Release of virus to air Rupture of vessel or bags Rodent contact	Enclosed building Shelter from weather Operator training and supervision. Minimal storage times. Impermeable surfaces.			administration PDA, PDEF	administration PDA, Local administration PDA,	
Birds may not be effectively killed	Serious animal welfare issues. Virus spread form escaped poultry	Supervision and monitoring Slaughter Operator Training	N/A	N/A	Local administration PDA	Local administration PDA	
Storage of fuel oil	Groundwater pollution Soil contamination	Bunded tank Impermeable surfaces Run off containment tank	Part of incinerator package	N/A			
Incineration	Gaseous emissions Ash Fat Hot surfaces	Turkish law for incineration emissions 2 second 850 ^{o}C secondary chamber or 1000 ^{o}C, 1 second for mobile units. Animal by products Directive guidance on use and installation. Operator training and	Part of incinerator package	N/A	Local administration PDA, PDEF	Local administration PDA,	Personal protective clothing in similar mass to body bags used for pet cremation in accordance with EU Directive

Phase	Hazard	Mitigation Measure	Cost Costs per village except *		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	Operate	Supervise	Operate	
		supervision Minimal burning of other wastes e.g. personal protective clothing. Restricted access to operators Tainting and operation manual					1774/2002
Ash disposal	Particulate	Damping down Enclosed container Regular de ashing Animal by products Directive guidance on use and installation. Operator training and supervision	N/A	N/A	PDE	Local administration	
Washdown processes incinerator & vehicle Transport containers Transport vehicle	Disinfectant Organic liquor Influenza virus Groundwater pollution Surface water pollution	Use at recommended rates. Killed by biocide Impermeable surfaces Sealed catchment Operator training and supervision	N/A	$10	Local administration PDA, PDEF	Local administration PDA	
Collection of effluents from washdown	Leaching of nutrients Groundwater pollution Avian influenza virus transmission	Tank installed with connecting pipe at hardstanding Tank enclosed Liquid stored until certified	N/A	N/A	Local administration PDA, PDEF, MoH	Local administration PDA,	

Phase	Hazard	Mitigation Measure	Cost Costs per village except *		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	Operate	Supervise	Operate	
		safe to spread to land					
Phase 3 clean up of infected premises							
Hardstanding remains after incineration	Contaminated water if used to store organic materials	Maintain as a clean area. Contain contaminated water in tank	$500	$400	MARA	Municipality	Assumes that the small impermeable area will remain
Handling of waste from infected premises	Disinfectants Leaching of nutrients surface and groundwater pollution Influenza virus release Odour	Impermeable surfaces Drainage to impermeable vessel. Treatment on site Operator training and supervision	$10/holding	$50	Local administration PDA, PDEF	Local administration PDA	
Disposal of stored wash water with disinfectant mixed in	Pollution of groundwater Toxicity to soil organisms Pollution of surface water	Disinfectant used at recommended dilution. Further dilution by clean water Degradation of biocide in storage 10 m wide no spread zone near drains and watercourses. Avoid slopes and spread according to a waste management plan Operator training and supervision	$100 /holding	N/A	Local administration PDA, PDEF	Local administration PDA	A waste management plan is required for the spreading of the liquid and solid wastes after the sanitary period

Phase	Hazard	Mitigation Measure	Cost Costs per village except *		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	Operate	Supervise	Operate	
Removal of faeces from backyards and poultry housing interior	Transfer of virus in faeces mixed in the soils. Disinfectants surface and groundwater pollution loss of soil	Minimal transport distances. Covered loads Operator training and supervision	$100/holding	N/A	Local administration PDA, PDEF	Holding owner, PDA	Importation of material to return surface levels
Hold solid waste for the sanitary period.	Transmission of Influenza virus by air ,water, vermin	Marked dedicated area Covered heaps Impermeable surfaces Removal of soil with waste. Sanitary period according to EU directive on AI	$20 *holding		Local administration, PDA, PDEF	Holding owner	
Use of disinfectants on the surfaces of the infected premises	Biocides are list 2 substances in the Groundwater Directive toxic to aquatic fauna from drainage and surface run off	Block or intercept the flows in drains to surface or groundwater. Collect and store the diluted disinfectant and organic material for the sanitary period of 42 days Operator training and supervision	$500*holding for temporary tank	$200	Local administration PDA, PDEF	Holding owner , PDA	

Annex 6C

MITIGATION PLAN- New Housing and Enclosure of Village Poultry

Phase	Hazard	Mitigation Measure	Cost		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	Operate	Supervise	Operate	
Relocated Larger Poultry Housing							
Waste storage Concentration of waste	Groundwater pollution	Recycle to agricultural land Impermeable base Waste management plan Training and information Extension support	N/A	N/A	PDA, PDE	Owner	
	Ammonia release affects adjacent natural flora	Deep storage. Site selection	N/A	N/A	PDE	Owner	
	Odour	Site location away from housing. Keep waste dry No slurry waste system Good ventilation	N/A	N/A	PDE	Owner	
Concentration of poultry	Dust release	Natural ventilation	N/A	N/A	PDE	Owner	
Transport of feed	Contamination on route Motor emissions	Enclosed transport Larger loads reduce frequency	N/A	N/A	PDA	Owner	

Phase	Hazard	Mitigation Measure	Cost		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	Operate	Supervise	Operate	
Manure recycling	Groundwater pollution	Recycle to agricultural land with Good Agricultural Practices. Waste management plan to Nitrate directive Training and information Extension support	N/A	$5/tonne	PDE	Owner	
	Spillage of waste	Secure trailers Avoid overloading	N/A	N/A	PDE	Owner	
Penning of animals	Soil compaction	Avoid high densities Selection of site Movable pens for ground resting	N/A	N/A	PDA	Owner	
	Nutrient run off	Avoid high densities Avoid steep slopes Training and information Extension support	N/A	N/A	PDA, PDE	Owner	
Closing of barns	Ammonia concentration	Site selection Avoid high stock numbers Regular removal of waste Improved ventilation openings Training and information Extension support	N/A	N/A	PDE	Owner	
	Groundwater pollution	Avoid high stock numbers Regular removal of waste	N/A	N/A	PDA PDE	Owner	

Annex 6 D

MITIGATION PLAN- Slaughter and Meat Processing Facilities for Spent Laying Hens

Phase	**Hazard**	**Mitigation Measure**	**Cost**		**Institutional Responsibility**		**Comments (e.g. Secondary impacts)**
			Install	**Operate**	**Supervise**	**Operate**	
Site construction	Noise	Speed limits Maintenance Site location Hours of activity	N/A	N/A	Owner	Contractor	
	Dust	Water suppression Speed limits	N/A	N/A	Owner	Contractor	
	Traffic	Traffic control routing	N/A	N/A	Owner	Contractor	
	Litter	Proper storage and disposal	N/A	N/A	Owner	Contractor	
Site opereation	Noise	Hours of activity Sound proofing Transport after dark	N/A	N/A	PDE	Owner	
	Air emissions	Filters Fuel selection Plant maintenance Operator training Best Available Technique guide Emissions monitoring	N/A	N/A	PDE	Owner	
Liquid Waste	Water pollution	Treatment plant Operator training	N/A	N/A	PDA PDE	Owner	

Phase	Hazard	Mitigation Measure	Cost		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	Operate	Supervise	Operate	
		Best Available Technique guide Waste minimisation					
Solid waste	Odour	Enclosed storage and transport	N/A	N/A	PDA PDE	Owner	
	Disease	General Hygiene Operator training Best Available Technique	N/A	N/A	PDA	Owner	
Water/ condensate treatment plant	Odour	Encased processes	N/A	N/A	PDE	Owner	
	Water pollution	Treatment monitoring Bunded tanks Operator training Impermeable surfaces	N/A	N/A	PDE	Owner	
	Sludge disposal	Good agricultural practice Sanitisation. Waste management plans Separation of waste types Best Available Technique	N/A	N/A	PDE	Owner	
Bone meal production	Odour	Enclosed processes	N/A	N/A	PDE	Owner	
	Particulates	Encased processes	N/A	N/A	PDE	Owner	

Phase	**Hazard**	**Mitigation Measure**	**Cost**		**Institutional Responsibility**		**Comments (e.g. Secondary impacts)**
			Install	**Operate**	**Supervise**	**Operate**	
	Air emissions	Fuel selection Plant maintenance Operator training Best Available Technique guide Emissions monitoring	N/A	N/A	PDE	Owner	
Fuel storage	Leakage and spillage	Bunded fuel tanks Maintenance Operator training	N/A	N/A	PDE	Owner	

Annex 6 E

MITIGATION PLAN- Laboratory Safety and Waste Management

Phase	Hazard	Mitigation Measure	Costs per location		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	Operate	Supervise	Operate	
Assess labs needs for training, equipment and physical infrastructure	None		N/A	N/A	MoH, MARA	Consultants	Refer to BSL requirements and International Best Practice in Safety of Research Laboratories (EMP Annexes 3 and 4)
Conduct training and physical reconstruction to bring lab(s) to BSL-3	Operation of laboratory below BSL-3 risks release of virus	Training and physical upgrades to BSL-3 prior to operation of laboratory	N/A	N/A	MoH, MARA	Consultants, contractors	
Procure equipment and provide staff training	Release of virus	Training on new equipment	N/A	N/A	MoH, MARA	MoH, MARA, contractors, consultants	
Ongoing laboratory	Inappropriate waste management	Training and upgrades to laboratory infrastructure and			MoH, MARA	MoH, MARA	

Phase	Hazard	Mitigation Measure	Costs per location		Institutional Responsibility		Comments (e.g. Secondary impacts)
			Install	**Operate**	**Supervise**	**Operate**	
operations		equipment based on International Best Practice in Safety of Research Labs				contractors, consultants	

Annex 7 A

MONITORING PLAN- Carcass and Waste Material Disposal by Burial

Phase	**What** *parameter is to be monitored?*	**Where** *is to be monitored?*	**How** *is it to be monitored/ type of monitoring equipment?*	**When** *is it to be monitored - frequency or continuous?*	**Why** *is the parameter to be monitored (optional)?*	**Responsibility**
Baseline	Burial in pits or unregulated disposal	Burial sites	Observation	During burial		PDA, PDEF, local government
Construct	Site selection and pit construction	Burial sites	Observation; Design and construction to appropriate standard	During construction After completion of construction	To ensure appropriate size and design	PDA, PDEF, local government
Operate	Safe handling of carcasses and materials for disposal; Disinfection of workers and equipment	Burial sites	Observation and records.	During burial Hourly when operating During disinfection before breaks and at end of day	To avoid spreading the virus; to avoid water pollution from disinfectants	PDA, Local government
Closing	Burial pit	Burial sites	Observation and records.	After pit it closed	To ensure correct closure to prevent	PDA, PDEF, local government

Phase	**What** *parameter is to be monitored?*	**Where** *is to be monitored?*	**How** *is it to be monitored/ type of monitoring equipment?*	**When** *is it to be monitored - frequency or continuous?*	**Why** *is the parameter to be monitored (optional)*?	**Responsibility**
					spread of virus	

Annex 7 B

MONITORING PLAN- Carcass and Waste Material Disposal by Incineration

						Responsibility
Phase	**What** *parameter is to be monitored?*	**Where** *is to be monitored?*	**How** *is it to be monitored/ type of monitoring equipment?*	**When** *is it to be monitored - frequency or continuous?*	**Why** *is the parameter to be monitored (optional)* ?	
Baseline	Burial in pits	Burial sites	Observation	During burial		PDA, local government
Construct	Site selection and impermeable hard standing	Incineration sites	Designs and construction to avoid escape of liquid to water	During construction After completion of construction	To avoid water pollution	PDA, PDEF, local government
Operate	Incinerator emissions Smoke odor CO, O_2 Temperature Particulate HCl, CO, SO_2 Washdown water	Incinerator flue stack Effluent tank Drains near the site	Integral instrumentation and records. Visual and olfactory assessments of emissions Extractive	During incineration Hourly when operating Continuous Annual	To avoid air pollution	PDEF, local government

						Responsibility
Phase	**What** *parameter is to be monitored?*	**Where** *is to be monitored?*	**How** *is it to be monitored/ type of monitoring equipment?*	**When** *is it to be monitored - frequency or continuous?*	**Why** *is the parameter to be monitored (optional)* ?	
	emission		Visual presence in open channels	At washdown	to avoid water pollution	
De-com-mission	Water Land Debris	Incinerator site	Burial site of ash Presence of Biocide in watercourse Un incinerated materials	After incinerator is removed	To ensure all waste is managed	PDEF, PDA, local government

Annex 7 C

MONITORING PLAN- New Housing and Enclosure of Village Poultry

						Responsibility	
Phase	**What** *parameter is to be monitored?*	**Where** *is to be monitored?*	**How** *is it to be monitored/ type of monitoring equipment?*	**When** *is it to be monitored - frequency or continuous?*	**Why** *is the parameter to be monitored (optional)* ?		
Baseline	Enclosure of the poultry	Village holding	Visual inspection and record form	Before new investment	For investment decision on scale		Owner, PDA
Construct	Materials use. Provision of impermeable surfaces	At new site and holding	Visual inspection According to Good agricultural practice	During construction	To assure bio and pollution security		Owner, PDA
Operate	Pollution of groundwater	At water bodies	Sampling and lab analysis	Monthly	Nitrate pollution control		PDE, PDA
Decommission	Soil Concrete materials Poultry Waste	At the holding	Visual inspection. Soil sampling and analysis	After poultry is removed	No residual pollution risk		PDE, PDA

Annex 7 D

MONITORING PLAN- Slaughter and meat processing facilities for Spent Laying Hens

						Responsibility	
Phase	**What** *parameter is to be monitored?*	**Where** *Is to be monitored?*	**How** *Is it to be monitored/ type of monitoring equipment?*	**When** *Is it to be monitored - frequency or continuous?*	**Why** *Is the parameter to be monitored (optional)?*	**Install**	
Baseline	Animals being slaughtered in villages	In villages	Count of number of birds	Daily			PDA
Construct	Noise topsoil	On site Where the soil is placed	Noise meter Visual inspection	During construction. After deposition			PDE
Operate	Releases to water Noise Odour	At discharge points Site boundary Site boundary	Sampling and analysis Observation	Every month Daily Daily	To avoid contaminatio n of water To avoid loss of amenity		PDE
Decommission	Soil contaminants litter	Around the site	Soil sampling Visual inspection	After site clearance	To identify contaminate d land and remediation		Owner, PDE, PDA

Annex 7 E

MONITORING PLAN- Laboratory safety and Waste Management

Phase	**What** *parameter is to be monitored?*	**Where** *is to be monitored?*	**How** *is it to be monitored/ type of monitoring equipment?*	**When** *is it to be monitored - frequency or continuous?*	**Why** *is the parameter to be monitored (optional)*?	**Responsibility**
Baseline	Labs	location	Observation	Once prior to project effectiveness	Establish baseline	MARA, MoH, or consultants of AI PIU
Training and Construction	Staff training; lab renovations	location	Observation; records of training; Design and construction to appropriate standard	After completion of training and construction	To ensure satisfactory completion of training and lab renovations	Qualified independent consultants satisfactory to the Bank contracted by MARA and MoH PIUs
Procure and install equipment	Installation and safe operation of equipment	location	Observation and records of training	After installation, before operations Quarterly thereafter	To avoid spreading the virus	Qualified independent consultant satisfactory to the Bank contracted by MARA and MoH PIUs

ANNEX 8

COUNCIL DIRECTIVE 2005/94/EC
of December 20, 2005

On Community measures for the control of Avian Influenza and repealing Directive 92/40/EEC

ANNEX VI

(referred to in Article 48)

Principles and procedures for cleansing, disinfection and treatment of holdings

1. The following general principles and procedures shall be applied for the cleansing, disinfection and treatment provided for in Article 48:

(a) the cleansing and disinfection and, where necessary, the measures to destroy rodents and insects must be carried out under official supervision and in accordance with the instructions given by the official veterinarian;

(b) the disinfectants to be used and their concentrations must be authorized by the competent authority to ensure the destruction of avian influenza virus;

(c) disinfectants should either be used in accordance with the recommendations of the manufacturer where provided or in accordance with the instructions of the official veterinarian and/or the instructions of the competent authority, if any;

(d) the choice of disinfectants and of procedures for disinfection must be made taking into account the nature of the holdings, vehicles and objects which are to be treated;

(e) the conditions under which degreasing agents and disinfectants are used must ensure that their efficacy is not impaired; in particular, technical parameters indicated by the manufacturer, such as pressure, minimum temperature and required contact time must be observed;

(f) irrespective of the disinfectant used, the following general rules shall be applied:

(i) a thorough soaking of bedding and litter, as well as faecal matter, with the disinfectant;

(ii) washing and cleansing by careful brushing and scrubbing of the ground, floors, ramps and walls following the removal or dismantling, where possible, of equipment or installations otherwise impairing the effective cleansing and disinfection procedures;

(iii) then, further application of disinfectant for a minimum contact time as stipulated in the manufacturer's recommendations;

(g) where washing is carried out with liquids applied under pressure, re-contamination of the previously cleansed parts must be avoided;

(h) washing, disinfecting or destroying of equipment, installations, articles or anything likely to be contaminated must be envisaged;

(i) following disinfection procedures, re-contamination must be avoided;

(j) cleansing and disinfection as required in the framework of this Directive must be documented in the holding or vehicle register and, where official approval is required, be certified by the supervising official veterinarian or person under his supervision;

(k) cleansing and disinfection of vehicles used for transport and by staff.

2. Cleansing and disinfection of infected holdings shall be carried out in accordance with the following principles and procedures:

(a) preliminary cleansing and disinfection:

(i) during the killing of the poultry or other captive birds all necessary measures must be taken to avoid or minimise the dispersion of avian influenza virus; those measures must include the installation of temporary disinfection equipment, supply of protective clothing, showers, decontamination of used equipment, instruments and facilities and the interruption of power supply to the ventilation;

(ii) carcases of killed poultry or other captive birds must be sprayed with disinfectant;

(iii) any transport of carcases of poultry or other captive birds which have to be removed from the holding for disposal shall be carried out in closed, leak proof vehicles or containers under official supervision in such a way as to prevent the spread of avian influenza virus;

(iv) as soon as the killed poultry or other captive birds have been removed to be disposed of, those parts of the holding in which they were housed and any parts of other buildings, yards etc. contaminated during the killing, or the post-mortem examination must be sprayed with disinfectants authorised in accordance with Article 48;

(v) any tissue or blood spilled during the killing or from the post-mortem examinations must be carefully collected and disposed of with the killed poultry or other captive birds;

(vi) the disinfectant must remain on the surface for at least 24 hours;

(b) final cleansing and disinfection:

(i) manure and used bedding must be removed and treated as provided in paragraph 3(a);

(ii) grease and dirt must be removed from all surfaces by the application of a degreasing agent, and the surfaces cleansed with water;

(iii) after washing with cold water, further spraying with disinfectant must be applied;

(iv) after seven days the holding must be treated with a degreasing agent, rinsed with water, sprayed with disinfectant and rinsed again with water.

3. Disinfection of contaminated bedding, manure and slurry shall be carried out in accordance with the following principles and procedures:

(a) manure and used bedding shall either:

(i) undergo a steam treatment at a temperature of at least 70 °C;

(ii) be destroyed by burning;

(iii) be buried deep enough to prevent access by wild birds and other animals; or

(iv) be stacked to heat, sprayed with disinfectant and left for at least 42 days;

(b) slurry must be stored for at least 60 days after the last addition of infectious material, unless the competent authorities authorises a reduced storage period for slurry which has been effectively treated in accordance with the instructions of the official veterinarian so as to ensure the destruction of the virus.

The competent authority may authorise the transportation of manure, litter and bedding likely to be contaminated to either an approved treatment plant where a treatment ensuring the destruction of any influenza virus is carried out, or for intermediate storage before destruction or treatment, in accordance with Regulation (EC) No 1774/2002 or with the specific rules referred to in Article 63(1) of this Directive. Such transport shall be carried out in closed, leak proof vehicles or containers under official supervision in such a way as to prevent the spread of avian influenza virus.

4. However, by way of derogation from paragraphs 1 and 2, the competent authority may establish specific procedures for cleansing and disinfection, taking into account the type of holding and the climatic conditions. The competent authority shall notify the Commission when this derogation is applied and provide them with details of the specific procedures.

5. Without prejudice to Article 48(b), if the competent authority is satisfied that any holding or part of any holding cannot, for any reason, be cleansed and disinfected, it may prohibit the entry of any person, vehicle, poultry, other captive bird or mammal of domestic species or any thing on to those holdings, or part of those holdings, and such prohibition shall remain in force for a minimum of 12 months.

ANNEX 9

Consultancy Report

Public Disclosure of the Environmental Management Plan

Nedret Durutan
Consultant

May 7, 2006
Ankara

Background

1. The Avian Influenza (AI) outbreak started in October 2005 in Turkey in the Manyas District of Balıkesir Province that is a natural habitat for migratory birds and spread most part of the country starting from January 2006. Government of Turkey has requested from the World Bank (WB) to finance the emergency operation to address the Avian Influenza (AI) threat to Turkey that is directly on the major flight path of migrating birds. The WB assistance was provided to the Government of Turkey in preparing a project under the Global Program for Avian Influenza (GPAI). The Avian Influenza and Human Pandemic Preparedness and Response (AIHP) Project that is supported by the Bank's Multi-Country Adaptable Program Loan instrument is expected to become effective in June, 2006.

2. The activities under the Project are not expected to generate any adverse environmental effects as they are focused largely on public sector capacity building and improved readiness for dealing with outbreaks of avian influenza in domestic poultry. In fact, overall the AI prevention and response-focused activities are expected to have a positive environmental impact, as the investments in facilities, equipment, and training for veterinary and public health service staff and laboratories will improve the effectiveness and safety over existing avian influenza. However, The Project has been assigned World Bank Environmental Category B, since it involves moderate environmental impacts mainly from two of the three components (mainly from Component I: Animal Health, and to a limited extent from Component II: Human Health) that can be managed during implementation of the project. The Environmental Assessment (EA) process for these components is addressed through this Environmental Management Plan (EMP). The EMP includes mitigation and monitoring plans to ensure appropriate attention to environmental issues and tracking of progress or problems in their management.

3. Animal Health Component: the EMP addresses zoonotic disease containment and waste management issues, as pertain to special waste emissions and materials at laboratories, and training for veterinary services workers, to include procedures for safe handling of AI materials, safe culling of infected and at-risk poultry and disposal of carcasses. The Plan also focuses on equipment, refurbishing and training for reference and regional veterinary diagnostic laboratories.

4. Human Health Component: the EMP focuses on equipment, refurbishing and training for reference and regional diagnostic laboratories to include key environmental issues in zoonotic disease containment and waste management.

5. The scope of the consultancy assignment covered the following tasks:

- an assessment of the impact of AI on backyard poultry in Turkey (English and Turkish),
- reviewing and finalizing the draft EMP, iii) reviewing its translation into Turkish,
- preparing and disseminating a 2-page summary of the draft EMP (English and Turkish) to the relevant agencies,
- assisting MARA in organization of public consultation meeting,

- collecting and incorporating the comments and finalizing the EMP,
- preparing the minutes of the meeting, and
- circulating the final version to CEU/MARA and Project Implementation Unit (PIU) of the Ministry of Health (MOH) to be submitted to the Turkish Government agencies and the World Bank.

Tasks Completed

6. An assessment of the impact of avian flue on backyard poultry in Turkey was conducted. The English and Turkish versions were submitted to the Bank and CEU/MARA. A summary of the report is presented as Attachment 1.

7. The draft EMP was reviewed and the gaps were identified. The main text, mitigation and monitoring tables were finalized by making necessary additions and changes. The Turkish translation was also reviewed and finalized. A 3-page summary of the draft EMP was prepared and conveyed to the World Bank and CEU to be distributed to MARA, MOH and Ministry of Environment and Forestry (MOEF) for comments. Based on the comments the summary was finalized. The draft EMP (main report and the annexes) was posted on the official websites of MARA and MOH.

8. An invitation letter (announcing the place, time and purpose of the meeting, and the website addresses where the draft EMP can be accessed) a stakeholder invitation list (including central and local government agencies, sectoral and professional NGOs, academicians, media and the local representatives of international organizations) were prepared and agreed with General Directorate of Protection and Control (GDPC) of MARA. The GDPC sent the invitation letters (39 agencies) and the summary of the draft EMP to the stakeholders a week in advance of the meeting.

9. An initial review meeting was held on April 26, 2006 with MARA, MOH and MOEF and initial reactions and comments were taken. The minutes of the meeting and the list of participants are given as Attachment 2 and 3. Based on the comments, revisions were made in the draft EMP and the mitigation tables.

10. Public briefing and consultation was held on May 4, 2006 at the Conference Hall of the Union of Chambers of Trade and Exchanges (TOBB). The last version of the draft EMP, mitigation and monitoring tables were made available for the participants as hard copies at the venue. A total of 68 people attended the meeting that was chaired by the General Director of the GDPC/MARA. The minutes of the meeting and the list of participants are presented as Attachment 4 and 5.

11. After the Public Consultation Meeting, based on the comments of the MOEF representative, the Waste Management Department of the General Directorate of the Management of Environment was visited and the necessary revisions in the EMP were agreed.

12. Comments were incorporated-as appropriate-into the draft EMP. The final version of the EMP will be made publicly available in Turkey, provided to the World Bank, and used by the government agencies in the implementation of the project.

Attachments

1. Summary of the Assessment
2. Minutes of the Initial Review Meeting
3. List of participants of the Initial Review Meeting
4. Minutes of the Public Consultation Meeting
5. List of participants of the Public Consultation Meeting

Attachment 1

AN ASSESMENT OF AVIAN INFLUENZA IMPACT ON BACKYARD POULTRY IN TURKEY

Summary

Objectives

1. The purpose of the study is to assess: i) nature of the backyard poultry in Turkey, ii) the impact of the recent AI outbreak, particularly on smallholders, iii) the level of preparedness (awareness) at the individual and small community level for current and future avian flue outbreaks, and iv) factors that might limit or hinder the implementation of the disease control plans.

Study Area

2. The study was conducted in 15 provinces (25 settlement areas) in 6 geographical regions during February 15-25, 2006. Eight settlement areas out of the 25 experienced AI outbreak and culling. Purposive selection was applied when selecting the provinces, counties and villages. Outbreak occurrence, proximity to outbreak and wild bird areas/wetlands, proximity to neighboring countries where outbreak was observed (i.e. Georgia, Greece and Bulgaria), different socio-economic settings and geographical areas and the relative importance of commercial poultry production were the factors considered in the selection of sample areas. Eight settlement areas out of 25 experienced AI outbreak and culling.

Methods Used

3. Focus group meetings and interviews, and distant meetings/surveys were used. The formats for the surveys comprised two main parts: i) situation before the AI outbreak in the country and ii) situation after the outbreak.

Main Findings

4. A wide range of impact was observed on rural communities and individuals: i) psychological impact on individuals, ii) psychological impact on the community, iii) impact on elderly, iv) impact on food and nutrition security, and vi) economic impact. It was observed that there are direct and indirect economic impacts of AI on backyard poultry. Direct economic losses are: i) loss of animals directly due to AI infection, ii) loss of animals as a result of culling and iii) loss of supply sources (chicken) for backyard poultry. It should be noted that, in the rural context, it is difficult to separate social from economic issues.

5. In general, there was good coordination and support synergy between local administrations and PDAs/MARA. Local administrations (governor's office and municipalities) provided funds, staff, labor and transport and shared all of the challenges that MARA staff faced. The Animal Constabulary Committees convened as soon as necessary and all required decisions were duly taken. Local administrations mobilized their funds to provide bio-safety outfits, culling equipment, disinfection material, etc. It was emphasized that the logistical and organizational support from local gendarmerie and police forces were helpful in carrying out of the necessary tasks (culling/disposal, restricting animal movements). In some non-outbreak counties, burial sites, culling teams, vehicles, bio-safety outfits have already been prepared based on the lessons learned from outbreak counties.

6. Generally, in case of bird deaths, veterinarians in most PDAs sent every/each specimen to Veterinary laboratories for diagnosis. This created very high workloads on the laboratories. In several cases and locations, veterinary staff in PDAs used professional judgment, backed by clinical symptoms and autopsies done locally, in deciding whether or not to send the samples to research laboratories for further testing/diagnosis. In many cases, decision was made not to send and thus preventing further overloads for the laboratories. This approach was backed by FAO and OIE experts who visited these areas.

7. While PDAs were busy trying to contain AI, they also had to respond to panic calls from the urban community. Individuals asked for services ranging from culling their parrots to taking away the dead birds from their roofs and cleaning the bird feces in their balcony. MARA staff weathered shouting, screams and threats.

8. Despite the above, there are issues that need to be addressed before new outbreaks:

- The rural communities are not convinced that AI exists and that it is dangerous.
- AI is considered as the government's problem.
- Communication at all level suffered from bottlenecks and sometimes was chaotic.
- There is skepticism about the accuracy of diagnostic laboratory tests.
- Government veterinarians have limited knowledge/experience on backyard poultry.
- Methods used for culling were not always humane.
- Culling is questioned as a method of prevention/protection.
- One time compensation payment does not cover the long-term production losses, particularly for eggs.
- Workers in the poultry sector face a high risk of infection.
- Public awareness and training material are not answering some of the basic questions and concerns of the villagers
- Dissemination of information at the village level is weak.
- Rural people show little interest in the written material.
- Women are not systematically informed that they could be eligible for compensation payments.
- There is lack of guidance on the future of backyard poultry.
- Provincial Directorates of Agriculture do not have sufficient resources to deal with emergency cases.

Recommendations

- All government staff should understand that communication is an essential element of response to a crisis and a communication strategy which includes mass-media links should be in place before a crisis starts. They should keep continuous links with media by regularly providing them with information and briefings
- It is important who provides information to public from the government side. The bureaucratic level of the communicator is less important than what and how he/she expresses the things to the public that matters. Spokespersons should be identified in advance.
- It is important that the communicators should show respect and empathy to public anxiety and select a style and tone accordingly. The nature of villagers' attachment to their poultry and the meaning of this relationship have to be appreciated
- In order to prepare public awareness and training material, audiences (stakeholders) should be identified and the materials prepared in advance. Reviewing and testing these materials before the outbreak (outside the stressful environment) would help to address gaps, inconsistencies, weaknesses etc.
- Taking into consideration the general tendency in rural communities, public awareness and training efforts should be based on TV programs and village meetings (face-to-face) supported by video films. The majority of the villagers contacted emphasized the effectiveness of face-to-face communication. In fact, mass media channels could be more effective in creating general knowledge of AI, whereas interpersonal channels could be more effective in changing attitudes in backyard poultry production.
- AI awareness campaigns should become a routine element of extension programs.
- Schools can play an important role in disease prevention. MARA, MOH and the Ministry of Education can jointly develop a national campaign to convey simple messages to village children who are in close contact with poultry as part of their daily life.
- MARA should make a plan/time table about when areas affected by culling can restock their chicken/poultry populations
- Until such restocking can take place, families can be reimbursed for egg production lost on the basis of the poultry inventory that has seen carried out by PDAs in the counties. The amount of compensation can be based on the number of chickens culled for each family and an average productivity (eggs) of the poultry.
- Women should always be informed that they could be eligible for compensation payments.
- Results from national laboratories should be displayed in the public areas such as coffee shops, muhtars' office, village schools and health centers that are accessible to both women and men.
- Preparedness at the county level should include, pre-identification and basic training of culling teams, communication and transport requirements and modes, predetermination carcass burial sites and simple job descriptions for all who may be

involved in all interventions, assurance of the availability of all equipment and supply including chemicals, disposable clothing.

- MARA should establish standards for culling equipment including design and use. The Ministry should provide all necessary funds and information to PDAs for culling in line with international practices. Funding should also include allocations for transport and communication.
- Culling/disposal at night should be preferred advantageous because: i) poultry owners were at home, ii) animals were at the farm, sleepy, therefore easy to collect, iii) children and elderly who are vulnerable to culling/disposal scenes did not witness the operations and iv) media is not present.
- Joint poultry housing/production should be tested on pilot scale. In some regions, such an approach may not be worth pursuing because socio-economic settings do not favor collaboration.
- Material to be used in the improved poultry housing should be locally available at costs that are affordable to the users as well as accepted as local modes of construction.
- Government veterinarians should be given supplementary training on poultry diseases, focusing on backyard poultry in general and AI specifically.
- Workers and the employers in sector should be made aware of AI-related risks and should take necessary precautions. Improved occupational safety measures for those working in the sector should be developed and enforced
- The consequences of the banning of live poultry trade, particularly spent layers, due to AI has to be studied for its economic and social impacts and remedial measures should be developed.
- A comprehensive database should be developed for backyard poultry in terms of source, size, productivity level, economic benefits, housing etc.
- Village-based cooperatives can play an important role to help improve awareness and dissemination of information.

Attachment 2

EMP INITIAL REVIEW MEETING
April 26, 2006

Minutes of the Meeting

1. The meeting was held at with sixteen participants at CEU/MARA and chaired by Mr. Tayfur Çalayan (Director, CEU/MARA). He explained that the purpose of the meeting was to review the draft EMP together with TKB, SB and MOEF prior to the Consultation Meeting planned for May 4, 2006.

2. Mr. Hasan Bacç, (Director, PIU/MOH) expressed his thanks to the team that prepared the draft EMP for the comprehensive job done. Dr. Yldrm Bayazt, representative of General Directorate of Health Services/MOH suggested that the burning of medical waste also be included in the mitigation and monitoring plans in the EMP. He also suggested that the burial pits should be at least 5 meters from the water table and at least 90-100 meters away from water sources. The EMP preparation team explained that the mobile incinerators would be used predominantly in rural areas where there was very little chance of medical waste being burned. It was also noted that the transportation of such material to the incinerator operation sites carries high risk. The agency responsible for the selection of the burial site, particularly its soil characteristics was also discussed. It was agreed: i) to revise the safe distances given in the draft EMP as suggested, and ii) to keep the local administrations as the responsible agency for the siting of the burial pits as indicated in the EMP since this responsibility is given to them by the law.

3. Dr. Belgin Günay (veterinarian GDPC/MARA) questioned whether the burial pits would be lined with plastic. The CEU team explained that this was not the practice but carcasses are buried in plastic bags. She also pointed out the potential difficulty in constructing or finding a hardstanding for the mobile incinerators in a short period of time in case of an outbreak. It was explained that existing infrastructure such as asphalt roads, cement backyard of an official building, a market area could be used for this purpose and a cement hardstanding could be constructed in one or two days. Dr. Günay also raised concerns about transporting the mobile incinerators to remote villages with poor roads. It was explained that in such cases, burial of carcasses would be the most practical method of disposal.

4. Dr. Özlem Özsaraç (Biologist, Waste Management Department/MOEF) stated that the EMP is well prepared. She also noted that titles of some of the Turkish legislation referenced in the EMP had been changed or the content was modified and provided an updated a list of these. The consultants responsible for preparing the EMP ensured that the necessary changes would be made.

5. The meeting adjourned after an overall discussion of the EMP with no other notable comments.

Attachment 3

EMP INITIAL REVIEW MEETING
April 26, 2006

Participant list

Name	Institution	Telephone	E-Mail
Banu Buyurgan	MARA - CEU	312 419 2175	banu.buyurgan@arip.org.tr
Halil Agah	World Bank	312 459 8360	hagah@worldbank.org
Amy Evans	“	001 202 473 8018	Aevans1@worldbank.org
İbrahim Akçayoğlu	“	532 690 1492	iakcayoglu@worldbank.org
Cüneyt Okan	Consultant	533 525 3365	cnokan@tr.net.tr
Nedret Durutan	“	533 525 3365	cnokan@tr.net.tr
Hasan Bağcı	MoH – PIU	505 210 0065	hasan.bagci@saglik.gov.tr
Belgin Günay	GDPC	505 776 9310	belging@kkgm.gov.tr
Aysun Yerli	MoH – PIU	505 243 3425	aysun.yerli@saglik.gov.tr
Ayşe Çıbık	“	537 425 5800	ayse55ayse@yahoo.com
Hacer İçen	“	505 242 7953	hacer.icen@saglik.gov.tr
Özlem Özsaraç	MOEF	505 319 7512	ozsaraco@yahoo.com
Ömer Eyicil	MoH – PIU	505 312 4198	omer.eyicil@saglik.gov.tr
Yıldırım Bayazıt	MoH	543 232 3611	yildirim.bayazit@saglik.gov.tr
Saim Yıldırım	MARA - CEU	532 456 6218	saimyildirim@arip.gov.tr
Tayfur Çalayan	“	532 291 8902	tayfur@tarim.gov.tr

Attachment 4

PUBLIC CONSULTATION MEETING
May 4, 2006

Minutes of the Meeting

1. The Public Consultation Meeting for Environmental Management Plan (EMP) was held at TOBB Conference Hall with 63 participants representing stakeholder groups (Attachment 5) and chaired and mediated by **Dr. Hüseyin Sungur**, General Director of Protection and Control (GDPC) of the Ministry of Agriculture and Village Affairs (MARA).

2. An opening statement was made by Dr. Sungur explaining that the draft EMP had been prepared as a requisite for the Turkey Avian Influenza (AIHP) Project by GPDC and its consultants. He noted that AI was very important in Turkey, and similar to other countries experiencing the disease, outbreaks had been seen both in domestic poultry and wild birds; there had been no occurrences in commercial poultry. Turkey had experienced the disease in 211 points across the country over since October, 2005 and currently only 4 points were under quarantine and would remain so for another 10-15 days. He emphasized that though the disease was under full control, the risk of re-emergence later in the summer or some other time in the future remained and that vigilance must be maintained.

3. Dr. Sungur briefly described the role of international donors and other institutions and the international meeting held in China on AI earlier this year. He explained that following the outbreaks in Turkey, the Government and the World Bank started discussions on the need for urgent action and the Project was rapidly prepared.

4. He summarized the Turkey Avian Influenza and Human Pandemic Preparedness and Response (AIHP) Project components and explained that the Project would become effective around June 2006. He explained that the objective of the meeting was to obtain feedback from the stakeholders through their representatives in the meeting on the draft EMP, particularly the envisaged mitigation and monitoring measures. He explained that the discussions would focus only on the EMP and that the Project would not be up for debate as it had already been negotiated and finalized.

5. Mr. Haluk A□karo□lu, Chief of Animal Disease Control Section of GDPC/MARA, made a presentation to aquaint the participants with AIHP Project and the EMP. He gave an overview of AI from the international and national perpectives, explaining the various stages of the spread at both levels, followed by a summary of the Project, its objectives, components, budget and implementation arrangements. After this, the EMP was introduced and the mitigation and monitoring tables were explained in detail. The EMP was made available to the public through the websites of MARA and Ministry of Health. The audiance had also received a copy of the full EMP at onset of the meeting and could therefore closely follow the presentation. Questions and comments were reserved for the end of the presentation.

6. Discussions were lively and some of the comments and questions were related directly to the AI outbreak and project design i.e. AI control, rendering and poultry feed,

number and geographical distribution of laboratories, hospitals having small incinerators for their own medical wastes versus a number of hospitals using large central incinerators, restructring of poultry sector, future of backyard poultry. A chemical company representative and the EU representative emhasized that incineration is not a prefered disposal method in the EU; the first choice is sterilization which is a better method. A private sector representative who markets composting technology recommended that the Project support purchase of mini composting facilities for villages. The prevailing view of those against incineration was that it led to loss of potentially valuable materials.

7. Those that were directly about EMP were generally focused on incineration. A number of participants indicated that the choice of mobile incinerators over fixed ones was correct. Some noted that fuel cost for operating the incinerators may be high but GPDC explained that fuel cost should not be compared with the risks to human health.

8. Representatives of Ministry of Environment and Forestry underlined the point that monitoring particularly for air emissions, is very important. The methods and thresholds should be acceptable to all parties and in line with Turkish regulations which are also in the process of being harmonized with EU. All mitigation and monitoring activities should follow Turkish legislation where such exist to be augmented by accepted international ones where there are gaps. Operating procedures for burial and incineration should be well documented and detailed. The CEU explained that this would be done in the Project Operation Manual.

9. There were also comments regarding the necessity of identifying burial sites prior to outbreaks and the necessity of environmental impact assesments for large scale burial sites.

10. No written comments were received.

Attachment 5

EMP CONSULTATION MEETING
MAY 4, 2006

Participant list

Name	Institution	Telephone	E-Mail
Musa Ar□k	General Directorate of Protection and Control (GDPC)	312 418 2436	musaa@kkgm.gov.tr
U□ur Battal	Ankara Gendarmarie Command Environment Team	312 387 3515	
Musa Akturk	Ankara Gendarmarie Command Environment Team	312 387 3515	
Salih Çelik	MARA General Directorate of Agricultural Producers	312 287 9434	sceliks2@gmail.com
Muammer Koksal	Village headman, Kayabükü Village/Beypazar□ Ankara	0535 4482946	
Nilüfer Gökçek	Beypazar□Municipality	312 762 2510	nilufergokcek@yahoo.com
Adnan Ser□ev	□zmir Chamber of Veterinarians	(232)4651063	adnanser□ev@ttnet.net.tr
Levent Genç	Turkish Union of Chambers of Agricultural Producers	312 231 6300	lgenc@tzob.org.tr
Hüseyin Sungur	GD, GDPC		huseyinsungur@kkgm.gov.tr
Ahmet Ergün	Veterinary Poultyr Association	312517 2565	
Rahmi Demir	Sustainable Rural Development Association (SURKAL)	312 472 6860	rahmi@surkal.org.tr
Meltem Çelik	K□r□kkale Provincial Directorate of Health (PDH)	533 669 7526	drcelikmeltem@hotmail.com
Nadir Özel	Kirikkale PDH	532 738 2157	ozelnadir@hotmail.com
Cemal Kald□r□mc□	Metan Ltd. Company	532 454 9077	metan@kablonet.com.tr
Hasan Cebi	K□r□kkale Provincial Directorate of Agriculture (PDA)	533 263 6834	hsncb71@hotmail.com
Veysel Bulur	K□r□kkale Provincial Directorate of Environment and Forestry (PDEF)	318 225 3488	veybul@hotmail.com
Asl□□□gen	Livestock Fattening Association	312 472 7788	asl□@besd-bir.org
Mustafa Tufan	GDPC	312412 63 17	mustafat@kkgm.gov.tr
Hüseyin Küçük	GDPC	“	huseyink@kkgm.gov.tr
Asiye Dakman	Etlik Veterinary Control and Research Institute	312 326 0090	a-dakman70@yahoo.com
Neziha Y□□maz	Refik Saydam Central Public Health Institute	312 433 1413	neziha.y□□maz@sagl□k.gov.tr
Özlem Özsaraç	Ministry of Environment of Forestry (MOEF)	312 207 6485	ozsaraco@yahoo.com
Dilber Akta□	Ankara PDH	312 385 9700	dakta□@hotmail.com
Y□ld□r□m Cesaretli	Refik Saydam Central Public Health Institute	312 431 1280	yildirimcesaretli@sagl□k.gov.tr
Ahmet Safran	MOH	312 433 2331	ahmet.safran@sagl□k.gov.tr
Beytullah Okay	MOH	312 433 2331	

Adil Ad□güzel	MOH	312 433 2331	
Serdar Y□lmaz	MOH	312 433 2331	
Hacer □cen	Project Implementation Unit (PIU)/MOH	312 435 6840	hacer.icen@saglik.gov.tr
David Young	US Embassy	312 455 5555	youngdk@state.gov
Hatice Yazar	MOH		haticeyazar@yahoo.com
Bahar Özden	Turkish Union of Municipalities	312 431 6740	baharozden2013@yahoo.com
Hamit Demirci	GDPC	312 417 4176	
Nilay Köseda□	GDPC	312 417 4176	
Sinem Duyum	GDPC	312 417 4176	sinemd@kkgm.gov.tr
□ebnem Gürbüz	GDPC	312 417 4176	sebnemg@kkgm.gov.tr
Yüce Canoler	Livestock Fattening Association.	312 472 7788	besd-bir@interaktif.gen.tr
Nicu Homtaro	FAO		n□cuhomtaro@fao.org
Rag□p Bayraktar	FAO		ragipbayraktar@gmail.com
Yalç□n Karaca	MOEF	312 207 6482	yalcinkaraca@hotmail.com
S. □sfendiyaro□lu	Nature Association	312 448 0537	süreyya.isfendiyaro□lu@dogadernegi.org
Hayri Mente□	Veterinarian (retired)	312 323 7758	
Selim Peksar□	Turkish Radio&Television (TRT)	312 491 2824	
Mehmet Efe	Turkish Radio&Television (TRT)	312 491 2824	
Aylin Yerli	MOH	312 435 6840	aylin.yerli@saglik.gov.tr
Ayfer Y□ld□r□m	General Dir. of Agr. Reserach	312 315 4623	aaltinor@tagem.gov.tr
Aylin Yerli	MOH	312 435 6840	aylin.yerli@saglik.gov.tr
H. Büyük□ah	Union of Egg Producers	312 480 7989	hbuyuksah@mynet.com
Belgin Günay	GDPC	312 417 4176	belging@kkgm.gov.tr
Firdevs Aktap	Gazi University Medical Faculty	312 202 5403	firdevs@gazi.edu.tr
Semra Gürbüz	GDPC	312 417 4176	semrago@kkgm.gov.tr
A. Köseman	GDPC	312 417 4176	akoseman@kkgm.gov.tr
Orhan Cetin	K□r□kkale PDA	318 224 2592	71@vet.gov.tr
Cengiz Y□ld□r□m	Kirikkale PDA	318 224 2592	71@vet.gov.tr
Tahir Goncagül	Assoc.of Turkish Veterinarians	0533 5412411	71@vet.gov.tr
Ali □hsan Ak□n	GDPC	312 417 4176	ihsana@kkgm.gov.tr
Necla Kalköy	GDPC	312 417 4176	nacik@kkgm.gov.tr
Özlem Arslan	GDPC	312 417 4176	ozlema@kkgm.gov.tr
H.Çak□ro□lu	Çorum PDA	364 213 8313	husvet@yahoo.com
E. Kalendero□lu	Ankara PDEF	312 212 9056	kalenderli@hotmail.com
C.A□karo□lu	Ankara PDA	312 311 63 28	bercandan@yahoo.com
Y□lmaz □angül	Ankara PDA	312 236 6000	yilmazsæ@gmail.com
Gürdo□ar Sar□gül	EU Delegation	312 459 8700	gurdog.sarigul@cec.eu.int
Tayfur Ca□layan	CEU	419 21 79/118	tayfur.caglayan@arip.org.tr
Saim Y□ld□r□m	CEU	419 21 79/116	saim.yildirim@arip.org.tr
Banu Buyurgan	CEU	419 21 75/168	banu.buyurgan@arip.org.tr
Cüneyt Okan	Consultant	0533 5253365	cnokan@tr.net.tr
Nedret Durutan	Consultant	0533 5253365	cnokan@tr.net.tr