E1430

Environmental Management Plan

for the

MOLDOVAN AVIAN INFLUENZA CONTROL & HUMAN PANDEMIC PREPAREDNESS & RESPONSE PROJECT

UNDER THE

GLOBAL PROGRAM FOR AVIAN INFLUENZA AND HUMAN PANDEMIC PREPAREDNESS AND RESPONSE (GPAI) FOR ELIGIBLE COUNTRIES UNDER THE HORIZONTAL APL

Chisinau, April, 2006

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Introduction/Summary

1. Emergence of Avian Flu. Outbreaks of Highly Pathogenic Avian Influenza (HPAI) began in several Southeast Asian countries in 2003 and spread to Europe in 2005-2006. Significantly for Moldova, outbreaks in the neighboring Danube delta region of Romania and in the Crimea peninsula of the Ukraine in 2005 obliged governments to cull (kill) poultry. New outbreaks of avian flu were registered in the Danube delta of Romania and in Turkey as recently as February 2006. To date, over 140 million domestic poultry, on several continents, have either died or been culled. Economic losses to the Asian poultry sector alone total around $10 billion.

2. Potential infection of humans. Up to the end March 2006, the World Health Organization (WHO) reports that a world-wide total of 186 people had contracted the infection (of which 105 have died). The increase in infection raises concern that the virus could mutate in ways that favor human to human transmission. The WHO warns that the subsequent pandemic could have devastating effects on human health and livelihoods.

3. Government response. As a response for Avian Influenza appearing at the national territory the Government of Moldova has organized emergency teams, at both the local and national levels, to respond to any outbreak of Avian Influenza. Importantly, the Government of Moldova designed and enacted a National Contingency Plan for Avian Influenza, a National Preparedness Plan for Human Influenza Pandemic and a National Action Plan for Avian Influenza Mitigation Measures. The World Bank team reviewed the plans and these appear adequate and in line with recommendations of the World Organization for Animal Health, the Food and Agriculture Organization, and the WHO, but further strengthening of the plans will be required. In early 2006, the Government of Moldova formally approached the Bank asking for technical and financial assistance for augmenting its Avian Influenza prevention and mitigation efforts. The Project and current environmental assessment are being processed to respond to this request.

4. International response and role of the Bank. In January 12, 2006, the World Bank's Board of Directors approved up to $US 500 million in financing for the Global Program for Avian Influenza (GPAI) that will assist eligible countries. The role of the Bank in Moldova, with respect to HPAI, is to mobilize funds and technical expertise and to build partnerships with technical agencies and donors. A technical team from the WHO joined the Appraisal Team and took the lead in identifying human health activities. The FAO/OIE is expected to contribute with technical expertise to the implementation of the proposed Project. The UNICEF is leading the technical work on communications. Importantly, the US Agency for International Development (USAID) and the EU supported Food Security Project are also partners in funding the fight against HPAI in Moldova. Japan PHRD grant will support Human health capacity building sub-component.

5. Rationale for Moldova. To date, Moldova has not suffered an outbreak of Avian Influenza, though it is at significant risk, since two nations on its borders, Ukraine and Romania, suffered outbreaks. Moreover, the Government demonstrated its commitment to the fight against Avian Influenza through policy statements, through preparation of formal plans, and through expenditure and commitment of funds from the national budget. The Government has made implementation and monitoring arrangements, after benefiting from advice from a WHO delegation, and will further define these arrangements in a Project Operations Manual.

6. Project objectives are to lower the economic and social burden of disease in Moldova – all while lowering health and economic risks to neighboring countries. The overall objective of the Project is to minimize the threat posed to humans by HPAI. To achieve this, the Project

will support surveillance for outbreaks of such diseases, preparation for outbreaks, and control of outbreaks among humans and animals.

7. Project components. The project consists from four components as: **Component 1: Animal Health,** (including three sub-components: Animal disease surveillance & diagnosis; Animal HPAI control and outbreak containment; and Compensation Fund); **Component 2: Human Health** (including sub-components: Human health capacity building; Human HPAI testing; and Human health system response**. Component 3: Public Information and Awareness; and Component 4: Implementation support, monitoring and evaluation**.

8. Financing of overall Project. The proposed Project is a Standard Investment Loan (SIL), financed through the International Development Association (IDA). It is 50% credit on IDA terms, and 50% grant. The proposed IDA financing is the largest source of financing of an overall Project of US$ 10.6 million.

9. The Bank Safeguard Policy. 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.

10. Project category. The Moldovan Avian Influenza (AI) Project, incorporating investments in incinerators and bio-safety, has received an environmental rating of B, since it involves moderate environmental impacts that can be managed during implementation of the project.

11. Expected environmental impacts. Although project activities supporting HPAI prevention, preparedness and planning, and response and containment are not expected to generate significant adverse environmental effects, they do present a moderate environmental risk from inadvertent spread of the AI virus, disinfection and infected materials (carcasses, litter, protective gear) management. The potential impacts may be associated with pollution of areas during disinfection, poultry's carcasses burning in open pits, burring of infected bio-materials and marginal pollution from small scale veterinary laboratory incinerators. Overall the AI prevention and response-focused activities are expected to have a positive environmental impact, as the investments in 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. This would be reinforced by the mainstreaming of environmental safeguards into guidelines and procedures for the culling and disposal of animals during AI outbreaks. For the Human Health component, the proposed mitigation measures focuses on equipment, refurbishing and training for diagnostic laboratories to include key environmental issues in zoonotic disease containment and medical waste management. The management of hospital wastes will be done in accordance to the existing national regulations in laboratory, medical wastes and sanitary zones management.

12. Environmental management plan. The environmental management plan (EMP) addresses the moderate adverse environmental effects of the Animal Health component of the project, namely zoonotic disease containment, safe culling of infected and at-risk poultry and disposal of carcasses, and procedures for safe handling of AI materials. The EMP provides mitigation plan and monitoring plans for major environmental concerns to ensure appropriate attention to environmental issues, and tracking progress or problems in their management. The EMP has been prepared in close coordination and consultation with major stakeholders (see Annex 11), the summary had been disseminated for specialists and co-interested public via web-sites and, finally had been passed through the public consultation and disclosing process (see Annex 12).

I. Global, regional and national concerns

(a) The Global/International dimensions

13. 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 March 2006, more than 140 million domestic poultry had either died or been destroyed and over 186 people had contracted the infection (of which 105 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.

14. 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. The geographical spread of HPAI, the human dimension, and the potential enormous social and economic impact are unprecedented. Economic losses to the Asian poultry sector alone are estimated to date at around $10 billion. 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.

15. 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. The pandemic of 1918 is estimated to have killed almost 50 million people in eighteen months, with peak mortality rates occurring in people aged 20-45 years. The pandemics of 1957 and 1968 were milder, but many countries nevertheless experienced major strains on health care resources. If a major pandemic were to appear again, similar to the one in 1918, even with modern advances in medicine, 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. The Center for Disease Control (CDC) estimates 2 to 7.4 million deaths world-wide. Simulation of a 'mild-case' pandemic at the Lowy Institute of Australia National University predicts loss of 1.4 million people and of US$ 330 billion of world GDP while simulation of an 'ultra-case' scenario finds loss of 142 million people and US$ 4.4 trillion. The likelihood of such scenarios is highly uncertain.

16. 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 World Health Organization (WHO) and the World Organization for Animal Health (OIE) international standards (e.g. the local, regional, and global quarantine powers under the International Health Regulations; and the international standards, guidelines and recommendations under the OIE Terrestrial Animal Health Code). 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.

17. 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 influence A virus with a severity which varies from year to year, but 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].

18. 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.

19. 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

[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 reassortment 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.

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.

- ***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.

20. The long-term vision of the strategy prepared by FAO and OIE in collaboration with WHO (see summary in Annex 1) 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.

21. The Recommended Strategic Action plan prepared by WHO for Responding to the Avian Influenza Pandemic Threat (see summary in Annex 2) 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.

22. 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.

(b) The regional dimension

23. Cases of the H5N1 strain of avian flu have already occurred in more than 30 countries in the Middle East, Asia, Europe and Africa. Since the year 2005 the HPAI has been detected in Europe and rapidly spreading, covering countries as Georgia, Azerbaijan, Austria, Croatia, France, Germany, Greece, Italy, Romania, Russia, Turkey and Ukraine. There are also possible cases in Macedonia and Slovenia. The Russian outbreak of HPAI H5N1 has to date affected seven administrative regions, beginning in the Ural Mountains and moving west to within 200 km of Moscow. The countries in the Balkan region, including Moldova, are at risk due to their proximity to two main flyways, the East Africa-West Asia Flyway and the Central Asia Flyway. Both flyways cross areas in North-eastern Europe, where avian influenza in wild and domestic fowl has been diagnosed. From a geographical point of view, the Balkan and Black Sea region represent a vast area in which introduction of AI is likely to occur, and where the sensitivity of the veterinary and human health system for early detection of HPAI is low. All EU countries have plans to fight a possible avian flu pandemic. All countries in ECA have or are developing similar plans.

24. Significantly for Moldova, outbreaks in the neighboring Danube delta region of Romania and in the Crimea peninsula of the Ukraine in 2005 obliged governments to cull (kill) poultry. New outbreaks of avian flu were registered in the Danube delta of Romania as recently as February 2006. The Turkey has been affected in 2006, by both poultry and human infection.

(c) The national dimensions

25. Moldova is a small, landlocked country in south-eastern Europe, bordering on Romania on the west and Ukraine on the east. Its resident population is estimated by the 2004 census to be 3.97 million. The population density of the country is the highest in the Former Soviet Union, and among the highest in Europe, at 129 persons per km^2. The country presently has a nominal GDP per capita of US$765 and a Purchasing Power Parity per capita income estimated to be US$1,470 per annum. By this measure Moldova ranks 148th of 177 countries. The country has a moderately continental climate which is favorable to agriculture. Agriculture is the largest real sector of the Moldovan economy: it accounts for 18.2% of GDP (33% if agro-processing is included), generates the majority of Moldova's exports (65%). It is also important in terms of employment (39% of the total), incomes and poverty reduction, especially in rural areas, with rural poverty accounting for 68% of the total and rural households deriving 73% of their income from agriculture.

26. The poultry sector in Moldova represents circa 80% of the livestock and poultry population, at roughly 16 million heads (as of January 2006). Poultry meat is a nutrition staple generally, but more importantly, it is so in rural areas where poverty incidence is high. Twelve million birds are owned by households (backyard poultry) and small commercial farmers. The number of backyard poultry is highly variable, with peak season (summer and early fall) population reaching approximately 20 million birds. Backyard farming patterns are characterized by unsafe bio management practices, such as maintenance of multiple species in confined space and free range roaming for grazing. The presence of poultry in close contact with households creates a high risk of spreading from domestic birds to humans. The country's commercial poultry industry is characterized by the predominance of 5 large producers. Since independence, commercial poultry has suffered a severe drop in output, but has been on a strong rebound since 2002, with an average output (meat and eggs) growth of 10%. Adequate bio-safety standards are enforced at all commercial producers.

27. In 2005, the first confirmed outbreaks of Avian Influenza were reported in Romania and Ukraine. This posed an epidemiological threat to Moldovan poultry production. In response, the Government set up a Republican Emergency Anti-epidemic Commission to take charge of preparations for outbreak response and containment. The Commission took several practical organizational and institutional steps, with regard to both the agricultural and human health sides, to improve response capacity: (i) imports of poultry products from countries with officially registered outbreaks were banned; (ii) equipment for serological and viral testing was purchased; (iii) additional disinfection equipment was installed at all border crossing facilities; (iv) outbreak containment simulation exercises at national and regional levels were carried out; (v) an immunization campaign for human influenza virus among 100,000 people who are considered to be high-risk for bird flu infection was implemented; (vi) a cooperation agreement with Romania for Avian Influenza diagnostic verification and virus isolation was concluded.

28. The Government prepared and formally approved key documents, which set forth the institutional and functional responsibilities for Avian Influenza prevention and response preparedness, including the National Contingency Plan for Avian Flu, a National Preparedness Plan for Human Influenza Pandemic and a National Action Plan for Avian Flu Mitigation Measures. To operationalize the contingency and action plans, the Government issued 26 operational guidelines and normative acts to concerned line agencies and institutions. A welcome development is that the Government decided to compensate households and poultry farmers for losses incurred in cases of culling. Furthermore, with the help of UNICEF, the Government drafted and implemented a comprehensive public awareness campaign which disseminated basic knowledge on various aspects of Avian Influenza prevention and preparedness among the population at large, farmers, veterinarians and children. In addition, many staff of relevant Government agencies has been participating in various media events to raise awareness about AI risks and mitigation measures. The Government is committed to

continue its public awareness efforts, while further streamlining the focus of its interventions to specific target groups.

29. The Contingency Plan for Avian Influenza of the Republic of Moldova was approved on October 20, 2005. The plan provides the basis for the mobilization of resources and the provision of coordinated technical and financial support, training and capacity building with regard to animal health and veterinary services. It establishes preparedness responsibilities and benchmarks of the relevant institutions, from the Ministry of Agriculture and Food Industry, and its State Veterinary Service to specific village based groups, to deal with the imminent threat of the disease being introduced into poultry in the country, with actual outbreaks and compensation for culling. The Plan is based on the existing in-country institutional and service structure, and adequacy and readiness to perform the intended tasks. The plan specifically deals with three main themes: **surveillance**, c**ontainment and control of outbreaks, and communications.**

30. National Preparedness Plan for Human Influenza Pandemic addresses aspects of human health preparedness for human influenza in lieu of national capacity in key public health areas, inter-sectoral coordination, epidemiological surveillance, laboratory diagnosis, disease prevention, clinical case management, and communication. It will be updated and modified as needed in the light of evolving conditions and growing experience. The Plan addresses the pandemic alert periods (when animal and human cases may occur) and the pandemic period (effective person-to-person transmission). It establishes mechanisms for coordination with the veterinary services as well as with relevant local, regional and international organizations, epidemiological surveillance, laboratory diagnosis, and clinical management human cases (under both periods). It addresses pandemic preparedness, including procurement of a pandemic vaccine when available, rapid implementation of a national immunization campaign, and communication to the public.

II. Project Development Objective and Alternatives

31. The overall objective of the Project is to minimize the threat posed to humans by HPAI. To achieve this, the Project will support surveillance for outbreaks of such diseases, preparation for outbreaks, and control of outbreaks among humans and animals.

32. **Component 1: Animal Health** includes four sub-components. The sub-component **1.A. Animal disease surveillance & diagnosis** strengthens the NCVD and its two regional satellite laboratories. The key investments are in essential equipment for testing for the presence of HPAI in animals, for consumables and reagents. Technical assistance focuses on building human resources in the use of database programs and in the analysis of data to support decisions on prevention and control of animal diseases. To develop an efficient disease information system, the sub-component supports training on collection and analysis of epidemiological data and on risk assessments. Project-supported technical assistance builds institutional capacity for serology and virology tests for the disease. The sub-component **1.B: Animal HPAI control and outbreak containment** supports actions to contain any outbreak of HPAI, starting with culling of infected and at-risk poultry and then moving to disposal of their carcasses in a bio-secure and environmentally acceptable manner. Moreover, the sub-component promotes bio-security at commercial poultry farms and invests in control of movement of birds and products that may be infected. The sub-component trains and equips staff and external workers, and delivers personal protective clothing. In addition, it supports technical assistance to review, assess, and if necessary recommend improvements in the Government's contingency plans for HPAI preparedness and response. The sub-component **1.C: Compensation Fund** has the purpose to encourage farmers to report possible outbreaks of Avian Flu. In the absence of mechanisms and cash available to reimburse the cost of birds culled, many small farmers will not report sick poultry because of the potential loss from culling. The communications component explained will help address farmers' concerns.

33. **Component 2: Human Health** has three sub-components. The stock of medical equipment deteriorated over past decades because of lack of spending on rehabilitation and investment. The focus of the human health component is therefore on procurement and training in use of key equipment. The sub-component **2.A: Human health capacity building** sub-component brings technical assistance and trains government staff in epidemiology at the national and rayon level. It also procures epidemiological surveillance software and trains staff in its use. Importantly, it supports training in crisis preparedness and management. Moreover, it supports assessment & planning, and training in the information and telecom system. Finally, the sub-component supports review and update of the regulatory system and development of guides for use of personal preparedness equipment. Sub-component **2.B: Human HPAI testing** sub-component procures key testing equipment for the Laboratory for Respiratory Diseases, which is the only viral laboratory in Moldova. The lab's personnel have a good quality professional background and can learn to use new equipment quickly. At present, the Ministry of Health cannot test for the presence of HPAI in humans. Sub-component **2.C: Human health system response** sub-component procures equipment for the intensive care unit of the National Infectious Disease Hospital in Chisinau. Furthermore, the sub-component purchases WHO accredited influenza kits (including vaccines) and purchases Oseltamvir (Tamiflu), to increase the national stockpile.

34. **Component 3: Public Information and Awareness** implements a three-stage strategic communication plan: (i) a pre-epidemic campaign to promote health and safe behaviors to reduce risks to children, families, households and communities; and to promote responsible media reporting to avoid panic and misinformation; (ii) an intensive communication campaign during the pandemic alert, to begin immediately if and when human transmission is confirmed; (iii) post epidemic communication support to promote recovery.

35. **Component 4: Implementation support and monitoring & evaluation**. There are two implementing agencies. The Ministry of Agriculture and Food Industry implements the Animal Health Component, while the Ministry of Health and Social Protection implements the Human Health Component. The Ministry of Health and Social Protection also coordinates implementation of the Public Information and Awareness Component, although implementation and administration of the component activities will be contracted, if possible, to a qualified outside agency. Because of the urgency of launching the Project, an existing unit, the Consolidated Agricultural Project Management Unit (CAPMU) assumes responsibility for procurement, financial management and disbursement. It provides fiduciary support to the two agencies and facilitates the work of the Component Coordinators. Furthermore the CAPMU prepares bidding documents, drafts contracts, executes payments upon instruction of the implementation agencies, submits financial reports and consolidates project progress reports. Project evaluation includes both quantitative and qualitative aspects and be conducted on a yearly basis.

36. **Project alternatives and reasons for rejection.** Moldova is a poor country which receives a relatively small allocation of IDA funds from the World Bank Group. The small size of the portfolio sharply limits the options available to the Appraisal Team. The main alternative is to drop plans to assist Moldova in combating Avian Influenza. But this defies common sense, since poultry in Moldova's neighbors to the East and to the West have been stricken by the disease. With agreement of the Government, the Team is restructuring $US 1 million from the Social Sectors Management Project. The remaining alternative is to cancel processing of an agriculture project. This option is rejected because poverty is so heavily concentrated among rural farmers.

37. "Without project" alternative should be cancelled also taking into consideration environmental, economic and social environment in Moldova, particularly in rural area as it is the poorest regions in the country. If no prevention and quick response measures will be

supported by the project the infection disease and dead of domestic birds in rural households, small and industrial farms can raise significant economic losses and unwanted social site consequences. As results it may generate more human pressure to natural environment by population, which may lose expected income and revenue for living in rural areas.

38. From environmental consideration the massive infection and outbreaks of domestic birds followed by non-proper management, handling, disposal or liquidation of bio- and other infected materials (carcasses, animal waste, litter, and used protective gear) can generate the opposite pathway for infection of wild non-infected populations of birds. Such route are not clearly confirmed yet in already affected countries and regions, but should be not forgotten if no quick and proper response will be managed by country veterinary authorities. The environmental safety management of infected materials is an important project output, so "without project" alternative is an undesired environmental option.

39. Currently, the project document is not specifying exact locations (as it is hardly predictable) and precise technology to be used for culling, transportation and further disposal of animal carcasses and other infected HPAI wastes. The technical alternatives may include different modality of animal culling (examples - mechanical, in gas chamber, electrical shock, etc), infected materials transportation (convention vehicle, specialized mobile epidemic vehicle, by other transportation means, etc.), and final disposal methods (burial in simple or protective earth pit, biothermal composting holes (so called Bekkari holes), cremation or incineration at high capacity incinerators, burning in earth pits, and mobile incinerators). Also the range of alternatives is available in disinfection procedures normally applied for affected sites, equipment, protective gears, and vehicles by using different disinfectant agents. The spectrum of "technical" alternatives has been extensively consulted during preparation of the EMP with national veterinary, environmental and health authorities at national and rayonal levels in order to identify more realistic, affordable and environmentally friendly technologies to be recommended from environmental perspective.

III. Policy context

(a) IDA/IBRD Safeguards Policy

40. 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.

41. EA takes into account the natural environment (air, water, and land); human health and safety; social aspects (involuntary resettlement, indigenous peoples, and cultural property); 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.

42. The Moldova Avian Influenza (AI) Project has been assigned World Bank environmental category B, since it involves moderate environmental impacts that can be managed during implementation of the project. The EA process for the AI project is addressed through this EMP. Key considerations and methodology are taken into account during the EA process include:

- Generic initial screening to determine appropriate environmental assessment;
- Identification of high risk zones for appearing of HPAI infection;
- Compliance with existing environmental regulations in Moldova;
- Taking into consideration the economic and social evaluations (in the light of their linkage to the environmental concerns);
- Analysis of major expected impacts, balancing positive and negative effects and assessment of realistic alternatives;
- Public participation and consultation with affected people, organisations and stakeholders; and
- Disclosure of information.

(b) Moldovan Legislation

43. ***Environmental legislation***. Moldovan Constitution stipulates that the citizens of Moldova have the right to a healthy environment. The national environmental legislation reflects these requirements, considering provisions of international conventions and treaties. Generally the national legislation is covering the whole range of protective measures. Activities carried out under the project will conform to current laws in Moldova and sound environmental principles. The environmental, health and veterinary laws relevant to the AI project are the following.

44. *The Law on Environmental Protection (1516-XII, 16 June, 1993, revised in 2001).* This Law determines the general environmental framework related to air, soils, biodiversity and water resources protection, pollution control, waste management and other environmental issues. The law specifically (i) prohibit any non-treated discharges (also contaminated by pathogen bacterium) to surface water bodies; (ii) prohibit burial of wastes without permission from environmental, health and public authorities; (iii) required to take appropriate measures for air protection during transportation and disposal of any wastes; (iv) gives authority to environmental, health and public administrative bodies for issuing a permission in warehousing of any wastes (including agrozoowastes) and only in specially designated and arranged places, after landowner permission, and only if not negative impacts to the land, surface and groundwater, human localities, biodiversity and valued touristy places and landscape are expected.

45. *The Water Code (1533-XII, 22 June, 1993, revised in 2003).* This Law regulates management and environmental issues related to surface and underground waters. The state control on water resources protection is designated to the environmental authorities. The law in general terms: (i) regulates requirements for location, designing and construction of facilities that may have impact to water resources, (ii) setting the provisions on water protection zones, (iii) prohibit any untreated discharges or discharges that may negatively affect water resources (environmental and health authorities), (iv) stipulates general requirements on protection of surface and groundwater against pollution and degradation.

46. The environmental *water protection standards* (Maximum Admissible Concentrations) are included in the "Rules for Protection of Surface Water" (1991) and sanitary norms for water quality in the "Hygiene Regulation on Protection of Water Bodies against Pollution" (1997).

47. *The Law on Protection of Ambient Air (599-II, 4 May, 1998).* This Law regulates institutional responsibilities, air quality norms and measures for protection of ambient air quality. The environmental authorities are mainly responsible for planning of measures and monitoring of air quality. The health authorities are responsible for: (i) providing of thresholds limits (Maximal Admissible Concentrations), including admissible levels for contamination of air by microorganisms, (ii) control of emissions, (iii) set up the limits for sanitary-protection zones.

48. The law *"On Veterinary Activities (1538-XII, 23 June, 1993)* is under revision now and it is expected that draft of new general veterinary law will be issued soon. Nevertheless the Article 5 stipulates that emergency veterinary response should be taken by National and Rayonal Emergency Commissions. The Article 10 provides for control by the State Veterinary Service over execution of plans, instructions and resolution adopted in regards with (i) prevention of carrying and expansion of veterinary infections to the national territory and, together with sanitary authorities (ii) with prophylaxis and liquidation of hazardous infectious diseases common to animals and humans. The Article 19 is foreseen that owners (physical and juridical persons) of animals (i) should carry out veterinary measures in order to prevent and, if happened, to liquidate nucleus of infection, as well as to avert expansion by all required measures; (ii) inform veterinary authorities in case (or suspicion) of infection; (iii) leave the animals for veterinary inspection; (iv) maintain the places for animals' growing in a proper order. Articles 21, 22 and 23 provides the set of general rules and responsibilities in case of quarantine and zooanthroposic diseases.

49. *The Law on sanitary-epidemiological safety of population (1514-XII, 16 June, 1993, revised 1996)* introduced in general terms the basic requirements, responsibilities, and institutional set-up in the various spheres of sanitary-epidemiological safety of population. The role of system for sanitary-epidemiological control and relevant sanitary service are described. The Article 23 specifically deals with prevention, localization and liquidation of infectional human diseases. It provides the legal platform for integral institutional, technical, medical, hygienical and epidemiological measures to be implemented under umbrella of Emergency Commissions in case of massive human infections. The affected and at-risk persons should be hospitalized, treated and controlled by medical staff in quarantine conditions.

50. ***Emergency regulations.*** As a response for Avian Influenza appearing at the national territory the Government of Moldova has organized emergency teams, at both the local and national levels, to respond to any outbreak of Avian Influenza. Importantly, the Government of Moldova designed and enacted a National Contingency Plan for Avian Influenza, a National Preparedness Plan for Human Influenza Pandemic and a National Action Plan for Avian Influenza Mitigation Measures.

51. ***Legal and administrative framework for EA.*** Since 1992, Moldovan authorities have developed a series of laws and regulations which stipulate in detail all aspects of the EA procedure, as follows:

- Law on Environmental Protection (1993)
- Law on State Environmental Expertise (SEE) and Environmental Impact Assessment (EIA) (1996)
- Land Code (1991)
- Water Code (1993)
- Subsoil Code (1993)
- Law on Industrial Safety (2000)

- Law on Amendments of Penal Code, the Code of Penal Procedure, and the Code of Administrative Violations (1993)
- Guidelines on Performing State Environmental Expertise (1995)
- Regulation on Joint Expert Committee of the Ministry of Environment (1998)
- Regulation on Public Participation in Environmental Decision-Making (2000).

A chapter on State Ecological Expertise (SEE), which represent the basis of EA in the country, was included in the Law on Environmental Protection (1993). It defines SEE as an environmental protection activity that aims to: (a) prevent and minimize the potential of the direct, indirect, or cumulative impact of new economic activities on the environment, ecosystems, and human health; and, (b) to assess from this perspective all economic activities, separately or as a whole, that could affect the environment, human health, or living standards in the present or future (Article 21). This chapter describes the responsibilities of the state authorities (Division on SEE) to conduct a SEE and of the project proponents. According to this law, SEE is mandatory for all planned activities that could influence the environment and/or use natural resources, irrespective of their purpose, location, type, and ownership, volume of capital expenditures, financing body, and mode of implementation. It stipulates also that SEE is one of the main responsibilities of the National Environmental Protection Authority(Article 15b) and the exclusive body to undertake ecological review of new laws, programs, and projects (Article 16a) that are listed in Article 23. The law establishes that state experts should be highly trained professionals with at least 10 years of experience in the field. It also provides some very general guidelines on SEE, such as the time schedule and documentation requirements.

52. Some elements of SEE are incorporated in other legal acts. Hence, the Water Code (1993) requires SEE of all economic activities that potentially could affect water quality (Articles 11 and 12a). The Subsoil Code (1993) requires SEE of projects that aim to dispose of hazardous wastes underground (Article 36), as well as those that use subsoil resources (Article 48). The Soil Resources Code (1991) stipulates the conditions of land allocation for economic activities (Article 16). In 1993, the Republic of Moldova ratified the Espoo Convention on EIA in a Transboundary Context. According to the Moldovan Constitution, international treaties take precedence over national laws; hence, the Espoo Convention constitutes the legal basis for EIA studies of projects with potential transboundary impacts.

53. *Law on SEE and EIA*. This law covers all aspects of conducting SEE and EA. It stipulates the following issues: (a) roles and responsibilities of various state institutions and of NGOs in conducting EA and SEE; (b) rules and procedures of EA and SEE as well as procedures for public SEE; (c) responsibilities in the case of violation of the current law: (d) special requirements to the project documents; (e) screening categories of project documents; other important aspects of EA.

54. *Law on Urbanism and Territorial Arrangement Principles* (1996). It stipulates procedures and decision-making processes for developing planning documents, primarily for urban and rural development plans, including preliminary coordination.

55. *Regulations concerning public participation*. Public participation and consultation are recognized as valuable tools in environmental assessment for mediating differing interests, arriving at sound decisions, and ensuring the rights of citizens to have access to environmental information and a role in environmental decision-making. Two government regulations were also issued: Public Consultation in the Approval of Urbanism Documents (1997) and Public Participation in Environment Decision-making (2000). And in April 1999, the Moldovan Parliament ratified the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters.

56. *Administrative framework*. The competent SEE and EA authority in Moldova is the Division on SEE within the State Ecological Inspectorate, a subdivision of the Ministry of Ecology and Natural Resources. It incorporates dual functions. As the main administrative body, it is responsible for organizing and coordinating the SEE procedure (Law on SEE and EIA, Article 7(2)). As the expert body, it is responsible for reviewing project documentation for planned activities and deciding whether or not they may be implemented. In the latter function, the ministry is represented by a group of permanently employed state experts of the Division on SEE. All aspects of the environment are represented, *e.g.*, atmosphere, soil, flora and fauna, *etc*. According to the Law on SEE and EIA, these experts should be highly trained professionals with at least 10 years of experience in the field and five years as planners (Article 7(3)). The Division on SEE is also responsible for control and supervision of SEE procedures.

57. *Guidelines and procedures*. An annex to the Law on SEE and EIA contains regulations for conducting EIA studies. However, there are no regulation/guidelines for specific sectors (agriculture, waste water treatment, waste disposal and incineration, *etc)*. Procedures for conducting SEE are contained in Guidelines on Performing SEE (2001). The comprehensive guidelines define in detail the goal, objectives, and principles of SEE. They stipulate the structure and function of the process, procedures for submitting project documentation, and review procedures. The guidelines are accompanied by a series of annexes, on such topics as requirements for project documentation submitted to SEE; the subdivisions responsible for SEE of various types of projects; requirements for every chapter, or volume, of project documentation projects that require a separate chapter on EIA at the project stage, *etc*.

58. *Screening: methods and categories*. The Law on SEE and EIA clearly indicates the screening method that should be applied, while the Guidelines on Performing SEE lists categories of projects subject to screening. According to the cited law and guidelines, the initial stage of the SEE procedures is the preparation of project and planning documentation to be submitted to SEE for approval. Depending on the complexity and the expected environmental impact of the planned activity, an EIA study may or may not be required as a preliminary SEE procedure. The Law on SEE and EIA stipulates that all activities that could have a significant impact on the environment and affect it radically require such a preliminary EIA study. The mandatory list of developments that require EIA is provided in Chapter X of the Regulation on EIA annexed to the law. It considers 32 types of activities in total. According to Chapter I (4) of the same regulation, the central environmental authority may also require an EIA for activities that are not on the list – even though the procedure for case-by-case screening is not elaborated in Moldovan environmental assessment legislation. If the proposed development project does not require an EIA study, then the planner prepares the project and planning documentation according to the requirements stipulated in the Guidelines on Performing SEE (2001). If an EIA is required, then the procedures stipulated in the Regulation on EIA annexed to the Law on SEE and EIA are followed. Thus, the planner/EIA team conducts an EIA study according to the methodology designed by the National Institute of Ecology.

59. *Basic requirements for EAs*. The basic requirements for EA study are stipulated in Chapter II of the EIA Regulation. The first requirement is that alternatives to the project and mitigation measures should be covered. As already mentioned, all alternatives to the project or to any of its components should be comparatively analyzed, and the best option should selected (Chapter II, 6.2). The regulation also requires that the "zero-option," or "do-nothing option," be considered. Measures that would exclude or mitigate the negative impact of the project should also be addressed, as well as those that would increase its positive impact (Chapter II, 6.3). In fact, national legislation is required to adopt measures to reduce environmental impacts or to rationalize natural resources use. For compatibility with the World Bank, legal documents should be revised to clearly indicate the necessity for comprehensive environment management plans that take into consideration all necessary aspects of environmental impact

mitigation. EA studies are also required to cover impact prediction and consideration of transboundary impacts.

(c) WHO and FAO/OIE Guidelines

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

IV. Baseline of the Project Region/High Risk Zones

61. The project will operate throughout entire Moldova, as it is fully possible that AI will appear in wild birds and domestic poultry in all areas of the country. The project duration is assumed to be three years, but outbreaks combating actions may be urgently needed in case of invasion of HPAI virus to the national territory.

62. The current status of Moldovan natural environment is under strong human-made pressure. The major concerns to be considered during project implementation are the high level of top-soil quality degradation, deterioration of water quality of small river streams and water bodies as well as of ground waters, deteriorated drinking water sources in rural surroundings and affected biodiversity, habitats, and landscapes health[2].

63. Water quality of major river's (Dniester, Prut) streams are moderately, and in some sections - heavily polluted. The major sanitary-epidemiological concern in surface water quality is mounting of samples with microbiological exceeding values. The extensive network of small internal rivers and tributaries (3621 water courses totaling the length of about 16 000 km)[3] and large number of surface water reservoirs (more than 3500 reservoirs had been build for supporting of local irrigation, fish-farming, recreation) are considered as seriously degraded water quality bodies – both by nutrients and microbiology[4]. Shallow groundwater quality is seriously deteriorated chemically and microbiologically in the limits of rural locations[5]. The trends shows the constant grow of samples exceeding drinking water quality parameters which have particular alarm as the bulk of rural population is only relay to the dig shallow wells as a sources of drinking water[6, 7]. The major sources of surface water quality degradation are agricultural run-off and discharge of non-properly treated municipal wastewater. The impacts to water quality in rural drinking wells are associated with non-treated human excreta (earth toilets) and large number of domestic livestock and back-yard poultry processing at the households by peasants.

64. Due to human pressure the natural habitats are limited in their capacity to maintain wild population of animals and birds. The condition of national fauna biodiversity is a concern as 116 animal species, including 39 varieties of birds, are included in the Red Book[8]. It is about 25 % from the total number of wild birds' species in Moldova. Nevertheless the remaining biodiversity is included 281 species of wild birds, including migratory ones[9]. The migratory water flow birds, which are the major concern in global spreading of HPAI, are mostly

[2] State of Environment in the Republic of Moldova, 2004
[3] State of Environment in the Republic of Moldova, 2003
[4] Water Resource Management Strategy, draft papers, ACVAPROIECT
[5] Study of Rural Drinking Water Quality, WB/EPBRD, 1997
[6] National Report Children's Health and Environment, 2004
[7] The Environment Millennium Development Goal (MDG) in Europe and Central Asia. Water and Sanitation Targets for Moldova, 2004
[8] The Red Book of the Republic of Moldova, 2001
[9] Biological Diversity Conservation National Strategy and Action Plan, 2002

presented by orders *Gaviiformes, Podicipendiformes, Pelecaniformes, Ciconiformes, Anseriformes, Gruiformes.* The river corridors, forming by the streams and floodplains of rivers Prut and Dniester, oriented in South-North direction, are the major pathways for migratory birds in Moldova[10].

65. The poultry sector in Moldova represents circa 80% of the livestock and poultry population, at roughly 16 million heads (as of January 2006), which may highly vary, with peak season (summer and early fall) population reaching approximately 20 million birds. Poultry meat is a nutrition staple generally, but more importantly, it is so in rural areas where poverty incidence is high. Twelve million birds are owned by households (backyard poultry) and small commercial farmers. Backyard farming patterns are characterized by unsafe bio management practices, such as maintenance of multiple species in confined space and free range roaming for grazing. As a consequence it is increase the probability of contacts, both with humans (risk for human infection) and potentially infected wild organisms (risk for poultry infection).

66. The country's commercial poultry industry is characterized by the predominance of 5 large producers (located in Riscani, Falesti, Criuleni, Donduseni, Anenii-Noi raions). The poultry population maintained at the industrial base is more under control as adequate bio-safety standards are enforced at all commercial producers.

67. The zones of the major risk for appearing of HPAI in Moldova are mostly associated with the lower Prut and Dniester rivers segments. Both regions are characterized by wetlands, open water mirror, lakes and small channels, reeds and other aquatic and marshes vegetations. Both concerned areas are closely situated to the large wetland areas as Danube Delta (HPAI has been recently registered in 2006) and Dniester Lyman. Two big water reservoirs, build in the middle sections of the rivers Prut (Costesti-Stanka) and at the Dniester (Dubasari), are the risk zones as well, represented by open water and riparian vegetation. The principal migratory ways of wild birds are shown in Annex 10, as well as initial areas of concern which are regions that host large populations of migratory waterfowl (see map attached as Annex 10).

68. However the broad network of medium and small artificial inland reservoirs is also the important risk factor for invasion of AI by wild waterfowl and first virus attack to human beings. It is because the most of small reservoirs and lakes are silted, partly covered by reeds – thus providing habitats for many water based species. In addition, the major part of small lakes/reservoirs are rented by farmers for processing of commercial fish, which is also important nutrition and income factor for rural inhabitants, considered as the poorest quota of Moldovan population. Close location of villages to the small reservoirs, fishery/fishfarming activities at the water bodies, watering of livestock (cows) at the natural water streams are factors which may increase the possibility for spreading of AI among domestic poultry and humans.

69. The target inhabitants for primary risk-contact are farmers, peasants which have permanent access to water bodies and contacts with free moving domestic poultry, hunters, amateur fish-man, workers on hydrotechnical infrastructures (dams, pumping stations), employees of fish-farming entities.

70. The existing experience in Moldova for disposal of animal carcasses is by using of biothermal composting holes (Bekkari holes). The holes are constructed at a dry, high-ground place with a low level of subsoil water, at least 300 m from the livestock sheds, processing facilities, rivers, ponds and wells, and the area is fenced to a height of not less than 2 m. The hole itself is 10-12 m deep, with a diameter of 2-3 m. The facility is constructed of moisture- and thermo-resistant material (bricks, ferroconcrete, wood and clay), with a hermetic cover and a ventilation system. 20 days after being loaded with animal carcasses the internal temperature

[10] The Animal Kingdom of Moldova, Birds, 1981

rises to 65^0 C. The decaying process is completed within 35-40 days, with the formation of uniform and odorless compost, suitable for fertilizing. The biothermal hole has a significant advantage over burial grounds in that it causes fairly rapid destruction of many microbes. But in the current conditions in Moldova most of about 100 Bekkeri holes are in very poor technical and management status and only virtually existing. Most of them had been constructed nearby the large animal farms, but were not properly maintained. Actually, due to the absence of previous holders (former sovhozes and colhozes) the facilities has been allocated to the local public authorities (primaria) which have no funds and human resources to proper management of facilities.

71. Veterinary service in Moldova has been declined last decades, but capacities for first emergency responses are existing. There are several laboratories for identification of animal infection in the country, but they very poorly equipped. As a response for potential invasion of HPAI in Moldova in each rayons the minimal stock of individual protection gears, disinfectants and spreading equipment has been consolidated. The National Center for Veterinary Diagnostic and some regional veterinary centres have mobile disinfection team (equipped by special car, spreading units, protection clothes, etc), which are capable to manage mitigation measures if required. Nevertheless the stocks of available equipment and reagents are quite limited.

V. Assessment of Environmental Impacts

72. Activities under AI projects are not expected to generate significant adverse environmental effects as they are focusing largely on public sector capacity building and improved readiness for dealing with outbreaks of avian influenza in domestic poultry and a potential human pandemic. These prevention-focused activities are expected to have a positive environmental impact as the Project's intervention in equipment, training for veterinary and public health services as well as laboratories will improve the effectiveness and safety of existing zoonotic epidemics handling and testing procedures. This would be reinforced by the mainstreaming of environmental safeguards into protocols and procedures for the culling, selection of burial sites and disposal of animals during AI outbreaks and use of less harmful disinfectants. In addition, waste generated in upgraded laboratory facilities will be managed using existing national guidelines and small capacity incinerators that are consistent with international good practice.

73. The main areas of environmental impacts from project activities are linked with the ***Animal Health component.*** The possible impacts can be characterized as both moderately negative and positive. The environmental risk mainly associated with the inadvertent spread of the AI virus during culling and transportation; disposal of carcasses, litter, and used protective gear; contamination of surface and groundwater from use of disinfectants; contamination of groundwater via composting of bio-degradable wastes in the earth pits and laboratory bio-safety. **The moderate environmental impacts are expected if no mitigation measures will be applied.** For the ***Human Health component*** there are **no significant environmental impacts, except management and disposal of hospital wastes, which is normally implemented by careful and safety manner according national legal requirements and international best practices.** From environmental consideration Human Health project's component have long-term beneficial influence regarding better and efficient country preparedness to any zoonotic disease response and mitigation measures planning. The ***Strategic Communications component*** have **no environmental issues**, but an important for design and delivery of communications tools for good hygiene, safe culling and disposal of animal carcasses, animal waste management. The ***Project Implementation component*** has **no environmental issues,** but implementation and evaluation of the EMP will be monitored through this component.

74. Summary impact matrix for Animal Health component, which includes (i) assessment of negative and positive effects, (ii) identification of magnitude/scale of impacts, (iii) evaluation of direct, indirect and cumulative nature of impacts expected, (iv) identification of mostly affected economic, social and natural environments is presented in the Annex 5.

75. Most of impacts are classified as positive, including impacts to economic and social spheres which particularly related to non-direct environmental benefits expected by project intervention as prevention of massive economic and social disturbances in poor rural areas will significantly benefit environment. It is due to supposition that farmers will remain mainly to their traditional incomes and not illegally affect surrounding natural resources (as example – obtaining of free wood by illegal cutting of trees) as they will be intended to indemnify possible income losses.

76. The negative environmental impacts are mostly local, short-term and ranged from insignificant to moderate. Most of them are already mitigated by project activities as training in bio-security, laboratory practices, infected wastes handling, personal security control, risk identification, compensation and communication. Nevertheless mitigation measures will be required for prevention of possible impacts associated with some activities planned under Animal Health component.

VI. Mitigation measures

77. Generally the planned project actions, combined with properly implemented mitigation measures in order to avoid and/or reduce environmental impacts, will enable Moldova to the meet international standards set by the OIE and the recommendations developed by FAO. This in turn will help to provide the capacity for safe and environmentally sound management of culling and disposal of AI infected materials.

78. Animal Health Component. This component will support strengthening of disease monitoring and surveillance, planning for containment measures in event of an outbreak, including preparation of plans for compensation. Short environmental training, particularly for regional staff, in selection of disposal places, proper preparation of burial holes, and covering of holes by earth after burring of carcasses is the major mitigation response. Testing equipment and training for regional veterinary laboratories should include key environmental issues in zoonotic disease containment and waste management as pertain to special waste, emissions and materials. Training for veterinary services and poultry sector workers should include procedures for safe handling of AI materials, safe culling of infected and at-risk poultry and environmentally safety disposal of carcasses. Training in implementation of bio-safety measures at the commercial farms should also include elements of environmental mitigation measures. The required training and mitigation measures will be supported through the following sub-components:
    - **1.A: Animal disease surveillance & diagnosis**
    - **1.B: Animal HPAI control and outbreak containment**

79. In addition to technical assistance and training, these sub-components will provide priority equipment, materials and supplies. Funding would be provided for essential first response equipment. This would include personal protection equipment, disinfectant equipment, and materials for sampling and culling. Actually Moldova's veterinary laboratory capacity is hardly non-adequate to response in identification of H5N1. The equipment of two laboratories by required testing equipment will substantially strengthening national capacities in diagnoses all notifiable diseases including HPAI. Essential equipment, consumables and reagents, staff training and technical assistance would be provided to complete the chain of response for disease surveillance.

80. In case if HPAI will be detected in animals the cutting of infected and at-risk poultry will be urgent actions. In Moldova, the most appropriated animal carcass disposal method is digging of burial pits, probably - burning of carcasses and used protective clothes in open earth pits, and use of quicklime to prevent earthworms bringing contaminated material to the surface after pit closure. It should be stressed that burning of carcasses and other infected materials in open pits is not the best environmental option. It can generate air pollution, strong odor and anxiety of local population. Burring of carcasses in properly selected places under observance of all required safety measures (see Annex 6) is provide effective sterilization of infected bio-materials and considered as the better environmental option (as alternative solutions by using of Bekkery holes or mobile incinerators are not realistic in current Moldovan conditions). Disposal of carcasses in the earth pits is 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 bodies, soil characteristics, etc. Of particular concern however is the risk to groundwater from poorly selected sited pits. However the properly sited and constructed burial pits is valid disposal option in Moldova.

81. It should be mentioned, that there are no national requirements for emergency build burial sites, in particular to the earth pits used for **infected materials and wastes**. However, the former soviet standard (Sanitary Norms for Designing of Industrial Facilities, SN 245-71) have provisions for sanitary protection zones: (i) small animals and poultry slaughterhouses - 300 m, (ii) animal cemeteries buried in earth pits – 500 m, (iii) factories for liquidation of animal corpses – 500 m. The recommended mitigation measures are: dimensions of sanitary protected zone for burial site – at least 300 m, distance to the surface water, wetlands, forests and natural protection zones – at least 500 m (but can be corrected according to the landscape slopes and other characteristics), depth to groundwater table – at least 2 m, clay soils, earth cover of carcasses - 400 mm soil first, then apply lime, then complete filling, cover with minimum 2 m soil to ground level, plus overfill.

82. So, the important and required mitigation measures are mainly associated with proper selection of burial sites according to the landscape and soil characteristics, observance of sanitary distances to human localities, natural water streams and drinking water sources. This selection should be done by the local emergency commissions that would include among others representatives from rayon level ecological Inspections. Besides, the set of principal mitigation measures during transportation of dead and slaughtered birds and other infected materials to the disposal site can include - safe bags with proper head lock, avoiding of transportation bags overfilling, using of covered containers. During unloading/temporal storage of culled poultry at the disposal site mitigation should mainly include operator's training and supervision, use of mechanical loader, shelter from weather, minimization of storage time and use of impermeable surfaces. Burial of dead poultry should be mitigated by ground cover, application of lime, fencing and disinfecting. Environmental mitigation measures for disinfection procedures should include - use of appropriate and less toxic disinfectants, avoiding of drainage to watershed, operator training and supervision, minimization of disinfectant diffusion out of designated area, considering the weather conditions (strong winds and rainfalls).The details of mitigation measures proposed are presented in the Annex 6.

83. The biothermal composting holes (Bekkari holes) may provide effective and environmentally friendly carcass sterilization. But their renovation and putting into proper maintenance and operation regime is hardly predicted option, considering the urgent needs for disposal actions and absence of funds from local authorities. The after-disposal operation will require qualified and permanent staff which is not available at the moment. Other options for disposal include cremation, incineration by high capacity mobile or stationary incinerators, and rendering are not considered as appropriated and affordable ones.

84. The key discharges to surface water may arise from the water used during washing of affected territories, facilities (poultry housing), and disinfectants. Disinfection and washing can be are applied for infected households and other rural areas, the vehicles used in transport, disposal sites and slaughter of the poultry. 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 (internationally permitted chemicals, as well as soaps and detergents), and (ii) providing training to veterinary services personnel and poultry growers on measures to limit use of toxic disinfectants and prevent untreated drainage or runoff into surface or groundwater systems.

85. The project will also finance essential equipment, consumables and reagents, staff training and technical assistance for regional laboratories. The project will address laboratory waste management by basic training and upgrades to laboratory infrastructure and equipment based on "International Best Practice in Safety of Research Laboratories" guidelines, developed by the US National Institutes of Health. The guidelines are attached below as Annex 4.

86. The small veterinary laboratory incineration facilities will be procured, installed and operated in compliance with the national safety, operational health and environmental standards which are harmonized with the EU ones, and the process will be operated within established guidelines drawn from existing regulations. The key emissions to the air from operation of the incinerators are odour, particulate matter, hydrogen chloride, nitrogen oxides, sulphur dioxide, carbon monoxide, volatile organic compounds. In addition there is also risk from airborne release of virus as the infected by HPAI animal products and used small laboratory devises are loaded into the incinerator. Considering that capacities of incinerators are small, and they should provide better management of laboratory wastes, the emissions are not expected to generate significant environmental impacts. 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 main requirements for installation of small incinerators in laboratories should follow national legal provisions related to protection of air, treatment of wastewater, sanitary norms and occupational health provisions. Mitigation Plan for Laboratory Safety and Waste Management is included in Annex 7.

87. The Human Health component is not expected to generate significant environmental impacts. The only concern is handling of hospital wastes if human infection will be registered and affected peoples will be treated at National Infectious Disease Hospital in Chisinau. Nevertheless the subcomponent **2.C: Human health system response** will provide assistance to the health care system for preparedness planning and strategy development to provide optimal medical care and maintain essential community services. To this end, sub-component will finance: a) technical assistance for the development of plans to establish specialized units for AI patients in hospital and increase bed availability in case of a pandemic, b) development and/or updating of treatment guidelines and hospital infection control guidelines and measures, including hospital waste management, antibiotic stocks, mobilization of additional health personnel, c) training of health personnel, d) provision of equipment, drugs, vaccines, and other medical inputs, diagnostic reagents, including kits, and e) minor renovation of specialized units in hospital. The training program for human health care services should also include key elements of environmental issues in zoonotic disease containment and waste management under the Rules for Medical Wastes Management (MHSP decision, 06.8.3.45, 10 December, 2001, published in Official Monitor 18 January, 2002).

VII. Monitoring

88. The project environmental monitoring plan was developed to monitor environmental performance and identify any problems during the project implementation so that these can be addressed promptly. The plan includes proposed activities with the description of roles and

responsibilities, as well as monitoring indicators in order to measure the success of the mitigation measures (see Annexes 8 and 9)

89. The overall monitoring is lies under responsibility of the Ministry of Agriculture and Food Industry (MAFI) and the Ministry of Health and Social Protection (MHSP) as monitoring of the EMP implementation will form a part of the overall project monitoring and evaluation system. Nevertheless the monitoring plan will be operationalized by the environmental specialists from Rayonal State Environmental Inspectorate. While the Environmental Inspectorate is not formally implicated in the Emergency Commissions, defined by the Government for combating against avian influenza, their representatives should be involved if practical outbreaks measures will be needed. To implement the proper monitoring requirements the Environmental Inspectorate staff should participate in the selection of burial site as well as in supervision of the upper land reclamation procedures. They will be also involved in monitoring/mitigation of discharges and spills during disinfection if happened. Monitoring of the interception of liquid run off from disinfecting and wash down of the hen houses, containers, disposal sites 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

90. The environmental inspectors will provide monitoring reports to the AI Project Implementation Team (PIT) and to the Ministry of Ecology and Natural Resources and will notify the national environmental authorities in the event of problems or issues connected with the mitigation measures. .

VIII. Institutional Arrangements and Budget

91. The Ministry of Agriculture and Food Industry (MAFI) implements the Animal Health Component, while the Ministry of Health and Social Protection (MHSP) implements the Human Health Component. Under this component, the Ministries hire (a total of two) Component Coordinators (composing the key staff of AI Project Implementation Team) as local consultants to manage and implement project activities within their sectors. Their role is to coordinate project activities with other relevant government agencies. Moreover, they prepare annual work programs in their sectors and submit inputs to the Project's quarterly and annual financial monitoring reports. The Coordinators are responsible for monitoring and collecting relevant data from their respective implementing ministries and agencies and compile them into progress reports, focusing on the status of physical implementation by component, the use of project funds, and monitoring indicators, including environmental ones. Both Components Coordinators should closely cooperate with Rayonal Environmental Inspectorate, as well as with the Ministry of Environmental and Natural Resources (MENR) if necessary, for any environmental issues raised during project implementation and if specific permissions or assistance will be required.

92. Budget for implementation of the EMP is provided under the project component 1*(1.A: Animal disease surveillance & diagnosis 1.B: Animal HPAI control and outbreak containment)* and component 2 *(Human Health).* As it is mentioned above, under the subcomponent A.1 these costs will cover expenditures for testing equipment and training for regional veterinary laboratories; for consumables and reagents; building human resources in the use of database programs and in the analysis of data to support decisions on prevention and control of animal diseases; as well as training on collection and analysis of epidemiological data and on risk assessments. The sub-component 1.B: will provide budget for actions to contain any outbreak of HPAI, starting with culling of infected and at-risk poultry and then moving to disposal of their carcasses in a bio-secure and environmentally acceptable manner (the financing for these activities will be provided from the unallocated fund of US 1.450 million). The sub-component trains and equips staff and external workers,

and delivers personal protective clothing. The *Human Health component* also includes budget for proposed mitigation measures in this area and specifically for the development and/or updating of treatment guidelines and hospital infection control guidelines and measures, including hospital waste management, antibiotic stocks, mobilization of additional health personnel, c) training of health personnel. The training program within this subcomponent will also include key elements of environmental issues in zoonotic disease containment and waste management under the Rules for Medical Wastes Management.

93. Budget for the EMP monitoring is provided under the *Component 4, Implementation support and monitoring and evaluation*. This component funds training in project monitoring and evaluation at all administrative levels, and development of an action plan for monitoring & evaluations. As was mentioned, the overall monitoring is lies under responsibility of the Ministry of Agriculture and Food Industry (MAFI) and the Ministry of Health and Social Protection (MHSP) as monitoring of the EMP implementation will form a part of the overall project monitoring and evaluation system.

94. Additionally to what is specified above, the project will specifically support training activities related to EMP implementation and monitoring: (i) one training session for Rayonal Environmental Inspectorate, where the EMP and especially the Monitoring Plan should be explained in details. The number of participants is expected to be 35-40 environmental inspectors; (ii) at least one training session for veterinary service and emergency teams in each rayon; and (iii) at site monitoring, evaluation and reporting during outbreaks event. .The trained environmental inspectors should further serve as local trainers in order to conduct similar environmental training for veterinary and emergency teams in each rayons. It is expected 35 training sessions in all rayons for 10-20 participants.

IX. Public Consultation Arrangements

95. The Veterinary Inspection from MAFI and MHSP on April 26, 2006 has disseminated the draft summary EMP in their and other relevant ministries for review and comment.

96. On April 29, 2006 the Veterinary Inspection has publicly disseminated the 5-page announcement summary (with Annexes showing the Impact Matrix, Mitigation and Monitoring Plans) for public access in paper copies and by the MAFI website. The arrangements for an announcement regarding the availability of the EMP summary, data of public consultation, contact information and where copies can be obtained, etc. had been done by the Veterinary Inspection (see Annex 12). At the same time the EMP summary and relevant annotation has been open for wide NGO community via website of Regional Environmental Center (REC). In addition the REC has mailed information on public consultation meeting on May, 15, 2006 by the network of environmental NGOs.

97. The Veterinary Inspection organized and conducted one public briefing and consultation on the draft EMP on May 16, 2006. The place, time and purpose of the consultation were announced in the local press two weeks in advance of the meeting. In addition to the public announcement of the meeting, invitations were sent to environmental and socio-agricultural NGOs, commercial poultry growers, farmers associations, the MENR, the MHSP, and the MAFI, and local representatives of international organizations.

98. The draft EMP was revised after the meeting taking into account inputs from the consultation. The final version of the EMP was be made publicly available in Moldova, provided to the World Bank, and will be 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

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, geo-graphical 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

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.

3. 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 containment	Yes	Yes	Yes
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[11]

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 ⊠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

[11] US National Institutes of Health

- 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 posal 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 liquids, disposal in sanitary sewer; putrescible waste disposed of by incineration; needles and sharps require destruction, typically 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 come in contact with discarded items

Annex 5.

IMPACT MATRIX for Moldovan Avian Influenza Control & Human Pandemic Preparedness & Response Project

Project interventions	**Environmental impacts**		**Impacts classified by:**		**Mostly affected environment**						
	Positive	**Negative**	**Time**	**Scale**	**Economic**	**Social**	**Natural**				
							Ambient air	**Surface water**	**Groundwater**	**Soil**	**Biodiversity**
1. Animal Health											
1.1. Equipment, reagents and consumables for HPAI testing in animals	YES (improve preparedness, veterinary services will be able for rapid identification, localization and immediate response)	NO	Long-term	National and international	Protection of poultry sector (backyard and commercial) at poor regions. Indirect protection of local natural resources	Reduction of social consequences after sudden losses in household economy, nutrition and livelihoods practices	None	None	None	None	Possible indirect protection of wild fauna by reduction of viruses spreading in natural environment
1.2. Actions to contain any outbreak of HPAI, including:											
- culling infected and at-risk poultry	YES (minimizing areas affected by HPAI)	NO	Middle-term	Local, regional	Protect overall population of backyard and commercial poultry. Direct losses is mitigating by Compensation Fund	Livelihood disturbance and rural population caution is mitigating by Communication	None	None	None	None	Possible indirect protection of wild fauna by reduction of viruses spreading in natural environment
- transportation of carcasses	YES (reduction of risks at the areas affected	YES (Possible way for enlarging of contamination	Short-term	Regional	None	None	None	None	None	Local contamination of land surface by	None

Project interventions	Environmental impacts		Impacts classified by:		Mostly affected environment						
	Positive	Negative	Time	Scale	Economic	Social	Natural				
							Ambient air	Surface water	Groundwater	Soil	Biodiversity
	by HPAI)	by virus. Mitigation will be required)								leaking materials.	
- disposal of carcasses and other infected bio-wastes	YES (reduction of risks at the areas affected by HPAI)	YES (magnitude of impacts are depends from the modus of implementation, location and treatment technology for disposal. Moderate impacts as contamination of natural environment. Mitigation will be required)	Middle-term	Local/Regional (cumulative impact)	None	None	Air emissions during burning of carcasses	Not expected for properly sited burial holes	Not expected for properly sited burial holes. Biodegradable animal carcasses my have long time period for composting and may increase nutrients pollution of shallow groundwater if water table is high.	None	None
- decontamination (HPAI affected zones, protection clothes, burial sites) by chemicals	YES (reduction of risks at the areas affected by HPAI)	YES (magnitude of impacts are depends from the modus of implementation, location and treatment technology for disposal. Moderate impacts as contamination of natural environment. Mitigation will be required)	Short-term	Local	None	None	Volatile chemicals may affect air quality during spreading of disinfectants. Particular concern is rural localities and sites nearby the fishery surface waters. The effect on bee population	Not expected for areas located at the distance from the sites required disinfection. After disinfection washing may generate contamination flow to surface water streams.	None	Not expected as after disinfection the surface and materials will be washed by clean water.	Not expected to wild populations

Project interventions	Environmental impacts		Impacts classified by:		Mostly affected environment						
	Positive	Negative	Time	Scale	Economic	Social	Natural				
							Ambient air	Surface water	Groundwater	Soil	Biodiversity
							and other helpful insects can be registered.				
- backyard poultry restructuring (not confirmed by financial sources yet)	YES (reduction of risks at the areas affected by HPAI, reduction of pressures to natural environment, improve sanitation at villages)	NO	Middle-term	Local/ Regional	Prevent sudden income losses for poorest population	May have affect on rural behavior and sanitary improvement in rural areas	None	May have positive reduction on surface water contamination level by nutrients and microbiology	May increase contamination of shallow groundwater nearby drinking wells	Reduce contaminati on level of rural outstriks and floodplains	Reduce non-controlled contacts with wild fauna and consequently prevent spreading of HPAI in natural areas
Bio-security at commercial farm, control of movement of domestic birds and products	YES (improve bio-security and protect poultry population)	NO	Long-term	National	Protect overall population of commercial poultry. Prevent economic losses.	Stabilize the working opportunities for rural population.	None	None	None	None	None
Training/ equipping of personal and workers	YES (improve personal, sanitary and environmental security, increase preparedness level of veterinary service)	NO	Long-term	National	Indirect positive impacts	Indirect positive impacts	None	None	None	None	None
Contingency plan improvement	YES (improve preparedness	NO	Long-term	National	Indirect positive impacts	Indirect positive impacts	None	None	None	None	None

Project interventions	Environmental impacts		Impacts classified by:		Mostly affected environment						
	Positive	Negative	Time	Scale	Economic	Social	Natural				
							Ambient air	Surface water	Groundwater	Soil	Biodiversity
	level and planning capacities)										
Formal compensation for culled animals	YES (improve early detection of HPAI cases)	NO	Short-term	National	Mitigate direct losses. Prevent non-control spreading of infected poultry.	Mitigate livelihood disturbance and rural population concerns.	None	None	None	None	Indirectly protect wild fauna, by rapid elimination of infected domestic birds and decreasing the intensity of domestic/wild birds contacts

Annex 6

MITIGATION PLAN - Carcass and Other Infected Material Disposal by Burial (disinfection is included)[12]

Phase	**Hazard**	**Mitigation Measure**	**Costs**	**Institutional Responsibility**		**Comments (e.g. Secondary impacts)**
				Supervise	**Operate**	
1) Set up of the site						
Location of disposal site	Inadvertent spread of the HPAI virus Indirect and direct pollution of water during decomposition of carcasses	Select the disposal site at the required distance from the surface water, springs, residential areas, wetlands and forests and nature protection zones. Select appropriate soil characteristics suitable for burial (clay soils). Avoid sandy, gravel and other easily permeable soils. Base the pit bottom above required distance from water-table	No costs under the project, - the expenses will be covered by the Emergency Commission	Emergency Commission	Local public authorities	
Excavation	Dust	Suppression with water	Depend upon the scale of the works, - will be covered from unallocated Fund	Emergency Commission	Contractors or farmers	

[12] Most of the proposed mitigation activities will be supported by the financial resources provided in unallocated Fund at the level of US $ 1.450 million.

Phase	Hazard	Mitigation Measure	Costs	Institutional Responsibility		Comments (e.g. Secondary impacts)
				Supervise	**Operate**	
Temporal disposal of soil	Loss of soil quality	Use as overfill	Depend upon the scale of the works, - will be covered from unallocated Fund	Emergency Commission	Contractors or farmers	
Secure site	Transfer of virus to humans or animals	Fencing	Depend upon the scale of the works, - will be covered from unallocated Fund	Emergency Commission	Contractors or farmers	
2) On site operations						
Transport of dead and slaughtered birds and other infected materials to the disposal site	Emission of virus to air & body fluids from dead stock Rupture of transportation/storage units	Use safe bags with proper head lock Avid overfilling of bags Ensure that bags are not dropping during transportation Sealed covered container Short transport distances Select safe transportation way (out of localities and farms, proper road cover) Operator training and supervision	Depend upon the scale of the works, - will be covered from unallocated Fund	Emergency Commission	Contractors	
	Emission of virus on transport vehicles	Procure Disinfectant Disinfectant used at recommended rates Disinfect vehicles at the safe and arranged site	180.000 Depend upon the scale of the works, - will be covered from	Emergency Commission	Contractors	

Phase	Hazard	Mitigation Measure	Costs	Institutional Responsibility		Comments (e.g. Secondary impacts)
				Supervise	**Operate**	
		Use of appropriate sprays for wash down Operator training and supervision	unallocated Fund			
	Contamination of personnel	Procure and use of individual protective clothes Operator training and supervision Follow required disinfecting procedures	180.000 Depend upon the scale of the works, - will be covered from unallocated Fund	Emergency Commission	Contractors or farmers	
Unloading of dead poultry at the disposal site and temporary storage for culled birds accumulated between transport runs	Leaching of fluids to the soil Release of virus to air Rupture of storage units Rodent contact	Operator training and supervision Use of mechanical loader Keep carcasses in properly locked and safe bags Shelter from weather Minimal storage times Impermeable surfaces	Depend upon the scale of the works, - will be covered from unallocated Fund	Emergency Commission	Contractors	
Filling the burial pit by culled birds and burning by open fire	Air emissions Fire risk Odor	Ensure that burning temperature and duration are enough to sterilize infected carcasses and other materials Avoid strong winds and rainfall Consider wind direction (out of	No costs	Emergency Commission	Contractors	

Phase	Hazard	Mitigation Measure	Costs	Institutional Responsibility		Comments (e.g. Secondary impacts)
				Supervise	**Operate**	
		residential areas) during burning Minimize the number of personal				
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 to ground level, plus overfill Disinfecting procedures	Depend upon the scale of the works, - will be covered from unallocated Fund	Emergency Commission	Contractors	
Birds may not be effectively killed	Serious animal welfare issues. Virus spread form escaped poultry	Supervision and monitoring Slaughter Operator Training	Depend upon the scale of the works, - will be covered from unallocated Fund	Emergency Commission	Contractors or farmers	
3) Clean up of infected premises						
Disposal of infected materials and wastes from infected premises	Disinfectants contaminate surface and groundwater Influenza virus release	Minimal transport distances. Covered loads Use appropriate disinfectants Avoid drainage to watershed Operator training and supervision	No costs	Emergency Commission	Contractors or farmers	
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	Depend upon the scale of the works, - will be covered from	Emergency Commission	Site owner	

Phase	Hazard	Mitigation Measure	Costs	Institutional Responsibility		Comments (e.g. Secondary impacts)
				Supervise	Operate	
			unallocated Fund			
Use of disinfectants on the surfaces of the infected premises	Biocides toxic to aquatic fauna from drainage and surface run off Biocides toxic to bee and other helpful insects	Block or intercept the flows in drains to surface or groundwater. Avoid diffusion of disinfectant out of designated area Consider weather conditions (strong winds and rainfalls) Operator training and supervision	Depend upon the scale of the works, - will be covered from unallocated Fund	Emergency Commission	Contractors or farmers	

Annex 7.

MITIGATION PLAN – Laboratory Safety and Hospital Waste Management

Phase	**Hazard**	**Mitigation Measure**	**Costs per location**	**Institutional Responsibility**		**Comments (e.g. Secondary impacts)**
				Supervise	**Operate**	
1) Assess labs needs for training, equipment and physical infrastructure	None		The costs will be covered by MAFI/MHSP	MAFI/MHSP	Consultants	Refer to national requirements and International Best Practice in Safety of Research Laboratories
2) Conduct physical reconstruction of laboratory facilities	None	Follow national construction standards Ensure installation of devises for proper indoor air quality and treatment of evacuated air Ensure connection to proper wastewater treatment Ensure the safe waste sites	No additional costs	MAFI/MHSP	Contractors	
3) Procure and installation of equipment	None	Training on new equipment	37.000	MAFI/MHSP	Contractors, consultants	
4) Ongoing laboratory and hospital	Inappropriate waste management	Training and upgrades to laboratory infrastructure and equipment based on	49.000	MAFI/MHSP	Laboratory and hospital personal	

Phase	Hazard	Mitigation Measure	Costs per location	Institutional Responsibility		Comments (e.g. Secondary impacts)
				Supervise	**Operate**	
operations		International Best Practice in Safety of Research Laboratories Operation of hospital wastes according to the national safety rules.				

Annex 8.

MONITORING PLAN - Carcass and Waste Material Disposal by Burial and Disinfection[13]

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	Selected place(s) for burial in pits or no defined place(s)	Potential burial sites	Observation	Before burial, before AI outbreak	Important environmental concern, providing safety of disposal	Raional Environmental Inspectorate with Emergency Commission and local government
Construct	Final site selection and pit construction or unregulated disposal	Burial sites	Observation; Construction to appropriate standard	During construction After completion of construction	To ensure appropriate environmental setting (distance to localities, natural sensitive areas, surface and groundwater, drinking sources, springs, etc)	Emergency Commission, local government in coordination with Raional Environmental Inspectorate
Operate	Safe handling of carcasses and materials for disposal; Disinfection of workers and equipment	Burial sites Disinfecting sites Potential leakages and discharge 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	Emergency Commission, local government in coordination with Raional Environmental Inspectorate

[13] The expenditures for the monitoring Plan depend on the scale of the outbreaks and will be covered by Emergency Commissions and unallocated Fund

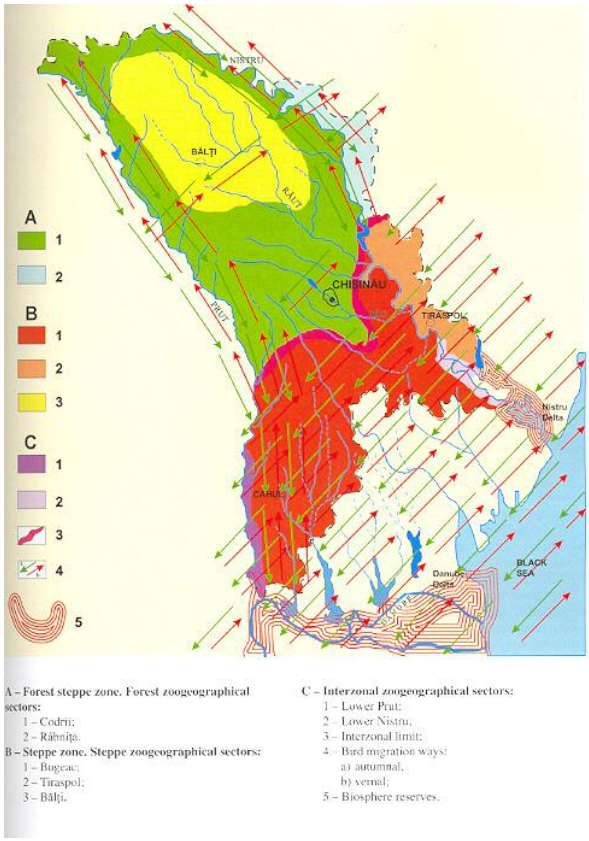
Phase	**What** ***parameter is to be monitored?***	**Where** ***is to be monitored?***	**How** ***is it to be monitored/ type of monitoring equipment?***	**When** ***is it to be monitored - frequency or continuous?***	**Why** ***is the parameter to be monitored (optional)?***	**Responsibility**
Closing	Burial pit	Burial sites	Observation and records.	After pit it closed	To ensure correct closure to prevent spread of virus	Rayonal Environmental Inspectorate with Emergency Commission and local government

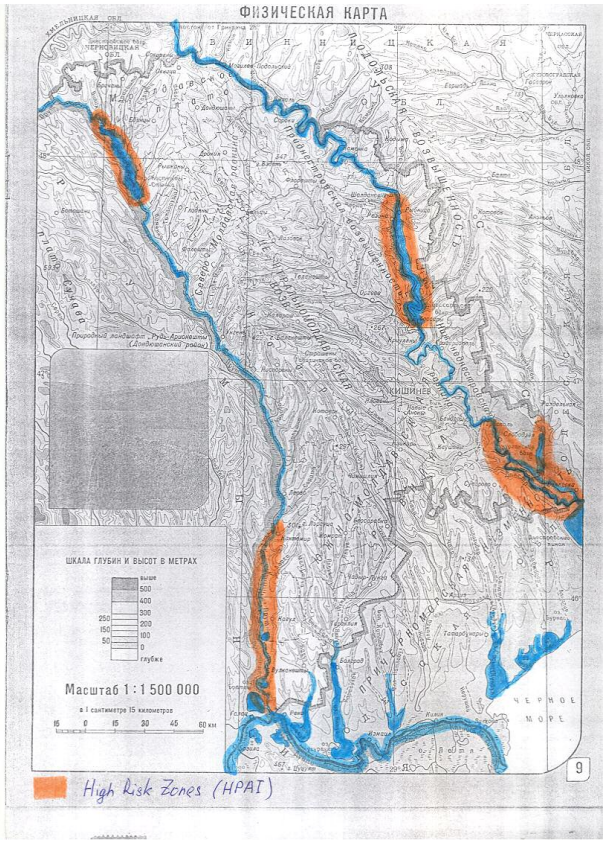
Annex 9.
MONITORING PLAN – Laboratory Safety and Waste Management[14]

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	MAFI, MHSP, 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	MAFI, MHSP, or consultants of AI PIU
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	MAFI, MHSP, or consultants of AI PIU

[14] The costs for the implementation of Monitoring Plan are included in the component 4.

Annex 10.
MAP of migratory pathways of wild birds[15] and potential High-Risk Areas for first appearance of AI





[15] Biological Diversity Conservation National Strategy and Action Plan, 2002

Annex 11.

LIST of consulted institutions and persons during preparation of EMP

Name	Institution, position
Erhan D.	MAFI, General Directorate for Veterinary and State Inspectorate, Head of
Gobjila A	The WB
Caraus V.	Republican Veterinary Diagnostic Center, Head of Section
Zabar V.	Agricultural University, Department for Animal Anatomy
Spinu E.	Ministry of Health, Deputy Director of Epidemiological Center
Sireteanu D.	Epidemiological Center, Deputy Chief of Division
Tirshu I.	Epidemiological Center, Chief Specialist
Chilaru V.	Republican Veterinary Diagnostic Center, Head of Section
Gheorita L.	Laboratory for Control of Veterinary Chemicals, Head of Lab
Avram E.	Direction of Veterinary, Satu Mare, Romania, Head of Lab
Bulgaru V.	Laboratory for Control of Veterinary Chemicals, Specialist
Josan I.	Laboratory for Control of Veterinary Chemicals, Specialist
Sohotscii V.	Center for Preventive Medicine, Deputy General Director
Andriuta V.	Center for Preventive Medicine, Head of Department for Hospital Hygiene
Volneanscii A.	Deputy General State Sanitary Doctor
Guvir T.	MENR, Department for Impacts Assessment
Iftodii M.	MENR, State Ecological Expertise, Head of
Holban V.	State Ecological Inspectorate, Specialist
Cotruta V.	REC
Isac A.	REC, Director

Annex 12.

SUMMARY of the consultation meeting

1. Invitation to a Public Briefing

Public briefing and consultation of the draft Environmental Management Plan of the **Moldovan Avian Influenza Control and Human Pandemic Preparedness and Response Project** will be held for the interested parties.

The briefing materials are available at the Ministry of Agriculture and Food Industry (Direction of the State Veterinary Control). Electronic version are also available at the web sites of Ministry of Agriculture and Food Industry and Regional Ecological Center Moldova (www.rec.md).

If you are interested to attend the meeting please contact Mr. Dumitru Erhan, Chief of Direction for Veterinary Medicine by phone 21 01 59 or by e-mail dmv@moldova.md.

You can also send your comments electronically to dmv@moldova.md with copy for rmelian@rambler.ru

The briefing will be held at the Ministry of Agriculture and Food Industry.
Address: Chi□inău, Ministry of Agriculture and Food Industry, bv. Stefan cel Mare, conference hall, second floor.

Date: 16 May, 2006; Time: 12:30

2. Summary information on Consultation with Local NGOs and Project-affected groups

Location	Objective	Invitees	Participants	Summary conclusions and Comments	Responsibility
Chisinau	To describe the EMP and solicit feedback	environmental NGOs, commercial poultry growers, farmers associations, local officials, the MENR, the MHSP, the MAFI, veterinary services from raions, sanitary-epidemiological services and local representatives of international organizations including the World Bank, European Union, United Nations Children's Fund (UNICEF), United Nations Development Program (UNDP), Food and Agriculture Organization (FAO), and US Agency for International Development.	43 participants, representing veterinary services from 25-30 raions, MAFI and Veterinary Diagnostic Center, MHSP, Agrarian University, Association of Veterinary Doctors, environmental NGO, mass-media, the WB, FAO.	• The project, the WB safeguards policy and EMP has been presented (PowerPoint) to participants. • Mitigation measures and Institutional responsibilities for EMP monitoring have been discussed. • Environmental options and concerns have been elucidated by participants. • The EMP has been accepted and proposed further steps for environmental training has been agreed. • It was stressed that clear	Veterinary Inspection

				responsibilities for environmental authorities in case of AI outbreaks should be further developed. • It was proposed that environmental regulation in case of AI outbreaks should be prepared by the Government Agencies. • Close cooperation between veterinary, health, environmental authorities and project PIU will be necessary during implementation.	