



Briefing Note for Russian Authorities On Avian Influenza, the Threat of Human Pandemic Influenza, And the World Bank's Response

The World Bank Group

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Background

Ten East and South Asian countries have experienced outbreaks of the highly contagious H5N1 avian influenza (AI) strain in two separate waves starting in 2003, resulting in the culling of some 140 million birds at a cost of about \$10 billion to the poultry industry. The economic costs of AI have been estimated for Vietnam alone at \$120 million, or 0.3 percent of GDP. The rural poor have been particularly vulnerable in terms of income losses. To date some 121 animal-to-human infections have been reported, resulting in 62 human deaths.

In recent months the H5N1 virus has spread beyond Asia to Russia, Mongolia and Kazakhstan, and most recently to Turkey, Croatia and Romania, apparently through contact between domestic poultry and migratory wild birds. In light of the migratory pattern of these birds, East Africa is feared to be the next region to be infected. This has in turn raised concerns about the spread of further animal infections and the potential mutation of the virus—into a form that makes human-to-human infections easily possible, and that could thus fuel pandemic influenza, with devastating worldwide effects.

It is impossible to anticipate when the next influenza pandemic may occur or how severe its consequences may be. The World Health Organization (WHO) and other international organizations have recently warned that an influenza (flu) pandemic is both “inevitable” and “imminent.” Such warnings have been fueled largely by the persistence of the highly virulent strain of “bird” (avian) flu in Asia that experts fear could trigger another influenza pandemic. 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, unparalleled levels of illness and death could result. Air travel might hasten the spread of a new virus, and decrease the time available for preparing interventions. Countries’ health care systems could be rapidly overwhelmed, economies strained, and social order disrupted. Experts predict that the global death toll could range from between 2 million to over 50 million. Studies by the US Centers for Disease Control and Prevention (CDC) reduce that range to between 2 to 7.4 million world-wide. However, narrowing down the range cannot be done with any confidence until the pandemic is under way. The level of preparedness in each country will also influence the final death toll.

¹ This note was prepared by Patricio V. Marquez, Lead Health Specialist, ECA Region, World Bank, on the basis of documentation prepared by a Task Team for the proposed US\$500 million GLOBAL PROGRAM FOR AVIAN INFLUENZA AND HUMAN PANDEMIC PREPAREDNESS AND RESPONSE (GPAI).

While precise figures are difficult to estimate, the burden on health systems is likely to be considerable. In high-income countries alone, which represent 15 percent of the world's population, experts anticipate around 280,000-650,000 deaths, 134-233 million hospital visits and 1.5-5.2 million hospital admissions.²

While there are many uncertainties about such a development—and the timeframe in which it could occur—the potential severity of the impact warrants a major effort to avert it. Experts agree that the best prospect for doing so is to prevent further animal infections and to contain existing ones (treating the disease “at source”). In this regard, there have been some earlier successes in eliminating AI from the poultry population (Japan, South Korea, some parts of China, Malaysia), based on well-known interventions ranging from surveillance to movement control, vaccination, and to culling of infected flocks. The spread of AI has also raised the longer-term issue of past under-investment in veterinary services, as well as in disease surveillance in animal and human health, and how this can be remedied.

Global, regional and sector issues

The proposed APL allocation of US\$ 500 million is based upon the likely needs of 10-20 countries to put in place basic prevention, preparedness, and control measures in advance of significant AI impacts and to give countries confidence that the Bank would mobilize resources to help them respond in the event of in-country epidemics amongst poultry. If the AI threat did not emerge, the facility could be retained to respond to other emerging zoonoses. It was acknowledged that, in the event of a human pandemic the limit would need to be increased significantly.

The instrument has been designed to be as flexible as possible to provide support to countries for taking preventive actions to reduce the risk of an outbreak, for improving their preparedness to respond to an outbreak in poultry, or for responding to a human influenza pandemic. While longer-term needs are quite clearly defined, short-term needs – specifically the priorities for financial support – will need to be assessed as a matter of urgency. The East Asia Region has initiated country assessments in ten of countries in the region (along with preliminary estimates of the costs of the priority measures needed), and has made its methodology available to other regions conducting similar assessments. The Europe and Central Asia Region is beginning this process.

On the financing side, apart from the proposed US\$500 million APL, and the possible reprogramming of existing relevant operations, another expected instrument is a proposed US\$500 million multi-donor trust fund to be administered by the World Bank. The possibility of such a trust fund has been discussed with some donors, and will be pursued further if donors so wish. The current expectation is that, if developed, its primary role would be to channel grant resources in support of integrated country programs, ideally as co-financing of the APL. However, the design of any such trust fund will remain under review until the potential role it might play is clear. Any proposal would necessarily be aimed at filling otherwise empty niches, and avoiding duplication.

² NHS. 2005. Explaining Pandemic Flu. A guide for the Chief Medical Officer. London.

(a) Introduction

A coordinated global response should involve three types of strategic activities: (i) preventing the spread of the disease in animals, thus lowering the animal origin 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:

- ***Avian influenza control is multi-sectoral in nature.*** It involves many players, including those in the areas of health, agriculture, economics, finance, and planning among others. At the country level, in particular, an integrated, multi-sectoral response is needed based on clear 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 infections, which will persist as long as the H5N1 virus continues to circulate in animals. With the present situation, the potential of the HPAI virus to become transmissible among humans should be of serious concern to the global community. If the virus adapts itself to human-to-human transmission, lives may be threatened on a large scale.
- ***The livelihoods of the rural poor are particularly threatened.*** The Asian region is home to two-thirds of the world's poor, with the great majority of these being represented by women and children. Some 80% of the poor live in rural areas and the vast majority of these people are still dependent on agriculture for their livelihoods. For poor households depending for their livelihoods on poultry, HPAI has meant the loss of income and food security.
- ***Avian Influenza virus is constantly evolving with unpredictable results.*** The HPAI viruses are of particular concern because they are very labile and undergo constant genetic change that can have unpredictable results. While this is a clear threat to global poultry industry and public health, the constant and rapid evolution of the virus necessitates a global approach to controlling the disease.
- ***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.
- ***Individual countries are central to any coordinated response.*** Country strategies developed and owned by the governments facing the threat of avian influenza should be the foundation of a global response. However, capacities to plan and execute appropriate responses vary considerably among countries. Capacity constraints and the highly decentralized nature of some affected countries makes the task of implementing actions and plans agreed at higher levels of government even more challenging.
- ***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, including Europe and Central Asia, 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 objective in the short-term is to reduce the risk to humans by preventing further spread of HPAI in those countries that are currently infected. The long-term strategy is to minimize the global threat and risk of HPAI in humans and domestic poultry, through progressive control and eradication of HPAI. Achieving this goal will diminish the global threat of a human pandemic, stabilize poultry production, support a robust regional and international trade in poultry and poultry products, increase human and food safety, and improve the livelihoods of the rural poor. Work on the short- and long-term fronts should proceed in parallel; efforts should be made to ensure that short-term responses are consistent with and contribute to proposed longer-term interventions.
- ***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 (ASEAN) and South Asian Association for Regional Cooperation (SAARC).
- ***An important challenge at the global level concerns market failures.*** Supply responses are likely to be inadequate, at least in the short-term, with respect to the production and stockpiling of anti-virals and the development/production of vaccines for use by developing countries. Global efforts to address such market failures will likely require public-private partnerships and should be considered an important longer-term objective. There are also technical questions about the efficacy of different strategies for anti-viral use and vaccination, as well as questions of how quickly and how best production could be ramped up in the short-term.
- ***Evaluation of key interventions and actions will be critical for moving forward.*** This will require building such evaluations into program designs. Doing so could also help address the incentive issue for countries by generating evidence on what actions are, or are not, effective.
- ***Developing strong contingency plans to reduce the impact of a pandemic make sense.*** Being prepared is not only prudent but necessary in today's globalized environment. The global expansion of tourism and the vast increase in air travel can accelerate the spread of infectious diseases, allowing little time to prepare. The rapid international spread of Severe Acute Respiratory Syndrome (SARS) in 2003, for example, provided some valuable lessons in emergency public health protection. This, together with an outbreak of avian flu (A/H5N1) in Hong Kong in 1997, highlighted the need for countries to develop or improve existing contingency plans.

(d) Global dimension

The FAO/OIE's Global Strategy. The long-term objective of the strategy prepared by FAO and OIE in collaboration with WHO is to minimize the global threat and risk of HPAI in humans and domestic poultry, through progressive control and eradication of HPAI, particularly that caused by H5N1 virus, from terrestrial domestic poultry in Asia. Achieving this goal will diminish the global threat of a human pandemic, stabilize poultry production, support a robust regional and international trade in poultry and poultry products, increase human and food safety, and improve the livelihoods of the rural poor. 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.

The **World Health Organization (WHO)**³ has defined phases in the evolution of an influenza pandemic which allow a step-wise escalating approach to preparedness planning and response leading up to declaration of the onset of a pandemic. Once a pandemic has been declared, country action will depend on whether cases have been identified in the country, and how extensively it has spread. The WHO's phases, which were revised in April 2005, describe the progression of an influenza pandemic from the first emergence of a novel influenza virus, to wide international spread. This is a global classification based on the overall international situation and is now used internationally for planning purposes. The phases are: (i) inter-pandemic period, where no new influenza virus subtypes have been detected in humans, and an influenza virus subtype that has caused human infection may be present in animals posing a risk of human diseases; (ii) pandemic alert period, where human infection with a new subtype, but no new human-to-human spread, or at most rate instances of spread to a close contact, highly localized spread suggesting that the virus is not well adapted to humans, and large cluster but human-to-human spread still localized, suggesting that the virus is becoming increasing better adapted to humans, but not yet be fully transmissible; and (iii) pandemic period, increased and sustained transmission in the general population occur. Transition between phases may rapid and the distinction blurred. A move to a higher alert level in a country may be triggered, after assessing the risk, if influenza due to a pandemic strain is affecting another country geographically close to the country, although technically it is still "outside" the country. 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.

As part of an overall financing framework for Avian Influenza control, the **World Bank** proposes a multi country facility (a horizontal APL) designed along the lines of a multi-country Adaptable Program Loan (MAP). In parallel, the Bank is discussing with the EC, WHO, FAO/OIE and bilaterals and multi-laterals organizations options for grant financing. One option would be the establishment of a multi-donor trust fund (TF) that would primarily support country level activities, while having a smaller and complementary role at the regional and global level.

(e) Regional implications

Episodes of emerging zoonoses are increasing around the world and the confluence of people, animals and animal products today is unprecedented. Concurrently, a wide array of complex factors are also converging that will not only ensure the continuous emergence of zoonoses, but are also likely to drive

³ WHO. 2005. Global Influenza Preparedness Plan. Geneva.

the further increase and expansion of these diseases. The recent epidemics or epizootics demonstrate the global importance of emerging diseases in terms of health and well-being of the public. In addition, emerging zoonoses of public health concern are also a sobering reminder of the tremendous socio-economic and trade damage that this group of diseases can cause to both developed and developing countries.

Africa

There is a potential risk that AI sub-type H5N1 might be carried along migration routes of wild birds to Africa. Bird carriers of the avian influenza virus could thus reach North and East Africa during any of the upcoming migratory seasons, starting with late 2005, early 2006. Except for a few commercial farms in North and East Africa capable of implementing bio-security measures, most of the production systems found in Africa (traditional and intensified systems alike) would be at very high risk. The exact economic cost cannot be predicted now and will have to be later determined through scenarios based on solid epidemiological hypothesis. What can be predicted is that the impact will vary considerably depending on whether the epidemic can be contained at an early stage or requires large scale culling of poultry. Serious disruption of trade and tourism might also take place. In almost all African countries, the human and managerial capacity, the financial resources, the infrastructure and the available equipment to respond to an AI outbreak would be extremely weak. Countries have begun to respond by preparing human epidemic plans in addition to poultry control plans.

East Asia

East Asia is the region most affected by HPAI to date. The disease is endemic in poultry populations. The number of countries affected by HPAI is increasing and now includes Cambodia, China, Indonesia, Japan, Lao PDR, Mongolia, South Korea, Thailand, and Vietnam. The economic consequences have already been serious for the poultry industry in these countries (with about 20% of poultry stocks lost in Thailand and Vietnam, an industry which represents 1% of GDP). In Vietnam, the value of birds culled so far represents 0.3% of GDP. In China, the Ministry of Agriculture reported on October 26, 2005 an outbreak of AI where authorities immediately culled 370,000 birds. Poor households are particularly affected since poultry is a significant source of income. There is also a risk that tourism will be affected by concerns about human infections. In Vietnam for example, a modest decline of 5 percent in tourism would translate into a 0.4 percent decline in GDP.

East Asia is the only region with human cases of HPAI to date, with Cambodia, China, Indonesia, Thailand, and Vietnam all reporting human infections. WHO confirmed a total of 130 human cases of bird flu infections that had resulted as of mid-November 2005 in 67 deaths in Southeast Asia since December 2003. Of the fatalities, 42 are from Vietnam, 13 from Thailand, 5 from Indonesia, 4 from Cambodia, and at least one from China; the possibility of bird-to-human transmission crossing over to sustained human-to-human transmission is real in all affected countries. Countries have begun to respond by preparing human epidemic plans in addition to poultry control plans and to assess and gather resources. The issue has also received attention in regional forums, such as ASEAN, and international technical agencies and donors have begun providing assistance.

Europe and Central Asia

Cases of avian flu have already occurred in several countries, including in Romania (which reported on November 14, 2005 discovering 4 new cases of H5 type in domestic birds in a village in the Danube delta), Turkey Ukraine, and Croatia. These events have prompted the ban by the EU on the import of poultry from these countries. The Russian outbreak of HPAI H5N1 has affected six administrative regions, beginning in the Ural Mountains and moving west to within 200 km of Moscow. With AI

reported in one country in the Balkan Peninsula (Croatia), other countries in the peninsula and the Caucasus are at risk due to their proximity to two main flyways, the East Africa-West Asia Flyway, which crosses Turkey, and the Central Asia Flyway. Both flyways cross areas in North-eastern Europe, where avian influenza in wild and domestic fowl has been diagnosed.

In August 2005, outbreaks in poultry of HPAI H5N1 were reported in four regions of northern and central Kazakhstan. The epidemic has severely affected poultry production in the country, with the death or culling to date at least 14,900 birds, according to government and media sources. Central Asian countries have become exposed to HPAI by migratory birds, spreading the disease from infected neighboring countries. From a geographical point of view, Central Asian countries represent a vast area in which introduction of AI is likely to occur, and where the sensitivity of the 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 similar plans with the exception of Macedonia, Moldova and Turkmenistan. In close coordination with WHO, FAO and bilateral agencies the Bank is actively engaging with affected countries. A multi-sector Bank team is at present working with the Turkey authorities to assess the situation and help design a country-specific project. Similar efforts are underway in the Kyrgyz Republic where a Bank team is expected to visit the country in early December.

Latin America

There have been no reported cases of avian flu attributed to the H5N1 strain reported in the bird population of the region and until now the region has been largely isolated in terms of migratory routes from areas of the globe where the disease has been identified. If the disease were to spread through wildfowl migration, it would most likely come from a previous infection in North America and then spread via prevailing North-South routes. This migration is now well underway for this fall season, and if the virus is not currently present in the North, it will not probably spread in this manner before fall 2006. There are also the possibilities of the virus being carried through people or live fowl from infected areas, although these seem to be remote. If there is a transmission of the virus to the region, the exact economic cost could not be predicted now and would depend heavily on how effective surveillance and early detection are. Poultry has been the fastest-growing segment of the meat industry in the region over the past twenty years. Last year in LAC there were over 2.5 billion chickens, nearly 1 billion more than 10 years ago. Brazil has become the world's largest exporter; in fact, Brazil chicken exports rose 26% last year alone, accounting for 43% of total international trade, in large part fueled by dramatic increases in exports to Asia because of the outbreak of avian flu there. Poultry also constitutes a major component in the diet of the region. Unfortunately, the development of animal health surveillance systems has lagged well behind this expansion of industrial poultry farming. For example, in the 1990s an epidemic of a low-pathogenic avian influenza began in Mexico and remained uncontrolled for three years, allowing the virus to transform into a highly fatal form. Along with compensation for culling programs, surveillance and detection systems would require immediate and large-scale assistance in the case of an outbreak of H5N1.

Most Latin American countries have begun preparing for a possible outbreak of avian or human flu. Poultry commissions from around the region have met and regional authorities have taken some preventive measures, including improved surveillance of poultry farms and monitoring of migratory birds. Regional health consultations have been held among Andean countries and in Central America, and countries such as Mexico and Panama have set aside budgets for drugs, protective supplies, and monitoring. Brazil has set up an early warning system at 70 hospitals and clinics across the country. The Bank is active in strengthening human health systems in most countries in the region, including development of public health surveillance in several countries. In animal health, however, the Bank currently has only one project (a foot and mouth disease project in Uruguay). The Bank's dialogue and lending could be readily adjusted to respond to the AI threat or provide a platform for possible

additional assistance. The region also benefits from support from the Pan-American Health Organization (PAHO), which has probably the strongest field presence of any of the regional health organizations. PAHO is actively supporting national AI preparedness plans, surveillance, vaccine availability, and plans for health care workers, communication strategies, and other needed measures.

Middle East and North Africa Region

In November 2005, the H5N1 strain of avian influenza was reportedly identified in a migratory wild flamingo in Kuwait. If independently confirmed, this case would be the first evidence of HPAI in the Middle East and North Africa Region after suspected cases in Iran and Iraq were not confirmed. However, the MENA Region is located in the center of major Asian-African flyways of migratory birds. After outbreaks of HPAI in Romania, Turkey, Ukraine and Croatia, the risk of HPAI spreading to MENA has markedly increased. Countries in the Region are aware of this risk and have started to take some preventive measures such as import bans of live birds and poultry products, the suspension of the wild bird hunting season, the establishment of migratory bird observation posts and testing, and the stockpiling of antiviral drugs. Saudi Arabia has started to take special precautions ahead of the annual pilgrimage to Mecca in January 2006 when about two million travelers are expected to visit the country, many from Asian nations where H5N1 outbreaks have been reported. Financial and technical capacities, as well as the status and quality of emergency response plans, show large country-specific differences. Surveillance and analytical capacities, as well as the regulatory framework for financial compensation to farmers with infected poultry, are expected to need improvement in most countries of the Region. In addition, several countries are affected by military conflict or otherwise difficult security situations, which will affect the countries' effectiveness to detect and respond to an outbreak of HPAI. In close coordination with FAO, OIE and WHO, the Bank is working on rapid assessments of country-level HPAI preparedness to be conducted in the next two months.

South Asia

The South Asia Region faces the potential risk of being affected by HPAI H5N1 during the up-coming migratory season. This risk is increased because South Asia is in the path of the Central Asia Flyway (including Kazakhstan which has had an outbreak) and West Asia/East Africa flyway for migratory birds. Less virulent strains of avian flu (H9, H7 and H3) have already been found in Pakistan.

Countries in the South Asia region, with the exception of India, have very limited capacities for human and animal health disease surveillance, control and testing. In addition, mechanisms for information and coordination across relevant ministries and agencies (Health, Livestock, etc) are weak. In most countries, poultry and other fowl (e.g. ducks, geese) are an important source of livelihood for many small, poor farmers, who will suffer significant economic losses either due to death of animals or as a result of their mandatory slaughter. Governments, except perhaps India, have yet to formulate human and animal health preparedness and disease control plans (including compensatory policies). Therefore, there is a significant risk that an outbreak of the disease among animals or humans will not be detected or reported in a timely way.

Main International Actors and Efforts to Date

The Food and Agriculture Organization (FAO), the World Organization for Animal Health (OIE), and the World Health Organization (WHO) are the lead technical agencies in the containment of AI, and in the prevention and containment of a human pandemic. They have been coalescing around a shared multi-sectoral strategy of treating the disease at source, preventing/mitigating the effects of a breakout in humans, and averting a human pandemic at the country, global and regional levels. This emerging consensus was deepened at the US-hosted Partners' Meeting

earlier in October 2005 and at the Canadian health ministers' meeting also held in late October 2005. A series of other meetings were held to build support for the strategy and review the related financing needs: a regional meeting hosted by Australia on October 29-31; a WHO/FAO/OIE/World Bank-sponsored meeting in Geneva, November 7-9. Moreover, an European Commission (EC)-sponsored pledging conference in January 2006 (agreement has been reached that China will host this meeting).

To help coordinate the UN agencies' response, Secretary-General Kofi Annan appointed Mr. David Nabarro in late September as the overall Coordinator of the UN's efforts on AI. He has a major challenge in working with the UN technical agencies (FAO, OIE, and WHO) who are naturally protective of their mandates. Mr. Nabarro has already been a very constructive presence, and has played a key role in the successful raising of political awareness on AI. FAO has six national Technical Cooperation programs in six Asian countries, and similar support at the sub-regional level. FAO and OIE in addition have prepared a common strategic plan for the control of the AI virus in animals. For its part, WHO has also prepared a draft strategic plan laying out activities for individual countries, the international community, and WHO to prepare for a pandemic and its potential impact. The technical agencies (and FAO in particular) are however under-funded for services they provide to countries (for example, trans-boundary veterinary services), and their on-the-ground capacity is limited. The World Bank share their concern about the need to raise emergency funds for this purpose as a critical component in a comprehensive approach to AI.

The European Commission has also been in the forefront of efforts to coordinate the international response, and has proposed the establishment of a multi-donor trust fund to finance both regional and country-level AI/pandemic preparedness programs. In addition, it has indicated its willingness to make available Euro 2 million in a World Bank-administered trust fund to finance AI/preparedness-related activities for use by the end of the current calendar year. Building on the East Asia Region's collaboration with the Asian Development Bank, the World Bank has also begun a dialogue with the other multilateral development banks on AI.

3. Role of the Bank, Current Activities, and Options for Future Response

All key actors look to the Bank for its convening power and to its comparative advantage in facilitating a coordinated country-level response. To date, the Bank has worked at reinforcing the country focus in the international community's response and at the country level by:

- Facilitating international meetings on AI (August 4 and September 23 in Washington) and the consensus among UN and donor agencies necessary for their success; as a co-sponsor of the upcoming Geneva meeting, we have invested significant staff and senior management resources in its preparation.
- Analyzing the economic and social impact of AI in East Asia (discussions are currently underway on how to help scale up this work at a global level and possible avenues for research, based on its expertise on communicable diseases).
- Financing the \$5m Vietnam AI project which is helping the government strengthen its veterinary surveillance and diagnostic infrastructure as required for avoiding or minimizing future recurrence of AI. This has involved good collaboration with FAO, OIE, and the Agence Française de Développement. The Bank is also working to re-program an additional \$5 million from another Vietnam project.
- Completing 10 East Asia country assessments, and working to cost them in the run-up to Geneva and the January pledging conference.
- Strengthening the implementation of Bank/OIE agreement on good governance of veterinary services under a Development Grant Facility (DGF) grant.

Other Bank Country Teams outside of East Asia Region are now undertaking country assessments.

As AI spreads, the Bank is clearly prepared to do a lot more—in particular to respond to requests from countries for financing of their plans to address the animal disease and for enhancing their preparedness for a possible human pandemic. Apart from the proposed multi-donor trust fund (or possible country/regional or thematic based trust funds), the Bank has four main options for making its own financing available to countries:

- Restructuring and/or providing additional financing to on-going rural development or health projects in order to make resources available for AI response and pandemic preparedness;
- Providing supplemental financing to development policy loans/credits, including Poverty Reduction Support Credits (PRSCs); and
- Preparation of an umbrella operation and framework (encompassing both IBRD and IDA countries) for Board approval, with the subsequent approval of individual country operations delegated to the Regions and obtained when countries demand it and are ready to use it productively. This would cover both immediate short-term needs and the longer-term institutional strengthening which is a critical component of a comprehensive response. The operation—a “horizontal” Adaptable Program Loan or APL—would be similar to the multi-country HIV/AIDS program instrument (the MAP) used in the African and Caribbean Regions for support to countries’ HIV/AIDS programs.

Rationale for Bank involvement

A key justification for Bank’s involvement is the Global Public Goods aspect of the HPAI -- one of many emerging and re-emerging zoonoses -- and its strong link to poverty reduction. HPAI control

programs require a multi-disciplinary approach to integrate technical, social, economic, political, policy, and regulatory issues in addressing a complex problem. The Bank is well placed to build upon its knowledge base on multi-disciplinary approaches needed in the proposed operation and apply the evidence and lessons learned in the various regions during emergency preparedness responses, multi-disciplinary approaches and international best practice. The Bank's convening power will be crucial in bringing together the relevant ministries, government agencies, and the donor community, and in assuring high level political coordination. The Bank is seeking new ways of partnering with the other donors and the affected countries to address their preparedness constraints. The Bank has been working with FAO, WHO, OIE, EC, bilateral agencies and other partners in country and at the international level, as well with the affected countries in Asia and Central Asia to address both preparedness and outbreaks and to assist with institutional assessments. The Bank can assist governments and the global technical agencies in leveraging additional resources from other bilateral and international agencies. In addition to its financial role, the technical assistance provided by the Bank has been important in similar global or regional emergency situations such as SARS, post-disaster reconstruction, and HIV/AIDS. At the international level, the Bank's national and regional support would be closely linked with the activities of global partners in this field, i.e. FAO, OIE, WHO; the proposed program is fully consistent with, and draws heavily on, the global strategies developed by FAO and WHO. The Bank has a strong comparative advantage providing integrator skills and multi-sectoral perspectives, and in addressing the institutional dimensions of the response to such emergencies and can also bring extensive experience and skills in understanding and addressing the social and economic impact.

THE PROPOSED WORLD BANK-SUPPORTED US\$500 MILLION GLOBAL PROGRAM FOR AVIAN INFLUENZA AND HUMAN PANDEMIC PREPAREDNESS AND RESPONSE (GPAI)

Higher level objectives to which the program contributes

The overall objective of this Program is to minimize the threat posed to humans by HPAI infection and other zoonoses to prepare for, control, and respond to influenza pandemics and other infectious disease emergencies in humans. Achieving these goals will diminish the global burden of disease and loss of productivity, and will enhance economic and social prospects at the global, regional and country levels.

PROGRAM DESCRIPTION

Overall Coordination

Ongoing Dialogue. OIE, FAO and WHO are the lead technical agencies in the containment of AI, and in the prevention and containment of a human pandemic. FAO and OIE have prepared a common strategic plan for the control of the AI virus in animals. WHO has prepared a draft strategic plan laying out activities for individual countries, the international community, and WHO to prepare for a pandemic and its potential impact. The technical agencies have been coalescing around a shared multi-sectoral strategy of treating the disease at source, preventing/mitigating the effects of a breakout in humans, and averting a human pandemic at the country, global and regional levels. This emerging consensus was deepened at the US-hosted Partners' Meeting and at the Canadian health ministers' meeting in October 2005. A series of other meetings have taken place or are planned through early next year to build support for the strategy and review the related financing needs: (i) a regional meeting hosted by Australia on October 29-31, 2005; (ii) a OIE/FAO/WHO/World Bank-sponsored meeting in Geneva, November 7-9, 2005; (iii) and an European Commission (EC)-sponsored pledging conference in January 2006 in China.

The EC has established a task force to address AI. Directorates within the EC have been given responsibilities for coordination with EU countries and with other regions. EC is considering the allocation of funds into a multi-donor TF to be coordinated by the Bank. Secretary-General Kofi Annan appointed in September 2005 an overall Coordinator of the UN's efforts on AI. Although some countries will choose to support programs with investments separate from the proposed multi-donor trust fund, all support to countries will be based on adapting the OIE/FAO/WHO technical protocols to country circumstance.

Building on the East Asia Region's collaboration with the Asian Development Bank, The Bank has also begun a dialogue with the other multilateral development banks on AI, including meeting with them regularly, and sharing with them the guidelines we have used to conduct country assessments. It will be important to put in place an overall financing framework that ensures effective coordination among donors around agreed country, regional, and global strategies, even as they use different instruments of support.

The Bank has discussed the broad outline of the Program with international stakeholders, including during the Geneva meeting receiving broad and enthusiastic endorsement for making this financing mechanism available to eligible countries. The Bank has the comparative advantage of working across sectors, the ability to help governments develop response frameworks, and to channel significant resources through government systems. In addition it has the convening power to bring together various donors and partners. The Bank can also play an important role supporting and mobilizing technical assistance and knowledge sharing activities at the regional and global levels. The technical content of an Avian Influenza response will be led by the key technical agencies -- WHO for public health and FAO/OIE for animal health.

Coordination Framework. The Geneva meeting agreed on the need to finalize a coordination framework that builds on existing mechanisms at the country level, and on international best practices at the global level. That framework needs to ensure that: (i) it avoids duplication of efforts; optimizes the use of global assets and resources; (ii) facilitates knowledge transfer and active learning as the situation evolves; and (iii) provides a forum for building strong, effective working relationships before a full scale crisis hits. The meeting broadly endorsed the approach on these lines laid out by the Senior UN System Coordinator for Avian and Human Influenza.

This approach builds on three types of coordination that must come together. At the country level, coordination should build on existing arrangements, but also ensure that it supports close collaboration between the Human and Animal Health perspectives. Arrangements are also needed at both regional and global levels to achieve global alignment and harmonization at a working level among the interested parties; facilitate information exchange among these parties; set global, technical standards; and, prioritize activities against the broader objectives of the overall partnership. Finally, there is also a need for a high level of coordination for avian flu to address key issues around aligning global strategies, tracking progress against key indicators, identifying gaps and blocks, and providing the impetus to drive forward ways to overcome such blocks. For now, it has been proposed that the high level coordination be described as an International Consortium on Avian & Pandemic Influenza. That consortium might be chaired by the Senior UN System Coordinator, who would look for support to all parts of the UN system, including the World Bank Group. At the Geneva meeting, both the Senior UN System Coordinator and the US Government representative expressed interest in finding ways to bring this approach together with the US-led International Partnership on Avian and Pandemic Influenza (IPAPI), in order to maximize the synergy between them.

Lending Instrument

Overarching strategic direction. The proposed GPAI operation would have global reach. The Bank's investment support would be provided using the horizontal adaptable program loan instrument (APL), similar to the instrument already used to support the HIV/AIDS efforts in Africa and the Caribbean. The proposed horizontal APL would provide an overall framework for coordinated action and co-financing with other multilateral organizations and donor agencies, by establishing a US\$500 million facility to provide individual countries with financial and technical assistance during the period FY06-FY12.

The global program would be based on integrated national plans, including short-and medium-term development plans, based on the general direction of global strategies agreed by the international community. The global program would support individual countries to adapt, according to local realities, the provisions of global strategic preparedness and response plans. These plans, as noted below, outline priorities grouped under project components, which represent a comprehensive response to the emerging threat of the Avian Influenza and other emerging and re-emerging infectious diseases. Each country that decides to participate would be able to present its proposals for consideration and support under the framework of the global program, using a combination of tools and mechanisms available. The individual country project will need to be designed in accordance with the overall guidelines of the GPAI program, but taking into account the particular country situation, existing capacity and available resources, as well as other ongoing efforts being implemented simultaneously in relation to Avian Influenza.

As in the case of previously approved HIV/AIDS, energy, telecommunications, and disaster risk management multi-country programs, the proposed global program approach would allow the Bank, working with other multilateral organizations and bilateral agencies, to help address individual country requirements in a more cost-effective manner by maximizing the use of similarities between country situations, while respecting the fundamental differences between them. Because of the global zoonotic nature of HPAI, it is important to ensure that any activities supported by the Program and aiming at strengthening national Veterinary Services would be in compliance with the international standards of OIE. This would be achieved with the global and regional services centers being established by OIE and FAO to support capacity building and technical assistance projects.

Overall Financing Framework for Avian Influenza Control. FAO/OIE/WB/WHO organized a meeting in Geneva on Avian Influenza and Human Pandemic Influenza (November 7-9, 2005). This meeting strongly endorsed the need to finalize the costing of integrated, country plans, and the regional and global requirements to support them. It also endorsed the need to spell out the financing framework at country level to respond to such costs, in preparation for the meeting to be hosted by the Government of China in January 2006. This framework assumes that: (i) existing resources (from government and the domestic private sector, and from external donors) will be reprioritized as far as possible, and that (ii) all donors will contribute to a single country program, and avoid pursuing separate approaches that might overlap or contradict each other. The Bank is a potential channel for finance at country level, both using its own resources -- in particular via the proposed APL -- and through any available Bank-administered trust funds. Compared to the country level framework, the main difference is the inclusion of the global agenda that will need to be financed, and also key requirements of FAO/OIE/WHO and related agencies. The APL is not expected to provide direct support in either case, while the proposed trust fund, if established, could provide support to the global agenda. It also anticipates an intermediary between donors and UN agencies.

On the financing side, apart from the proposed APL, and the possible reprogramming of existing relevant operations, another expected instrument is a proposed multi-donor trust fund to be

administered by the World Bank. The possibility of such a trust fund has been discussed with some donors, and will be pursued further if donors so wish. The current expectation is that, if developed, its primary role would be to channel grant resources in support of integrated country programs, ideally as co-financing of the APL. However, the design of any such trust fund will remain under review until the potential role it might play is clear. Any proposal would necessarily be aimed at filling otherwise empty niches, and avoiding duplication.

Bank Lending Instrument. The global APL instrument, by visibly committing substantial resources and complementing activities supported by other international organizations and donor agencies, would help ensure the availability of adequate resources to fund priority investments and technical assistance for the rapid scaling-up of individual countries' responses. The APL instrument would enable the Bank to provide support in a flexible manner – when individual countries have met the eligibility criteria and when individual projects are ready to receive Bank support. While grant funding would be sought in parallel to finance country programs, countries would know up-front that they can rely on the Bank to support them in developing their preparedness and response capacities, if softer funding is available.

Under the global APL, individual countries would obtain separate loans, credits, and/or grants to finance their own national projects up to the global aggregate limit of US\$500 million. Since this program is designed to provide emergency finance to participating countries to contain an outbreak of avian flu through early detection and rapid response measures, the operations under the program would have to be processed under the Banks' emergency policy, OP/BP 8.50. The Program would treat specific emergency response projects in each country as "phases" of a horizontal APL (similar approaches include the Multi-Country HIV/AIDS Programs for the African and the Caribbean Regions, and the Energy Community of South East Europe APL).

The proposed GPAI would include projects appraised and approved during the four-year period FY06-09. Assuming each of the individual country projects would need an implementation period of three-four years, the overall implementation period for the GPAI program would be FY06 to FY12.

Depending on the readiness of projects being developed at present, the first one or two individual country projects would be approved when the GPAI global framework program is presented to the Board for review and endorsement. Subsequent decisions to proceed with country loans/credits/grants would be made based on degree of readiness of the countries and their ability to meet the eligibility criteria. In accordance with the procedures for horizontal APLs, for each "follow-on" loan/credit/grant, the Technical Annex (in lieu of the Project Appraisal Document) would be circulated to the Board for information after approval in principle of the loan/credit/grant by Bank Management, in accordance with OP 8.50 for Emergency Recovery Assistance. In the absence of requests from three or more Executive Directors for Board consideration of the loan/credit/grant, Bank Management approval would become effective 10 working days after circulation of the documents to the Board.

Financing Eligibility and Criteria. A country would qualify for support for an emergency project under the Program when it demonstrates its commitment and readiness to implement early detection and rapid response measures appropriate to the specific country conditions. As there is a wide variation of country conditions (i.e., widely differing needs and development levels, as well as implementation capacities), projects would need to reflect the environment in which they would be implemented with scaling and sequencing of project activities, management arrangements, cost-sharing provisions, and risk mitigation measures appropriate to the Borrower's/Recipient's needs and institutional, fiscal and social reality.

To reflect the above, a country request for assistance would be eligible for financing under the APL when it meets the following eligibility criteria:

- (i) For countries with an active outbreak of avian flu, the existence of an appropriate program of rapid response, detection and containment measures, including appropriate implementation and monitoring arrangements that the international agencies and donor community, including the Bank, could support.
- (ii) for countries with no active outbreak, or that are at an early stage of an outbreak, government commitment and appropriate plan of early detection and rapid response, including appropriate implementation and monitoring arrangements that the international agencies and donor community, including the Bank, could support.

In response to requests for assistance from countries in either of the above situations, the Bank would support a needs assessment and appraise the proposed response and a country's readiness to its implementation. Since individual countries will be starting from different levels in terms of prevailing country circumstances, risk level, capacity, etc., the Bank would have to make an informed judgment as to whether a given country meets the above criteria. The Bank team would seek the advice of key multilateral organizations such as FAO, OIE, and WHO, and donor agencies, in making a judgment on the readiness to proceed with each country case.

Assistance to countries in Non-Accrual Status (CNAs). The World Bank cannot use its standard lending facilities in countries in non-accrual status (CNAs). It can use limited grants in CNAs with agreed re-engagement programs, but it cannot provide any support without re-engagement programs. Given this situation, options such as the following could be contemplated under the proposed GPAI facility: (i) other multilateral and bilateral resources, (ii) the Bank could assist CNAs to prepare and supervise new projects, if there is an agreed program to re-engage, (iii) individual donor TFs, (iv) making IDF available for CNAs for capacity building in LICUS.

Program Characteristics. Constituent loans/credits/grants would meet all applicable Bank policies, practices and standards as discussed below. Loans/credits/grants would vary in size, and the Bank/IDA will make every effort to meet the needs of the eligible countries. Proposed operations for less than US\$1 million would be carefully vetted for cost effectiveness. For any proposed activity which might be below this level, as well as for other requests for technical assistance, the option of reimbursable technical assistance would be available.

We anticipate that **loans/credits/grants under this APL will be processed as emergency investment operations using procedures under OP 8.50 - ERL Procedures.** While we anticipate that the proposed APL Program would be the main vehicle for providing Bank support to its borrower countries to address and contain the avian flu, as with other emergency situations, in response to individual country circumstances the Bank would consider supplementing the response under the APL with other measures. These may include: (i) restructuring existing projects in relevant sectors (primarily health and agriculture) to add components to address avian flu through reallocation of outstanding balances and/or additional financing; (ii) canceling of outstanding balances under certain projects and channeling equivalent funds into an operation that would address the avian flu either under the APL program or a restructured project; and/or (iii) providing supplemental DPL financing in countries with ongoing DPLs where the situation merits such support.

Implementing agencies would be required to have in place adequate financial management arrangements that support each country-specific project in accordance with OP 10.02 on Financial Management. Disbursement arrangements would be developed and agreed with each country as part of each project's design, taking into account the country's institutional capacity, assessed risk, and the flexibility offered by the Bank's/IDA's disbursement procedures and policies under OP 8.50.

Individual loans/credits/grants would be processed at any time there is a country request (within the approved time frame) with an upper limit for individual and aggregate demand determined by the ceiling of the APL itself and subject to limitations, if any, imposed by country credit-worthiness and grant considerations. This approach would result in a significant reduction of the non-financial costs associated with processing of loans/credits/grants and therefore increase their attractiveness as an instrument for capacity and institution building to meet the needs of the eligible countries. Initial indications of demand suggest little likelihood that a significant portion of the amount designated under this APL would be used by any single country unless there is a major outbreak in a large country.

Given the urgency of the situation, following the recent experiences with HIV/AIDS projects in Africa and the Caribbean, preparation of country projects would give priority to detailing the activities to be included in the first year of the project with subsequent activities for later years to be refined in more detail as part of annual project reviews.

Retroactive Financing. To facilitate the prompt execution of key prevention and control activities, the individual country projects may include retroactive financing of eligible expenditures, which will have to be justified on the basis of the country's particular situation, its needs, and the financing available. In accordance with special procedures under OP 8.50, the total amount of retroactive financing will not exceed 20 percent of the loan amount and would cover eligible expenditures incurred by the Borrower up to 4 months before the date of the loan agreement. In exceptional cases, this period could be extended to start on the date of the first occurrence of the emergency. The nature of the goods and services to be considered for retroactive financing, as well as the period during which these expenditures could occur and the total amount involved, would be determined by the appraisal mission and recorded in the project documents. The same information should be provided in the Notice of Invitation to Negotiate and the Notice of Status of Negotiations, and specifically included in the Loan/Credit/Grant Agreements. The Executive Directors should be informed of these arrangements through the Monthly Operations Summary (MOS).

In accordance with the Procurement Guidelines and with the Consultant Guidelines, a Borrower may wish to proceed with the initial steps of procurement of works, goods and services. However, the procedures to be followed (including advertisement) should be in accordance with these Guidelines, as well as with the loan/credit agreement, in order for the eventual contracts to be eligible for Bank financing. The Bank shall review the procedures used by the Borrower. This undertaking would be at the Borrower's own risk and any concurrence by the Bank with the procedures, documentation, or proposal for award, will not commit the Bank to make a loan/credit for the project in question. For contracts signed prior to loan/credit signing, reimbursement by the Bank of eligible expenditures under the project would be only permitted within the limits specified in the loan agreement after effectiveness.

Program Preparation and Supervision. Program planning, preparation and supervision will be coordinated closely with all multilateral, donor and regional agencies that are active in this area. This will avoid a piecemeal approach to providing assistance and help build a common strategy and program for each of the countries. This is also done with the intention to draw on the expertise of each of these agencies and avoid duplication of effort and investments.

Program development objectives

The program development objective is to minimize the threat posed to humans by HPAI infection and other zoonoses and to prepare for, control, and respond to influenza pandemics and other infectious disease emergencies in humans. To achieve this, three areas will be considered for support: (i) prevention, (ii) preparedness and planning and (iii) response and containment.

Program components

The program would finance activities under four components: (i) animal health, (ii) human health, (iii) public awareness and information, and (iv) implementation support, monitoring and evaluation. Even though the activities are organized by sectoral components, the program calls for, and will strongly endorse integrated national plans that ensure common objectives across sectors for dealing with this issue. Moreover, as knowledge about Avian Flu and influenza preparedness evolves and given the diversity of the countries affected, these components are indicative of likely activities to be financed. Specific country programs should build in their design, these activities, as well as country knowledge and emerging technical updates and design issues.

I. ANIMAL HEALTH COMPONENT

The program would support national/regional activities proposed by individual countries to cover their needs in the short, medium or long-term, and ranging from prevention, to control and total eradication of HPAI, which have to be based on a detailed assessment of the particular conditions, constraints and possibilities of the country (emergency audit of veterinary services and rapid assessments of the poultry sector). These activities would fall into the main components and sub-components described below:

A. National policy framework and development of a national strategy

A1: Policy development and enabling environment. This sub-component would provide support to activities related to the improvement in the regulatory framework to address key policy issues to ensure that the recommended disease control, prevention and eradication measures are implemented in a uniform and effective way in accordance with OIE standards and guidelines. In addition, this sub-component would support reviews of existing regulations and policies, and would fund related policy studies and dissemination workshops.

A2: Disease control options and strategy development. Country-based disease control options and strategies will have to be defined by each country according to its specific conditions, constraints and possibilities (in particular, the capacity of its veterinary services, structure and importance of its poultry sector, and its status regarding HPAI). These country strategies will have to address a large number of inter-related issues to produce an effective response. The sub-component will provide support to activities needed to help each country to prepare and develop its own strategy to confront a HPAI outbreak.

A3: Evaluation of Veterinary Services. The ability of a country to prevent, detect and control a HPAI epidemic depends on the quality of its national Veterinary Services. To be effective, national Veterinary Services should operate based on scientific principles and be technically independent from political pressures on its user. To meet international standards set by the OIE, Veterinary Services need to develop and document appropriate procedures and standards for the implementation and management of animal health measures and international veterinary certification activities. To assist in this effort the OIE has developed instruments to assist national Veterinary Services in carrying-out a self-evaluation and establish their current level of performance, form a shared vision with the private sector, establish priorities and facilitate strategic planning. In this respect, the audit procedure, entitled 'Performance, Vision and Strategy for Veterinary Services', due to be incorporated into the standards published by the OIE as the reference instrument approved by the Member Countries, would be used for the evaluation of national Veterinary Services under the GPAI.

A4: Epidemiology-based control measures. The lack of reliable epidemiological information, and the sound analysis thereof, has hampered the development of rational, targeted disease

control measures in many countries. Thus, well-structured epidemiological studies and surveillance programs will be integrated with the disease control measures, which will be then adjusted and improved as new information becomes available. In addition, participatory methodologies involving farmer, para-veterinarians, and community workers, will be used extensively, given the fact the major control targets are the small-scale and semi-commercial poultry production systems.

A5: Disease information systems. The program would support the development of a uniform disease information system in each participating country, as part of their control program to provide better analytical capacity to enable them to participate in global disease information sharing, complying with their obligations as members of the OIE, thereby contributing towards progressively better global and regional control and eradication. The system would be linked with rapid and standardized methods of routine analysis of surveillance data, which would demonstrate important changes in the H5N1 situation, and promptly supply this information to field personnel.

B. Strengthening Disease Surveillance, Diagnostic Capacity and Virus Research

B1: Strengthening Veterinary Services. Once the evaluation of Veterinary Services and related services has been completed, support would be provided to strengthen national Veterinary Services to bring them into line with OIE standards. Such support would include: (i) technical support for strengthening governance and updating legislation; (ii) support for institutional and organizational restructuring and training of staff; and (iii) upgrading of priority infrastructure (limited works, equipment, materials and supplies, technical assistance).

B2: Strengthening Animal Disease Surveillance and Diagnostic Capacity. The sub-component would support the following activities: (i) improving animal health information flow among relevant agencies; (ii) detection, reporting and follow-up of reported cases; (iii) public and community-based surveillance networks; (iv) routine serological surveys and epidemiological surveillance; and (v) improving diagnostic laboratory capacity.

B3: Applied Veterinary Research. While a range of methodologies and tools are available to control HPAI, there are a number of aspects of the diseases that are not clearly understood. While some of these researchable issues are beyond the scope of this Program, it is proposed that funding be provided for studies linked with the national disease control plans. Some of these studies can be conducted by the participating countries directly; however, others will need international expertise. Technical assistance and competitive grants would be made available for carrying out applied research in the participating country. It is expected that many of these studies can be included in the national disease control plans and the disease control strategies can be revised and improved in light of new findings.

B4: Strategic Studies. Strategic studies would be supported under this sub-component to improve the surveillance and diagnostic capabilities of a country. These may include, inter-alia: (a) the preparation of a National Emergency Contingency Plan for HPAI and (b) a self-evaluation of veterinary services, following OIE standards on quality and evaluation of veterinary services to meet international requirements.

C. Outbreak Containment Plan

The sub-component would provide support to activities related to the implementation of an Emergency Outbreak Containment Plan. The Plan, intended as a rapid mobilization to respond quickly and effectively to recurring AI outbreaks during the project lifespan, would contain guidelines for the rapid activation of physical and human resources.

C1: Targeting virus eradication at the source. In developing countries, the specific HPAI control strategies and programs should include the principle of targeting the disease at source of infection. This sub-component would support the following activities: (i) destruction of infected and at-risk poultry (stamping out); (ii) compensation to farmers and producing companies (at a reasonable market price); (iii) disposal of carcasses and potentially infective materials in a bio-secure and environmentally acceptable manner; (v) enhanced bio-security at poultry farms and associated premises, through bio-containment and bio-exclusion; and (v) control of movement of birds and products that may be infected, including controls at the interface of infected/non-infected areas and border controls.

C2: Implementation of vaccination campaigns. This sub-component would support direct vaccination of poultry in countries where the virus is already endemic or in countries where other methods are not feasible. The use of vaccination to control HPAI must go in tandem with strategic field surveillance and epidemiological studies to identify virus sources, selection of priority hot spots, imposition of transport bans, and post-vaccination monitoring. Serological monitoring using DIVA principle, and the use of sentinel domestic ducks and chickens are essential measures to monitor vaccinated domestic duck flocks. This sub-component would support the use of good quality HPAI vaccines produced according to OIE standards and implemented according to FAO/OIE guidelines. The sub-component would also provide capacity building in vaccine quality control at the national level to ensure that vaccines are used with a clearly defined objective and time-phased exit strategy, linked to strict post-vaccination surveillance and monitoring.

C3: Human safety component. Due to the highly pathogenic nature of the HPAI virus to humans, particularly the Asian H5N1 strain, training of people in contact with live virus would be supported. This would include field workers involved in identification of the disease, farm workers involved in culling, laboratory workers involved in virus isolation and diagnosis. Adequate resources would be allocated for training and equipment (biosafety hoods and appropriate personal protective clothing).

C4: Pro-poor disease control programs and compensation packages. In many regions of the world, the smallholder sector has little or no access to veterinary services and it is highly exposed to the consequences of a HPAI epidemic. This sub-component would provide support to low-income groups that are particularly vulnerable by including activities specifically designed to increase small farmers' awareness, improving animal health services at the community level, and providing grants for additional compensation in case of economically vulnerable groups.

C5: Restructuring the Poultry Sector. Restructuring the poultry sector is an important strategy to guard against the damaging effects of HPAI, but is also a complicated intervention requiring understanding of the whole socio-economic system. Moreover, restructuring requires different approaches in different countries by virtue of the differences in their poultry sector infrastructures, marketing characteristics, backyard versus commercial poultry production, and socio-economic impact. Restructuring should be seen as a gradual process, affecting the various segments of the sector in different ways and at different rates. In principle, the main activities to be considered under this sub-component are: (i) restructuring of production compartmentalization and zoning; (ii) adjustment to marketing systems and transport; (iii) new regulations for national/international trade; (iv) reassessing farming systems and practices; (v) introducing segregation of species; (vi) re-stocking supply of poultry breeding stock; and (vii) strengthening bio-security at producing and marketing sites.

II. HUMAN HEALTH COMPONENT

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

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

A. Enhancing Public Health Program Planning and Coordination

Funding would be available for establishing inter-sectoral command and control system structures, identifying crucial gaps in infrastructure and resources, as well as in laws and/or statutes which if not corrected in advance may interfere with an effective response, defining operational priorities, ensuring coordination among affected units, and mobilizing additional resources. Support would be provided for the review and/or promulgation of: (i) statutory provisions regarding quarantine laws and how they apply in a public health emergency; (ii) statutes for mandatory vaccination during an infectious disease emergency; (iii) laws and procedures for closing businesses or schools and suspending public meetings during a declared state of emergency; (iv) medical volunteer licensure, liability, and compensation for retired and non-medical volunteers; and (v) workman's compensation laws as they apply to health care workers and other essential workers who have taken anti-virals for prophylaxis.

Additionally, support would be provided for health preparedness and response plan preparation, test runs of the plan at national level involving regional and local levels, as well as supranational levels. These plans would include activities to protect healthcare workers and other sectoral personnel and ensure they can and are willing to continue to do their job in a pandemic.

B. Strengthening of National Public Health Surveillance Systems

To assess risks to public health and establish early warning systems to 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 done by a coordinated animal-public health team.

There are four main national surveillance areas that need to be strengthened: (i) virologic surveillance to report the number of clinical specimens tested for influenza and the number of positive results by virus type and sub-type; (ii) surveillance for influenza-like illness (ILI) to report on the number of patient visits for ILI by age group and the total number of patient visits each week; (iii) surveillance for

influenza and pneumonia deaths to report the total deaths that may be influenza-related; and (iv) regional and local epidemiologists assess and report influenza activity levels in their respective localities. Current surveillance systems should be enhanced prior to the start of a pandemic, to assure that the high demand for timely information that can be anticipated in a pandemic can be met. In infected countries, it is also recommended to carry out active sero-surveillance of the population at risk to complement the animal health surveillance strategy. To this end, the proposed APL would support the following activities:

- Improvement of health information and telecommunication systems;
- Improvements of laboratory networks;
- Training;
- Studies and research in epidemiological surveillance; and
- Provision of technical assistance.

C. Strengthening Health System Response Capacity

C1: Social Distancing Measures. Aggressive containment measures such as isolation and prophylactic use of antiviral drugs may slow pandemic spread and allow time for response measures. 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 project would support the implementation of immediate term responses i.e. the 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 anti-viral and vaccine capacity would need to be explored and supported. The social distancing measures will probably be enforced on advice from health institutions, but health institutions will not be the enforcing group. As a result, financing would be made available to develop guidelines on social distancing measures (e.g., in phases) to operationalize existing or new laws and regulations, support coordination among sectoral ministries and agencies, and support the ministries of health on the caring of health and other sectoral personnel involved in pandemic control activities. Additional preventive actions such as personal hygiene promotion, including marketing of handwashing through various communication channels, and distribution and use of masks would be supported, along with increased awareness and promotion of community participation in slowing the spread of the pandemic.

C2: Vaccination. Under this sub-component, funding would be available for implementing an influenza vaccination program that rapidly administers vaccine to priority groups and monitors vaccine effectiveness and safety. To this end, support would be provided for the rehabilitation, expansion, and equipment of cold storage facilities to strengthen the distribution and storage of vaccines and other perishable medical products. In addition, national advance purchase agreements (NAPAs) of vaccines would be considered. This measure would help operationalize a public private partnership on influenza pandemic vaccines and achieve equitable distribution by matching capacity with total pandemic demand.

C3: Prophylaxis and Drug Therapy. In a pandemic, vaccine supply levels will change over time. That is, when a pandemic first strikes vaccines will likely not be ready for distribution. Support would be provided for the purchase and distribution of anti-viral drugs, determine the susceptibility of the pandemic strain to existing influenza anti-viral drugs, and target use of available supplies; adoption of measures to avoid inappropriate use to limit the development of anti-viral resistance and ensure that this limited resource is used effectively. The objective of anti-viral prophylaxis is to prevent influenza illness and would need to continue throughout the period of exposure in a community. Support would

also be provided to monitor patient compliance with treatment regimes and the onset of resistance to antiviral drugs. Country programs need to outline, as part of their preparedness plans, how and when retro-virals can be used, including definition of "essential personnel" and targeting mechanisms, where they apply. In addition, issues of availability, equitable access and pricing need to be addressed. Given the complexity of the issue, WHO is currently preparing a Global strategy on this issue. Such a strategy is expected to provide guidance to countries for dealing with this and should be an important element when appraising such requests.

C4: Medical Services. Assistance would be provided to the health care system for preparedness planning to provide optimal medical care and maintain essential community services. Strengthened clinical care capacity could be achieved through financing plans for establishing specialized units in selected hospitals, treatment guidelines, and hospital infection control guidelines. Also, strategies would be developed to increase hospital bed availability, including deferring elective procedures, more stringent triage for admission, and earlier discharge with follow-up by home health care personnel. As an influenza pandemic will place a substantial burden on inpatient and outpatient health care services, support would be provided under the APL to rehabilitate and equip selected health facilities for the delivery of critical medical services and to cope with increased demand of services posed by the pandemic, develop intra-hospital infection control measures, train and mobilize additional health personnel, provision of drugs, vaccines, and other medical inputs, diagnostic reagents, including kits, other operational expenses such as those related to mobilization of health teams and salaries, and technical assistance. Additionally, support would be provided to improve access to information and scientific knowledge using knowledge management tools, including the review and synthesis of scientific information for distribution to the public health community.

In addition, support would be provided to help establish health care facilities in non-traditional sites to help address temporary surge needs. As not all ill persons will require hospital care, but other support services, strategies would be developed to provide home care, delivery of prescription drugs, and meals to infected individuals. Local planning would be needed to address the delivery of these and other essential functions such as police, fire and utility services.

III. PUBLIC AWARENESS AND INFORMATION COMPONENT

The component is designed to safeguard human health, in particular for extension staff, animal health workers, poultry producers and their families, by improving public awareness and information. It would have two sub-components: (i) capacity building and (ii) information and communication services.

A. Capacity Building

The development of a strong, sustainable human resource base is one of the most important objectives of country-specific disease control strategies. Among the affected countries, there is a great variation in capacity to deal with serious outbreaks of infectious diseases, and therefore capacity building efforts need to be tailored to specific circumstances prevailing in each country. This sub-component would support: (i) the needs assessment of Veterinary Services (OIE audit of quality) and livestock extension staff and health workers at the central and local levels and the preparation of training programs and materials; and (ii) training of trainers (TOT) and the training of farmers in animal health and husbandry and of health workers in better identifying symptoms and providing recommendations to the public in control measures. Capacity would involve animal health governance and policies, institutional strengthening and human and physical resource development. The governance and policy aspects would be supported by the global and regional service centers established by OIE and FAO. On the institutional side, training would be supported in various aspects of policy development and economic

impact assessments to include poultry sector restructuring, compartmentalization and zoning, compensation and emergency preparedness planning. At the technical level this would include disease detection, laboratory diagnosis, risk-based surveillance, risk analysis, vaccine quality control, vaccination delivery and monitoring, and bio-security. On the physical side, laboratory diagnostic and surveillance capacity would be strengthened by upgrading equipment and disease information systems.

B. Information and Communication Services

B1: Communication preparedness

Activities would include developing and testing messages and materials to be used in the event of a pandemic or emerging infectious disease outbreak, and further enhancing infrastructures to disseminate information from national to state and local levels and between the public and private sectors. Communication activities will support cost effective and sustainable methods such as marketing of “handwashing” through various communication channels via mass media, counseling, schools, etc, and integrated into avian flu specific interventions as well as ongoing outreach activities of ministries and sectors, especially ministries of health, education, agriculture, and transport. Support would be provided for information and communication activities to increase the attention and commitment of government, private sector, and civil society, and to raise awareness, knowledge and understanding among the general population about the risk and potential impact of the pandemic and to develop multi-sectoral strategies to address it. In addition, support would be provided for: (i) the development and distribution of basic communication materials (such as question and answer sheets and fact sheets) on influenza, influenza vaccine, anti-viral agents, and other relevant topics; (ii) general preventive measures such as “dos” and “donts” for the general public; (iii) information and guidelines for health care providers; (iv) training modules (web-based, printed, and video); (v) presentations, slide sets, videos, and documentaries; and (vi) symposia on surveillance, treatment and prophylaxis.

B2: collaboration with Stakeholders

The multi-dimensional problems associated with HPAI infection necessitate collaboration from a wide range of stakeholders within each country, which has to be supported by broad communications and information campaigns to improve public awareness. The major stakeholders include various ministries (Planning, Finance, Agriculture, Health, Road and Transport, Livestock Departments, Veterinary Departments, national research institutions and diagnostic laboratories), NGOs, civil society, private sector companies and associations (e.g. large poultry production companies, farmers’ associations, veterinarians and farmer involvement at the grass roots level). The sub-component would support activities designed to improve the effective coordination and collaboration among these stakeholders.

B3: Developing Pilot Models for Community-based Rapid Communication

This sub-component would support the development and implementation of training courses in communications methodology for extension and veterinary staff as well as health workers at the central and local levels. It would include preparation of local programs, preparation and dissemination of information materials, and the provision of communications and information equipment for use at the local and central levels.

IV. IMPLEMENTATION SUPPORT AND MONITORING AND EVALUATION COMPONENT

The program would support the strengthening of public structures for the coordination and management of the individual country projects, including central and local (decentralized) arrangements for coordination of activities, financial management and procurement.

A. Project Management

This sub-component would support costs associated with project coordination. National Steering Committees for Avian Influenza Control or similar committees already working on these issues or created in the past to handle emergencies could be reactivated in each participating country to provide general policies and guidance for Program implementation. The Committee/s are to comprise human health and veterinary agencies tasked to oversee AI control and eradication operations. To ensure effective operation of the National Steering Committee, the Committee should be chaired by a high level official (Minister's level) of a central ministry or a Deputy Prime Minister or equal ranking official. The Committee/s will also be responsible for reviewing annual work plans and ensure coordination and linkages across relevant agencies and international partners.

Existing coordination structures operating in the sector ministries/agencies or working to support Bank-financed operations in the agriculture/livestock/health sectors will be entrusted with coordination of Program activities, as well as fiduciary tasks of procurement and financial management. The relevant structures will be strengthened to become a "Program Unit". They will be strengthened by the recruitment of additional staff/consultants responsible for overall administration, procurement, and financial management of the Program. Agreement is to be reached at the individual country level to second to these structures one senior officer from relevant agriculture/animal health/human health departments of relevant ministries. These officers are to be appointed as full time Project Coordinators in charge of the respective components for which their line agency is responsible. The Project Coordinators, together with the additional staff to be recruited for overall administration, procurement, and financial management of the Program, will form the Program Unit.

The Program Unit, under the overall direction of the Committee/s would be responsible for coordinating with relevant government departments to guide and monitor project implementation at the central and local levels. The relevant government department will be responsible for the preparation of annual work programs (WP) and budgets as well as quarterly and annual project management reports (PMRs). The Program Unit will be responsible for consolidating the annual work programs and budgets for submission to their relevant ministries and the Bank. At the local level, implementation would be the direct responsibility of each regional/provincial agricultural/health authority. Small units should be established at the local level comprising officials from health/agriculture to work under the supervision and guidance of the central Program Unit.

C. IMPLEMENTATION

1. Partnership arrangements

The Bank and the international community can play a key role in the response to Avian Influenza, especially at the country level where there is a need to develop an overall framework to guide national action plans that can be the basis for government and donor support. Such a framework should address both animal and public health aspects as well as economic impact. Many of the investments needed to address this disease are core public health and animal health functions that are considered "global public goods", thus, necessitating a global and regional response with support from the international community.

Based on the Global Strategy for the Progressive Control of HPAI prepared by FAO and OIE, combined with the two institutions' role, mandate, comparative advantages and collaborative arrangements, the following proposed global and regional activities and share responsibilities have been agreed upon by OIE and FAO for the implementation of the proposed GPAI.

- (i) Support to the World Fund for Animal Health, for the OIE global governance center for animal health and the FAO operational center for transboundary animal diseases;
- (ii) Support to the OIE/FAO Avian Flu Network (OFFLU), the new worldwide AI network that will improve collaboration between reference laboratories specialized on AI in animals, coordinated by OIE and FAO and laboratory networks focusing on human influenza coordinated by WHO;
- (iii) Support to the Global Early Warning System (GLEWS), the joint FAO, OIE and WHO initiative for the prediction of animal diseases including zoonoses, through sharing information, epidemiological analysis and joint field mission whenever needed;
- (iv) Support to OIE-FAO Regional Quality Centers, hosted in OIE Regional Representations and Offices, according to the OIE-FAO agreement under the Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs), for the OIE regional representations and offices to build the capacity of VS and stakeholders leaders and for the technical support to operations (FAO-OIE);
- (v) Support to Networks (Diagnostic; Surveillance; Economic policy), major FAO initiatives to provide coordinated support for AI surveillance and monitoring including laboratory diagnostic and support to policy and economic analysis for the restructuring of the poultry industries;
- (vi) Support to Epidemiological Investigations, for the required research at international level for a better understanding of AI epidemiology, in particular the immediate need to investigate the ecological and epidemiological relationships between HPAI virus, wild birds and poultry; and
- (vii) Support to the preparation of country Operations (FAO back-stopping technical support to countries and donors).

The governments of some affected and at risk countries are already undertaking a number of programs, supported by international organizations and multilateral and bilateral donors. For example, FAO has national Technical Cooperation Programs (TCPs) in East Asia, ECA, and Africa. These TCPs provide technical assistance and training, protective clothing, laboratory materials and spray equipment; and support to the development of country strategies and preparation of emergency plans. FAO also has sub-regional TCPs to support networking of surveillance teams and diagnostic laboratories and the development of policies on disease control and industry rehabilitation.

The Bank is financing the Vietnam Avian Influenza Emergency Recovery Project (approved June 2004), through a US\$5 million emergency recovery credit. FAO is contributing an additional US\$0.55 million mainly for technical assistance and the Government of Japan is financing a JSDF Grant in an amount of US\$1.8 million to support smallholder recovery from AI and vigilance against further outbreaks. The objectives of the project are threefold: (a) to strengthen disease surveillance and diagnostic capacity in the control of AI; (b) to strengthen the poultry sector infrastructure to better cope with serious disease outbreaks; and (c) to safeguard human health by improving public awareness and information. These objectives are the first phase of a longer-term program aimed at restructuring Vietnam's poultry sub-sector and strengthening the Veterinary Services system to deal with other potentially destructive new emerging infectious diseases.

Annex 1: Economic Analysis

GLOBAL PROGRAM FOR AVIAN INFLUENZA AND HUMAN PANDEMIC PREPAREDNESS AND RESPONSE

1. Evidence shows that the H5N1 strain of Highly Pathogenic Avian Influenza (HPAI) is now endemic in parts of South-east Asia, where Cambodia, Indonesia, Laos, Thailand and Indonesia are the worst-affected countries. The continuing outbreaks that began in late 2003 and early 2004 have been disastrous for the poultry industry in the region; by mid-2005, more than 140 million birds had died or been destroyed and losses to the poultry industry are estimated to be in excess of US\$10 billion.
2. Despite control measures, the disease continues to spread to raise serious public health concerns at the global level. The major world animal and human health authorities (FAO, OIE and WHO) are collaborating closely on a global strategy and regional and country-specific plans, the overall goal of which is to minimize the global threat of HPAI to human and domestic poultry and other animal populations through the control and gradual eradication of HPAI.
3. HPAI is mainly an animal health problem, although more than half of the 120 human cases have been fatal. However, it is widely believed in the scientific community that a global pandemic of human influenza is both overdue and inevitable. Such a pandemic would be the result of the emergence of a strain of virus to which the world's population had little or no immunity. A widespread epidemic needs not be severe or particularly deadly; the pandemics of 1957-1958 and 1968-1969 were relatively mild. However, there is the possibility that the H5N1 strain could, through genetic re-assortment or a more gradual process of adaptive mutation, become readily transmissible from human-to-human and become the basis of a global pandemic comparable to that of 1918-1919, the "Spanish" influenza, which recent research has shown to have had its origin in an avian influenza virus.
4. The situation faced by individual countries is characterized by both urgency and uncertainty. Warnings that a pandemic may occur have come from both changes in the epidemiology of the disease in human and animal populations and the expanding geographical spread of the virus that creates ever-widening opportunities for human exposure. Neither the timing nor the severity of the next pandemic can be predicted, but with the virus now endemic in bird populations the risk will not be easily diminished. There is a major opportunity for international and coordinated intervention, and it is in the interests of all countries to delay the emergence of a pandemic virus and its spread to augment the supply of vaccine.
5. There is a dilemma in preparing for a potentially catastrophic, but unpredictable event, especially for those countries currently affected by the H5N1 virus outbreaks in animal and human populations. It is clear, however, that containing and eradicating the virus would be a desirable objective even if the problem were restricted to one of animal health in a given country. The global public health implications of the potential emergence of the virus as the next human influenza pandemic make coordinated action essential.
6. Those countries with endemic HPAI of the H5N1 strain must sustain (and perhaps intensify) resource-intensive activities and shoulder the burden of economic losses in part to safeguard international public health. Assisting them with the financial costs of so doing is clearly an international responsibility.

7. WHO has prepared a global plan and guidelines for pandemic preparedness and is developing a model country plan that will allow countries to assess their state of preparedness and identify priority needs. The WHO strategy has five strategic actions, summarized as follows:

Phase	Strategic Action
Pre-pandemic	1. Reduce the opportunities for human infection 2. Strengthen the early warning system
Emergence of pandemic virus	3. Contain and/or delay the spread at source
Pandemic declared	4. Reduce morbidity, mortality and social disruption 5. Conduct research to guide response measures

8. In close coordination, WHO, FAO and OIE have prepared a global strategy for the progressive control of HPAI which is a “*master coordination plan ... defining ... short, medium and long term priority activities, to be endorsed and supported by individual countries and regional organizations ...*” which is to be complimented by more detailed country-specific HPAI control plans, the preparation of which is being technically supported by FAO. This global strategy, in effect, addresses the WHO’s two strategic actions in the pre-pandemic phase. The immediate and short-term objective is to prevent further spread of HPAI in those countries that are currently infected; specific measures are tailored to the circumstances of individual countries. The medium- and long-term objectives are to eradicate the disease progressively from the remaining “compartments” of infection and prevent its spread to those countries currently free of HPAI. This global strategy emphasizes a number of key points where action is required:

- (a) inadequate capacity is the main factor limiting the eradication of HPAI; capacity-building in terms of strong and sustainable human and physical resources needs to address all aspects of disease surveillance and control, policy development and socio-economic analysis.
- (b) the dynamics of the rapid spread and persistence of HPAI remain unclear; research into the epidemiology of HPAI, evaluation of the efficacy of vaccines (especially in ducks), the development of improved vaccines and rapid diagnostic tests are all essential. In addition, analysis of production and marketing systems and the risks associated with them are required to target effective disease control, and restructuring of the poultry sector may be required in several countries.
- (c) country-specific projects will be formulated, under-pinned by three sub-regional HPAI support units developing harmonized technical standards and regional policies related to live-animal movement, compensation plans, capacity building, disease reporting requirements and poultry sector restructuring.

9. Economic analysis of these country-specific projects must take into account the unique nature of the problems to be solved. There are two main categories of economic impacts associated with outbreaks of infectious diseases such as HPAI in poultry and a potential human influenza pandemic:

- (a) the economic consequences and costs of sickness or death resulting from the disease outbreaks; and
- (b) the economic consequences and costs associated with public and private efforts to prevent the emergence or spread of the disease and to treat its effects.

10. These two are clearly related; for example, a greater effort at prevention and/or treatment for a given severity of epidemic would be expected to reduce the spread of sickness and/or the percentage of mortality and thus reduce the economic impact and costs.

11. There are also two “levels” of potential economic costs. The present spread of HPAI of the H5N1 strain involves transmission between animals and (so far) a limited incidence of transmission between animals and humans; as such, given the lethal nature of the virus, especially in poultry, it is principally an animal health crisis. However, the emergence of a human influenza pandemic caused by a lethal virus would have a social and economic impact many times greater. Obviously, the severity of the impact of this second “level” of economic costs would depend on the severity of the pandemic; in the “worst case” scenario it would have a truly devastating effect on human population and on the world economy.

12. Actions taken by any given country can be analyzed using the traditional “with project” and “without project” scenarios when the issue is to treat HPAI as an animal health issue. In this case, costs and benefits can be accurately quantified in some aspects and estimated in others. However, when actions are taken by a country in the wider context of the prevention or slowing down of a human influenza pandemic, this type of analysis begins to enter the realm of fantasy. By definition, no single country can protect itself against an influenza pandemic, and the importance of actions undertaken in one country may well have implications for the well-being of the rest of the world’s population that are incalculable.

13. The economic costs of HPAI outbreaks in Asia have been limited at the macro-economic level but very high for specific sectors and communities. The costs so far incurred are mostly related to the death of poultry from the disease itself, the culling of poultry to stem its spread, and the costs to governments of containing the epidemic in terms of equipment, materials, transport and personnel. Ten Asian countries have had some sort of outbreak of HPAI, with around 140 million birds estimated to have been culled in the region as a whole. The direct economic costs of the outbreaks have been estimated at more than US\$10 billion.

14. In Vietnam, one of the most seriously affected countries, some 44 million birds or 17 percent of the total population of poultry, were culled at an estimated cost of \$120 million (0.3 percent of GDP)⁴. The costs would have been substantially higher if there had been a serious impact on tourism, where an estimated 5 percent drop in tourist and business arrivals would reduce GDP by a further 0.4 percent. Fortunately, there has been only a small impact on tourism so far; the number of tourist arrivals in Vietnam increased by 20.5 percent in 2004 and rose further by 23 percent in the first seven months of 2005. Overall real GDP growth in Vietnam accelerated to 7.7 percent in 2004.

15. Although the overall macro-economic effects have been relatively small, the impact on the poultry sector and on associated input and distribution channels has been severe. An FAO survey indicates that in the most seriously affected parts of Indonesia more than 20 percent of permanent industrial and commercial farm workers lost their jobs. The FAO-OIE estimate that between one-third and a half of the populations in the most affected South East Asian nations derive at least some of their income from poultry production⁵. In Vietnam, the poorest 60 percent of the population earn 6-7 percent of household income from this source and have been particularly at risk in terms of income losses.

⁴ World Bank. (2004). *Avian Influenza Emergency Recovery Project. Technical Annex*. Appendix 2. Other earlier and widely cited estimates by Oxford Economic Forecasting had been rather higher, suggesting costs of over \$200 million or around 0.6 percent of GDP for Vietnam, and costs of \$10-15 billion for East Asia as a whole, about 0.3-0.5 percent of regional GDP.

⁵ FAO and OIE. (2005). *A Global Strategy for the Progressive Control of Highly Pathogenic Avian Influenza*. (May).

16. The uncertainties and gaps in our knowledge about the scope and features of any future pandemic are extensive that a brief note such as this can only sketch some of main potential channels of impact. An important research priority for the future will be to undertake more formal analysis and modeling of economic impacts, building on previous work done for HIV-AIDS, SARS and other epidemics.

17. **The effects of sickness and mortality on output:** one main set of economic effects results from increased sickness and death among humans and their impact on the potential output of the world economy. Recent estimates suggest that the Spanish influenza of 1918/9 killed perhaps 50 million, or about 2.5 percent of the then world population of 1.8 billion. Experts predict that the global death toll could range from between 2 million to over 50 million. Studies by the US Center for Disease Control (CDC) reduce that range to between 2 to 7.4 million world-wide. However, narrowing down the range cannot be done with any confidence until the pandemic is under way.

18. The most direct impact on output would be through the effect of increased illness and mortality on the size and productivity of the world labor force. In addition there will also be a general decline in labor productivity due to illness and sick leave among the labor force at large. Such productivity losses due to illness during normal annual influenza episodes are estimated to be ten times as large as all other flu-related costs combined⁶. Other long-term impacts would play out as the increased costs of preventing and treating disease reduced savings and investment. The impact on output at the national level would vary widely, depending on the extent of the epidemic, the country's demographic structure, the extent of unemployed resources and other key variables⁷.

19. **Private preventive responses to an epidemic:** Another set of economic impacts would result from the uncoordinated efforts of private individuals to avoid becoming infected or to survive the results of infection. Private individuals will take action to avoid infection, based on their perceptions of factors such as the disease's transmission mechanism, the probability of infection, the probability of death once infected, and the availability of preventive or curative measures.

20. The SARS outbreak in East Asia provides a good example. There were approximately 800 deaths - and thus no discernible impact on output - but actual economic losses were estimated at 0.5 percent of annual East Asian GDP in 2003, concentrated in the second quarter of the year, when there was a much sharper loss of around 2 percent of quarterly GDP. (Note that a 2 percent loss of global GDP during an influenza pandemic would represent around \$800 billion per year). Why such a severe economic loss? Given the spread of the disease through droplet transmission, people tried to minimize face-to-face interactions. The result was a severe demand shock for services sectors such as tourism, mass transportation, retail sales, hotels and restaurants. Business costs no doubt also increased due to workplace absenteeism, disruption of production processes and shifts to more costly procedures⁸.

21. However, while such private actions were economically costly, they likely also played a role in breaking the chain of transmission of the disease. Thus an interesting policy question is how to

⁶ Laurie Garrett. (2005). *The Next Pandemic?* Foreign Affairs. July/August 2005.

⁷ Use of a simple Cobb-Douglas production function to make an crude calculation of the loss in world output due to a 2.5 percent decline in the size of the world labor force, leaving aside all issues of differences in the intensity of the epidemic in different countries, availability of unemployed labor, changes in labor productivity, etc. suggests a drop in world potential output of \$500-700 billion.

⁸ The role of private preventive actions is analyzed in Tomas Phipson. (1999). *Economic Epidemiology and Infectious Diseases*. NBER Working Paper 7037. See also John Edmunds and Nigel Gay. (2004). *Epidemiological Data Requirements for Economic Modeling: the Example of SARS*. Paper presented at WHO Workshop on The Rapid Assessment of the Economic Impact of Public Health Emergencies of International Concern – the Example of SARS. Toronto, Canada. January 2004.

minimize the ratio of costs to benefits of the inevitable private preventive actions that occur during an epidemic. Note that, at least initially, there was a dearth of public information about SARS, contributing to a large over-estimate by private individuals of the perceived probabilities of infection and death from SARS, a fact documented in opinion survey data. This could have led to over-reactions in the preventive actions taken by the population at large. One lesson from the SARS episode is that a prompt and transparent public information policy could help reduce the economic costs of an epidemic.

22. **Public policy responses to epidemic threats:** A last set of economic impacts are those associated with the policy efforts of the government to prevent the start of an epidemic, to contain the epidemic once it has begun, and to mitigate its harmful effects on the health of the population. These policy actions can be oriented towards the short, medium or long term, and, in spatial terms, towards national, regional or global levels. FAO-OIE (2005, *op. cit.*) elaborates policies to curb transmission among animals, including enhanced surveillance, diagnosis, bio-security measures, culling and vaccination of poultry. WHO (2005) sets out policies covering situation monitoring, assessment, prevention, containment and health system strategies during six stages before and during a human pandemic. These include, among many other measures, expanding production and targeted use of antiviral medicines and vaccines, as well as ‘social distance measures’ such as closures of schools and quarantines. Ferguson *et al* (2005) use a detailed simulation model of influenza transmission in Thailand to argue that targeted mass prophylactic use of antiviral medicines and social distance measures could halt a pandemic in its earliest stages⁹.

23. All these public policy measures entail economic costs. Even though the human and economic benefits of preventing or containing an influenza pandemic are overwhelming, governments may still be daunted by the cost of various policy measures, especially when these measures are in the nature of global public goods that benefit many more than just the citizens of that nation. The cost of significantly scaling up anti-viral medicine and vaccine research and production would be a case in point. Thus careful economic analysis of different incentive schemes that could foster greater anti-viral medicine and vaccine production in efficient, cost-effective ways could make a large contribution in the effort to prevent or contain a pandemic. Similarly, the use of blanket measures to curb movement within and between countries could cause major economic disruption due to the increasingly globalized nature of modern production processes. Again, careful analysis of critical logistical chains in the world economy could allow consideration of targeted prophylactic use of antiviral medicines to protect transport and other key groups of workers.

⁹ WHO. (2005). *WHO Global Influenza Preparedness Plan*.

Neil M. Ferguson, Derek Cummings, Simon Cauchemez, Christopher Fraser, Steven Riley, Aronrag Meeyai, Sopon Iamsirithaworn and Donald Burke. (2005). *Strategies for Containing an Emerging Influenza Pandemic in Southeast Asia*. Nature. Published online 3 August 2005.