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SOCIALIST REPUBLIC OF VIETNAM

Ministry of Agriculture and Rural Development

Ministry of Health

INTEGRATED OPERATIONAL PROGRAM FOR AVIAN AND HUMAN INFLUENZA (OPI)

2006-2010

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ACRONYMS AND ABBREVIATIONS

AA ..... *Administrative Agent*

ODA..... *Coordination Committee for Avian Influenza*

ADB ..... *Asian Development Bank*

AFD ..... *Agence Française de Développement*

AHI ..... *Avian and Human Influenza*

AI ..... *Avian Influenza*

AIERP..... *Avian Influenza Emergency recovery Project*

APEC..... *Asia-Pacific Economic Cooperation*

ASEAN..... *Association of Southeast Asian Nations*

CDC..... *US Center for Disease Control and Prevention*

CHE..... *Centre for Health Education*

DAH..... *Department of Animal Health*

DANIDA ... *.Danish International Development Agency*

DLP ..... *Department of Livestock Production*

DPM ..... *Department of Preventive Medicine*

EC..... *European Commission*

EWARS ..... *Early Warning and Response System*

FAO ..... *Food and Agriculture Organization*

GDP..... *Gross Domestic Product*

GIS..... *Geographic Information System*

GPAI..... *Global Program for Avian Influenza and Human Pandemic Preparedness and Response*

GoV..... *Government of Vietnam*

HCW..... *Health Care Workers*

HPAI..... *Highly Pathogenic Avian Influenza*

IDA ..... *International Development Association*

IEC ..... *Information Education and Communication*

MARD ..... *Ministry of Agriculture and Rural Development*

M&E ..... *.Monitoring and Evaluation*

MOET ..... *.Ministry of Education and Training*

MOF..... *Ministry of Finance*

MOCI..... *Ministry of Culture and Information*

MOH ..... *Ministry of Health*

MPI ..... *Ministry of Planning and Investment*

NAEC..... *National Agriculture Extension Centre*

NGO..... *Non-Governmental Organization*

NSCAI ..... *National Steering Committee for Avian Influenza Control and Prevention*

NSCAHI .... *National Steering Committee for Avian and Human Influenza*

NZAID..... *New Zealand Aid*

ODA..... *Official Development Assistance*

OIE..... *Office International des Epizooties (World Organization for Animal Health)*

OPI..... *Integrated Operational Program for Avian and Human Influenza*

PAHI ..... *.Partnership for Avian and Human Influenza Control*

PPE..... *Personal Protective Equipment*

PSC ..... *Program Steering Committee*

TF..... *Trust Fund*

UN..... *United Nations*

UNDP ..... *United Nations Development Program*

UNICEF.... *United Nations Children's Fund*

USAID..... *United States Agency for International Development*

VNRC..... *.Vietnam Red Cross*

WB ..... *World Bank*

WHO ..... *World Health Organization*

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PREFACE

PREPARATION PROCESS

A Task Force established under the National Steering Committee for Avian Influenza Disease Control and Prevention (NSCAI), and led by MARD was given responsibility for developing the Integrated National Operational Program for Avian and Human Influenza (OPI). It comprises twelve members, representing eleven ministries – Ministries of Agriculture and Rural Development (MARD), Health (MOH), Public Security, Transportation (MPST), Trade (MOT), Foreign Affairs (MOFA), Culture and Information (MCI), Science and Technology (MST), Natural Resources and Environment (MONRE), Planning and Investment (MPI), and Finance (MOF).

The process and preparation of the draft OPI (*Green Book*) had strong involvement of central ministries in close collaboration with WHO, FAO, UNDP, UNICEF and the World Bank. Based on initial documents from each sector (animal health, livestock production, and human health), a first draft OPI was prepared and discussed during a workshop in Hanoi on April 12, 2006 and further refined during a multi-donor joint assessment mission[1/] from April 17-28, 2006.

The priorities proposed in the OPI have been discussed in a number of *fora* including: (a) a workshop on livestock strategy development, organized by MARD from February 27-28, 2006; (b) a consultative meeting on human health priorities organized by MOH on March 23, 2006; and (c) a workshop organized on March 3, 2006 by the Information Education Campaign (IEC) Working Group to review achievements and lessons learned from the pre-Tet Avian Influenza Communication Campaign and to develop medium/long-term strategies and a three year framework for public awareness and behavior change activities.

OBJECTIVES

The *Green Book* identifies and outlines activities envisaged by the Government as required to achieve the objectives and outputs identified in the Integrated National Plan for Avian Influenza Control and Human Pandemic Influenza Preparedness and Response (*Red Book*). It also includes a range of health sector activities relevant to influenza pandemic preparedness but ranked as second level priority by the MOH and activities aimed at supporting the restructuring of the poultry sector that are in line with the "commercialization" strategy proposed by the Department of Livestock Production (DLP) of MARD, but that place emphasis on preserving poultry farmers' livelihoods and minimizing environmental externalities.

1/ The mission was coordinated by the World Bank (WB) and comprised representatives from Agence Française de Développement (AFD), Asian Development Bank (ADB), European Commission (EC) United States Aid Agency (USAID), World Health Organization (WHO),Food and Agriculture Organization (FAO),United Nations Children's Fund (UNICEF),United Nations Development Program (UNDP), New Zealand Aid Agency (NZAID), and Danish International Development Agency (DANIDA).

The general purposes of the OPI are to:

- Identify activities envisaged by MARD, MOH, and other concerned agencies to develop a framework for enhancing the existing integrated approach to HPAI control and pandemic preparedness over a five year period (2006-2010);
- Provide a framework for resource mobilization within an integrated strategy developed by the Government and endorsed by international partners; and
- Provide a framework for coordination and collaboration between the Government of Vietnam and international partners in the fight against HPAI.

AUDIENCE

The audience for the OPI is policy makers, particularly NSCAI, MARD, MOH, MOCI and MPI as well as provincial, district, and municipal health and agricultural authorities and the donor community. The audience is also the international community participating in the Consultative Group (CG) meeting planned for June 9-10, 2006 in Nha Trang, where the Government will seek financial support for the implementation of the OPI. The OPI will be formally presented at a preparatory Donor Meeting organized by MARD and the World Bank in Hanoi on June 2, 2006.

SCOPE

The Government of Vietnam and the Donor Community are committed to support the implementation of the OPI within a medium term framework, for the period 2006-2010. The program should also provide enough flexibility for adjustments based on an annual joint review of implementation progress and regular assessment of the epidemiological situation of the disease in both the human and the poultry populations.

The OPI also looks beyond the control of HPAI in poultry and the response to a potential influenza pandemic, as many activities proposed address the broader agenda of strengthening capacity to detect, control, and respond to emerging infectious diseases, especially zoonoses.

Executive Summary

A. Background and Socio-economic context

1. **Background.** Vietnam was among the first countries to report cases of Highly Pathogenic Avian Influenza (HPAI) at the start of the current panzootic. At the peak of the epidemic in Vietnam, 24 percent of communes and 60 percent of towns were affected and by March 2004, about 17 percent of the poultry population had died or been culled, amounting to about 45 million birds. This initial wave was followed by two less severe outbreaks in late-2004/early-2005 and in August 2005. A national poultry vaccination program was undertaken from October 2005 to January 2006 in all 64 provinces, covering 170 million chickens and 79 million ducks, and is beginning its third round. No new outbreaks in poultry have been reported since December 2005.

2. Vietnam has reported the highest number of human infections of any infected country by a substantial margin, with 93 confirmed cases, including 42 deaths (45% case fatality). Overall, 32 provinces and municipalities have reported human infections, with a concentration around the Red River Delta provinces in the North and the Mekong Delta Region in the South, matching the distribution of poultry outbreaks.

3. The relatively high number of confirmed human cases combined with widespread poultry outbreaks of H5N1 has led to concerns over the possible emergence of a human pandemic strain and has made avian influenza in Vietnam a focus of national and international concern. More recently, however, as H5N1 infection in birds has spread globally, the risk of a pandemic originating outside Vietnam has increased. These possibilities have led the Vietnamese government to enhance planning efforts to control H5N1 infection in domestic poultry and prepare for a possible human pandemic.

4. **Socio-economic Context.** The HPAI epidemic has resulted in significant social and economic costs, particularly among Vietnam's millions of farm households with small numbers of poultry. It is estimated that the direct economic impact of the epidemic amounted to about 0.5 percent of 2004 GDP, affecting some 8 million of Vietnam's 11 million households thought to be engaged in poultry production. This impact has been unevenly distributed since income from poultry and eggs is more important among the poorest segments of the population.

5. A human influenza pandemic could have devastating economic and social consequences, including large-scale loss of life and livelihoods. Vietnam, like other countries affected, confronts choices in balancing preparation versus action since both have economic costs. At least three impacts should be considered under a human pandemic scenario: (a) effects of sickness and mortality on potential output; (b) private preventive responses; and (c) public sector responses.

B. NATIONAL PLANNING AND RESPONSE

6. **National Strategic Plans**. Progress made by Vietnam in organizing its response to AI includes the following. *A National Steering Committee for Avian Influenza Disease Control and Prevention* chaired by the Minister of Agriculture and Rural Development (MARD) was established by the Prime Minister in January 2004 as the national coordination mechanism for HPAI planning and supervision. A *National Preparedness Plan in Response to Avian Influenza Epidemic H5N1 and Human Influenza Pandemic* completed by the committee was approved on November 18, 2005 (Decision No. 6719/VPCP-NN). The plan includes response measures under different scenarios, and allocates responsibilities and actions among fourteen ministries, mass organizations, as well as People's Committees.

7. In February 2006, the Government established a National Task Force under the National Steering Committee, to develop this document: the *Integrated Operational Program for Avian and Human Influenza* (OPI) (see above).

8. **Animal Health Plan.** An *Emergency Disease Contingency Plan for Control of Highly Pathogenic Avian Influenza in Vietnam* was approved by MARD on December 5, 2005 (Decision No. 3400 QD/BNN-TY). It constitutes the basis for the National Veterinary Services to develop their own strategy to control HPAI.

9. Policy measures adopted by MARD follow the FAO/OIE/WHO Global Strategy and propose medium to long-term aggressive control measures for Vietnam through the deployment of conventional methods of culling, bio-security and movement control, combined with strategic vaccination of domestic poultry and ducks. Other measures include raising public awareness, strengthening diagnostic capacity, enhancing research capability, imposing a temporary ban on the hatching of ducks, and carrying-out epidemiological surveys to understand the route of transmission as well as the role of wild birds. Following the recommendation of a study on compensation and related financial support to farmers, the Government's compensation for birds culled during the stamping-out of outbreaks has been raised from 10-15 percent of the market value to 50 percent in June 2005.

10. **Human Health Plan**. A *National Plan of Action on Human Influenza Pandemic Prevention and Control in Vietnam* was approved by the Ministry of Health on November 24, 2005 (Decision No. 38/2005/QD-BYT). The Plan addresses all the core areas in a human pandemic influenza response, including surveillance and early warning systems, risk communication for the public and health care workers, border control, and social distancing measures.

11. In developing its policy framework to respond to the current outbreak of HPAI and to the threat of a pandemic, the health authorities address two scenarios:

- A continuation of the current "pre-pandemic" phase, in which ongoing poultry outbreaks present a risk of further human cases of HPAI;
- A human influenza pandemic caused by a new viral strain, during which the number of human cases would be large and would place a great demand on the curative care sector.

12. The policy frameworks to respond to the two scenarios are as follows:

- For the first scenario, necessary responses include reinforcing the surveillance system to allow early detection of and rapid response to cases, and promoting behavior change in the population to minimize risk of human infection;
- The policy framework for the second scenario involves both classic public health and curative care responses tailored to the emergency situation. MOH policy is to invest now in the planning and core equipment that will allow a rapid and effective response in the future.

C. OBJECTIVES

13. The overall objective of the OPI is to reduce the health risk to humans from avian influenza by controlling the disease at source in domestic poultry, by detecting and responding promptly to human cases, and by preparing for the medical consequences of a human pandemic.

14. **For the Animal Health Sector**, the overall goal is to progressively control and eradicate HPAI from poultry in Vietnam. The specific short- to medium-term objectives are to: (a) strengthen veterinary services to control HPAI and other potential zoonotic disease threats; (b) control HPAI using a cost-effective phased approach that addresses each sector; and (c) plan poultry sector restructuring so that it enables better control of HPAI while minimizing loss of livelihood and environmental pollution. Over the longer term, the country plans to restructure its poultry industry by improving bio-security and food safety along the market chain from producer to consumer, while protecting the livelihoods of poor farmers and preserving the environment.

15. **For the Human Health Sector,** the specific objectives are to: (a) minimize the incidence and mortality of human avian influenza infections; (b) reduce the risk of an influenza pandemic occurring; and (c) take other steps necessary to reduce the impact of a human influenza pandemic. The principle underlying the health sector's response is to link activities targeting HPAI to a broader agenda to strengthen the capacity of the sector to detect, control, and respond to emerging infectious diseases, especially zoonoses. The OPI does not include all measures to respond to a pandemic in case this scenario happens, but rather focuses on priority activities and contingency costs associated with this scenario.

D. INSTITUTIONAL AND FINANCIAL FRAMEWORK

16. **Strengthening Coordination**. Vietnam has set up coordination mechanisms at the central level, which are replicated at the provincial, and in many cases, at the district level. Coordination has worked well under the leadership of NSCAI and will continue to require strong government leadership to ensure that the efforts of donors and international NGOs are consistent with national priorities. Accordingly, the OPI institutional framework proposes four measures: (a) strengthening national coordination; (b) enhancing coordination at the provincial level; (c) strengthening overseas development assistance (ODA) coordination through the establishment of a government-donor Partnership for AHI Control (PAHI); and (d) establishing thematic working groups for public awareness and behavior change, monitoring and evaluation, and capacity building. National coordination will be enhanced by expanding the membership and the mandate of the current national committee through creating an overall *National Steering Committee for*

Avian and Human Influenza (NSCAHI). The NSCAHI would coordinate all activities related to AHI, including pandemic preparedness and response. Sectoral responsibilities would be delegated to a newly created subcommittee in MARD and an existing one in MOH.

17. **Financial Management**. The response of the international community to fight AHI in Vietnam has been substantial both in terms of ODA and technical assistance. The financing framework favors a coordinating mechanism over a single new fund. Potential sources of funds would include the government budget (both central and provincial budgets), direct bilateral financing, the Joint Government-UN Program, the World Bank-administered Trust Fund, multilateral assistance (including loans, credit and grants from the Asian Development Bank and the World Bank), and potential assistance from regional organizations such as the Asia-Pacific Economic Cooperation (APEC) and Association of Southeast Asian Nations (ASEAN). The private sector will also contribute financial resources to the implementation of the OPI, in particular it will bear most of the cost of the poultry industry restructuring activities.

E. DESCRIPTION OF THE OPI

Part I – Enhanced Coordination Activities

18. **National Preparedness**. The goal of an integrated national preparedness effort is to coordinate objectives and activities across the human and animal health sectors. To achieve this goal will require sustained national-level planning and coordination among concerned ministries, and from the center to the grass roots level. For this to be realized, the OPI will require: (a) regular revision of National Plans; (b) regular updates of the operational plans of the ministries and local authorities and (c) coordinated simulation exercises of disease outbreaks in animals and humans. The OPI will support these three activities by financing national and international technical assistance, workshops and training materials (including incremental operating costs). The National Plan will develop the policy agenda, as well as define actions and responsibilities under different scenarios for all ministries, including laying out financing sources and mechanisms. Stockpiling resources such as anti-viral drugs and medical equipment will also be ensured. Operational plans for ministries and local authorities need to address linkages with other sectors to reflect OPI coordination and management arrangements.

19. **Policy and Strategy Development**. In both the animal and human sectors, national policy and strategy are moving towards the development of sustainable medium and long-term responses to prevention and control of infection in animals and humans. To achieve this, the animal sector is developing a targeted risk-based approach with activities defined by the epidemiological status of different areas. The health sector is focusing on integrating activities related to the current HPAI outbreak and human influenza pandemic preparedness into a framework of strengthened communicable disease control. The OPI will support studies to develop further these policy approaches and ensure the necessary revision of the legal and regulatory frameworks for both the agricultural and health sectors.

20. **Program Coordination**. The OPI will provide financial and technical support to program coordination at three levels: (a) central and provincial coordination through the NSCAHI and its subordinated committees at the provincial level; (b) donor coordination through

PHAI which would be supported by the International Cooperation Departments of MARD and MOH; and (c) working groups for monitoring and evaluation, public awareness and behavior changes, and capacity building.

21. **Public Awareness**. Public awareness and behavior change activities have been vital components of HPAI control since the outbreaks began in 2003. Many materials have been produced and distributed, targeting the general public, poultry farmers, animal and human health workers, and government officials. An Information, Education and Communication (IEC) working group of government and UN agencies' staff was established in 2005 with the goal to achieve greater impact through harmonization of the efforts of all implementing partners under an over-arching communication strategy with a common set of objectives and core messages ("One campaign – many sectors"). Therefore, under the OPI, this working group will expand its membership to include other implementing agencies and NGOs and will strengthen its role in effective coordination and strategy development. It will focus on providing a better rationale for activities through investigative work, monitoring and evaluation. It will also work to build capacity in the mass media, MARD, MOH and other government sectors which will be implementing the HPAI control and pandemic communication plans.

22. **Monitoring and Evaluation (M&E).** OPI M&E activities will measure the key input, output and outcome indicators identified in the results framework (see Annex 1), which will provide the information necessary to assess regularly overall implementation progress and impact. The relevant implementing agencies will be responsible for M&E of their OPI activities. Most importantly, MARD and MOH will each be responsible for M&E of Parts II and III, respectively, of the National Program. Other government agencies, including the Ministries of Trade, Transportation, Environment and others, will be responsible for M&E of their respective OPI activities. MARD and MOH's M&E reports would be made available to all participants and stakeholders, and all M&E reports from these ministries and other units would be provided to the National Steering Committee. The secretariat of the PAHI will set up an M&E unit responsible for regularly consolidating these various reports into an overall OPI M&E Report, to be presented to the NSCAHI as part of harmonized supervision and review of OPI implementation progress.

Part II – HPAI Control and Eradication in the Agricultural Sector

23. The HPAI control and eradication strategy developed by MARD will focus on four components: (a) strengthening veterinary services; (b) disease control; (b) surveillance and epidemiological investigation; and (d) poultry sector restructuring.

24. **HPAI Control and Eradication Strategy.** Avian influenza in the poultry population will be progressively controlled in three phases: (a) Control Phase, in which the incidence of outbreaks is reduced through stamping out outbreaks, mass vaccination, improvements in bio-security of poultry production, and changes in marketing practices. It is expected that the control phase will continue until 2007, with some reduction of the national mass vaccination program occurring in 2006; (b) Consolidation Phase, in which gains are maintained, further restructuring of the poultry industry is undertaken, farms in the industrial sector demonstrate freedom from HPAI, and disease free compartments are expanded. This phase will occupy the remainder of

the OPI planning horizon of 2008 to 2010; and (c) Eradication Phase, beyond 2010 and the OPI period.

25. The control measures described should be implemented with as little economic and social burden as possible on the rural poor, and minimize negative environmental impact. Specific control programs will be designed for each production sector[2/], which, because of their different requirements, will move at different speeds towards the elimination of the HPAI virus. Targeted, risk-based vaccination will remain a key tool in the control program wherever the risk of infection remains high. Control measures will require the strengthening of: (a) current veterinary services, including the development of formal links with community-based animal health workers; (b) disease surveillance; and (c) epidemiological investigations.

26. **Strengthening Veterinary Services.** Veterinary capability and capacity will remain key constraints to progressive disease control, unless further significant investments are made in infrastructure, manpower and training. The following OPI activities aim to overcome these constraints: (a) the capacity and capability of the veterinary laboratory network will be expanded to improve the speed and reliability of testing and increase the range of diagnostic tests that can be applied; (b) epidemiological expertise will be upgraded through training; (c) improved disease reporting and data analysis capacity will be introduced; and (d) DAH management capacity will be enhanced.

27. **Disease Control.** The OPI calls for improving the capability to investigate reported cases of diseases in order to identify outbreaks rapidly and effectively. This will require: (a) staff training and support; (b) operating funds for regional and provincial disease investigation teams, and the costs of collection and laboratory testing of specimens; (c) specialized investigative studies; and (d) the development of technical guidelines on environmentally sound disposal of culled poultry. These measures will strengthen the rapid response capability to eliminate the spread of infection from new foci, through the culling of infected birds, ring vaccination, implementation of movement controls, epidemiological investigation and disease tracing. A contingency fund for compensation is proposed, using the existing State Contingency Budget Mechanism and other sources of funds.

28. Vaccination will move progressively toward a targeted and risk-based approach, with variation between geographic areas and production sectors. In addition: (a) movement control of infected poultry and contaminated materials from infected places will be improved to limit the impact of new outbreaks; (b) improved vaccines and vaccine administration methodologies will be researched to increase flock protection; and (c) mechanisms for compartmentalization will be investigated as a means of increasing the numbers of certified disease-free poultry facilities and to contribute to the development of exports over the longer term.

29. **Surveillance and Epidemiological Investigation.** Cost effective surveillance will improve knowledge of virus circulation and of vaccination coverage. At the same time, surveillance in Sectors 1 and 2 farms will ensure that disease free status is maintained. Lastly,

2/ *Classification of poultry production systems: Sector 1 – private sector vertical integrators; Sector 2 – independent private producers; Sector 3 – small-scale private producers; and Sector 4 – free-ranging backyard poultry.*

mapping of temporal and spatial distributions of activity ranges for wild and migrating bird species will assist in the risk assessment of HPAI spread within and into Vietnam.

30. **Restructuring of Poultry Industry**. The goal of the Government's strategy for Agriculture and Rural Development 2001-2010 is to restructure the agricultural sector to become more competitive and demand-driven. As part of this strategy, MARD has the long-term aim to industrialize poultry farming, slaughtering and processing. This objective has implications for HPAI control, including opportunities to improve bio-security in production, and control the poultry marketing chain. However, while pursuing a goal of modernization, it will be essential to take into account the importance of poultry production to small-scale producers and the poor, since an estimated 65 percent of households in Vietnam keep poultry, and diversity of income generation is important for poor households.

31. **Risk-based Approach to HPAI Control** needs to be employed while restructuring the poultry sector, to protect the interests of the poor. Poultry production in large cities will be discouraged and eventually prohibited. Slaughterhouses will be relocated away from residential areas to minimize public health risks and environmental nuisance. When implementing this plan, it will be necessary to take into account the risk of loss of livelihood to Sector 3 producers, small traders and market stall operators. Sector 4 will be more difficult to regulate in the short-term, but in the longer term is likely to erode naturally in densely populated areas as other enterprises take the place of poultry rearing. The expanded industrial sector will market processed poultry products, particularly within urban areas. In the more remote rural areas, the risks of spreading HPAI in poultry are moderate and poultry sector industrialization need not be a priority measure to control HPAI, although improvements in bio-security, food safety and the regulation of poultry marketing will be beneficial in the long term.

Part III – Influenza Prevention and Pandemic Preparedness in the Health Sector

32. HPAI prevention and pandemic preparedness in the human health sector focuses on strengthening surveillance and response, diagnostic capacity, and curative care capacity; improving research; and focusing public awareness and behavioral change activities.

33. **Strengthening Surveillance and Response**. The OPI proposes an extensive evaluation of the current infectious disease surveillance system which would result in recommendations for improvements. In addition, the development of an early warning and response system (EWARS) for clusters of Severe Acute Respiratory Infections (SARI) will be implemented to strengthen and expand the existing mechanism. Included in this strategy is the development of a National Electronic Surveillance Network. Provincial and district level rapid response teams will be trained in epidemiology and outbreak response, and equipped appropriately. Arrangements for implementing a Field Epidemiology Training Course also are underway. In addition, legislation on infectious disease control will be reviewed and revised, with the development of new powers that public health authorities can apply. Lastly, border control will be enhanced.

34. **Strengthening Diagnostic Capacity**. Laboratory capacity to detect and monitor HPAI and other influenza viruses is central to Vietnam's surveillance and response system. Laboratory capacity to diagnose H5N1 viruses currently exists at NIHE in Hanoi and the Pasteur Institute in

HCMC, but needs to be strengthened in some key areas. Regional, provincial, and mobile laboratory facilities will be upgraded, with funds for equipment, test kits and consumables. In addition, the capacity and safety of laboratory staff will be improved through bio-safety training courses and updated guidelines.

35. **Strengthening Curative Care Capacity**. The curative care sector is pursing a two-pronged approach to pandemic influenza preparedness and response. Firstly, it aims to reinforce the capacity of the hospital system to recognize and respond to human cases of HPAI and influenza. Secondly, it is preparing for an influenza pandemic scenario in which there is a sudden, large increase in demand for curative care across Vietnam, including the development of hospital-level pandemic response plans.

36. Specifically, the OPI will include the following areas and activities: (a) situation assessment of capacity to respond to HPAI cases and a pandemic scenario; (b) revision of standards and guidelines and provision of training and supervision to strengthen clinical care of patients; (c) improvement of equipment and facilities; (d) establishment of isolation units and improving hospital procedures to improve infection control in hospitals; and (e) building of capacity to respond to an influenza pandemic by planning, rehearsing pandemic responses, and stockpiling materials and equipment.

37. **Improving Research.** The transition from an emergency response phase to medium-term control presents new opportunities to conduct scientific research that can guide HPAI prevention and control strategies. Research will focus on determining the risk factors for severe illness with H5N1 influenza and its transmission, determining the prevalence of H5N1 among different populations, expanding the options for laboratory screening tests, and monitoring the genetic variability of the virus.

38. **Focusing Public Awareness and Behavior Change Activities.** The implementation of public awareness and behavior change activities will be done sectorally with a core set of common objectives. The health sector will take the lead on promoting behaviors associated with: (a) timely reporting of human diseases; (b) improved personal hygiene and food safety; (c) compliance with medical regulations; and (d) improved containment response if human-to-human transmission occurs. The primary target audience is the general public who will be reached through different channels such as health workers, mass organizations, and the school network.

F. CHALLENGES AND PROPOSED SOLUTIONS

39. Mounting an effective HPAI program presents a formidable exercise for a number of reasons, including knowledge gaps in HPAI epidemiology and evidence-based control measures and the need for strong multi-sectoral coordination. The key challenges to designing and implementing a national HPAI plan and possible solutions include:

- **Vietnam may, as the result of having contained the disease so far, fall victim to its own success**, with the danger that sustained national and international commitment may wane over time. However, sustained vigilance is needed as long as the risk of further outbreaks remains.

- **The most effective and efficient interventions may not receive the needed level of funding.** Resources may be diverted to less effective interventions because of limited knowledge about the best way to respond to HPAI. Increasing the knowledge base through directed research efforts will help mitigate this risk.
- **Absorptive capacity is limited**. Some investments, particularly in equipment, risk not being fully used because of limited numbers of staff and skills, and inadequate space in facilities, hence the importance of carefully planning supporting technical assistance, training and capacity building activities.
- **The response does not give sufficient attention to implementation mechanisms in the provinces, districts and communes**. Human resource shortages, inadequate skills, competing incentives, and decentralization make implementation in the provinces, districts, and communes a challenge. Implementation procedures and funding mechanisms will explicitly address the link between the required centralized decision-making and the local-level implementation.
- **The influenza pandemic may start outside of Vietnam**, which highlights the need to address border control issues and strengthen collaboration among countries in the region and internationally.
- **Certain activities may not be sustainable unless long-term financing is addressed**. Sophisticated techniques for laboratory diagnosis of influenza are expensive: these costs are currently incurred by ODA. Plans for ongoing financing, including for recurrent costs are required.
- **Social and environmental externalities may occur** if planning and regulatory processes do not keep pace with economic development in the livestock sector. The OPI includes proposals for impact assessment, pilots and review of regulations.

G. ESTIMATED BUDGET

40. During the Joint Assessment Mission the total cost of the OPI was estimated at about US$250 million for the period 2006-2010. The breakdown by component is: Part I - US$31.2 million for the enhanced coordination activities (12 percent); Part II - US$116.4 million for HPAI Control and Eradication activities in the Agricultural Sector to be implemented by MARD (47 percent); and Part III - US$102.4 million for Influenza Prevention and Pandemic Preparedness in the Health Sector to be implemented by MOH (41 percent). This amount includes US$13.5 million for price contingencies and US$27 million for physical contingencies.

41. This amount corresponds to public sector and ODA financial requirements in support to the OPI, and does not include private sector finance of poultry industry restructuring, estimated at an additional US$225 million, which is in line with the "Commercialization Strategy" proposed by DLP of MARD. Similarly, the amount does not include a range of activities relevant to influenza preparedness and response in the health sector, totaling approximately US$222 million, but ranked as second level priority by the MOH.

A. BACKGROUND

1. CURRENT STATUS OF HPAI IN VIETNAM

1. The first trimester of 2006 has seen a marked improvement in the HPAI situation in Vietnam, with no officially confirmed poultry outbreaks since December 2005 and no new confirmed human cases since November 2005. This reduction in HPAI cases in both birds and humans has been an important achievement, particularly since the outbreak-free period included the high-risk period of Tet, when a large proportion of Vietnam's population travel to their home villages. In contrast, the 2004 Tet period saw a peak in poultry outbreaks. Significantly, this recent outbreak-free period has also coincided with the northern hemisphere's influenza season, the highest-risk period for human influenza infections.

2. However, HPAI continues to be a major concern for Vietnam. Since the beginning of the current wave of poultry outbreaks in late 2003, Vietnam has seen widespread outbreaks across the country and reported the most human cases of HPAI infection of any infected country. Despite recent improvements in the situation, there are legitimate concerns that the HPAI virus continues to circulate among birds in Vietnam. Illegal movement of potentially infected chickens across borders is a continuing issue.

3. Vietnam was among the first countries to report poultry outbreaks of HPAI in the current panzootic. After the first confirmed cases in December 2003, the disease was detected throughout much of the country. At its peak, the epidemic affected 24 percent of communes and 60 percent of towns. By March 2004, about 17 percent of the poultry population had died or been culled, amounting to about 45 million birds. Following this severe initial wave, there were two less severe outbreaks in late-2004/early-2005 and again from about August 2005. A national poultry vaccination program was undertaken from October 2005 to January 2006 in all 64 provinces, covering 170 million chickens and 79 million ducks.

4. Vietnam has reported the highest number of human HPAI infections in any country by a substantial margin. From December 2003, when the first human case was detected, there have been 93 confirmed cases. With 42 deaths, this gives a very high case fatality rate (45%). The majority of those infected have had direct or indirect exposure to infected poultry with no evidence of human-to-human transmission. Reported cases, including fatalities, have been highest in the winter season (January-April). Since December 2003, Vietnam has experienced three epidemic waves of human HPAI infection. Although cases have occurred across 32 provinces and municipalities, they have tended to focus around the Red River Delta provinces in the north and the Mekong Delta Region in the south, corresponding to the distribution of poultry outbreaks.

5. Although Vietnam has been outbreak-free in recent months, it is unlikely to be virus free. Virus is almost certainly circulating in avian species such as waterfowl and quail, in which low pathogenicity makes it difficult to detect. HPAI may also be entering Vietnam from outside. Current market price differentials are driving a large illegal movement of chickens from southern

China to Vietnam, where the selling price may be substantially higher. Indeed, recent research has confirmed viral strains in Vietnam, which closely resemble those circulating in China. Migratory waterfowl populations pose an additional concern, as they may re-transport HPAI into Vietnam or continue to promote its spread throughout the country.

6. Overall, the relatively high number of human cases and widespread HPAI virus infections in bird populations have made HPAI in Vietnam a focus of national and international concern. Given the proximity between domestic fowl and humans in rural households, Vietnam could become the origin of a mutated, highly pathogenic human influenza virus which causes a human pandemic. The recent spread of HPAI in birds throughout Asia and Europe also raises the possibility that a human influenza pandemic could enter Vietnam from outside. These possibilities have led the Vietnamese government to draw on international support to develop and launch plans to control HPAI infection in domestic poultry, to respond to human HPAI cases, and to prepare for a possible human influenza pandemic.

2. ECONOMIC IMPACT

7. The AI epidemic has resulted in significant social and economic costs, particularly among Vietnam's millions of farm households with small numbers of poultry. A total of about 51 million birds were killed between December 2003 to December 2005. It is estimated that the direct economic impact of the AI epidemic amounted to about 0.5 percent of GDP in 2004. Around 8 million of Vietnam's 11 million households were estimated to be engaged in poultry production prior to 2003. The impacts, however, are unevenly distributed as income from poultry and eggs is more important among the poorest part of the population. The economic costs of avian influenza in Vietnam are not only evident for commercial and rural poultry owners, but also for the poultry service trade.

8. A human pandemic would have devastating economic and social consequences, including large-scale loss of livelihoods as well as lives. Vietnam, like other countries affected countries, confronts choices in balancing preparation versus action since both imply economic costs. At least three impacts should be considered under a human pandemic scenario: (a) effects of sickness and mortality on potential output; (b) private preventive responses to an epidemic; and (c) public sector responses.

3. NATIONAL PLANNING AND RESPONSE TO DATE

9. Vietnam completed its *Integrated National Plan for Avian Influenza Control and Human Pandemic Influenza Preparedness and Response 2006-2008* in January 2006. This plan brought planning in the animal and human health sectors together around a common objective and laid out costed interventions to improve national planning and policy, animal and human health surveillance, virus eradication in poultry, and rapid containment and curative care capacity in human health. Although the Plan had a three-year focus, it also set out the key areas to be addressed under a medium-term agenda.

10. These interventions built upon Vietnam's *National Preparedness Plan in Response to Avian Influenza Epidemic H5N1 and Human Influenza Pandemic,* approved by the Prime

Minister in November 2005. The *National Preparedness Plan* describes the hallmarks of Vietnam's strategy to control HPAI using a multi-sectoral approach, which allocates responsibilities to twelve Ministries in addition to MARD and MOH, gives a key coordinating role to the People's Committees at the provincial and lower levels, and includes civil society organizations. This Plan also addresses responsibilities and actions for central and provincial authorities under three different human epidemic phases and scenarios.

11. **Animal Health Planning.** An *Emergency Disease Contingency Plan for Control of Highly Pathogenic Avian Influenza in Vietnam* was approved by the Ministry of Agriculture and Rural Development on December 5, 2005 (Decision No. 3400 QD/BNN-TY). It constitutes the basis for the National Veterinary Services to develop their own strategy to control HPAI. This plan includes: (a) the establishment of HPAI disease control centers; (b) a series of technical guidelines to respond to and control HPAI; (c) guidelines to destroy and dispose of affected poultry; and (d) guidelines to disinfect premises and to improve disease control activities for poultry traders, transporters, processors, and small-scale poultry farms.

12. **Human Health Planning.** A *National Plan of Action on Human Influenza Pandemic Prevention and Control in Vietnam* was approved by MOH in November 2005. This plan addresses the core areas specific to the health sector's response to HPAI and a possible influenza pandemic under different phases of an epidemic. The strategy focuses on strengthening surveillance and early warning systems, risk communication for the public and health care workers, planning for social distancing measures, and preparing the curative care system for a possible influenza pandemic. A guiding principle of the Plan was that HPAI preparedness should also strengthen the health system's capacity to respond to other zoonoses and emerging infectious diseases.

4. POLICY FRAMEWORK AND GOVERNMENT INTERVENTIONS

13. **Animal Health Policy**. Measures adopted by MARD propose aggressive control measures for Vietnam through the deployment of conventional control methods of culling and bio-security, and movement control combined with strategic vaccination of domestic poultry and ducks. Other measures include raising public awareness, strengthening diagnostic capacity, enhancing research capability, imposing a temporary ban on the hatching of ducks, and carrying out epidemiological surveys to understand the route of transmission as well as the role of wild birds. Following the recommendation of a study on compensation and related financial support to farmers, the Government's compensation support for birds culled during the stamping-out of outbreaks has been raised from 10-15 percent of the market value of the poultry slaughtered in 2004 to 50 percent in June 2005 (VND 15,000 per bird). It is shared equally between the central and provincial contingency budgets. However, the level of compensation differs considerably from province to province, depending on the income level of the province.

14. The agriculture sector's policy framework is now moving from a short-term emergency response to a medium-term agenda. This will address two key factors driving concern about HPAI in Vietnam and the region: the trend of increasing poultry sector production without adequate bio-security measures and the limited capacity of veterinary services to detect, confirm, and respond to disease outbreaks. The agriculture sector policy framework involves a range of

departments concerned with the poultry industry and veterinary services. The policy focus will be on strengthening surveillance, epidemiology, diagnostic capacity, and coordination of veterinary service activities at all levels of the system.

15. **Human Health Policy.** The health sector is addressing two scenarios in its response to HPAI. The first is a continuation of the current pre-pandemic phase, in which there are ongoing poultry outbreaks with a risk of new human cases of HPAI, into the medium-term. These human cases are expected to be relatively few in numbers but severely ill. The second scenario is a human influenza pandemic caused by a new viral strain, probably arising from H5N1, starting either in Vietnam or from outside. Human cases here are expected to be large in number but the severity of illness in the population will range from mild to severe.

16. The policy framework to respond to the first scenario involves the activation of classic public health measures. Although this was initially a reactivation of the *ad hoc* framework used to control SARS, MOH is now aiming to integrate the response into the health system. This approach includes reinforcing the surveillance system, instituting a mechanism for early detection of and rapid response to cases, and promoting behavior change in the population to minimize risk of human infection. Policy for the curative care sector aims to reinforce the existing division of responsibilities in which central and provincial hospitals are for the sickest patients, while reinforcing capacity to identify human cases at all levels.

17. The policy framework for the second scenario is a mix of classic public health and curative care responses to a catastrophe scenario. Although the likelihood of occurrence of a pandemic and its severity, should one occur, are unknown, MOH policy is to invest now in planning and core equipment to allow a rapid response in the future. This response would include social distancing measures, such as quarantine, closure of public meeting places, and isolation of affected areas where possible. In curative care, they include organizing overflow capacity and the resources needed to treat large numbers of moderately ill influenza patients in field settings, if necessary.

5. LESSONS LEARNED

18. Relevant lessons for the design of the OPI have been drawn from the design of previous and on-going emergency response projects implemented in Vietnam since 2004. The main lessons arising from Vietnam's experience are as follows:

(a) **Speed and transparency are key factors of success**. When dealing with emergency situations early and transparent reporting are essential to contain the disease. Similarly speed in response is also a key factor. For instance, with an on-going program embedded in MARD working on small livestock production, DANIDA was able to act immediately on requests from MARD, with a response time of less than two months before support reached district and communal levels.

(b) **Preparedness is a key factor of success**. While Vietnam had a national strategy document to control avian influenza in the domestic poultry population, it was not clearly understood and shared by all relevant agencies and stakeholders and some aspects of the response have been lagging behind.

(c) **A two-pronged strategy is to be implemented**. This should include: (a) the control of avian influenza at the source in high-risk regions (through aggressive measures including culling, movement control and vaccination campaigns for poultry and ducks); and (b) simultaneously prepared short and medium-term measures to minimize the risks to humans and prepare for an eventual pandemic.

(d) **High level Government commitment is of the essence.** For implementation arrangements, it is important to have a coordination structure which is empowered with multi-sectoral responsibilities, and to have full time project coordinators to implement activities in a "crisis situation". Moreover, such level of coordination would foster effective integrated national response, including all technical ministries in charge of agriculture/animal health and human health, as well as other relevant sectors, at the national and sub-national level, in case of a human epidemic.

(e) **Donor coordination to support Government program is critical.** The donor community is characterized by many actors with different ways of operating and different agendas. At the beginning of the epidemic the lack of clear coordination mechanisms among donors made it difficult to coordinate activities. This situation has remarkably improved after the Government paid due attention to the crises and the donor community started to work more jointly.

(f) **HPAI Control Strategy and Preparedness Plans need to be linked to the broader agenda of regulatory and institutional reforms**. In particular, a revised "compensation framework" is an essential element to obtain real cooperation from affected stakeholders (farmers/producers) and to ensure the efficacy of the surveillance and diagnosis mechanisms. Other long-term reforms include the restructuring of the poultry industry and the development of food safety regulations.

(g) **Technical, scientific and operational capacity of the relevant participating agencies, and in particular National Veterinary Services, should be strengthened**. The AI crisis highlighted several weaknesses in the animal health as well as public health services systems, including: poor surveillance at the local level, weak diagnostic capacity, lack of epidemiological expertise and information system, and inadequate operating budget to bear the additional costs of physical and human cost to contain the spread of the disease.

(h) **A strong Preventive Medicine System** with improved infrastructure and reporting mechanisms from grass roots to national level, together with strong **inter-sectoral collaboration** at all level, is essential to ensuring a coordinated response to the outbreaks.

(i) **Control strategies must include awareness raising and public information campaigns**. It is extremely important to raise awareness in the public and private sectors from the initial moments. Moreover, within the public awareness raising activities, there are many government, multilateral, bilateral and non-governmental organizations developing and disseminating messages and materials. Hence, the importance of coordination of methods and messages among these organizations is critical to actually achieving behavior change and effectively using resources. In addition, baseline research to formulate effective messages needs to be emphasized more in the further development of the communications strategy

(j) **Regional collaboration is critical**. A key lesson from the SARS is the need for regional cooperation in public health responses including the exchange of information and coordination on public health activities. Attention should be given to support the integration of each country to a regional and global framework for the control of HPAI, and more broadly of all trans-boundary animal diseases and other emerging infectious diseases, to increase cost-effectiveness and ensure the harmonization of activities and responses.

(k) **Flexibility is needed in responding to the evolving epidemiological situation of HPAI at the national, regional and global level**. As the HPAI epidemic began to develop and control and prevention measures became successful, there has been a constant need for Vietnam to adjust its program with now the opportunity to focus attention on the medium- to long-term response. Moreover, regionally and internationally the virus has continued to spread, creating new risks which also need to be taken into account when adjusting the program.

B. OBJECTIVES OF THE OPI

19. **Objective.** The overarching objective of the OPI is to reduce the health risk to humans from avian influenza by controlling the disease at source in domestic poultry, by early detection and response to human cases, and by preparing for the medical consequences of a human pandemic if it occurs over the next five years.

20. **Agricultural Sector.** For the animal health sector, the overall goal is to progressively control and eradicate HPAI from poultry in Vietnam. The specific short to medium-term objectives are:

(a) To strengthen veterinary services in order to control HPAI and other potential zoonotic disease threats;

(b) To control HPAI using a cost-effective phased approach that addresses each sector; and

(c) To plan poultry sector restructuring so that it enables better control of HPAI while minimizing loss of livelihood and environmental pollution.

21. **Health Sector.** The specific objectives for the health sector's response to HPAI are:

(a) To minimize the incidence of, and mortality caused by, avian influenza;

(b) To reduce the risk of an influenza pandemic occurring; and

(c) To take steps to reduce the impact of a possible influenza pandemic.

22. The principle underlying the health sector's response is to link activities targeting HPAI to a broader agenda of strengthening the capacity of the sector to detect, control, and respond to emerging infectious diseases, especially zoonoses.

C. INSTITUTIONAL AND FINANCIAL FRAMEWORK

1. COORDINATION

National and Provincial Coordination

23. Vietnam has set up coordination mechanisms at the central level, which are also replicated at the province, and in many cases, at the district level.

24. **At the central level**, inter-ministerial coordination has been functioning through the *National Steering Committee for Avian Influenza Disease Control and Prevention* (NSCAI). The NSCAI was established in January 2004 (Decision No 13/2004/QD-TTg, dated 28/1/2004) as the national coordination mechanism for HPAI planning and supervision. The NSCAI is chaired by the Minister of MARD, with the Vice Ministers of MARD and MOH as vice chairs. The official members are the Ministry of Finance, Ministry of Trade, Ministry of Police, Ministry of Transport, Ministry of Natural Resources and Environment, Ministry of Culture and Information, and the Ministry of Foreign Affairs. The Department of Animal Health (DAH) in MARD and the Department of Preventive Medicine (DPM) in MOH are also formal members. Although the (DAH) is supporting the NSCAI with secretariat functions, this is not part of the official Decision regarding the NSCAI.

25. This Committee meets on a weekly basis to brief the Government on the evolution of the disease situation and report on the implementation of the control measures. The Prime Minister and Deputy Prime Minister have chaired several of these meetings. The focus of the NSCAI has been on poultry, but has also addressed wider questions of coordination. In addition, as per Prime Minister's Decision No 348/2006/QD-TTg, dated 21/2/2006, the *National Steering Committee on Influenza Pandemic Prevention and Control in Human* evolved from the *National SARS Steering Committee* established in 2003. This is chaired by the Minister of Health, with participation of other concerned ministries and sectors.

26. At the provincial and in some cases the district level, Steering Committees for Avian Influenza have also been established under the People Committees. They play an important role in local coordination, but this role varies from locality to locality.

Donor Coordination

27. NSCAI has effectively been entrusted with the responsibility for government-donor coordination and has met on a regular basis with the International Community. In particular, the DAH with help of the International Cooperation Department (ICD) in MARD have played a central role in government-donor coordination in recent months, especially regarding the Joint Government-UN Program to Fight Avian Influenza, which receives funds from seven bilateral donors. The DPM in the MOH and other actors are also engaged.

28. In 2005 the EU Presidency, represented by the Royal Netherlands and United Kingdom Embassies, organized technical meetings as well as briefings for the donor community, NGOs, and representatives of the private sector with strong support from WHO and FAO.

29. The Joint Government-UN Program has supported government-donor coordination meetings since October 2005. It has also mobilized a donor coordination specialist (with an assistant) who has brought together information on all donor and international NGO assistance and has started to support the NSCAI and particularly MOH and MARD in working with several other donors.

30. However, no formal Official Development Assistance (ODA) coordination mechanism currently exists. Various bilateral relations continue among donors, international NGOs and different ministries, departments as well as People's Committees at different levels. This engagement is not fully coordinated as yet, although information flows have improved recently, with increasing information available through websites of WHO and also FAO, and the DAH and MOH. In addition, the Joint UN-Government Program website is nearly on-line and will focus on coordination and donor information.

Strengthening the Coordination Framework

31. Coordination at the national level requires strong Government leadership, specifically to ensure that the efforts by donors and international NGOs are in line with national priorities and complement instead of overlap each other. Strong leadership was provided during the emergency situation that existed until the winter of 2005-06, when due to a range of factors the outbreaks in poultry and human infections were halted. Stronger leadership and better coordination and information exchanges will be needed during the current endemic nature of HPAI, including a broadening scope of control and prevention activities, and involving a growing number of stakeholders.

32. The following sections provide additional background information and sets out a range of options to develop an institutional framework, within which the medium- to short-term measures to minimize poultry outbreaks and contain the risks of a human pandemic should take place. Four measures are proposed: (a) strengthening national coordination; (b) enhancing coordination at the provincial level; (c) strengthening ODA coordination through the establishment of a government-donor partnership for AHI; and (d) establishing thematic working groups (see Chart 1 – Proposed Coordination Framework).

(a) Strengthening national coordination

33. The NSCAI has performed very well and will play an even greater role in the successful implementation of the OPI. It will continue to meet regularly under the chairmanship of the Minister of MARD. The focus has been on the containment of the poultry outbreaks, while it has a wider role of coordination of all activities related to avian influenza.

34. The continued risks of a pandemic demand further strengthening of overall coordination and collaboration. To this end, the NSCAI would become the National Steering Committee for

Avian and Human Influenza (NSCAHI) and be the primary forum to enhance cross-sectoral pandemic preparedness and response. The Committee would enhance its membership to include other key Ministries such as the Ministry of Education and Training, the Ministry of Planning and Investment, the People's Army, as well as representatives from the Vietnam Red Cross (VNRC) and from mass organizations.

35. Sectoral responsibilities will be delegated to two sub-committees: (a) a currently existing sub-committee on Human Influenza Prevention and Response led by the MOH, and (b) a newly created sub-committee on HPAI Control and Prevention led by MARD. The role and expanded functions of the Committee and the two sub-committees would be formalized through an amendment of Decision No 13/2004/QD-TTg.

36. The two sub-committees would require active participation of DPM and the Department of Therapy (DOT) and NIHE in MOH, and DAH and the DLP in MARD. These two sub-committees would also need to share information among each other, with donors and other stakeholders, including civil society and the business community, in thematic working groups (see below).

(b) Enhancing coordination at the provincial level

37. At the provincial and district levels, coordination committees have been created. Collaboration between key stakeholders is strongly facilitated by the leadership of the People's Committees. However, at this level there is also a need for stronger coordination through the formalization of such committees, and the inclusion of all key stakeholders, such as, for example, the Vietnam Red Cross (VNRC).

(c) Strengthening ODA Coordination

38. The OPI forms the basis for mobilization and utilization of both national and ODA resources, including grants and loans during this period. To ensure effective utilization of ODA sources, ODA coordination mechanisms will be established within the context of the Hanoi Core Statement (HCS).

39. **Donor harmonization and alignment to national priorities**. The Hanoi Core Statement (HCS) was developed following the Paris Conference and endorsed at the mid-year Consultative Group Meeting in Can Tho in June 2005 "in a spirit of mutual accountability" by the Government of Vietnam (GoV) and major donors. The HCS essentially outlines five main areas of partnership commitments that should underline all government-donor partnerships in Vietnam (see Box 1).

Box 1 – The Hanoi Core Statement *(summary)*

1. Ownership

- GoV defines operational development policies

2. Alignment

- Donors align with GoV strategies and commit to use strengthened country systems
- Vietnam strengthens institutional capacity with support from donors
- Donors increasingly use government systems

3. Harmonization and simplification

- Donors implement common arrangements and simplify procedures
- Complementarity: more effective division of labor
- Incentives for collaborative behavior

4. Managing for results

- Managing resources and improving decision-making for results

5. Mutual accountability

- GoV and donors are accountable for development results

40. **Government/Donor Partnership for Animal and Human Influenza Control (PAHI)**. In order to improve ODA efficiency as well as mutual accountability, the Government and Donors would establish a *Partnership for Animal and Human Influenza Control* (PAHI), which would endorse and support the OPI as the medium-term country program developed to control HPAI in poultry and prevent the global risk of a human influenza pandemic.

41. The PAHI will be established under the leadership of the NSCAHI. It will: (a) be a forum for information sharing and exchanges with ODA partners; (b) make recommendations to the Government and donors on ODA priorities and allocations; (c) provide guidance on M&E of the overall national program, particularly the ODA-funded parts; and (d) support Vietnam to share information and experiences with other countries within the region and more widely.

42. The national membership of PAHI will include the Chair and Vice-Chairs of the NSCAHI, as well as representatives from MPI, MOFA, MOF, MOCI, the DAH, DLP and International Cooperation Department under MARD, and the DPM, DOT and International Cooperation Department of MOH's Peoples Committee representatives from about three provinces or centrally-managed municipalities will also be invited. Also included will be national social organizations, notably the VNRC, which has an extensive network in all provinces.

43. On the international side, PAHI's membership will include the supporting UN agencies: FAO, WHO, UNICEF and UNDP, and all donors providing direct or indirect assistance to the

national efforts, including the World Bank, EC, ADB, Japan, USA, Denmark, the bilateral donors to the Joint Government-UN Program and key international NGOs.

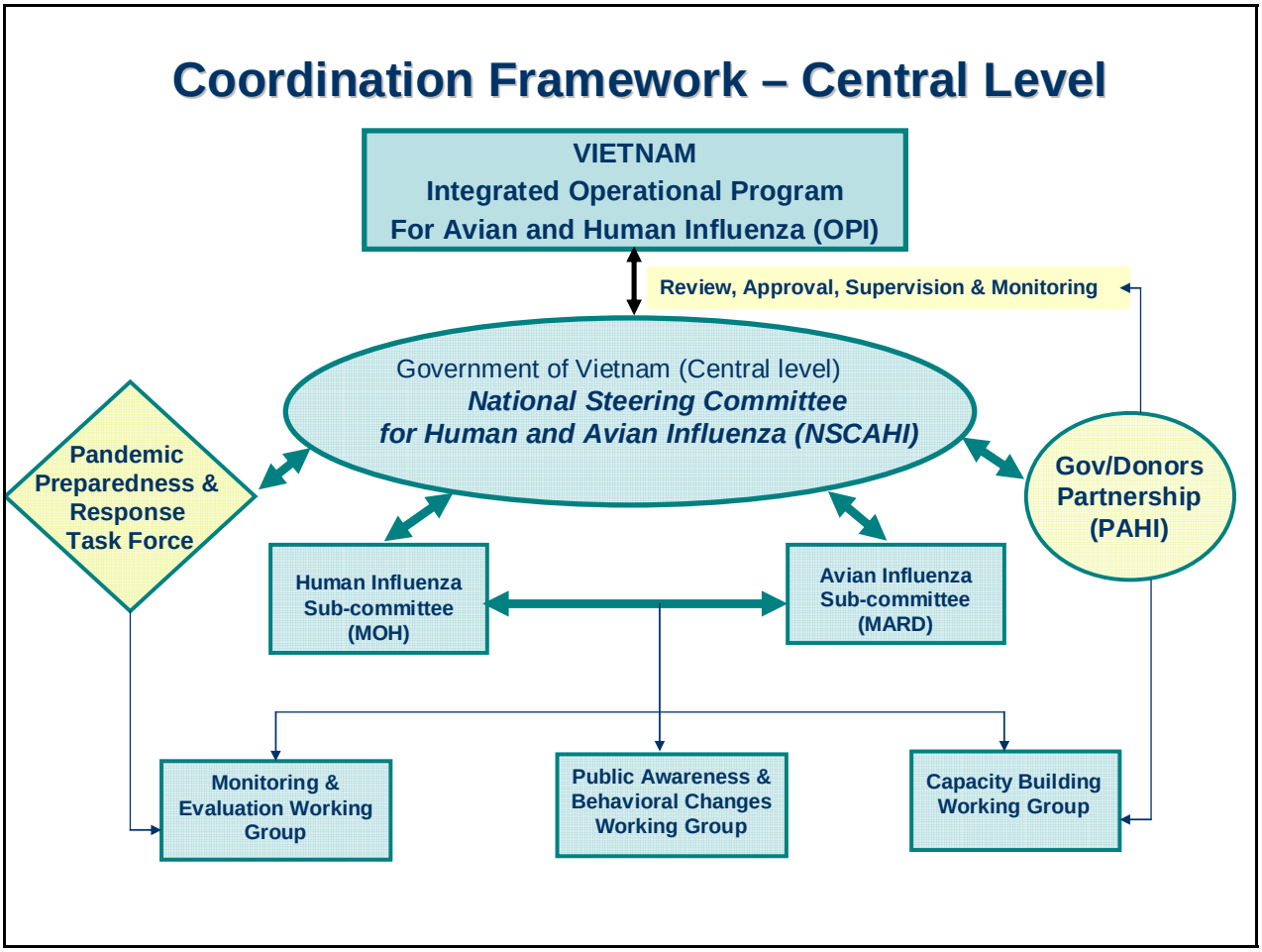
44. **Engagement with civil society and the business sector**. The PAHI would also include representatives from the scientific research community and civil society generally such as *large INGOs, Mass Organizations* notably the Vietnam Red Cross Society and representatives from the business sector, including animal feed processors, manufacturers and suppliers of laboratory equipment, drugs and vaccines.

45. PAHI will be hosted by the International Cooperation Departments (ICDs) of both MARD and MOH, who will each assign focal points; a secretariat will be established. The donor community would support the PAHI by contributing to the financing of administrative staff, some technical assistance, such as an International Coordination Advisor, as is currently the case through the Joint Government-UN Program, and an operation budget for its activities as well as for the support to the working groups (see paragraph 48).

(d) Establishing thematic working groups

46. Working groups are to be enhanced and established for a number of themes, as follows.

- **Public Awareness and Behavioral Change Working Group.** The existing working group on IEC (Information, Education and Communication) has played a key role in recent months with regards to public awareness raising and behavioral change activities. It was established under the Joint Government-UN Program and includes government staff and UN agencies. The IEC Working Group will broaden its membership and strengthen its role to develop an overall communication strategy to be implemented by individual sectors.
- **Monitoring and Evaluation Working Group.** M&E of the OPI is described in Section D. This will be guided by an equally inclusive working group of officials and donor agencies. The group will address concrete issues, aiming at ensuring the M&E that the methodologies used are appropriate and that data collection and analysis are sound. The group will share results with the NSCAHI, government and the donor community. Joint supervision as well as joint M&E activities are key elements for supporting the harmonization and aid-effectiveness agenda as promoted by the HCS.
- **Capacity Building Working Group.** This working group will ensure that detailed plans for technical assistance specified in the OPI are sound and well coordinated. The working group will also identify additional technical assistance requirements, partly based on monitoring data. Overall and specific capacity building needs must be continuously assessed. Implementation of capacity building plans is not addressed here as this is done in the sector-based activity plans.



2. FINANCIAL MANAGEMENT

Strong Donor Support

47. Because of the global public good nature of the fight against avian and human influenza in Vietnam, the response of the international community has been substantial both in terms of ODA funds and technical assistance.

48. WHO, OIE and FAO sent experts as early as January 2004 to assist the Government in containing the outbreak, and several bilateral assistance agencies, NGOs and private sector companies donated protective clothing, disinfectants and other goods and services. FAO approved regional and country-focused Technical Cooperation Programs (TCPs) to provide technical assistance with disease diagnosis and epidemiological surveillance. The World Bank was responsive in preparing an Emergency Recovery Loan for the Avian Influenza Emergency Recovery Project, approved in August 2004, which includes a co-financing grant from the Government of Japan. DANIDA, which has a long-term presence in livestock development in Vietnam, has supported MARD since March 2004 to control HPAI outbreaks. Similarly ADB, AusAID, NZAID, the European Commission, and the US, French, German and Japanese

governments have allocated funds to support either MARD or MOH. Finally, a Joint Government-United Nations Program "Strengthening the Management of Public Health Emergencies in Vietnam" was established in September 2005.

49. During the Beijing Conference, the estimated overall amount committed by the international community was approximately US$47 million, part of which has been spent over the period 2004 and 2005 (see Annex 2 of the Red Book).

Avian and Human Influenza Multi-donor Financing Framework for Vietnam

50. The recommendations made in Beijing were to: (a) establish a national level task force, including Government, bilateral donors, development banks, NGOs, private entities, specialized international agencies, and the wider United Nations System; (b) further develop integrated country programs, evolving from crisis management to longer-term response to avian and human influenza; (c) carry out joint appraisal and prioritization of this program; and (d) hold a national donor conference to endorse and support the program. The OPI is the result of the work of the Government Task Force and the Joint Assessment Mission and will be the supporting document for a Donor Conference to be organized prior to the mid-year Vietnam Consultative Group Meeting to be held in Nha Trang from June 9-10, 2006.

51. In considering possible financing frameworks, the Joint Assessment Mission, recognizing the sustained involvement of the donor community, through a wide range of financial instruments, has expressed a preference for a coordinating mechanism rather than a single new vertical fund. Accordingly, this section proposes, in line with the recommendations at the Beijing Conference[3/], the organization of an Avian and Human Influenza Multi-donor Financing Framework for Vietnam. The framework would focus on the coordination of donor funds and activities to provide support through grants, loans, credits channeled in various ways, including through a trust-fund facility at the World Bank and through a Joint Government-UN Program. In addition to the financial instruments, the framework would map technical assistance support by FAO, WHO, and OIE, as well as the potential support from regional organizations (APEC and ASEAN). To be comprehensive, the financing framework would include contributions from the private/business community and NGOs.

Description of existing and potential source of funds

52. **Government central and provincial budget**. The Government is expected to finance up to 50 percent of the total estimated cost of the OPI, equally shared between the central and provincial budgets are expected to cover a great portion of estimated costs under the OPI. So far approximately US$104 million have already been committed from the state budget for the next two years.

3/ Avian and Human Influenza: Multidonor Financing Framework The World Bank – January 12, 2006.

53. **ODA support**. There are potentially six major types of financial contributors to the HPAI program (see Chart 2 – AHI Multi-donor Financing Framework), including:

- **Direct bilateral financing and TA**. This covers grant assistance from bilateral donors (13 have contributed to the program to date). The Red Book (January 2006) lists thirteen donor countries, who committed approximately US$18 million to HPAI control in Vietnam. These included China, Korea, Denmark, the UK, New Zealand, Germany, the Netherlands, Australia, Japan, Luxembourg, France, Italy, and the USA. Funding was in the form of both in-kind (e.g. personal protective equipment, disinfectants, etc.) and cash. Funds were utilized to support procurement of equipment, upgrading of facilities and institutions, education training, public awareness and behavior change activities and technical assistance.

- **Joint Government-UN Program on HPAI**. Under the Joint Government-UN Program, FAO, WHO, UNICEF and UNDP collaborated to support the emergency aimed at: *"Strengthening the Management of Public Health Emergencies in Vietnam – with focus on the Prevention and Control of Diseases of Epidemic Potential including Highly Pathogenic Avian Influenza"*. The Minister of MARD has been the chair of the NSCAI and has been responsible for Phase I of the Joint Program. Seven donors committed funds to Phase I, amounting to about US$4.9 million in direct funding for which UNDP acts as the Administrative Agent, channeling grant funding to the ministries and the UN agencies. UNDP and other participating UN agencies provide international and national technical assistance under this program, and substantial resources have also been allocated to equipment and support to vaccination campaigns. In addition, US$2.5 million in parallel funding from 3 donors to FAO is aimed at the same outcomes. Phase 2 of this Program is currently being designed, with completion pending broad approval of this OPI, as Phase 2 is expected to support specific parts of the OPI.

- **Multi-donor Trust Fund for Avian and Human Pandemic Influenza (AHITF).** The first Avian and Human Influenza (AHI) Facility resources should be available for grants to the recipient countries by end May 2006 and can provide stand alone activity grants and project cofinancing grants in all member countries of the World Bank. The AHI Facility will be administered by the World Bank and has been created to assist developing countries in meeting financing gaps in their AHI integrated country programs to minimize the risk and socio economic impact of avian and possible human pandemic influenza. The European Commission (EC) is expected to be the largest donor. Other donors expected to contribute are Australia, China, Ireland and Russia. Vietnam is eligible to the AHITF through the "Asia window. As soon as the OPI is endorsed by the Government the World Bank task teams, in consultation with MARD, MOH, the European Commission Delegation in Hanoi and other MDTF donors present in Vietnam, would start the preparation of grant funding proposals.

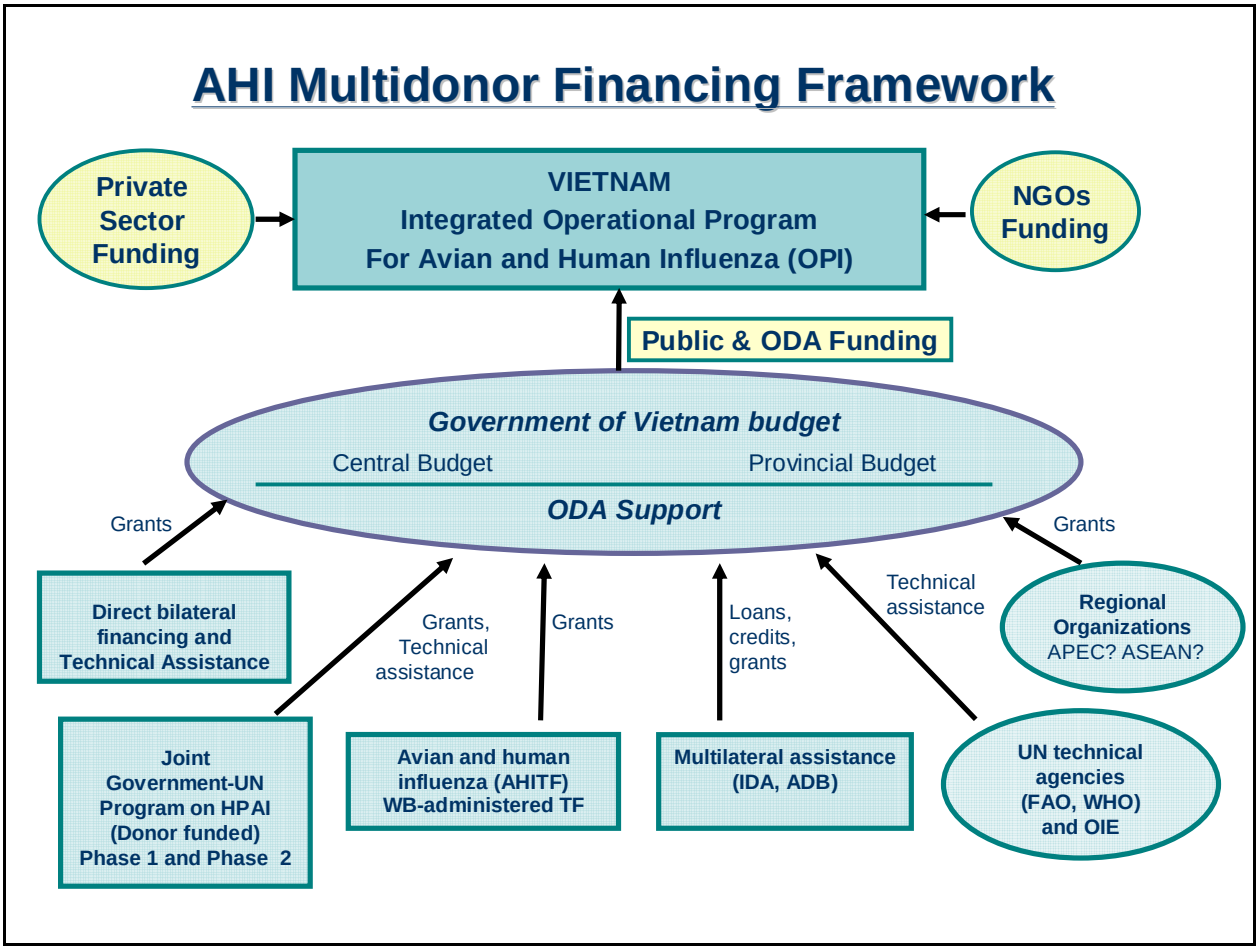
- **Multilateral assistance – World Bank and Asian Development Bank**. Both the WB and ADB have been supporting Vietnam in its fight against HPAI. The WB has an on-going Avian Influenza Emergency Recovery Project (Cr. 3969-VN) supported by an IDA Credit of US$5 million and a JSDF Grant from the Government of Japan in an amount of approximately US$1.8 million. This project which is being implemented by MARD is scheduled to close at the end of December 2006. Funds have also been reallocated to

finance US$13 million of equipment for Human Influenza response under the on-going National Health Support Project (Cr.2808-VN). At the request of the Government, the WB is envisaging to prepare a follow-up operation, which would be broader as it would include both MARD and MOH, and would be developed under the Global Program for Avian Influenza and Human Pandemic Preparedness and Response (GPAI) approved by the World Bank's Board on February 9, 2006, and which allows regions to process the following operations or activities: (a) new Avian Flu operations under IBRD/IDA terms, i.e. loans/credits/grants; (b) Avian Flu components added to ongoing operations with the support of Additional Financing; and (c) Avian Flu components added to ongoing operations through project restructuring that involve reallocation of funds to finance an Avian Flu component. ADB has recently approved the following health projects with avian influenza related activities: the Greater Mekong Communicable Disease Control Project, with approximately US$8.4 million for surveillance in Vietnam; and the Preventive Health System Support Project, with approximately US$9.7 million for surveillance and system management. In addition the Prevention and Control of Avian Influenza in Asia and the Pacific grant project was approved by ADB in March 2006, but the specific expenditure for Vietnam has not been determined yet.

- **Regional organizations – ASEAN, APEC**. There is potential funding available from both APEC and ASEAN countries. **[…MOH/MARD to specify the potential support from ASEAN and APEC ……]**

- **UN technical agencies (FAO and WHO) and OIE**. Technical assistance support is provided on a country basis through the Joint Government-United Nations program for Vietnam and on a regional basis through global programs[4] presented at the Beijing International Conference in January 2006. FAO and OIE have responsibilities at the global, regional and national levels to respond to the HPAI epidemic with effective collaboration, coordination, communication, provision of technical advice, and assistance with identifying and mobilizing resources to combat the disease. The focal point of the FAO response is the Emergency Center for Transboundary Animal Diseases (ECTAD). The response to the threat of Human Influenza Pandemic follows the WHO/FAO/OIE Global Strategy. **[…FAO/OIE/WHO specify the specific regional support provided to Vietnam ……]**

4/ *Avian Influenza Control and Eradication – FAO's proposal for a Global Programme. Beijing, [Date of the Final Version]*


AHI Multidonor Financing Framework
Private Sector Funding
VIETNAM
Integrated Operational Program
For Avian and Human Influenza (OPI)
NGOs Funding
Public & ODA Funding
Government of Vietnam budget
Central Budget
Provincial Budget
ODA Support
Grants
Grants
Direct bilateral financing and Technical Assistance
Grants, Technical assistance
Grants
Loans, credits, grants
Technical assistance
Regional Organizations APEC? ASEAN?
Joint Government-UN Program on HPAI (Donor funded) Phase 1 and Phase 2
Avian and human influenza (AHITF) WB-administered TF
Multilateral assistance (IDA, ADB)
UN technical agencies (FAO, WHO) and OIE

D. DESCRIPTION OF THE OPI

Part I – Enhanced Coordination Activities

1. NATIONAL PREPAREDNESS

54. Preparedness at the national level is a central feature of the OPI. The multi-sectoral nature of the response to HPAI and the possible need for emergency action make it essential to have a well coordinated plan. Further, the need to work with neighboring countries and to bring the public and private sectors together reinforces the importance of national-level planning. This planning aims to ensure coordination of the agriculture, health, and other involved ministries (such as education and police) at all levels of administration around the set of common objectives laid out in the OPI.

55. The following activities will be addressed under the OPI:

- **Revision of the National Plan.** The National Plans for animal health and human health will be updated on an annual basis to reflect changes in the HPAI situation and improvements in knowledge and technology. The review of the plans will address the developing policy agenda as well as reviewing actions and responsibilities under the current scenario and an influenza pandemic scenario for all ministries, including laying out financing sources and mechanisms. Resource stockpiles, such as vaccines for poultry and medical equipment stockpiles, will also be ensured under this plan.
- **Operational planning.** Operational plans for ministries and local authorities have been developed but need to be revised to be consistent with the responsibilities set out in the national plan. In particular, operational plans need to address linkages with sector other than agriculture and human health to reflect OPI coordination and management arrangements. In the agriculture sector, the action plan will be updated annually and available in all provincial animal health offices. In the health sector, MOH's action plan will be updated annually and disseminated in an annual conference. Stockpiles of anti-viral drugs, antibiotics, and personal protective equipment will be established according to the action plan's guidelines.
- **Coordinated simulation exercises.** Simulation exercises of disease outbreaks in humans will be undertaken to address coordination and operation between all involved groups. Simulations will include multi-province outbreaks. Coordinated simulations will be linked to revisions of the operational plans.

56. The OPI will support these activities by financing national and international technical assistance, workshops, materials, printing, and incremental operating costs.

2. POLICY AND STRATEGY DEVELOPMENT

57. Since HPAI has persisted in the poultry population, the national strategy needs to focus on a sustained response to animal and human cases. In the animal population this response has taken the form of wide-scale operations to suppress outbreaks. As the disease has come under control, the strategy is moving towards a risk-based approach with activities in different areas defined by their epidemiological status. For health, the strategy is focusing more on a medium-term agenda of integrating HPAI preparedness activities into the control framework for a range of communicable diseases. This approach builds on the public goods features of communicable disease control, which provide the rationale for strengthening surveillance and response systems and ensuring government capacity to respond to pandemics.

58. The OPI will support studies to further develop these approaches into policy and will ensure the necessary revision of the legal and regulatory frameworks and other policy instruments. In agriculture this will include review of the animal health regulations necessary for outbreak control, in particular for financing of response activities. For poultry industry restructuring there is a need to develop appropriate regulation to prevent environmental pollution and ensure equity. In health, this will include revising the national legislation to support infectious disease control and informing health care workers of their new responsibilities. In addition, the OPI will support analytical work looking at the impact of decentralization on the center's ability to ensure that provinces and local authorities respond to HPAI and other communicable diseases as a national priority. Finally, the legislative framework will be reviewed to ensure that the national and operational plans for other sectors, such as education and police, can be implemented.

3. PROGRAM COORDINATION

59. **Support to Central and Provincial Coordination**. The OPI will provide financial and technical support to the NSCAHI and its subordinated committees at the provincial level. Most of this support would be provided through the PAHI.

60. **Support to Donor Coordination**. The OPI will provide financial and technical support for Coordination through PAHI. PAHI will be largely donor-funded along with in-kind Government funding, notably of staff time and facilities in the two ICDs. Costs will include financing of administrative staff, some technical assistance, such as an International Coordination Advisor, as is currently the case through the Joint Government-UN Program, basic equipment; expenditure for meetings (including travel of national participants); some advisory services, especially focused on the working groups (see below); translation services; and printing of publications and materials.

61. **Support to Working Groups**. The OPI will provide financial and technical support to the three proposed working groups, although the participants will not be remunerated.

- **IEC Working Group**. Established in October 2005 under the Joint Government-United Nations Program, the IEC Working Group[5/] is the only working group operational to date.
- **Monitoring and Evaluation Working Groups**. The OPI will also support the establishment and functioning of a working group responsible for supporting the all monitoring and evaluation of the OPI (see Section 5 below).
- **Capacity Building and Monitoring and Evaluation Working Groups**. The OPI will also support the establishment and functioning of two additional working groups: The First one will deal with Capacity Building and will support the development of capacity building plans, focusing mainly on medium-to-long term human resources development activities; and the second one will be responsible for supporting the monitoring and evaluation of the OPI (see Section 5 below).

4. PUBLIC AWARENESS AND BEHAVIORAL CHANGE

62. Raising public awareness in order to implement effective behavior change strategies is a vital component of Highly Pathogenic Avian Influenza (HPAI) control. In Vietnam, many government and non-government organizations have been involved in HPAI public awareness and behavior change communication since the first HPAI outbreaks began in late 2003. Although some degree of collaboration exists, there is not yet a formal coordinating and communication mechanism across Ministries or among implementing agencies. This has led to some overlapping and waste of resources; confusion among the audience as they have received inconsistent messages; unnecessary competition for audience's time and attention; and the potential for low impact as result of technically incorrect information. In addition, monitoring and evaluation of the activities and behavioral surveillance need to be improved and the capacity of the Government agencies and mass media needs to be further strengthened.

63. The IEC Working Group began to develop a public awareness and behavior change strategy and successfully coordinate activities. It is proposed that the IEC Working Group broaden its membership and strengthen its role to coordinate all the public awareness and behavior change activities under this Operational Work Program. The Working Group will also be responsible for overarching activities, such as development of an overall communication strategy ("one campaign-many sectors"), core messages, a research framework, implementation plans, a cross-cutting monitoring and evaluation strategy, and capacity building for various Government sectors. However, leadership for the actual implementation of the campaign activities will rest with respective sectors (see part II and III).

5. PROGRAM MONITORING AND EVALUATION

64. **Purpose.** Program monitoring and evaluation (M&E) activities will measure the key input, output and outcome indicators identified in the results framework (see Annex 1). This will

5/ The IEC Working Group include members from various key Government Agencies and UN organisations (MARD, MOH, MOCI, FAO, WHO, and UNDP) under UNICEF's leadership and technical assistance.

provide the information necessary to assess overall implementation progress and impact on a regular basis. This process will alert decision makers in government to actual or potential problems in implementation so that adjustments can be made, help determine whether the relevant stakeholders are responding as expected and intended, and provide a process whereby the coordinating and executing agencies can further improve the effectiveness of their activities. In addition, the M&E process will help inform all stakeholders and participants, within civil society and in the international donor community, of the status and effectiveness of Program implementation, in compliance with the recommendations of the Hanoi Core Statement.

65. **Responsibilities.** The relevant implementing agencies will be responsible for M&E for the Program activities they undertake. Most importantly, MARD and MOH will each be responsible for M&E of Parts II and III respectively of the Program. Other government agencies, including the Ministries of Trade, Transportation, Environment, and others, will be responsible for M&E of their respective activities of the Program. M&E activities would be carried out by the regular staff of the agencies, with technical assistance in some cases, and by contracting out these functions with specialized agencies and institutes when appropriate. MARD and MOH's M&E reports would be made available to all participants and stakeholders, and all M&E reports from these ministries and other units would be provided to the National Steering Committee. The M&E Working Group will then assemble these many reports into an overall Program M&E Report to be discussed on a regular basis with the members of the NSCAHI and PAHI.

66. **Reporting.** Monitoring project progress and the achievement of objectives will entail a continuous and systematic process for reviewing the various Program implementation activities. The results of relevant M&E activities will be reflected in the quarterly and annual progress reports. The progress reports will cover the progress with the works, institutional activities, training and studies, performance indicators, and financial management. A section of the progress reports will be devoted to issues identified during Program implementation and the strategies and actions to be taken to resolve such issues that affect progress. The fourth quarterly report of each year will be an annual report, providing information of the progress during the past year. A comprehensive Mid-Term Progress Report will be prepared approximately half-way during the implementation period. This report would support the Mid-Term Review exercise to be carried out by government with the participation of all stakeholders including civil society and the international donor community.

6. SUPPORT FOR REGIONAL ACTIVITIES

67. Improved regional coordination and collaboration is critical to ensure the success of the global response to HPAI. Financial resources have been allocated to strengthen collaboration with regional bodies (such as ASEAN and APEC) and technical organizations (FAO, OIE, WHO) and to attend regional and international conferences. In particular, Vietnam will join the WHO Global Surveillance Program for Influenza and will cooperate in international, epidemiology and virology studies. FAO and WHO will also provide back-up technical support through respectively the regional ECTAD office in Bangkok and the Western Pacific Regional Office in Manilla.

Part II – HPAI Control and Eradication in the Agricultural Sector

68. Activities to be funded under Part II of the OPI will support the implementation of the HPAI Control and Eradication Strategy and include: (a) Strengthening of veterinary services; (b) Disease control; (c) Surveillance and epidemiological investigation; (d) Restructuring of the poultry industry; and (e) Public awareness and behavioral change. These activities are presented in a detailed action plan in Annex 2.

1. HPAI CONTROL AND ERADICATION STRATEGY

69. HPAI in the poultry population will be progressively controlled in three phases:

- ***Control phase***, in which the incidence of outbreaks is reduced by stamping out of outbreaks, mass vaccination and commencement of improvements in bio-security of poultry production and changes to marketing practices;
- ***Consolidation phase,*** in which gains are maintained, further restructuring of the industry is undertaken, farms in the industrial sector demonstrate freedom from HPAI, and disease free compartments are expanded; and
- ***Eradication phase,*** in which freedom from disease is achieved on a national or sectoral basis. This phase falls outside the current planning horizon, beyond 2010.

70. It is expected that the control phase will continue until 2007, with some reduction in the national mass vaccination occurring in 2006. The consolidation phase will occupy the remainder of this planning horizon (to 2010).

71. All control measures will be implemented in a way that causes the least economic and social impact on the rural poor and minimizes environmental impacts. The impact of the proposed control measures should be assessed before implementation. Specific control programs will be designed for each production sector, all of which have different requirements and will move at different speeds towards freedom from infection.

72. Vaccination will remain a key component of the control program wherever the risk of infection remains high and application of vaccination will continue to be risk-based. Other elements of control are early identification of infection and disease outbreaks, continuing surveillance and epidemiological analysis, enhancements in bio-security and industry restructuring (including changes in marketing and transport practices), movement controls and enhanced farm and equipment hygiene. Stamping out will be limited to infected farms with ring vaccination to include poultry in direct contact. All these measures will require the enhancement of current veterinary resources, from the community level to the central level to undertake appropriate surveillance and to mount effective investigations and disease control. Formal links with community-based animal health workers will be required to ensure success.

73. Poultry farms in the industrial sector (Sectors 1 and 2) will need to meet clearly defined rigorous bio-security standards. Farms not meeting requirements should be denied access to key

market chains, which increasingly will involve processing of poultry through purpose-built slaughterhouses rather than live bird markets, especially in major urban areas. This will require renovation and relocation of some farms and the construction of additional slaughterhouses. Integrated industrial farms and associated facilities will eventually form disease free compartments. Small non-bio-secure chicken farms in the semi-industrialized sector (Sector 3) should be encouraged to upgrade to the industrial sector. Farms that cannot upgrade to this level (such as those rearing native chickens on an extensive basis) will be required to meet bio-security standards appropriate to the production systems, but restrictions on market access should be considered. Studies will be undertaken to determine how native chickens, which occupy an important niche in the market, can be produced in a way that prevents spread of avian influenza.

74. Remaining populations of grazing ducks (Sectors 3 and 4) should be subject to compulsory vaccination, movement restrictions and minimization of contact with other poultry. Socio-economic, ecological and virological studies will be conducted on this sector to assist in determining its long-term future. Where appropriate, upgrading to industrial production will be encouraged.

75. Village households will continue to rear scavenging chickens (production Sector 4) as a vital source of income and protein throughout and beyond the OPI planning horizon. Plans are needed for the long-term protection of this sector given that mass vaccination of this sector is unlikely to be sustainable. These poultry should not enter the formal market chain but may be sold and consumed locally. Some protection of this sector will be afforded by effective control of infection in the commercial sectors.

76. This phased control program will require, on the basis of progress with disease control and information coming from epidemiological investigations, that the strategy is reviewed and modified to increase efficiency and effectiveness of control measures.

2. STRENGTHENING OF VETERINARY SERVICES

77. Veterinary capacity will remain a key constraint to progressive disease control unless further significant investment is made in infrastructure, manpower and training. The following activities will be undertaken under the OPI to overcome this problem: (a) the capacity and capability of the veterinary laboratory network will be expanded to improve the speed and reliability of testing and increase the range of diagnostic tests that can be applied; (b) epidemiological expertise will be upgraded through training; (c) improved disease reporting and data analysis capacity will be introduced; and (d) DAH management capacity will be enhanced.

3. DISEASE CONTROL

78. Disease control will be achieved through a combination of measures, including rapid identification and response to disease outbreaks, risk-based vaccination, enhanced management and control of poultry movements, and development of disease free compartments. Investigations into alternative vaccines, quality of vaccines and vaccination strategies will be undertaken to support the vaccination program.

79. The OPI will support the implementation and enhancement of these measures through the following activities: (a) improve capability to investigate a reported case of diseases in order to identify outbreaks rapidly and effectively; (b) improve rapid response to outbreaks to limit spread of infection from new foci; (c) progressively move towards targeted, risk-based vaccination, with variation between geographic areas and production sectors of different risk to reduce the costs of disease control; (d) improve control of movement of poultry and contaminated materials from infected places to limit the impact of outbreaks; (e) promote research into improved vaccines and vaccine administration methodologies increases flock protection; and (f) investigate mechanisms for compartmentalization to increase numbers of certified disease-free poultry facilities, and eventually contribute to developing export markets.

4. SURVEILLANCE AND EPIDEMIOLOGICAL INVESTIGATION

80. Well executed surveillance programs and epidemiological investigations are required to assess the effectiveness of control programs and to provide the information needed to modify approaches to control. Specific studies would assess the environmental social and economic costs and benefits of grazing ducks and ways to ensure native chickens can be sold without spreading HPAI. The specific programs would include the following: (a) Cost effective surveillance which will be focused on markets and slaughterhouses to improve knowledge of virus circulation and of vaccination coverage in a cost effective manner. At the same time Sector 1 and 2 farms will ensure that disease free status is maintained in these sectors; (b) Mapping of temporal and spatial distributions of activity ranges for wild and migrating bird species to support risk-assessment of HPAI spread within and into Vietnam; and (c) Studies on grazing ducks and native chickens.

5. RESTRUCTURING OF POULTRY INDUSTRY

81. This proposal covers activities for restructuring of the poultry sector as it applies to HPAI control and as part of the strategy for long-term control of HPAI defined by DAH. In line with Vietnam's strategy for Agriculture and Rural Development 2001-2010, MARD has a long-term aim to industrialize poultry farming, slaughter and processing. The majority of restructuring activities, and certainly the bulk of investment, should fall within the consolidation phase.

82. While pursuing a goal of modernization, it will be essential to take into account the importance of poultry production to small scale producers and the poor, since an estimated 65 percent of households in Vietnam keep poultry and growing domestic demand for poultry has led to considerable diversification into small scale pigs and poultry. Diversity in income generation is important for poor households, and Vietnam has signed up to the Millennium Development Goals, with a strong emphasis on poverty reduction. It can also be expected that there will continue to be a demand for traditional poultry, from backyard production systems, for some years to come.

83. While industrialization might reduce some problems facing the sector today, it will also exacerbate some challenges that are not so predominant in the sector with its present structure. When poultry systems intensify, they provide increased capacity to detect and control disease

outbreaks, but can also create externalities in the form of animal health problems and environmental pollution that are exaggerated by intensive rearing.

84. With a rapidly modernizing livestock industry, the role of the government in regulating externalities becomes increasingly important. At the same time, its role in financing construction of facilities is reduced as the private sector takes over. MARD proposes that state in ownership of livestock farms and slaughter facilities should be phased out, possibly by 2015.

85. The Government of Vietnam will be attempting to meet four objectives simultaneously:

- to control avian influenza in a sustainable manner;
- to modernize the livestock sector;
- to reduce poverty and preserve livelihoods; and
- to anticipate and prevent environmental pollution from livestock.

86. The outcomes and activities described here would be implemented under a risk-based approach, compatible with that being applied for disease control. Poultry production in large cities (such as Ho Chi Minh City and Hanoi) should be discouraged and eventually prohibited. Slaughterhouses should be located away from residential areas so as to minimize public health risks and environmental nuisance. Marketing of poultry will be regulated, and it expected that industrialization would lead to increased sales of processed product, especially in urban areas. When implementing this plan, it will be necessary to take into account the risk of loss of income to Sector 3 producers, small traders and market stall operators. Sector 4 will be more difficult to regulate in the short term, but in the longer term is likely to erode naturally as producers find that they are less competitive.

87. In areas with lower HPAI risk and more land, further from cities, but with access to transport infrastructure, new or upgraded production, slaughter and processing facilities could be encouraged. The challenge is to regulate this activity so that it does not cause unreasonable loss of livelihood to existing producers, through competition from intensive systems, and to build plans for minimizing environmental pollution into the design of new initiatives.

88. In more remote areas, the risks of spread of HPAI in poultry are moderate, and people are highly dependent on small scale poultry production within their livelihoods portfolio. Poultry sector industrialization would be less important for HPAI control, although there is still a need to improve bio-security in production and regulation of poultry marketing.

89. The OPI will support DLP to plan and advice on poultry sector restructuring that is socially and environmentally as well as economically viable. While the focus of the proposals relates to restructuring in the context of HPAI control, they would also contribute to the development of a longer term restructuring process. The activities proposed for donor support include: (a) plan, appraise and pilot poultry development schemes that meet economic, social and environmental criteria; (b) support for alternative livelihoods, mainly through trainings and rural development support for farmers moving out of poultry in six regions; and (c) capacity building in DLP, including training, study tours and purchase of equipment. In addition; the private

sector is expected to finance with government subsidy for provision of credit, civil works construction and upgrading, including breeding farms, bio-secure production facilities and slaughterhouses.

6. PUBLIC AWARENESS AND BEHAVIORAL CHANGE

90. While it is crucial that each sector involved in public awareness and behavior change for avian and pandemic influenza work under an overall strategy and broader framework steered by the IEC Working Group, the actual implementation of campaign activities will be done sectorally with a core set of common objectives (the idea of "One Campaign-Many Sectors"). Specifically, the agricultural sector will take the lead on promoting behaviors associated with: (a) timely reporting of animal diseases; (b) improved bio-security in poultry farming; and (c) safer poultry handling practices in slaughtering, transport and marketing. The agriculture sector will also contribute to the efforts to communicate human health risks (particularly to farmers and their families) under health sector guidance. Within MARD, the National Agriculture Extension Centre (NAEC) is responsible for training agricultural extension agents, who are located at provincial, district and commune levels. NAEC is also involved in public awareness campaigns on AI and produces information materials in collaboration with DAH and DLP.

91. The primary target audiences of the agricultural sector include backyard poultry farmers (Sector 4), semi-commercial poultry farmers (Sector 3), semi-industrial poultry farmers (Sector 2), traders, and marketers who are reached through different channels such as animal health workers, agricultural extension agents, mass organizations, and the school network. Specific strategies will be developed to reach these audiences based on a sound situational and audience analysis. This will also help guide the development of specific messages, revision of existing materials and development of new materials including TV spots, radio spots, leaflets, booklets, and posters. These materials will be cleared by the IEC Working Group before mass reproduction or airing to ensure the appropriateness for the intended audiences and the consistency across different implementing agencies. In addition, these materials will be made available at local levels for further reproduction.

Part III – Influenza Prevention and Pandemic Preparedness in the Health Sector

1. STRENGTHENING SURVEILLANCE AND RESPONSE

92. The Preventive Medicine System in Vietnam, under the direction of the Vietnam Administration of Preventive Medicine of the Ministry of Health has played a critical role in the current outbreak of HPAI and in activities associated with planning for an Influenza Pandemic. The OPI aims to build upon its current strengths by expanding capacity in the following key areas

- Improving surveillance for infectious disease threats;
- The development of an 'Early Warning and Response System';

- Facilitating rapid investigation and containment activities through the development of Rapid Response Teams;
- Building skills and human resources through the establishment of a Field Epidemiology Training Program;
- Revision of the current legislation relating to infectious disease control; and
- Strengthening control of infectious disease threats at International borders

93. **Improving surveillance for infectious disease threats.** The Vietnam Administration of Preventive Medicine is responsible for operating a surveillance system for 24 communicable diseases. A preliminary analysis suggests that this system does not work optimally in detecting outbreaks, reporting is sometimes incomplete and that information obtained is not well disseminated. An extensive evaluation of the surveillance system is proposed, which is expected to result in specific recommendations for improvement.

94. **The development of an "Early Warning and Response System" (EWARS).** As described previously, the onset of an influenza pandemic in Vietnam *may* be signaled by the appearance of a rapidly expanding cluster of severe respiratory illness in humans, and it is currently believed that immediate intervention may succeed in mitigating its impact. In order to facilitate detection of such an event, it is proposed that Vietnam modifies a system of mandatory weekly reporting for priority infections to include clusters of Severe Acute Respiratory Infections (SARI), which would then be immediately notified to health authorities. An effective EWARS needs to be highly sensitive, based in both community and clinical settings and would critically rely on well maintained and reliable communication systems, so that immediate responses can be mounted (risk assessment, verification, investigation, laboratory confirmation and containment). Although some of the objectives and infrastructure requirements of EWARS are different from the existing surveillance system, it is important that implementation should occur in a manner that strengthens and expands existing mechanisms.

95. A new National Electronic Surveillance Network will be established as the technical infrastructure of the new system so that computers with modems and uninterruptible power supplies (UPS) will form the backbone of both the 'routine' surveillance system and also the newly established EWARS. This will represent a major advance for infectious disease surveillance in Vietnam, which until now has relied on hand, carried paper forms or telephone reporting. To achieve this, every District and Provincial Preventive Medicine Centre will need computers with internet access and dedicated software/data systems will need to be developed. In addition, the fees for telephone line, internet access, maintenance and operation should be financed at least for the first few years after being established.

96. **Facilitating rapid investigation and containment activities through the development of Rapid Response Teams.** Much of the responsibility for recognizing, investigating and controlling a potential influenza pandemic will rest with local public health workers, who may currently have limited epidemiological training. Therefore a critical need exists to provide high quality standardized training to designated response teams at the District and Provincial levels. To this effect, a curriculum designed to provide training and build epidemiological capacity of

inter-disciplinary, 5-person rapid response teams (which has been developed by the US CDC and WHO) will be made available to the Vietnamese MOH for translation and dissemination in July 2006. Plans are in place to recruit and train experienced epidemiologists as instructors and then commence the training of 825 teams at District and Provincial levels.

97. The proposed rapid response teams will require appropriate equipment, including specimen collection kits (and a bio-secure transport system) to ensure the provision of good quality specimens to diagnostic laboratories. The capacity of Provincial and District Preventive Medical Centers to respond to infectious disease emergencies would also be enhanced by the procurement of specialized vehicles for undertaking field investigations and containment activities.

98. **Building skills and human resources through the establishment of a Field Epidemiology Training Program.** It is also proposed that a Field Epidemiology Training Course is established in Vietnam. A framework for an implementation plan has been developed by MoH, which aims to operate and sustain the proposed program until 2010 and beyond. Detailed content of the FETP training curriculum is underway, arrangements for implementation are progressing and a pilot phase is planned for 2006 - 2007

99. **Revision of the current legislation relating to infectious disease control.** It is proposed that legislation on infectious disease control be reviewed and revised, with the development of new powers, where appropriate, that public health authorities can apply. Once the legislation is finalized, documents will be printed and disseminated and training delivered to Preventive Medicine Staff.

100. **Strengthening control of infectious disease threats at International borders.** Border control will be enhanced by upgrading infrastructure (including the establishment of basic quarantine/healthcare facilities), developing an improved reporting system and delivering training. Collaboration with neighboring countries will also be undertaken to exchange experiences and harmonize procedures where appropriate.

2. STRENGTHENING DIAGNOSTIC CAPACITY

101. The laboratory capacity to detect and monitor HPAI and other influenza viruses is a central component of Vietnam's surveillance and response system. This laboratory capacity is a necessary complement to the early warning system, which detects suspected cases on clinical grounds but depends upon laboratory testing for confirmation. Studies have suggested that response and containment measures taken within three weeks of the appearance of a highly pathogenic human influenza strain may prevent, or at least delay, progression to a pandemic. In Vietnam, laboratory capacity to diagnose H5N1 (and similar) viruses, currently concentrated in two BSLIII laboratories at NIHE (Hanoi) and the Pasteur Institute (HCMC), needs to be strengthened to ensure reliable and timely performance. The strategy to improve laboratory capacity for HPAI addresses the following elements: (a) adequate sample collection; (b) rapid transportation to a provincial/regional laboratory; (c) rapid genomic diagnosis of the specimens; (d) confirmation of diagnosis; (e) virus isolation followed by further characterization by NIHE or other reference laboratories; and (f) rapid information sharing among human health and animal

health sectors. To ensure that this system functions correctly, NIHE—already designated by WHO as the National Influenza Center—needs to be upgraded to implement a quality assurance system across the country.

102. **Improving laboratory facilities and equipment.** Two BSLIII laboratories are currently being set up at NIHE and the Pasteur Institute (HCMC) to improve national capacity for viral cultures and advanced virological testing. These will be backed up by establishing classical PCR capacity in 32 Provincial Preventive Medicine Centers and ten central and regional hospitals, with a mobile BSLII laboratory facility based in the central region to assist investigation in the field. Five central hospitals with high loads of suspected influenza cases will receive real-time PCR equipment to allow rapid diagnosis on site. Viral sequencing systems will also be provided for the central and highlands regions, to improve regional capacity for advanced virological analysis. Financing will also be available for test kits and consumables.

103. **Improving capacity and safety of laboratory staff.** Staff will be trained in new laboratory techniques and will receive refresher trainings in bio-safety procedures and practices. To support these trainings, MOH will update guidelines for specimen collection and handling using technical assistance, if needed. Key staff in the regional laboratories with new sequencing systems will receive overseas training in advanced virological analysis.

104. **Establishing NIHE as a national reference laboratory.** To support the expanded virology capacity of the PPMC and regional center laboratories, NIHE will develop a national quality assurance function. Investment will support technical assistance, trainings and workshops, and incremental operating costs to ensure that a full quality assurance system is established.

3. STRENGTHENING CURATIVE CARE CAPACITY

105. The curative care sector is pursuing a two-pronged approach to pandemic influenza preparedness and response. Firstly, it is aiming to reinforce the capacity of the hospital system to recognize and respond to human cases of HPAI and influenza within the existing division of responsibilities between district, provincial, and central levels. In this, Vietnam has designated eight central hospitals as the key facilities for treatment of HPAI and influenza patients. Patients diagnosed at lower levels will be transferred to these central hospitals for specialized care. These hospitals will also serve as support centers for lower level facilities, responsible for training, supervision, and technical support. One hundred and eighteen (118) provincial-level hospitals will serve as the second-line hospitals for treatment of HPAI and influenza patients, receiving any overflow of critically ill patients from the central hospitals and caring for moderate cases themselves. This strategy requires strengthening intensive care capacity in central and provincial hospitals and improving performance of the referral system. Finally, district hospitals will provide basic care for patients with mild illness as the front line in the health system. All levels of the hospital system will improve case recognition, address infection control procedures, and contribute to case reporting under the surveillance system.

106. The curative care sector is also preparing for an influenza pandemic scenario in which there is a sudden, large increase in demand for curative care across Vietnam. Although it is

impossible to predict whether a pandemic will occur or how severe it would be, Vietnam has chosen to develop a response capacity for a scenario in which patient demand significantly exceeds hospital capacity. In this, hospitals are preparing pandemic response plans which address surge capacity, staff responsibilities and patient flows, and staffing continuity. Under a pandemic, central and provincial hospitals will care for the sickest patients while district hospitals treat milder cases. Provincial health authorities, under the Provincial People's Committees' guidance, are developing action plans to establish and operate field hospitals. Stockpiles of basic logistical materials, equipment, and drugs will be established in centers across Vietnam to support field hospitals. These preparations will be relevant to a range of public health catastrophe scenarios in addition to an influenza pandemic.

107. Specifically, the OPI will include the following areas and activities:

- **Situation assessment and planning.** A detailed assessment process will look at the curative care system's capacity to respond to HPAI cases and to a pandemic scenario. This assessment will review total bed and intensive care unit bed capacity; numbers and skills of staff in key departments; and availability of core equipment and facilities to respond to HPAI at the central and provincial levels. It will also develop guidelines for a pandemic scenario, addressing surge capacity and defining detailed needs and procedures for establishing field hospitals.

- **Improving staff capacity to care for influenza patients.** Clinical care of patients with HPAI or human influenza will be strengthened through revising standards and guidelines, training, and supervision. MOH has already developed guidelines on HPAI case recognition and treatment, including caring for critically ill patients. Trainings in these for all doctors and nurses in central and provincial hospitals will continue, using a training-of-trainers model with the goal of updating the skills of all relevant health care staff to treat influenza. The central hospitals will provide supervision and quality control in lower-level facilities.

- **Improving equipment and facilities to care for influenza patients.** Intensive care units will be reinforced in the eight central hospitals and all provincial hospitals with a defined equipment package, including ventilators, monitors, mobile X-ray machines, and other key items as set out in the HPAI treatment guidelines. Equipment investments will take into account existing stock and will be closely linked to staff capacity to use this equipment properly. In particular, a training program for nurses to use ventilators, consisting of a short course following by six months' on-the-job supervision, will be coordinated with procurement of ventilators to address absorptive capacity issues. Further, central oxygen delivery systems will be installed in the 20 provincial hospitals currently without such a system. These will be able to deliver oxygen to about 100 beds, significantly improving capacity to care for influenza (and other respiratory) patients. Finally, the eight central hospitals will each receive a vehicle for the retrieval of severely ill, infectious disease patients from the provincial hospitals.

- **Improving infection control in hospitals.** Infection control in central, provincial, and district hospitals will be strengthened by establishing isolation units for influenza patients and improving hospital procedures. In the first year of the OPI, infection control guidelines and standards for influenza patients will be developed from the existing MOH

nosocomial infection guide. Trainings, again using a training-of-trainers model, will be held for all nurses and doctors at all three levels of hospital and personal protective equipment will be distributed to all hospitals to help minimize influenza transmission in health care facilities.

- **Building capacity to respond to an influenza pandemic.** The core components in building pandemic response capacity will be pandemic planning, stockpiling materials and equipment, and pandemic response rehearsals. MOH will support the central, provincial, and district hospitals to develop pandemic action plans which address surge capacity, triage and patient flows, and staffing continuity. Provincial hospitals, in collaboration with the Provincial People's Committees, will also prepare plans for establishing and operating field hospitals, including defining financing mechanisms to be activated under a pandemic. In addition, stockpiles of materials and equipment needed to operate field hospitals will be pre-positioned in regional centers across the country.

4. IMPROVING RESEARCH

108. Although scientific understanding of avian influenza H5N1 is rapidly progressing, key questions remain unanswered. The transition from emergency response phase to medium-term control presents new opportunities to conduct scientific research that can guide prevention and control strategies. Research will focus on determining the risk factors for severe illness with H5N1 influenza and for its transmission, determining the prevalence of H5N1 among different populations, expanding the options for laboratory screening tests and monitoring the genetic variability of the virus. These studies will be undertaken by NIHE and MOH in collaboration with international agencies and partners undertaking similar research in poultry HPAI infection. Under the OPI, financing will support technical assistance, some materials and equipment, and incremental operating costs. Investments in the preventive and curative health sectors will also be used to complete these research activities.

5. PUBLIC AWARENESS AND BEHAVIORAL CHANGE

109. While it is crucial that each sector involved in public awareness and behavior change for avian and pandemic influenza work under an overall strategy and broader framework steered by the IEC Working Group, the actual implementation of campaign activities will be done sectorally with a core set of common objectives (the idea of "One Campaign-Many Sectors"). Specifically, the health sector will take the lead on promoting behaviors associated with: (a) timely reporting of human diseases; (b) improved personal hygiene and food safety; and if the pandemic occurs: (c) compliance with medical regulations; and (d) improved containment response if human to human transmission occurs. The health sector will also contribute to the efforts to communicate animal health risks under agricultural sector guidance. Within MOH, the Sub-committee for Avian Flu Communication is now responsible for coordinating these activities, with implementation by the Centre for Health Education, which employs health educators at the national, provincial, district, commune and village levels.

110. The primary target audience is the general public who is reached through different channels such as health workers, mass organizations, and the school network. Specific strategies

will be developed to reach these audiences based on a sound situational and audience analysis. This will also help guide the development of specific messages, revision of existing materials and development of new materials including TV spots, radio spots, leaflets, booklets, and posters. These materials will be cleared by the IEC Working Group before mass reproduction or airing to ensure the appropriateness for the intended audiences and the consistency across different implementing agencies. In addition, these materials will be made available at local levels for further adaptation and reproduction.

E. CHALLENGES AND OPPORTUNITIES

1. THE CHALLENGES OF INTEGRATION

111. Strong coordination mechanisms and collaborative working arrangements between the human and animal sector are critical for the success of an integrated AI Control and Prevention Program. Well documented examples exist in countries where the recognition and containment of outbreaks of zoonotic diseases were initially impeded by sub-optimal communication between animal and human health authorities. In Vietnam, the response to the current outbreak has involved close and productive collaboration, but there are areas where additional improvements may be possible.

112. There are a number of key areas where a joint approach is essential:

- Surveillance / information exchange
- Investigation of outbreaks
- Laboratory diagnosis
- IEC / behavior change
- Joint training activities
- Planning for the above activities

113. **Surveillance / information exchange.** Because of the clear link between animal and human disease seen with HPAI, surveillance for animal outbreaks should inform human surveillance activities and vice-versa. Therefore, recognition of an outbreak in poultry would be reported to human health authorities who could then enhance surveillance for human cases, by for example by raising awareness in clinicians in the local hospital. Similarly, examples exist where human cases have been reported at a stage when no animal outbreaks have been reported locally, so there are also good reasons why recognition of a human infection should be reported to local animal health authorities

114. To facilitate this, a formal system of information exchange is required, which could consist of the weekly/bi-weekly submission of aggregated surveillance data from human to animal public health authorities at different administrative levels (and vice versa).

115. **Investigation of outbreaks.** Some human HPAI cases have been reported globally where a clear history of exposure to diseased poultry is lacking. A number of explanations are

possible, such as exposure to a contaminated environment (for example, poultry faeces) or in some cases, limited, but inefficient human to human transmission. In such situations, investigation by human health authorities could usefully be supplemented by a broad multidisciplinary team including animal epidemiologists

116. **Laboratory diagnosis.** Laboratory diagnosis of human and animal HPAI infection (and more sophisticated laboratory procedures, such as genetic sequencing) essentially involves the same techniques. Although animal and human laboratories should remain physically separated, there are areas where there is likely to be additional value in collaborative work, such as the development of diagnostic reagents, guidelines on bio-safety and training on laboratory techniques

117. **IEC/behavior change.** Public awareness and BCC/IEC has already been consolidated between the animal health, livestock and human health sub-sectors in the Vietnamese response to HPAI. This must continue and be reinforced further to ensure that available resources are used optimally and the impact of campaigns on public awareness and behavior is maximized.

118. **Epidemiology Field Training.** Although the day to day work of epidemiologists and veterinary epidemiologists differ, the basic concepts used are identical. Many veterinarians have become epidemiologists through completion of a human orientated course as there are fewer opportunities for veterinary epidemiology training. After the initial training they learn more applied concepts which are relevant to their sector.

119. A FETP program for Vietnam is in concept stage for human health sector. It is proposed that the animal health sector will financially support several veterinary trainees in the first instance, which would allow them to gain basic knowledge in epidemiology.

120. Using veterinary epidemiology expertise within Vietnam (with some external support), specific veterinary modules would be designed and taught. This would represent the first attempt globally at producing veterinary FETPs and could serve as a model for other countries to follow suit. Since students are of both disciplines in early combined training – their informal sharing of experiences will help to promote cross-sectoral relationships.

121. **Planning for the above activities.** Since an integrated approach to technical issues (and some operational issues) is currently sub-optimal, it is essential that a more pro-active approach is taken towards enhancing collaborative work. It is therefore important that planning *itself* is a multi-disciplinary endeavor.

2. THE CHALLENGES OF DECENTRALIZATION

122. The ongoing decentralization process in Vietnam means that an increasing number of government decisions are made at lower levels in the administrative structure, and especially at the province level. Administrative units and service delivery units are being given the autonomy to design their own strategies and make their own spending choices. Resources and needs, however, differ vastly across provinces, districts, communes and villages and the accountability of the service delivery units remains limited. In parallel with the decentralization from central to

sub-national governments, Vietnam is delegating substantial amounts of budget discretion to administrative and service delivery units. The latter cover a vast and complex group of activities, including inter alia, hospitals and clinics and agricultural extension services. What these activities have in common is their ability to raise some revenues on their own. Since 2004, spending units are free to reallocate resources across line items within each of four blocks of expenditures – wages and salaries, operations and maintenance, capital, and other. While flexibility could allow a more efficient use of resources, in the absence of sound monitoring and accountability, discretion could also be used to improve staff wellbeing at the detriment of national policy goals.

123. Sub-national spending is funded through a combination of locally raised revenues and transfers from the central budget. In the case of wealthier provinces, the transfer is actually to the central budget rather than from it. The way the "size" of net inter-provincial transfers is determined in Vietnam is quite unique from an international perspective. Such size can be seen as the joint outcome of two mechanisms. One mechanism determines the share of locally-raised government revenue each province can retain. The other allocates an equalization grant from the state budget to each province. The resources directly available to each province are thus the sum of retained revenue and the equalization grant received from the central budget, if any. Given the severity of the social and economic costs of a human pandemic, special measures are justified to assist the provinces to mobilize and access financial resources and be able to take responsibility for the implementation of their local preparedness strategies. This implies that agreements/commitments with the central authorities will be agreed upon and fulfilled in a timely manner so the different sectors at the provincial level can collaborate together and each province can discharge its responsibilities. All funding, including central grants, should be accounted for fully and openly through regular and publicly available implementation reports. Good management and public accountability are essential to protect access to the services by the poor and other vulnerable groups. Implementation procedures will explicitly address the link between the required centralized decision-making (the principle of 'direct chain of command') and the local-level implementation.

3. CHALLENGES AND PROPOSED SOLUTIONS

124. The lack of knowledge about HPAI, the short time-frame within which the government and external agencies have had to respond, and the need for strong multi-sectoral coordination make mounting an effective HPAI program a formidable exercise. The key challenges to designing and implementing a national HPAI plan and possible solutions include:

- **Vietnam may, as the result of successfully having contained the disease so far, fall victim to its own success**, with the danger that sustained national and international commitment may wane over time. This possibility must be prevented from developing in the knowledge that even though the country may presently be free of human and animal HPAI cases, it is not virus free.
- **The most effective and efficient interventions may not receive the needed level of funding.** Resources can be diverted to less effective interventions because of limited knowledge about the best way to respond to HPAI. For example, demands for funding high profile areas, such as hospital equipment, might direct scarce funding away from

more effective, but less visible activities such as surveillance. In addition, uncertainties about the timing, scale, and impact of a pandemic mean that resource allocation decisions may not correspond well to actual events as they occur, risking either over or under spending in certain areas. This risk is being mitigated through: (i) proactive limits on the financing of expensive high-technology equipment, (ii) careful contingency planning, and (iii) strengthening surveillance systems.

- **Limited absorptive capacity could mean that some investments are underutilized.** Investments, particularly in equipment, may not be fully used because of limited numbers of staff and skills, and inadequate space in facilities. This challenge highlights the importance of carefully: (i) reviewing and prioritizing investments based on a realistic assessment of absorptive capacity of the systems, (ii) phasing planned technical assistance and studies in a manner not to overwhelm veterinary and medical staff, and (iii) providing training and capacity building.

- **The response does not give sufficient attention to implementation mechanisms in the provinces, districts, and communes**. Human resource shortages, inadequate skills, competing incentives, and decentralization make implementation in the provinces, districts, and communes a challenge. Having good technical responses to HPAI is unlikely to be effective unless these basic implementation questions are also addressed. Given the severity of the social and economic costs of a human pandemic, special measures are justified to assist the provinces to mobilize and access financial resources and be able to take responsibility for the implementation of their local preparedness strategies. This implies that agreements/commitments with the central authorities will be agreed upon and fulfilled in a timely manner so the different sectors at the provincial level can collaborate together and each province can discharge its responsibilities. All funding, including central grants, should be accounted for fully and openly through regular and publicly available implementation reports. Good management and public accountability are essential to protect access to the services by the poor and other vulnerable groups. Implementation procedures will explicitly address the link between the required centralized decision-making (the principle of 'direct chain of command') and the local-level implementation.

- **The influenza pandemic starts from outside of Vietnam**. Although Vietnam's national response may be successful in avoiding human cases and thereby minimizing the risk of a human epidemic starting in Vietnam, the influenza virus may come from neighboring countries or further afield. This risk highlights the need to address border control issues and strengthen collaboration among countries in the region and internationally.

- **Certain activities may not be sustainable unless long-term financing is addressed**. Sophisticated techniques for laboratory diagnosis of influenza are expensive, costing US$20-50 per patient. These costs are currently incurred by ODA. Plans for ongoing financing, including for recurrent costs are required.

- **Social and environmental externalities may occur** if planning and regulatory processes do not keep pace with economic development in the livestock sector. The OPI includes proposals for impact assessment, pilots and review of regulations.

F. ESTIMATED BUDGET

125. During the Joint Assessment Mission the total cost of the OPI was estimated at about US$250 million for the period 2006-2010 (see Table 1). This amount includes US$13.5 million for price contingencies (assuming an average 2 percent international and 6 percent domestic inflation over the plan implementation period) and US$27 million for physical contingencies with 75 percent physical contingency on vaccination for domestic poultry and compensation to farmers representing US$13.5 million and US$9.4 million respectively. The vaccination will be risk-based and the precise number of doses to be delivered cannot be predicted. Similarly, depending on the effectiveness of the targeted vaccination campaign and implementation of other control measures, the amount of culled domestic poultry will vary and the total compensation cannot be precisely predicted.

Table 1 – Estimated budget by component

	Foreign	Local	Total
I. Enhanced Coordination Activities			
I. A. National preparedness	318.0	272.0	590.0
I. B. Policy and strategy development	6.0	128.0	134.0
I. C. Program coordination	2,532.6	2,873.4	5,406.0
I. D. Public awareness and information, education and communication	4.0	4,196.0	4,200.0
I. E. Program monitoring and evaluation	600.0	1,200.0	1,800.0
I. F. Support for regional activities and international agencies	15,512.0	1,970.0	17,482.0
Sub-total	18,972.6	10,639.4	29,612.0
II. HPAI Control and Eradication in the Agricultural Sector			
II. A. Strengthening Veterinary Services (capacity building)	7,382.5	8,380.5	15,763.0
II. B. Disease Control	20,885.4	34,274.8	55,160.3
II. C. Surveillance and Epidemiological Investigation	1,124.8	3,319.0	4,443.8
II. D. Poultry sector restructuring [(1)]	783.0	7,587.0	8,370.0
Sub-total	30,175.8	53,561.3	83,737.1
III. Influenza Prevention and Pandemic Preparedness in the Health Sector			
III. A. Strengthening Surveillance and Response	15,158.0	22,767.0	37,925.0
III. B. Strengthening Diagnostic Capacity	11,286.0	3,156.0	14,442.0
III. C. Strengthening Curative Care System	22,330.5	11,922.5	34,253.0
III. D. Improving Research	6,400.0	3,210.0	9,610.0
Sub-Total	55,174.5	41,055.50	96,230.00
BASE PLAN COSTS	104,322.9	105,256.2	209,579.1
Physical Contingency	15,399.1	11,590.2	26,989.4
Price Contingency (inflation allowance)	2,648.4	10,828.3	13,476.7
Total PLAN COSTS (include contingency)	122,370.4	127,674.7	250,045.2

126. The breakdown by component shows a total estimated cost of US$31.2 million for the overarching enhanced coordination activities (12 percent for Part I of the OPI), US$116.4 million for HPAI Control and Eradication activities in the Agricultural sector to be implemented by MARD (47 percent for Part II) and US$102.4 million for Influenza Prevention and Pandemic Preparedness in the Health Sector to be implemented by MOH (41 percent for Part III).

127. This amount corresponds to public and ODA financial requirements in support to the OPI, and as such does not include the contribution of the private sector to the poultry industry restructuring investment cost estimated to an additional US$225 million in line with the "Commercialization Strategy" proposed by DLP of MARD. In addition, Annex 4 also includes a range of activities relevant to influenza preparedness and response in the health sector, totaling approximately US$222 million, but ranked as second level priority by the MOH.

Table 2 – Estimated budget by category

	Enhanced Coordination Activities	HPAI Control & Eradication in Agricultural Sector	Influenza Prevention & Pandemic Preparedness in Health Sector	Total	Percent
I. Investment Costs					
A. Civil Works	0.0	6,500.0	2,150.0	8,650.0	3%
B. Equipment & Vehicles	306.0	25,236.3	56,855.0	82,397.3	33%
C. Consulting Services					
1. International	12,450.0	2,757.8	4,890.0	20,097.8	8%
2. National	1,794.0	653.3	2,047.0	4,494.3	2%
Subtotal Consulting Services	14,244.0	3,411.1	6,937.0	24,592.1	10%
D. Meeting, Training and Fellowships	4,952.0	14,699.7	13,148.0	32,799.7	13%
E. Public Awareness, Information, Education & Communication	4,210.0	0.0	120.0	4,330.0	2%
F. Compensation	0.0	12,500.0	0.0	12,500.0	5%
G. Program Management and M&E	5,900.0	0.0	0.0	5,900.0	2%
Total Investment Costs	29,612.0	62,347.1	79,210.0	171,169.1	68%
II. Recurrent Costs					
Incremental Operating Costs	0.0	21,390.0	17,020.0	38,410.0	15%
BASE PLAN COSTS	29,612.0	83,737.1	96,230.0	209,579.1	84%
Physical Contingency	15.3	24,308.8	2,665.3	26,989.4	11%
Price Contingency (inflation allowance)	1,591.5	8,373.3	3,511.9	13,476.7	5%
Total PLAN COSTS (include contingency)	31,218.8	116,419.2	102,407.1	250,045.2	100%
Percent	12%	47%	41%	100.0%	

128. The breakdown per category presented in Table 2 shows relatively high incremental operating costs (about 15 percent of the overall cost) and contingencies (about 16 percent). Measures to control HPAI in poultry, including vaccination campaigns, stamping-out and disinfection measures, control of movements of birds and poultry products, and increased animal and human disease surveillance, are labor intensive. In addition, because of the uncertain evolution of avian and human influenza in the future, the scope of some activities under the OPI, such as compensation to farmers and vaccination of domestic poultry, is difficult to predict.

Hence the need for the international community to support these costs as well, which are going to last several years and are key to the success of the overall strategy to control HPAI. Other categories include goods (approximately 33 percent), consultant services and training (approximately 23 percent), civil works (approximately 3 percent), public awareness, information, education and communication (approximately 2 percent) and program management and M&E (approximately 2 percent).

ANNEXES

ANNEX 1. RESULT FRAMEWORK

ANNEX 2. DETAILED DESCRIPTION – PART II

ANNEX 3. DETAILED DESCRIPTION – PART III

ANNEX 4. COST TABLES

ANNEX 1 – RESULTS AND MONITORING FRAMEWORK

OPI Development Objective	Outcome Indicators	Use of Outcome Information
To reduce the health risk to humans from avian influenza by controlling the disease at source in domestic poultry, by early detection and response to human cases, and by preparing for the medical consequences of a human influenza pandemic.	• Effective mechanisms in place for program implementation, coordination and financing of the OPI • Strengthened veterinary services able to control HPAI and other zoonotic disease threats • Cost-effective phased approach in place to control HPAI • Effective poultry sector restructuring plan in place to enable improved control of HPAI minimizing loss of livelihood and environmental pollution • Lowered incidence of, and mortality caused by, avian influenza • Lowered risk of an influenza pandemic occurring • Strong preparedness for a possible pandemic	***Annual:*** • Review activity plans and adjust as needed ***2007:*** • Gauge effectiveness of OPI strategy and determine if changes are needed ***2008:*** • Conduct Mid-term review of the OPI, with a focus on lesson learning and mainstreaming lessons into animal health and human health systems ***2010:*** • Conduct OPI impact evaluation

Part I – Enhanced Coordination Activities

Intermediate Outcome	Intermediate Outcome Indicator	Use of Intermediate Outcome Monitoring
Component I.1 - *National preparedness* Influenza pandemic preparedness planning strengthened	• 2007 National Plan of Action is published by December 2006 (and the 2008 National Plan of Action is published by December 2007, etc.) • National antiviral stockpile has 20 million Oseltamivir tablets by January 2007 • Eight reference hospitals and 32 provincial hospitals completed AI response plans by January 2007 • Seven provincial capital cities completed simulation exercises for HPAI pandemic outbreak by January 2007 • Twenty additional provincial capital cities, completed simulation exercises for HPAI pandemic outbreak by January 2008	***2007:*** • Review Publish National Plan of Action and make necessary changes • Review effectiveness of national antiviral stockpile system and amend as needed • Assess AI response plans for provincial hospitals and recommend improvements • Complete seven simulation exercises ***2008:*** • Publish National Plan of Action • Evaluate effectiveness of simulation exercises and identify gaps/needs ***2009-2010:*** • Review National Plan of Action and identify gaps • Results of simulation exercises used to identify need for information, training and equipment
Component I.2 - *Policy and strategy development* National policies and strategies reviewed and revised to ensure sustained response to animal and human cases in a co-ordinated manner	• Studies completed in the agricultural and health sectors to guide policy and strategy development, including review/amendment of legal and regulatory frameworks • Study completed to review impact of decentralization on implementation of HPAI activities	***2007:*** • Identify gaps and needs for additional support/training • Recommendations of studies used to guide policy and strategy development in both sectors ***2008:*** • Gauge effectiveness of implementation of national policies aiming at developing a sustained response to HPAI ***2010:*** • Review plan and modify as necessary
Component I.3 – *Program Coordination* National Coordination framework defined	• Amendment of Decision 13/2004/QD-TTg issued to enhance membership and scope of the National Steering Committee and sub-committees	***2007:*** • Review comprehensiveness and implementation of formal decisions and guidance and make appropriate changes

Intermediate Outcome	Intermediate Outcome Indicator	Use of Intermediate Outcome Monitoring
	• Formalization of coordination committees at the provincial level completed • Partnership of Government-donors (the "Partnership") on AHI formally established and funded • Thematic Working Groups established on: (i) public awareness and behavioural change, (ii) monitoring and evaluation, and (iii) capacity building	***2008:*** • Review functioning of Steering Committee and sub-committees and make necessary changes • Review functioning of Partnership and adjust *modus operandi* ***2010:*** • Evaluate functioning of Committee and sub-committees and make necessary changes • Evaluate functioning of the Partnership
Component I.4 - *Public awareness and behavioral change* Public awareness raised to facilitate behavioral change	• Expansion of role and membership of IEC Working Group issued • Communication Strategy "one campaign-many sectors" developed	***2007:*** • Evaluate functioning of expanded IEC Working Group. ***2008:*** • Review effectiveness of implementation of communication strategy and make changes as needed ***2010:*** • Determine changes required to strategy in view of evolving situation
Component I.5 – *Program monitoring and evaluation* Monitoring and evaluation framework developed in MARD and MOH	• Baseline data compiled and consolidated for monitoring and evaluating the OPI • Progress reports and periodical financial reports of activities summarizing progress with implementation of the OPI issued and shared • Appropriate M&E methodologies defined and agreed	***2007-onwards:*** • Review quality of progress and periodical financial reports ***2008:*** • Review M&E data and adjust OPI mid-term ***2009-2010:*** • Use progress/periodical financial reports, audit reports and M&E data for (preparation of) final OPI evaluation
Component I.6 - *Support for Regional Activities* Regional coordination activities defined	• Strengthened collaboration mechanisms in place with ASEAN and APEC • Arrangements completed for Vietnam to join WHO Global Surveillance Program for Influenza	***2007/2008:*** • Assess impact of participation of Vietnam on ASEAN and APEC meetings and WHO Global Surveillance Program

Part II – HPAI Control and Eradication in the Agricultural Sector

Intermediate Outcome	Intermediate Outcome Indicator	Use of Intermediate Outcome Monitoring
Component II.1 - *Control and eradication strategy* National Control and Eradication Strategy developed to control and eradicate HPAI	• Well defined control phase developed and arrangements in place and functioning • Well developed consolidation phase defined and its implementation is underway	***2007:*** Gauge improvements in bio-security of poultry production and changes to marketing practices and identify needed changes. ***2008-2010:*** Review effectiveness of restructuring of poultry industry and make necessary changes
Component II.2 - *Strengthening of veterinary services* Veterinary services strengthened and training of the veterinary services designed and completed	• Turn around time is less than 72 hrs for virus detection from receipt of sample • Senior management has full confidence in results from all laboratories supported under the OPI • Epidemiological staff review disease control strategy on the basis of sound epidemiological investigations • Timely communication of quality data and information between field, laboratory and head-quarters through web-based systems	***Annually from 2007/2010:*** • Review timeliness of detection procedures • Evaluate performance of laboratories • Monitor increasing use of web based systems with extension to lower administrative levels (eg district) • Review incorporation of appropriate information gained at international/regional *fora into AI control strategy*
Component II.3 - *Disease control* Improved capability to investigate cases and rapid response to outbreaks	• 80% of outbreaks confined to control area of index cases • Overall cost of disease and disease control is falling • Vaccination strategy is based on a risk assessment • Based on research findings the most appropriate vaccines are applied in the field • 95% of poultry in urban markets and slaughter houses have health certificate • Increased numbers of intercepted illegal consignments • Assist industry in considering formation of compartments	***Annually*** • Review of outbreak control measures • Evaluate costs for disease control • Comprehensive review of vaccination strategy- informed by research findings • Increasing trend in numbers of valid health certificates produced at urban markets/slaughter houses • Review progress towards poultry sector/certified disease-free poultry compartments • Develop export market

Intermediate Outcome	Intermediate Outcome Indicator	Use of Intermediate Outcome Monitoring
Component II.4 - *Surveillance & epidemiological investigation* Cost effective surveillance in place focusing on markets and slaughterhouses to improve knowledge of virus circulation and of vaccination coverage	• Targeted surveillance modified as per disease control strategy • Maps produced and used as tool for risk assessment	***2007 onwards:*** • Better knowledge of virus circulation and of vaccination coverage ***2008:*** • Mapping of wild and migrating bird species assists in risk assessment of further incursions of HPAI into domesticated species ***2010:*** • Disease free status is maintained
Component II.5 - *Restructuring of poultry industry* Restructuring plan for poultry industry regarding HPAI control defined.	• 7 study reports, 6-10 pilot activity evaluations • 30 courses/study tours • 50% of displaced farmers attending training courses find related employment within 6 months • DLP staff have wider range of skills relevant to management and poultry keeper • Increased private sector investment in poultry production and marketing	***2007/annually:*** • Review quality of reports/evaluations/courses and tours ***2008:*** • Evaluate training courses for farmers with respect to success in new employment opportunities • Review skill training of DLP staff ***2010:*** • Review progress towards restructured industry to assess competitiveness/demand-drivenness • Examine private sector investment in poultry sector over 5-year period
Component II.6 - *Public Awareness and Behaviour Change* Improved knowledge, positive attitudes and practices that protect animals from AI transmission are adopted by people	• 50% of target audience able to list at least 80% of recommended preventive measures • 50% of target audience saying that AI animal-to-animal transmission is preventable • 50% of target audience practicing at least 60% of recommended preventive measures	***2007 and annually:*** • Review of PA/Behavioural Change ***2008-2010:*** • No change in behaviour indicates need to review communication strategy.

Part III – Influenza Prevention and Pandemic Preparedness in the Health Sector

Intermediate Outcome	Intermediate Outcome Indicator	Use of Intermediate Outcome Monitoring
Component III.1 - *Strengthening Surveillance and Response* Improved surveillance for infectious disease threats in place, including early warning and response system (EWARS), rapid response teams and strengthened control for infectious disease threats at international borders	• Systematic and in-depth analysis of the infectious disease surveillance system conducted • Surveillance system in place capable of identifying a cluster of severe acute respiratory infections (SARI) • Established FETP • Comprehensive analysis and final report with specific recommendations submitted to MOH by the end of 2006 • Computer systems, software and training delivered to all provincial and district level preventive medicine offices by the end of 2006 • Rapid response teams designated that will have completed a 40-hour training by the end of 2006 • FETP national coordinator and offices will be established and the training curriculum will be complete by the end of 2006 • Trainers and supervisors and the first cohort of FETP students in place by the end of 2007	***2007:*** • Assess compliance with recommendations of analysis of disease surveillance system • Gauge effectiveness of FETP training identifying gaps and needs for additional support • Review procedures for rapid response teams and make necessary changes ***2008-2010:*** • Gauge effectiveness of FETP training identifying gaps and needs for additional support • Identify gaps and needs for additional support. Determine if plans need to be changed.
Component III.2 - *Strengthening diagnostic capacity* Strengthened laboratory capacity to detect and monitor HPAI and other influenza virus	• Mechanisms in place to strengthen sample collection, diagnosis capacity, virus isolation and rapid information sharing among human and animal health workers • Regional, provincial and mobile laboratory facilities upgraded	***2007:*** Identify gaps and needs for additional support ***2008-2010:*** Gauge effectiveness of improved laboratory capacity and make further necessary changes
Component III.3 - *Strengthening curative care capacity* Strengthened curative care system to diagnose and manage influenza patients, including during an influenza pandemic.	• 100% of district, provincial, and central level hospitals have an influenza outbreak preparedness plan and infection control plans by the end of 2007 • More than 80% of all nurses and doctors have undergone training in influenza case recognition, management, and infection	***2007-2010:*** • Failure to prepare plans indicates need for greater support to hospital authorities. • Identify gaps in training and staff skills. • Verify the availability and functioning of new equipment items.

Intermediate Outcome	Intermediate Outcome Indicator	Use of Intermediate Outcome Monitoring
	control by the end of 2010 • Over 80% of central and provincial hospitals have installed and are using equipment items planned for procurement under the OPI by the end of 2010 • All necessary training for staff to use new equipment item completed and staff competencies reviewed by the end of 2010	• Identify gaps in training of staff to use new equipment and take remedial action.
Component III.4 - *Improving research.* Improved scientific and medical understanding of selected issues related to HPAI infection in humans.	• Two research studies completed by the end of 2007 and five research studies completed by the end of 2010	***2007-2010:*** • Failure to meet targets will indicate need to reassess capacity to undertake research with possible reallocation of investments to prioritize this area
Component III.5 - *Public Awareness and Behavior Change* Improved knowledge, positive attitude and practices of people that protect humans from AI transmission	• 50% of target audience able to list at least 80% of recommended preventive measures • 50% of target audience saying that AI animal-to-human transmission is preventable • 50% of target audience practicing at least 60% of recommended preventive measures • 50% of target audience able to list at least 80% of recommended preventive measures • 50% of target audience prepared to take preventive measures • 50% of target audience practicing minimum 60% of recommended preventive measures	***2007 and annually:*** • Review of PA/Behavioural Change ***2008-2010:*** • No change in behaviour indicates need to review communication strategy.

ANNEX 2 – DETAILED DESCRIPTION PART II

HPAI CONTROL AND ERADICATION IN THE AGRICULTURAL SECTOR

Activities to be funded under Part II of the OPI include: (a) Strengthening of veterinary services; (b) Disease control; (c) Surveillance and epidemiological investigation; (d) Restructuring of the poultry industry; and (e) Public awareness and behavioral change.

A. Strengthening of Veterinary Services

Veterinary capacity will remain a key constraint to progressive disease control unless further significant investment is made in infrastructure, manpower and training. The following activities, in particular expanding the capacity and capability of the veterinary laboratory network to improve the speed and reliability of testing and increase the range of diagnostic tests that can be applied, this will entail will overcome this problem.

A.1. Assessment of existing laboratory capacity and advice on relocation and construction of new laboratories.

A.2. Two laboratories are relocated or new facilities constructed at another site (NIVR and NCVD) including a BSL-3 facility. New facilities for serological testing are provided (six provinces) by Government. It is important that these are incorporated into the quality management system and have the capacity to conduct rapid antigen tests.

A.3. Additional equipment is provided to enable laboratories to carry out appropriate diagnostic testing including PCR (9 laboratories) gene sequencing (1 laboratory) virus isolation (3 laboratories), serology (all laboratories) etc.

A.4. Training of laboratory staff to conduct tests, including gene sequencing, and produce reliable results under bio-safe conditions.

A.5. Development of an inter-laboratory quality assurance program ensures consistency and accuracy of testing results.

A.6. Provision of vehicles for transport of specimens.

A.7. Improving **epidemiological expertise** enables surveillance, monitoring and epidemiological investigations to improve the effectiveness of disease control interventions. This will be achieved through: (a) Local post-graduate field-based training; (b) international post-graduate training; and (c) the recruitment of additional 25 technical staff required for regional laboratory network.

A.8. Introduction of improved **disease reporting and data analysis capacity** improves knowledge of the disease status and epidemiology at all level of the veterinary services, achieved through: (a) further development of TADinfo, Labnet and other databases; (b) training of central staff in database applications; (c) Data Manager; and (d) training of regional and provincial staff in database management.

A.9. **Management capacity** within DAH is enhanced through: (a) Activities are coordinated at a regional level; (b) Attendance at regional and international

conferences; (c) Study tours and international TA to support institutional development; and (d) Attend regional AI conferences.

B. Disease control

Disease control will be achieved through a combination of measures, including rapid identification and response to disease outbreaks, risk-based vaccination, enhanced management and control of poultry movements, and development of disease free compartments. Investigations into alternative vaccines, quality of vaccines and vaccination strategies will be undertaken to support the vaccination program. These measures will be implemented and enhanced through the following programs.

<1> Disease Investigation

Improved capability to investigate a reported case of diseases in order to identify outbreaks rapidly and effectively

B.1. Establish and maintain sufficient staff for the management and operation of centers for emergency disease responses.

B.2. Support "veterinary paraprofessionals" as the first point of outbreak investigation and reporting, in particular training in disease recognition, basic bio-security and reporting procedures.

B.3. Form and train regional/provincial disease investigation teams, and provide them with operating funds.

B.4. Cost of collection and laboratory testing of specimens.

B.5. Investigative studies in gene sequencing and production of biological reagents.

B.6. Investigations on poultry disease interactions with human cases.

<2> Outbreak Control

Rapid response to outbreaks limits spread of infection from new foci.

B.7. Culling of infected birds, implementation of movement controls, investigation and tracing. Costs include killing, disposal, disinfection and decontamination.

B.8. Compensation for owners, with policy to be renewed for 2006-7, and the establishment of a contingency fund.

B.9. Training of field staff in culling operations.

B.10. Technical guidelines on environmentally sound disposal of culled poultry.

<3> Vaccination

Progressive move towards targeted, risk-based vaccination, with variation between geographic areas and production sectors of different risk reduces the costs of disease control.

B.11. Targeted vaccination is undertaken. In sectors 1 and 2, owners pay for purchase and administration of vaccine. In sector 3 poultry, vaccination will continue in geographic areas or market sectors defined as high or moderate risk. Vaccination will continue in grazing ducks until there is no circulating H5N1 HPAI virus in domestic poultry or wild waterfowl. Vaccination of sector 4 backyard poultry will continue in high and medium risk areas at least until the end of 2006, when vaccination in this sector will be reviewed. In the event of outbreaks, ring vaccination will be conducted around infected places to minimize spread within the immediate vicinity.

B.12. Provide vaccination equipment.

B.13. Provide ongoing training to vaccinators.

B.14. Further enhance the cold chain for vaccines.

B.15. Vietnam Vaccine Product Development, including: (a) research into improved vaccines and vaccine administration methodologies increases flock protection; (b) Investigations to resolve outstanding questions on vaccination (e.g. Compare inactivated H5 vaccines from different sources, Compare vaccination of ducks at day-old and 14 days old, Investigate vaccination of Muscovy ducks, Investigate the application of ND recombinant vaccine, Trial the use of fowl pox recombinant vaccination in day-old chicks); (c) Investigate the costs and benefits of domestic vaccine production; (d) Upgrade domestic vaccine production facilities; and (e) undertake vaccine quality control testing on domestic or imported vaccines

<4> Quarantine and Movement Control

Control of movement of poultry and contaminated materials from infected places to limit the impact of outbreaks. Checking on movements of poultry to markets and slaughterhouses to limit the spread of virus. Improved control along international borders reduces the risk of introduction of HPAI virus.

B.16. Infected places will be kept in quarantine until veterinary authorities permit restocking. Movement restrictions will be imposed around outbreaks and on poultry sent to markets or slaughterhouses from commercial farms. May require funding for welfare culling (culling of birds where farmers can no longer afford feeding them) and compensation.

B.17. Training of field staff in quarantine and movement control.

B.18. Equipment for quarantine and movement control staff.

<5> Movement Control Across International Borders and Risk Management

B.19. Training of border quarantine personnel.

B.20. Provision of consumables for PPE,

B.21. Seize illegally imported product (DAH)

B.22. Disposal of illegally imported products (Department of Trade)

B.23. Risk analysis of poultry industry and negotiation of memorandums of understanding with counterpart authorities in neighboring countries.

B.24. Implement risk mitigation measures

B.25. Investigate **mechanisms for compartmentalization** as a way to increase numbers of certified disease-free poultry facilities, and eventually contribute to developing export markets, including: (a) definition of procedures for verifying disease freedom in compartments; and (b) support to the industry in developing bio-security, monitoring and auditing systems for compartmentalization.

C. Surveillance and epidemiological investigation

Well executed surveillance programs and epidemiological investigations are required to assess the effectiveness of control programs and to provide the information needed to modify approaches to control. Specific studies would assess the environmental social and economic costs and benefits of grazing ducks and ways to ensure native chickens can be sold without spreading HPAI.

The specific activities will focus on cost effective surveillance. This will be focused on markets and slaughterhouses to improve knowledge of virus circulation and of vaccination coverage in a cost effective manner. At the same time Sector 1 and 2 farms will ensure that disease free status is maintained in these sectors.

C.1. Undertake virus sampling in poultry markets to detect influenza A viruses

C.2. Collect blood samples for vaccine monitoring (in flocks and markets), including direct testing costs

C.3. Applied Veterinary Research, including: (a) Characterize risk profile of different markets and supervise collection and testing of specimens for virus screening and antibody detection; (b) Mapping of temporal and spatial distributions of activity ranges for wild and migrating bird species assists in risk-assessment of HPAI spread within and into Viet Nam and studies undertaken in collaboration with wild bird ecology experts; (c) Sector 3 and 4 and market-based epidemiology studies linked to post-graduate training programs; and (d) Studies on grazing ducks and native chickens, in particular studies undertaken to assess the environmental, social and ecological costs and benefits of grazing ducks and studies to assess ways to determine ways to ensure native chickens reared in sector 3 do not spread HPAI.

D. Restructuring of Poultry Industry

The following activities represent support to DLP capacity to plan and advice on poultry sector restructuring that is socially and environmentally as well as economically viable. While the focus of the proposals relates to restructuring in the context of HPAi control, they would also contribute to the development of a longer term restructuring process. These activities are proposed for donor support:

<1> Plan, appraise and pilot poultry development schemes that meet economic, social and environmental criteria.

D.1. Review the current poultry restructuring plan: map risk areas, review legislation on social impact assessment and review planning processes. This will provide a sound overall structure for a sustainable national plan along sustainable lines.

D.2. Review regulations on poultry production and marketing. This will reveal whether the necessary regulations are in place to reduce poultry production in high risk areas and promote it in others.

D.3. Review of the impact of bio security regulations and activities implemented to date. Bio security regulations put into place for control of HPAI outbreaks have already caused changes to the structure of market chains but the full impact is not known. Some markets have been moved, and the impact of the relocation has not been assessed.

D.4. Review and appraise (technical, economic, social, environmental) province plans for poultry development in: (a) 3 provinces; develop guidelines for technical, economic, environmental and social appraisal for development of new farms, slaughter and processing facilities. This would provide detailed steps for DLP to guide and regulate poultry development.; and (b) 6 provinces this would be a follow-up to activity 5, conducted by DLP and provincial staff.

D.5. Studies and pilot schemes for bio secure, efficient and equitable poultry production and processing. Guidelines for bio secure and sustainable operation for different scales of production and processing. Very few concrete guidelines or practical examples exist for bio secure and profitable poultry production on a small scale, although more have been developed for large scale operations. This activity would fill a critical gap in knowledge in ways that small scale operators, in particular, might continue to participate in more bio secure and intensive market chains.

D.6. Support to controlling environmental pollution from poultry farms and poultry production zones. Work has been done on regulation of waste from pig farms, less in knows about poultry farms. A combination of practical examples and regulations will be needed for Vietnam to promote environmentally sound poultry rearing, and until regulations are in place to allow “polluter pays” taxation, support may be needed to encourage farmers to minimize pollution.

<2> Support for alternative livelihoods

D.7. Trainings and rural development support for farmers moving out of poultry in 6 regions. This would include training in other activities, but training alone (as demonstrated in Europe) is unlikely to be sufficient. To the extent possible, links should be made with other agricultural diversification and rural development processes

<3> Capacity building in DLP

D.8. Training/Capacity building within DLP and commune teams. Training exercises and study tours for DLP staff at all levels (centre, province and district) to enhance capacity to plan and advice on poultry sector development. Training for staff at district level, and private practitioners at commune level, in bio-secure and efficient poultry production and marketing. Training equipment.

<4> Private investments in infrastructure

The following activities relate to a broader and longer term plan for poultry restructuring which is under discussion in MARD. These activities are expected to be funded by the private sector in Vietnam, with government subsidy for provision of credit. They are not proposed for donor funding but are included to indicate the government's proposed support:

D.9. Relocate large government breeding farms away from urban areas, and provide clear operating instructions for bio-secure management.

D.10. Investment in bio-secure production facilities in Area B, based on loans provided by private banks and underwritten by a government budget. There is provision in the government plan for up to 10,000 farmers to be supported but the actual level of support will depend on market conditions

D.11. Build 150 slaughterhouses by relocation or new construction

E. Public Awareness and Behavioral Change

The agricultural sector will take the lead on promoting behaviors associated with: (a) timely reporting of animal diseases; (b) improved bio-security in poultry farming; and (c) safer poultry handling practices in slaughtering, transport and marketing. The agriculture sector will also contribute to the efforts to communicate human health risks (particularly to farmers and their families) under health sector guidance. Within MARD, the National Agriculture Extension Centre (NAEC) is responsible for training agricultural extension agents, who are located at provincial, district and commune levels. NAEC is also involved in public awareness campaigns on AI and produces information materials in collaboration with DAH and DLP.

Because of the need to implement the public awareness and behavorial change program under an overall strategy, activities have been costed under Part I "Enhanced Coordination Activities" for a total estimated amount of US$4.2 million. Nevertheless, most these activities will need to be implemented sectorally and it is estimated that about 40 percent of this amount (approximately US$1.7 million) will be managed by MARD.

ANNEX 3 – DETAILED DESCRIPTION OF ACTIVITIES UNDER PART III

INFLUENZA CONTROL AND PANDEMIC PREPAREDNESS IN THE HEALTH SECTOR

A. Strengthening Surveillance and Response

A.1. Human Disease Surveillance and Early Warning: activities under this section include an assessment of the routine national surveillance system and meetings / workshops to improve coordination between the human and animal healthy sectors

A.2. Early Warning and Response Systems: activities include procurement of equipment for the proposed surveillance system and to operationalize the response (including specimen collection and transportation), development and operational costs and training

A.3. Operationalize Planned Response Teams; this includes mostly procurement of equipment and vehicles, but includes the purchase of antiviral drugs

A.4. Capacity of Provincial Centers; this includes civil works to upgrade infrastructure, procurement of vehicles and equipment and delivery of training

A.5. Capacity of Commune Centers; this includes civil works to upgrade infrastructure

A.6. Capability of Border Quarantine Health Enhanced; this includes civil works to upgrade infrastructure (border gates), development of guidelines, enhanced surveillance and reporting infrastructure and training, meetings / workshops

B. Strengthening Diagnostic Capacity

B.1. Diagnostic Capacity: BSL III, Mobile BSLIII lab, Sequencers, Lab equipment districts: activities included the procurement of laboratory equipment, (including mobile laboratories), revision of guidelines and provision of training

B. Strengthening Curative Medicine System

C.1. Assess Capacity of Curative System: activities include an assessment of the capacity of the human curative to receive large numbers of infectious cases (and planning to provide surge capacity) together with training and workshops

C.2. Develop Capacity of Curative System; activities include provision of isolation facilities and field hospitals, together with equipment to ensure provision of high level care to patients (ventilators, oxygen supply etc)

D. Improving Research

D.1. Research on Influenza virus gene changes

D.2. Study on epidemiology criteria, risk factors and preventive measures

D.3. Research on treatment

D.4. Support for vaccine production

D.5. Support for AI related microbiology

D.6. National annual science conference

E. Public Awareness and Behavioral Change

The health sector will take the lead on promoting behaviors associated with: (a) timely reporting of human diseases; (b) improved personal hygiene and food safety; and if the pandemic occurs: (c) compliance with medical regulations; and (d) improved containment response if human to human transmission occurs. The health sector will also contribute to the efforts to communicate animal health risks under agricultural sector guidance. Within MOH, the Sub-committee for Avian Flu Communication is now responsible for coordinating these activities, with implementation by the Centre for Health Education, which employs health educators at the national, provincial, district, commune and village levels.

Because of the need to implement the public awareness and behavorial change program under an overall strategy, activities have been costed under Part I "Enhanced Coordination Activities" for a total estimated amount of US$4.2 million. Nevertheless, most these activities will need to be implemented sectorally and it is estimated that about 40 percent of this amount (approximately US$1.7 million) will be managed by MOH.

ANNEX 4 – COST TABLES

Table 1 — Detailed Cost Tables per Component

Country Needs Assessment for
Avian Influenza Control and Human Pandemic Preparedness and Response
Vietnam Joint Mission April 2006

	Base Cost (US$'000)						Cost Include Contig. (US$'000)			
	2006	2007	2008	2009	2010	Total	For. Exch.	Local No Taxes	Duties & Taxes	Total
Component 1: Enhanced Coordination Activties										
I. A. National Preparedness										
I.A1. Strategic Planning for Animal Health	44	24	-	-	-	68	-	66	3	69
I.A.2. National Plan of Action on Human AI Prevention and Control	19	16	-	-	-	35	-	34	2	36
I.A.3. Operational Plan for Logistic Stockpiles Antiviral and Other Consumables	19	16	-	-	-	35	-	34	2	36
I.A.4. Conduct Simulation Exercise to Test Mechanism of Health Sector Action	196	196	-	-	-	392	303	90	5	398
I.A.5. Hold National Conference to Extend Health Sector Plan	20	20	20	-	-	60	19	41	3	63
I. B. Policy and Strategy Development								-		
I.B.1. Assistance to Rapidly Promulgate Human Health Laws	67	11	-	-	-	78	4	71	4	79
I.B.2. Support Veterinary Regulations	17	11	-	-	-	28	1	26	1	29
I.B.2. Support Quarantine Laws	17	11	-	-	-	28	1	26	1	29
I.C. Program Coordination and Management										
I.C.1. Support to Central and Provincial Coordination	250	250	250	250	250	1,250	-	1,330	70	1,400
I.C.2. Coordination Cost for the Animal Health Program at 64 Cities and Provinces	300	606	300	300	300	1,806	1,566	-	344	1,910
I.C.3. Coordination Cost for the Human Health Program at Central and 64 provinces/cities	350	350	350	-	-	1,050	1,071	-	-	1,071
I.C.4. Support to Donor Coordination	250	150	150	150	150	850	-	893	47	940
I.C.5. Support to Working Groups	150	150	150	-	-	450	-	453	24	477
I.D. Public Awareness and Information	2,360	920	920	-	-	4,200	4	4,143	218	4,366
I.E. Program Monitoring and Evaluation	-	450	450	450	450	1,800	640	1,291	80	2,010
I. F. Support for Regional Coordination and International Agencies	3,738	3,678	3,678	3,194	3,194	17,482	16,115	2,064	129	18,307
Sub Total	**7,797**	**6,859**	**6,268**	**4,344**	**4,344**	**29,612**	**19,724**	**10,562**	**933**	**31,219**

Country Needs Assessment for
Avian Influenza Control and Human Pandemic Preparedness and Response
Vietnam Joint Mission April 2006

	Base Cost (US$'000)						Cost Include Contig. (US$'000)			
	2006	2007	2008	2009	2010	Total	For. Exch.	Local No Taxes	Duties & Taxes	Total
Component 2: HPAI Control and Eradication in the Agricultural Sector										
II. A. Strengthening Veterinary Services										
II. A1. Assessment of Existing Laboratory Capacity	235	25	-	-	-	260	150	106	6	262
II. A2. Development of Laboratories	-	7,350	850	850	850	9,900	6,085	4,782	572	11,440
II. A3. Additional Equipment for Laboratories	-	2,300	-	-	-	2,300	1,256	1,005	251	2,512
II. A4. Training of Laboratory Staff	-	200	200	200	200	800	-	874	46	920
II. A5. Development Interlab Quality Assurance	200	50	50	50	50	400	-	409	22	430
II. A6. Provision of Vehicles	250	1,075	-	-	-	1,325	739	-	696	1,436
II. A7. Specialist Training (Improving epidemiological skills)	220	330	-	-	-	550	-	570	-	570
II. A8. Introduction of Improved Disease Reporting and Data Analysis Capacity	54	44	44	44	44	228	32	208	13	252
II. B. Disease Control										
Disease Investigation										
II.B1. Establish and Maintain Staff who can Respond to Outbreaks	600	600	600	600	600	3,000	-	3,192	168	3,360
II.B2. Support Para vets as First Point for Outbreaks	1,800	1,800	1,200	1,200	1,200	7,200	-	7,558	398	7,956
II.B3. Operating Funds for Provincial Investigation Teams	250	250	250	250	260	1,260	-	1,342	71	1,412
II.B4. Cost of Specimen Collection	170	170	170	170	170	850	-	904	48	952
II.B5. Virus Characterization Studies	20	20	20	20	20	100	-	106	6	112
II.B6. Parallel Investigation of Poultry Relationship and Human Cases	15	15	15	15	15	75	-	80	4	84
Outbreak Control										
II.B7. Culling of Infected Birds	500	200	100	100	100	1,000	-	1,013	53	1,066
II.B8. Compensation for Owners	2,500	2,500	2,500	2,500	2,500	12,500	-	24,500	-	24,500
II.B9. Training in Culling	20	20	20	20	20	100	-	106	6	112
II.B9. Development of Technical Guidelines for Biosecure Disposal of Birds	100	100	-	-	-	200	101	98	5	204
Vaccination										
II.B10. Targeted Vaccination	5,000	4,000	3,000	3,000	3,000	18,000	29,522	-	3,280	32,802
II.B11. Vaccination Equipment	687	-	-	-	-	687	649	-	72	721
II.B12. Training of Vaccinators	400	400	400	400	400	2,000	1,981	-	220	2,201
II.B13. Vaccination Cold Chain	-	1,464	-	-	-	1,464	884	552	160	1,596
II.B13. Vietnam Vaccine Product Development	950	950	867	400	400	3,566	1,064	2,705	143	3,912
Quarantine and Movement Control										
II.B14. Quarantine and Movement Control	100	100	100	100	100	500	-	532	28	560
II.B15. Training of Quarantine and Movement Control Staff	20	20	20	20	20	100	-	106	6	112
II.B16. Equipment for Quarantine and Movement Control Staff	100	100	-	-	-	200	191	-	21	213
Movement Control Across International Borders										
II.B17. Training of Border Staff	50	40	-	-	-	90	-	88	5	92
II.B18. PPE for Border Staff	100	-	-	-	-	100	53	42	11	105
II.B18. Seize Illegally Imported Products (DAH)	240	240	240	240	240	1,200	-	1,277	67	1,344
II.B19. Dispose Illegally Imported Products (Department of Trade)	40	40	40	40	40	200	-	213	11	224
II.B20. Risk Analysis of Poultry Imports	120	-	-	-	-	120	-	114	6	120
II.B21. Implement Risk Mitigation Measures	-	95	95	95	95	380	-	415	22	437
II.B22. Compartmentalization of Industry	110	56	56	20	26	268	137	140	7	284
II. C. Surveillance and Epidemiogical Investigation										
II. C1. Market and Slaughterhouse Surveillance	100	100	100	100	100	500	-	532	28	560
II. C2. Collect Blood Samples for Vaccine Monitoring	400	200	100	100	100	900	-	918	48	966
II. C4. Applied Veterinary Research										
II. C4.a Research into risk profile of different markets (epidemiological research)	-	1,653	986	200	-	2,839	1,099	1,925	-	3,024
II. C4.b Role of wild birds in disease transmission	-	105	-	-	-	105	61	45	2	109
II. C4.c Testing Sector 1 and Sector 2 farms	20	20	20	20	20	100	-	106	6	112
II. C. Poultry Sector Restructuring										
II.C.1. Develop Industrial Poultry Farms and Reduce Small-scale Production	-	-	-	-	-	-	-	-	-	-
II.C.2. Structural Studies										
II. C2.a Review poultry restructure plan	80	-	-	-	-	80	45	33	2	80
II. C2.b Review regulations on production and marketing	22	-	-	-	-	22	-	21	1	22
II. C2.c Review impact of biosecurity regulations	160	160	-	-	-	320	182	137	7	326
II. C2.d Review and appraise 9 province poultry development plans	-	205	258	27	-	490	294	216	11	521
II. C2.e Studies and pilot schemes for biosecure and equitable production	-	131	372	304	-	807	202	668	30	900
II. C2.f Study on controlling environmental pollution	-	1,647	1,547	1,547	110	4,851	81	5,085	268	5,434
II. C2.g Training and rural development (10 course materials)	-	400	200	200	200	1,000	-	1,075	57	1,132
II. C2.h Training of DLP (study tours, various training)	-	100	200	300	200	800	-	885	47	932
Sub Total	**15,632**	**29,274**	**14,620**	**13,131**	**11,080**	**83,737**	**44,808**	**64,683**	**6,928**	**116,419**

Country Needs Assessment for

Avian Influenza Control and Human Pandemic Preparedness and Response

Vietnam Joint Mission April 2006

	Base Cost (US$'000)						Cost Include Contig. (US$'000)			
	2006	2007	2008	2009	2010	Total	For. Exch.	Local No Taxes	Duties & Taxes	Total
Component 3: Influenza Prevention and Pandemic Preparedness in the Health Sector										
III. A. Strengthening Surveillance and Response										
III. A1. Human Disease Surveillance and Early Warning	2,110	2,110	2,050	2,050	2,050	10,370	61	10,965	577	11,602
III. A2. Early Warning and Response Systems	815	13,905	1,290	1,170	990	18,170	11,862	4,462	2,975	19,299
III. A3. Operationalise Planned Response Teams	6,670	200	200	200	200	7,470	3,426	2,052	2,431	7,909
III. A4. Capacity of Provincial Centers	600	600	-	-	-	1,200	-	1,174	62	1,236
III. A5. Capacity of Commune Centers	-	-	-	-	-	-	-	-	-	-
III. A6. Capability of Border Quarantine Health Enhanced	535	90	90	-	-	715	378	336	50	764
III. B. Strengthening Diagnostic Capacity										
III. B1. Diagnostic Capacity: BSL III, Mobile BSLIII lab, Sequencers, Lab equipment districts	7,070	4,902	952	762	756	14,442	12,052	1,990	1,444	15,486
III. C. Strengthening Curative Medicine System										
III. C1. Assess Capacity of Curative System	4,008	-	-	-	-	4,008	-	3,808	200	4,008
III. C2. Develop Capacity of Curative System	26,745	1,500	1,000	500	500	30,245	23,511	5,615	3,066	32,192
III. D. Improving Research										
III. D.1 Research on Influenza virus gene changes	380	380	380	-	-	1,140	826	332	17	1,176
III. D.2. Study on epidemiology criteria, risk factors and preventive measures	190	190	-	-	-	380	273	108	6	386
III. D.3. Research on treatment	170	170	40	-	-	380	273	111	6	390
III. D.4 Support for vaccine production	545	545	545	-	-	1,635	1,148	514	27	1,688
III. D.5 Support for AI related microbiology	545	545	545	-	-	1,635	1,148	514	27	1,688
III. D.6 National annual science conference	20	20	20	20	20	100	-	106	6	112
III. D.7. Training	1,580	1,260	360	360	360	3,920	2,882	1,144	-	4,026
III. D.8. Technical assistance and studies (under the Joint United Nations Program)	140	140	140	-	-	420	-	445	-	445
Sub Total	**52,123**	**26,557**	**7,612**	**5,062**	**4,876**	**96,230**	**57,839**	**33,675**	**10,893**	**102,407**
Total	**75,552**	**62,690**	**28,500**	**22,537**	**20,300**	**209,579**	**122,370**	**108,921**	**18,754**	**250,045**

Table 2 – Health Sector Activities with Medium Priority in the OPI

		Budget for 2006-2010 (US$'000)
A. Strengthening Surveillance and Response		
A4. Capacity of Provincial Centers		
Civil Works (Upgrade infrastructure districts)		135,000
Equipment and Vehicles (Equipment for districts)		54,000
A5. Capacity of Commune Centers		
Civil Works (Upgrade infrastructure 100 communes)		7,000
	Sub-total	196,000
B. Strengthening Diagnostic Capacity		
B1. Diagnostic Capacity: BSL III, Mobile BSLIII lab, Sequencers, Lab equipment districts		
Equipment and Vehicles (Mobile BSLII laboratory x 1 for NIHE)		700
Equipment and Vehicles (National level 2 sequencers: NIHE, Pasteur HCMC)		400
Equipment and Vehicles (Sprayers for H2O2)		400
Equipment and Vehicles (Real Time PCR systems for Institutes at Nha Trang and Highlands)		440
	Sub-total	1,940
C. Strengthening Curative Medicine System		
C2. Develop Capacity of Curative System		
Equipment and Vehicles (CPAP for district hospitals: 3 sets x 672 hospitlas)		14,100
Equipment and Vehicles (Laboratory equipment: haematology analyzers x 50, ozone machines x 118)		1,600
Equipment and Vehicles (Ambulances: 1 per provincial hospital x 118)		5,900
	Sub-total	21,600
D. Improving Research		
D7. Education and Training		
Postgraduate degrees (4 PhD molecular biology, 4 PhD influenza epidemiology, 10 MSc in epidemiology and microbiology)		2,175
Postgraduate degrees (10 PhD, 20 MSc, 20 doctor specialty level I in infectious diseases)		500
	Sub-total	2,675
	TOTAL SECOND-TIER PRIORITY ACTIVITIES	222,215

Table 3 – Potential private sector and public investment for poultry sector development

Activity description	Cost in US$ '000	Year			
		1	2	3	4
Relocation of 15 breeding farms, US$ 150,000 each	2,250	450	900	900	
Private sector contribution to loans for relocation of 10,000 farms	172,200		57,400	57,400	57,400
Government subsidy of loans for relocation of 10,000 farms	7,800		2,600	2,600	2,600
Loans for the relocation of slaughterhouses	45,000		10,000	15,000	20,000
Total	**227,250**	**450**	**70,900**	**75,900**	**80,000**

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