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OUTCOME AND IMPACT ASSESSMENT of the Global Response to the Avian Influenza Crisis 2005 – 2010
by James Moran
Former Director Asia,
European Commission,
Directorate-General for External Relations

Since 1 January 2011: Head of Department Asia
European External Action Service

In today’s interconnected world, it is more important than ever to ensure that when pandemics occur, the global response is coordinated, inclusive, effective and above all rapid.

The international community has learned a great deal about countering these threats over the past decade, as phenomena such as SARS and avian flu have occurred, and the EU has had a major role in contributing to the fight against them.

This has, of course, involved considerable funding and provision of expertise, especially for developing countries but, as convinced multilateralists, we have also played our part in strengthening the international technical agencies (UN system and OIE), to meet these global challenges.

This report makes an important contribution to taking forward these efforts and I hope that it will attract a wide readership, including administrators and technical specialists as well as those concerned with broader human and physical security aspects.
ical leadership at the highest level, to mobilising resources in our countries and to drawing upon government, civil society and the private sector to effect a coordinated response. In the context of our respective national plans, we agree to take vigorous prevention, mitigation, emergency preparedness, and rapid response measures in the short term together with actions over the longer term […]..

Subscribe to a long-term strategic partnership between the international community and the countries currently affected or at risk in which adequate and prompt financial and technical support is mobilised to complement the efforts by countries and regions, particularly developing countries […]..

Commit to evaluating the results and the impact of our national pandemic influenza preparedness and action plans periodically, reviewing and updating them as necessary and updating the global HPAI control strategy and human pandemic preparedness plans by taking advantage of the expertise and the existing technical networks established by the UN, WHO, FAO, OIE and other relevant organisations and groups.

(Excerpts from the final declaration of the International Ministerial and Pledging Conference on Avian and Pandemic Influenza, Beijing, 17 and 18 January 2006.)

The partnerships set up on the occasion of this global response were unprecedented, robust, and flexible. They not only opened up avenues for the control of the A(H5N1) virus, but they also prepared the world for the A(H1N1) pandemic 2009, and, in general, they strengthened animal and human health systems, increasing their short and long-term capacity to prevent and respond to serious crises.

This evaluation of the outcomes and impact of the global response to avian influenza (GRAI), being a proactive contribution of the European Union to the commitments made in Beijing, provides the perspective of an independent team of experts. It does not pretend to be a global impact survey or study — which it is not, and which would most probably be impossible to carry out. And it does not fall into the intellectual trap of ‘measuring impact’, which would be a conceptually impossible task in the real world. It is, however, a fair expert assessment, based on a broad collection of findings, a geographic sampling of countries and regions for field analysis, a large array of semi-directed interviews, iteration and cross-checks. It uses inference and assembles a bundle of convergent evidence, sustained by the strong conviction of a team.

The report you have before you identifies a series of positive outcomes and impact on various key links of the chain that unites the environment (including, and particularly in this case, pathogens) and human well-being. The report observes, documents, and analyses the impact of the GRAI on the prevention and control of various emerging and re-emerging infectious diseases. These diseases are one of the still underestimated negative effects of globalisation and of the exponential increase of animal, human and pathogen movements on the planet.

The report lists some of the less strong — or insufficient — outcomes of the GRAI, for instance the lack of sufficient behavioural changes, despite important investments in communication. By doing so, thematic issues for future efforts are suggested.
And, truly, this whole effort is about ‘the way forward’. As stated by the European Commission, co-organiser, at the last International Ministerial Conference on Animal and Pandemic Influenza, held in Hanoi, Vietnam, 17 to 19 April 2010:

At the end of the first decade of this 21st century, mankind is experiencing dramatic changes in environment and increased movements in all dimensions. Leaders and populations have to learn to live — again — with uncertainty and to prepare to respond to risks and incidents of an unpredictable nature. Like a volcanic eruption in Iceland that impacts a global event in Asia. Like emerging diseases and other major health risks, under the umbrella of a ‘One Health’ cross-sectoral approach.

The way forward, in our view, should not only address the continuation of responses to HPAI and other zoonotic diseases, but should also build and maintain a permanent readiness for all potential pandemics and more generally all high-impact health threats.

We are heartened by the fact that the One Health approach, which addresses health hazards at the interface between humans, animals and the environment — including neglected or forgotten diseases — is being taken on board every week by an increasing number of actors, global, regional, national and local.

The European Union has already taken new initiatives under the One Health umbrella and will continue to do so in the coming years. The adoption by unanimity of the final declaration of the Hanoi ministerial conference confirmed the support of more than 70 countries and regional entities to One Health. In that sense, it represents a new political point of reference. We will, of course, make use of the conclusions and recommendations of the present report to prepare and implement future activities. We would furthermore like to encourage our partners to do likewise, and to pursue with us the effort needed for continuous evaluation, not only of the level of funds spent or outputs produced, but also of outcomes and impact, which is a far more complex exercise.

Finally, this foreward would not be complete without mentioning the fact that this work, like the entire EU contribution to the GRAI, benefitted from close and productive coordination and collaboration between the various directorates-general of the European Commission and in particular with the EuropeAid Co-operation Office. At a time when I am being transferred to the new European External Action Service, I would like to thank all my colleagues who participated in this adventure, and I express the strong wish that our collaboration will continue under the new institutional framework.
CONTENTS

1. INTRODUCTION .............................................. 17
   1.1 Background ........................................ 17
   1.2 Rationale for the assessment .................... 19
   1.3 Methodology ....................................... 20

2. ANALYSIS AND RESULTS .................................... 25
   2.1 HOW FAR HAS THE GRAI ENHANCED NATIONAL,
       REGIONAL AND INTERNATIONAL COMMUNICATION
       AND COLLABORATION BETWEEN AGENCIES TO CONTROL
       TRANS-BOUNDARY (RE-)EMERGING INFECTIOUS ANIMAL
       AND HUMAN DISEASES? ................................ 25
       2.1.1 International communication and collaboration .. 25
       2.1.2 Regional communication and collaboration ...... 27
       2.1.3 National communication and collaboration ..... 27
       2.1.4 Development and implementation of national
              and (sub)regional policies on API control ...... 28
       2.1.5 Time between discovery of disease and
              information sharing (with neighbouring countries) 30
       2.1.6 Collaborative design and implementation of
              research programmes ................................ 31
       2.1.7 Sharing of expertise, goods, services ........... 32
       2.1.8 Sharing of virus genome data .................... 33
       2.1.9 Membership of regional organisations/partnerships 33
       2.1.10 Availability of resources ....................... 34
   2.2 TO WHAT EXTENT HAS THE GRAI REDUCED THE
       INCIDENCE OF AI IN POULTRY? ..................... 36
       2.2.1 HPAI infections ................................ 36
       2.2.2 Veterinary services ............................. 36
       2.2.3 Disease diagnosis and control ................. 37
       2.2.4 Disease surveillance ............................ 39
       2.2.5 Studies and research ........................... 39
       2.2.6 Networks ....................................... 40
       2.2.7 Capacity-building .............................. 41
   2.3 TO WHAT EXTENT HAS THE GRAI LIMITED THE
       DISSEMINATION OF THE VIRUS FROM BIRDS TO MAN? 42
       2.3.1 Animal and human health collaboration ......... 42
       2.3.2 Risk studies .................................... 43
       2.3.3 Communication .................................. 43
       2.3.4 Safe poultry production ......................... 46
   2.4 TO WHAT EXTENT HAS THE GRAI ENHANCED INCREASED
       FOOD SAFETY AND A ROBUST REGIONAL AND
       INTERNATIONAL TRADE IN POULTRY AND POULTRY
       PRODUCTS? ........................................... 47
       2.4.1 Restructuring of the poultry sector ............. 48
       2.4.2 Restructuring of the market and value chain .... 48
       2.4.3 Influence on other livestock species and products 49
2.5 WHAT SUCCESS HAS THE GRAI HAD IN PREVENTING THE INTRODUCTION OR ESTABLISHMENT OF API IN NON-INFECTED AT-RISK COUNTRIES?  
2.5.1 Contingency plans and emergency preparedness in place  
2.5.2 Absence of human and avian cases  
2.5.3 Conclusion  
2.6 HOW HAS THE GRAI EFFECTIVELY PREPARED THE WORLD FOR EMERGING DISEASES PANDEMICS?  
2.6.1 Planning  
2.6.2 Surveillance and early warning systems  
2.6.3 Pandemic preparedness in the health sector  
2.6.4 Whole of society pandemic preparedness  
2.6.5 Risk and outbreak communication  
2.6.6 Pharmaceuticals and research  
2.6.7 Conclusions: sustainability and increasing gains  
2.7 TO WHAT EXTENT HAVE GRAI FUNDING MODALITIES AND RESOURCES ENSURED EFFICIENT AND TIMELY OUTBREAK CONTROL IN INFECTED COUNTRIES, EFFECTIVELY INCREASED PREPAREDNESS IN COUNTRIES AT RISK AND IMPROVED THE OVERALL LEVEL OF PREPAREDNESS?  
2.7.1 Multi-donor financing framework  
2.7.2 Pledges, commitments and disbursements by international stakeholders  
2.7.3 Recipients of committed and disbursed funds  
2.7.4 Lessons learned and good practices in the funding modalities  
2.8 TO WHAT EXTENT AND HOW HAS THE EUROPEAN COMMISSION’S CHOICE OF FUNDING MODALITIES ALLOWED PROGRESS TOWARDS THE ACHIEVEMENT OF ITS SHORT AND LONG-TERM OBJECTIVES?  
2.8.1 Contribution of the European Commission to GRAI funds  
2.8.2 Observations on AHIF funding modalities  
2.8.3 Results and conclusions from recent evaluations by the European Commission  
2.9 CONSIDERING SUCCESSFUL ACTIONS IN VARIOUS SUPPORTED AREAS (POLITICAL, TECHNICAL MULTI-SECTORAL COORDINATION, TECHNICAL AND FINANCIAL ASSISTANCE FOR API CONTROL AND PANDEMIC PREPAREDNESS), WHAT IMPACTS HAVE BEEN OBSERVED, HOW HAVE THESE IMPACTS BEEN ACHIEVED, WHAT WERE THE CONDITIONS OF SUCCESS, AND TO WHAT EXTENT ARE THE LESSONS TRANSFERABLE?  
2.9.1 New or stronger systems  
2.9.2 Partnerships and collaboration  
2.9.3 International Health Regulations  
2.9.4 Pharmaceuticals and equity in access to health  
2.9.5 Economic impact and poverty reduction  
2.9.6 ‘Beyond H5N1’  
2.9.7 Global governance  
2.9.8 Conclusions  
3. CONCLUSIONS  
4. ANSWERING THE SIX EVALUATION QUESTIONS  
5. RECOMMENDATIONS
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AADMER</td>
<td>ASEAN Agreement on Disaster Management and Emergency Response</td>
</tr>
<tr>
<td>ACMECS</td>
<td>Ayeyawady — Chao Phraya — Mekong Economic Cooperation Strategy</td>
</tr>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
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<tr>
<td>AED</td>
<td>Academy for Educational Development</td>
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<td>AFRO</td>
<td>World Health Organisation Regional Office for Africa</td>
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<td>AH</td>
<td>Animal health</td>
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<td>AHE</td>
<td>Animal-human-environment</td>
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<td>AHIF</td>
<td>Avian and Human Influenza Facility</td>
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<td>AHIS</td>
<td>Animal Health Information System</td>
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<td>AI</td>
<td>Avian influenza</td>
</tr>
<tr>
<td>ALive</td>
<td>African Partnership for Livestock Development, Poverty Alleviation and Sustainable Growth</td>
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<tr>
<td>APAIR/APEIR</td>
<td>Asian Partnership on Avian Influenza Research/Asian Partnership on Emerging Infectious Diseases Research</td>
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<tr>
<td>APEC</td>
<td>Asia-Pacific Economic Cooperation</td>
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<td>API</td>
<td>Avian and pandemic influenza</td>
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<td>APSED</td>
<td>Asia-Pacific strategy for emerging diseases</td>
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<td>ARAHIS</td>
<td>Asia Regional Animal Health Information System</td>
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<td>ARIS</td>
<td>Electronic animal health/production information system</td>
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<td>ASEAN</td>
<td>Association of South-East Asian Nations</td>
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<td>ASEF</td>
<td>Asia-Europe Foundation</td>
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<td>AU</td>
<td>African Union</td>
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<tr>
<td>AU-IBAR</td>
<td>African Union/Inter-African Bureau for Animal Resources</td>
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<tr>
<td>AusAID</td>
<td>Australian government’s overseas aid programme</td>
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<tr>
<td>ATWG/PPR</td>
<td>ASEAN Technical Working Group of Pandemic Preparedness and Response</td>
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<tr>
<td>AVSF</td>
<td>Agronomes et Vétérinaires sans Frontières</td>
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<tr>
<td>BCC</td>
<td>Behaviour change communication</td>
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<td>BSE</td>
<td>Bovine Spongiform Encephalopathy</td>
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<td>CFR</td>
<td>Case fatality rate</td>
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<tr>
<td>CIDA</td>
<td>Canadian International Development Agency</td>
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<td>CMC</td>
<td>Crisis Management Centre</td>
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<td>Commission</td>
<td>European Commission</td>
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<td>CSR</td>
<td>Communicable disease surveillance and response</td>
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<td>CVO</td>
<td>Chief Veterinary Officer</td>
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<td>DAC</td>
<td>Development Assistance Committee of the European Commission</td>
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<td>DFID</td>
<td>Department for International Development</td>
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<tr>
<td>EAC</td>
<td>East African Community</td>
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<td>EC</td>
<td>European Community</td>
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<tr>
<td>ECOWAS</td>
<td>Economic Community of West African States</td>
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<td>ECTAD</td>
<td>Emergency Centre for Trans-boundary Diseases</td>
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<tr>
<td>EID</td>
<td>Emerging Infectious Disease</td>
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<tr>
<td>EMPRES</td>
<td>Emergency Prevention System for Trans-boundary Animal and Plant Pests and Diseases</td>
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<td>EU</td>
<td>European Union</td>
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<tr>
<td>EZD</td>
<td>Emerging zoonotic disease</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organisation (UN)</td>
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<tr>
<td>FETP</td>
<td>Field epidemiology training programme</td>
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<td>FMD</td>
<td>Foot-and-mouth disease</td>
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<td>GAINS</td>
<td>Global Avian Influenza Network for Surveillance</td>
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<tr>
<td>GAP</td>
<td>Global action plan to increase supply of influenza vaccine</td>
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<tr>
<td>GDP</td>
<td>Gross domestic product</td>
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<tr>
<td>GF-TADs</td>
<td>Global Framework for progressive control of trans-boundary animal diseases</td>
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<td>GHG</td>
<td>Global health governance</td>
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<td>GISN</td>
<td>Global Influenza Surveillance Network (WHO)</td>
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<td>GLEWS</td>
<td>Global early warning system for major animal diseases</td>
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<td>GOARN</td>
<td>Global outbreak alert and response network</td>
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<td>GPGH</td>
<td>Global public good for health</td>
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<td>GRAI</td>
<td>Global response to avian influenza</td>
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<tr>
<td>HH</td>
<td>Human health</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>TADinfo</td>
<td>Animal health information system designed by FAO</td>
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<tr>
<td>TOR</td>
<td>Terms of Reference</td>
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<tr>
<td>TRIPS</td>
<td>Trade-related aspects of intellectual property rights</td>
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<tr>
<td>UNDP</td>
<td>United Nations development programme</td>
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<tr>
<td>UNHCR</td>
<td>Office of the United Nations High Commissioner for Refugees</td>
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<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<tr>
<td>UNOCHA</td>
<td>United Nations Office for the Coordination of Human Affairs</td>
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<tr>
<td>UNRC</td>
<td>United Nations Resident Coordinator</td>
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<tr>
<td>UNSG</td>
<td>United Nations Secretary-General</td>
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<tr>
<td>UNSIC</td>
<td>United Nations System Influenza Coordination</td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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<tr>
<td>VAHW</td>
<td>Village animal health worker</td>
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<tr>
<td>VSF</td>
<td>Vétérinaires sans Frontières</td>
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<tr>
<td>WAHIS</td>
<td>World Animal Health Information System</td>
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<tr>
<td>WB</td>
<td>World Bank</td>
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<tr>
<td>WFP</td>
<td>World Food Programme</td>
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<td>WHA</td>
<td>World Health Assembly</td>
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<tr>
<td>WHO</td>
<td>World Health Organisation (UN)</td>
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<td>WPRO</td>
<td>Western Pacific Regional Office (WHO)</td>
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This independent assessment of the outcomes and impact of the global response to avian influenza (GRAI) addresses the following questions: (i) What are the verifiable outcomes of the GRAI and do they go beyond the objectives of the GRAI? (ii) What impacts are likely to be observed as a consequence of the GRAI, on the prevalence and distribution of avian and pandemic influenza (API), on the risk of a human pandemic arising from highly pathogenic avian influenza (HPAI due to the virus A(H5N1)) and on its effect on other emerging and re-emerging diseases (EIDs)? and (iii) How do these impacts relate to the inputs made by the European Commission?

From the study of the literature, nine operational questions, each with a set of judgement criteria, were formulated to guide the team of four experts during their field work.

A programme of visits comprised an assessment of the GRAI in South-East Asia by meeting stakeholders in Bangkok (Thailand) and a country case study in Phnom Penh (Cambodia); an assessment of the GRAI in South Asia by visiting Delhi and national assessments in West Bengal and Bangladesh (particularly with regard to the trans-boundary perspective); and, finally, an assessment of the GRAI in Africa by visiting Nairobi (Kenya) and a country case study in Uganda.

At global level, key informants from the relevant international organisations and major political actors in crisis response were interviewed face-to-face or by telephone.

A. FINDINGS OF THE EVALUATION

A.1. International responses

The global response to HPAI was made possible through the political impetus, technical assistance and financial support of key political, policy and development partners (referred hereafter as ‘development partners’); it was based in particular on a strong ad hoc collaboration and joint leadership of the European Union, the United States of America (United States) and the UN System Influenza Coordination (UNSIC) office, who, in collaboration with the World Bank (WB) and the relevant UN agencies, developed policies and set up mechanisms for crisis response.

A major outcome of the GRAI has been the successful coordination and partnership at international level between development partners, UN agencies and the World Organisation for Animal Health (OIE). Less coordination has been achieved at regional level because, as yet, regional institutions do not have sufficient management capacity, although this has been increasing during the course of the GRAI. At regional level, there have been some conflicting activities and overlaps instead of a harmonised approach, though informal networks of policymakers and technical experts are also developing at regional level, enabling a process of sharing information at strategic times, as demonstrated during the A(H1N1) pandemic.

The activities of the GRAI, facilitated by UNSIC and the development partners, have strengthened the organisations and encouraged the coordination between them. As a result, the UN organisations are better able now to respond to an emergency through increased powers for risk analysis, prediction, prevention, preparedness and control of avian and pandemic influenza (API) and zoonotic threats in general. They work better together sharing data through new networks. The Terrestrial Animal Health Code of the OIE has been improved in relation to AI and the compliance with the new International Health Regulations (IHR) of the World Health Organisation (WHO) has been boosted, enabling better notification of outbreaks and better sharing of epidemiological information. The GRAI has engendered greater awareness of the necessity for — and good governance of — well-functioning veterinary services and these are being further reinforced through the World Fund for Animal Health and Welfare. This new fund enables the OIE, through the methodology of performance of veterinary services (PVS), to identify their strengths and weaknesses and, consequently, strengthen their capacities. The GRAI has supported the development of the global early warning system for major animal diseases (GLEWS), a joint system that builds on the added value of combining and coordinating alert mechanisms of the WHO, the Food and Agriculture Organisation (FAO) and the OIE.

Through the GRAI, the Network of expertise on avian influenza (OFFLU) was set up. This joint OIE-FAO network was established in 2005 to support international efforts to monitor and control AI in poultry and other birds, and to share biological material and data to support development of human pandemic vaccines. With the dissemination of the influenza A(H1N1) pandemic virus in humans in 2009, the resources of the network have been mobilised to support international efforts to combat the new threat.

A.2. National responses

Supported by the development partners, international agencies and non-governmental organisations (NGOs), governments have established integrated national action plans (INAPs) and task forces that developed harmonised communication programmes and brought together actors from different sectors, notably from AH and HH. However, in many countries, multi-sectoral involvement at central and provincial levels does not yet extend sufficiently to the village level. Countries learned to test their INAPs by conducting simulation exercises, though studies reveal...
that large gaps remain in their capacities to implement them. These plans prove, in many cases, to be generic and applicable to other EIDs.

Task forces established through the GRAI had, and keep having, an important role in providing communication and multi-sectoral coordination to tackle H5N1 in animals and humans. This role is applicable to other crises that may emerge.

Through the GRAI, novel active grass-roots surveillance systems, including participatory techniques, electronic reporting and data analysis, event and sentinel-based surveillance and hotlines have been developed. Some have very high costs, affecting their sustainability.

Regarding A.1 and A.2, while some key informants questioned the sustainability of inter-agency and inter-sectoral coordination, others considered that partnerships have provided enough evidence of their added value to robustly impact on the way future global responses to health crises will be conducted.

A.3. Prevalence of disease

Most new outbreaks of HPAI (H5N1) were diagnosed in 2006, both in domestic and wild birds. Human cases also peaked that year. Since then, although avian influenza has become entrenched in China, Vietnam and, possibly, Bangladesh, and endemic in Egypt and Indonesia, overall, the number of countries with infections of poultry has decreased from 40 in 2006 to nine in 2009, with only one newly infected country that year: Nepal. This has been ascribed to improved disease detection and efficient control measures. Numbers of human cases have also fallen each year since 2006, until, worryingly, 2009, when human cases increased substantially. However, this rebounds to 2006 levels and standards of surveillance and diagnosis in poultry are falling because of low risk perception and major disincentives such as the economic and social consequences of reporting.

Absence of — or insufficient — indemnification/compensation for culling — a contentious subject — is also a major cause for under-reporting outbreaks. Worldwide, there is a large variety in compensation schemes, policies and payment mechanisms but in poor countries little compensation is actually paid. The GRAI produced compensation guidelines for the control of HPAI in developing countries.

A.4. Economic impact

Economic studies of HPAI have shown that the countries of East and South-East Asia have been especially hard hit. Losses have not only been sustained by farmers but also by other actors in the value chain, including traders and feed suppliers. Poor poultry-keepers have been most affected.

A.5. Funding the GRAI

In addition to the common financing practices of bilateral or multilateral partners and of development banks, specific modalities for funding the GRAI were developed through a multi-donor financing framework. Prior to the first International Ministerial Conference on Avian/Animal and Pandemic Influenza (IMCAPI) held in Beijing in January 2006, the World Bank had estimated that the financing gap to be filled to tackle HPAI was USD 1.2 billion. This figure was subsequently increased to USD 1.2 billion — USD 1.5 billion for a period of three years. The WB further estimated that about 80 % of external financing should be used for country programmes, while 20 % should go to regional and global activities conducted by regional organisations and the international technical agencies.

The international community, on the occasion of the successive IMCAPIs held in Beijing (January 2006), Bamako (December 2006), New Delhi (December 2007) and Sharm el-Sheikh (October 2008), pledged a total of USD 3 billion for HPAI control and pandemic preparedness (PP). After IMCAPI Sharm el-Sheikh, during 2009, pledges sharply increased (an additional USD 1.2 billion), mainly in response to the A(H1N1) pandemic. The total cumulative pledges thus stood at USD 4.3 billion. By 31 December 2009, a total of USD 2.7 billion had been disbursed (52 % in cash and the remainder in kind).

The largest contributor was the United States, which committed USD 1.6 billion and disbursed USD 1.4 billion. The European Union (Community and Member States) was the second largest global donor with a contribution of EUR 413 million. The Commission alone pledged and committed EUR 245 million, accounting also for 76 % of the Avian and Human Influenza Facility (AHIF), a WB-administered multi-donor trust fund pulling together resources from 10 donors.

About 40 % of the committed funds given bilaterally to recipient countries, 29 % to international organisations, 10 % to regional programmes like the WHO, FAO, OIE, the United Nations Children’s Fund (UNICEF) and others providing technical support, while 10 % of the funds were committed to regional programmes. Around 3 % were channelled through the AHIF. More than half (54 %) focused on HH and PP while less than a quarter (22 %) went to AH activities. About 7 % of the committed funds were intended to support information, education and communication (IEC) and the rest for programme implementation, monitoring and evaluation, and other activities.

Disbursements of loans from multilateral development banks have been faster than for their regular programmes but slower than the disbursements of bilateral or regional donors. The AHIF committed more than USD 80 million in grants, equivalent to 5 % of the total API financing for countries (and equivalent to 10 % of WB commitments). In some cases, for example Bangladesh and Cambodia, disbursements were delayed. In Uganda, the WB tied loans and AHIF grant funding to support HPAI control and PP. There is
indignation in Uganda about this \(^1\) and the project has been delayed by more than a year by the government \(^2\). The other African countries with grants tied to loans are Malawi, Mali, Mauritania and Nigeria \(^3\).

### A.6. Communication

The GRAI has assisted countries to develop or improve their communication systems, largely through UNICEF. Results of UNICEF activities vary across countries, depending on local factors (mainly government leadership, structure and resources) and partners. UNICEF coordinated with new partners (e.g. Ministries of Agriculture and FAO), strengthening capacities for outbreak and risk communication.

However, increased knowledge has not necessarily translated into effective behaviour change. Low levels of bio-secure farming and disease reporting were recorded in all surveyed countries. Factors discouraging reporting were: low risk perception; fear of the economic consequences of reporting; lack of clear information about follow-up actions; actual post-reporting of experiences; and a strong distrust of authorities. The current set of behaviour change messages, although technically sound, is perceived as imperative and often lacking relevance for the target group. In the future, messages and training programmes should be designed by working groups composed of technical and social scientists and based on the social, cultural, political and environmental values and contexts of the target group.

The GRAI has also improved outbreak/pandemic communication strategies and systems, benefiting pandemic communication, particularly during the influenza A(H1N1) pandemic in 2009.

### A.7. Restructuring and trade

Restructuring programmes for the poultry industry were proposed in early 2006 to combat HPAI. These mostly involved the replacement of backyard poultry production with large-scale commercial production, or at least a move towards semi-industrial or industrial production with a reduction in backyard poultry production. However, this proposal proved to be unrealistic since it did not take into consideration the actual socioeconomic factors of the countries at stake at that time and in that context. Generally, restructuring programmes have not been implemented except, perhaps, in Thailand where changes have been driven by the importance of the export market. With the exception of Thailand, countries need to raise their sanitary and phytosanitary (SPS) standards which currently limit their opportunities for legitimate regional trade in poultry and poultry products.

With the recognition of trade in poultry as being a major cause of the spread of the HPAI (H5N1) virus, an outcome of the GRAI has been to stimulate research in related issues. Various projects have set up networks, including UNICEF, to support research on avian influenza and other EIDs.

### A.8. Training

A great deal of training has been undertaken through the GRAI at all levels. Significantly, some training programmes have jointly involved AH and HH personnel. Joint rapid response teams (RRTs) have been trained and established in many countries: for example, in Bangladesh, Cambodia, India and Thailand in Asia, and in Ethiopia, Kenya, Rwanda, Tanzania, and Uganda in Africa. Undoubtedly, the training programmes have increased the availability of human resources with an understanding of the requirements for response and control of HPAI (H5N1) in both animals and humans and, ultimately, in PP and response (as seen in the A(H1N1) pandemic) and EID control in general. Their continued existence, however, is jeopardised by high staff turnover and will depend on continuing joint training to maintain cadres of personnel with this capacity.

### A.9. Laboratories

A major outcome of the GRAI has been the development of laboratories and laboratory networks, and training of their staff, that have led to faster and more accurate diagnoses of avian and human influenza with quality assurance. As of October 2008, 80 % of Asian countries could safely confirm human infection by H5N1 using the Reverse Transcription Polymerase Chain Reaction (RT-PCR) at national level. In Africa, 51 % of countries had access to RT-PCR for diagnosis of human infection nationally, and others had access to diagnostic facilities through a network of regional animal and HH laboratories that have been expanded and linked to the WHO system of influenza surveillance. Laboratory upgrades coupled with RRTs capable of rapid collection and sending of samples significantly decreased time between detection and confirmation of suspected infections.

The question remains concerning sustainability when external support ceases (high costs of tests and equipment). In addition, while some laboratories can confirm AI since the API crisis, they still cannot undertake other simpler, routine laboratory tests and this questions the relevance of investments when considering individual countries’ burden of diseases.

### A.10. Research

The GRAI has stimulated considerable research activity. Various projects have set up networks, including developing countries. These address epidemiology, diagnosis, vaccination and outbreak management in poultry, and treatment, vaccination and case management in humans. The GRAI also stimulated research in related subjects such as the environmental effects on virus survival, poultry husbandry, patterns of migration in waterfowl and communication related to behaviour change.

Better and faster diagnostic tests and more knowledge on the epidemiology of AI, API and other EIDs have been produced, enabling better surveillance and risk

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1. Interview — Ministry of Health, Uganda.
2. Correspondence with the WB.
A.11. One Health

Through the GRAI, the ‘One World, One Health™’ (OWOH) or ‘One Health’ concept which proposes a comprehensive and integrated approach to health risks and diseases at the animal-human-environment interface has been further translated into strategies and policies. At the third International Ministerial Conference on Avian and Pandemic Influenza (IMCAPI) meeting in New Delhi (December 2007), the concept was put forward for further development on the initiative of the Commission and the United States, in coordination with UNSIC. A joint strategic framework was subsequently developed early in 2008 by the FAO, WHO, OIE, UNSIC, UNICEF and the WB. It was presented at the October 2008 IMCAPI in Sharm el-Sheikh. On the initiative of the Public Health Agency of Canada, expert meetings were held in March 2009 in Winnipeg and in May 2010 in Stone Mountain (Atlanta, USA) to put the One Health (OH) concept into practice. The political commitment to OH was reiterated through the unanimous adoption of the Hanoi Declaration on the occasion of the IMCAPI Hanoi, April 2010. The support and promotion of the broad and ambitious OH concept by international stakeholders and leaders (at ministerial level) is a direct outcome of the GRAI.

A.12. Surveillance

In the HH sector, surveillance systems were strengthened for influenzas and particularly influenza H5N1 — and A(H1N1) in 2009 — which improved compliance with the International Health Regulations (IHR). Routine surveillance was expanded mainly at grass-roots level and was complemented by sentinel sites and event-based surveillance. Electronic systems of data collection and analysis were set up in some countries such as Bangladesh and Cambodia but are still of limited use due to incompleteness. Collaboration with the AH sector took place but mainly at times of infections. Surveillance, therefore, was better organised to detect sporadic cases of HPAI (H5N1) rather than clusters of cases and early signs of outbreaks. In addition, in countries where surveillance systems were already weak, real improvement of surveillance for PP is questionable.

A.13. Pandemic preparedness

Pandemic preparedness (PP) and response capacities have improved, although initial activities had been limited to improving the management of H5N1 human cases. PP has also been slow to reach the most decentralised, grass-roots levels sufficiently. However, with the response to the influenza A(H1N1) pandemic 2009 (although of moderate severity), the situation may have changed and pandemic readiness and response capacity may have improved between the time of visits and interviews in June 2009, just when the WHO announced Phase 6 of the influenza A(H1N1) pandemic and countries being studied were detecting, or managing, their first cases, and the time of finalisation of this report in July 2010. The need to address PP through a comprehensive approach within and beyond the health system was further recognised. Sectors like finance, energy, transport, telecommunication, food, water, defence, and law and order have not been systematically involved in country PP planning.

Internationally, the strong multilevel and multi-sectoral partnerships formed for the GRAI boosted a better definition of multi-sectoral PP and increased coherence and harmony in this approach. While the importance for multi-sectoral preparedness is now better acknowledged and recognised, there is still a need to further develop and invest in multi-sectoral pandemic preparedness, as well as support its policy, planning and implementation at national and decentralised levels, mainly in countries with limited resources.

While the availability of pharmaceuticals has increased globally, there are still differences between wealthy and poorer countries. Discrepancies in access to pharmaceuticals have led to difficult discussions on the sharing of virus samples, vaccines and other benefits which are not yet resolved. The GRAI has, nevertheless, prompted international support for the establishment of vaccine stockpiles and the opening of new vaccine plants in several countries. This will ultimately increase global vaccine production capacity and availability at country level, a substantial step towards improved global access to health.

Improved pandemic preparedness achieved through the GRAI was valuable for the swift and smooth response to the influenza A(H1N1) pandemic in 2009. There is, however, potential for additional and longer gains from the GRAI if, as foreseen in Beijing and promoted at the following IMCAPIs, countries could expand the scope of their work to encompass other EIDs, pandemic threats and health hazards.

While international policies, as well as regional programmes, aimed to tackle HPAI among other EIDs, countries’ preparedness has mainly focused on the response to the HPAI threat and has been slow to include other EIDs and pandemic threats. The increased awareness of the need for contingency planning and emergency preparedness for other EIDs is slowly influencing countries like China and Laos, supported by partners, to extend their plans for influenza A to other health hazards such as EIDs. The expansion of countries’ pandemic preparedness plans and policies beyond influenza to sustainably address other health hazards would tremendously increase the relevance and sustainability of efforts and investments and maximise the gains from the GRAI.

3 The OOWH concept is based on the Manhattan principles agreed in a meeting organised in New York in 2004 by the Wildlife Conservation Society and the Rockefeller University.
B. IMPACTS

The GRAI supported the development of various systems to respond to public health emergencies, such as a pandemic, which have proven effective to achieve their aim and can be used for other crises — highly pathogenic emerging infectious diseases (EID) or any other health hazard.

The GRAI supported the development of multi-sectoral partnerships and networks. Their achievements (in resource mobilisation, increased coverage of needs, cost-efficiency, flexibility, coherence and synergies) have greatly demonstrated the benefits of working across sectors and have created a new ‘culture of collaboration’, in particular between the AH and public health sectors, and the bodies in charge of disaster prevention and management.

It leveraged the implementation of the IHR and increased countries’ capacities to meet their requirements. It, therefore, produced ‘global public health good’ (such as more accurate information on potential trans-border dissemination of communicable diseases or other events that could constitute a public health emergency of international concern and on improved knowledge for international response) and contributed to the improvement of global health and of global health governance.

The GRAI offered opportunities to further the debate about inequalities in access to health in particular the timely access to scarce pharmaceutical resources such as antivirals and vaccine. Principally, the GRAI, even if still shackled by difficult discussions on samples and benefits sharing, led to the ongoing increase in vaccine production capacity through the opening of influenza vaccine plants in new economies. This process, which has taken on an additional dimension with the influenza A(H1N1) pandemic, resulted in important steps forward towards health for all.

The GRAI impacted the global economy by preventing further dissemination of HPAI, by improving country PP, by promoting additional investments, including through research, on EID and other pandemic threats.

By fostering advocacy for better equity in access to health, the GRAI had a positive impact on sustainable development and, therefore, on poverty reduction globally.

As per the long-term perspective anticipated at IMCAPI Beijing, the GRAI has broadened the scope of response to the HPAI crisis and promoted a balanced vision between emergency response and the need for a more developmental approach. GRAI achievements have progressively offered opportunities to go beyond HPAI and impacted the swift response to the influenza A(H1N1) pandemic. It also took advantage of the timely public attention to HPAI to further sensitise the international community, in particular policymakers, to the urgent need to address the rise of new health risks at the animal-human-environment (AHE) interface. It promoted One Health as a comprehensive, collaborative and cross-sectoral approach to health. The GRAI encouraged the further translation of OH into strategies and actions. It supported the development of a strategic framework to address the potential threat of EID at the AHE interface, underpinned by enhanced disease intelligence, surveillance and emergency response systems at the national, regional and international levels, and supported by strong and stable public and AH services, and wildlife monitoring.

It is expected that the GRAI will continue to reduce the risk and increase preparedness for other health hazards that could happen overnight in our increasingly globalised world.

Finally, from its success in mobilising worldwide attention and efforts, significant levels of resources, and multidisciplinary, multi-sectoral, multi-partners integration and collaboration, the GRAI demonstrated an example of effective global governance in dealing with matters of international concern.

It placed the issue of the threat of EID on the global agenda, facilitated the setting up of global standards, gathered and disseminated knowledge, provided the opportunity to strengthen markets that have the potential to produce increased public goods such as vaccines and science, and offered innovative implementation mechanisms for traditional intergovernmental treaties. The GRAI created new perspectives on key issues such as the response to uncertain threats which have transnational implications, the balance between emergency and development, the equilibrium between health and safety priorities versus livelihoods and the approach to effective operations in complex multilateral systems.

C. RECOMMENDATIONS

Further political sensitisation at the highest level should be fostered around the need for a whole of society PP permanent status (coined recently in the expression ‘pandemic readiness’).

Use should be made of the global attention on H5N1, H1N1 and EID to further increase the availability of global public goods through research, technical transfer and capacity-building in developing countries. Further research should be conducted on the epidemiology and transmission of HPAI (H5N1) from birds to humans. Mechanisms for compensation, contingency planning and RRT training programmes should be established that are compatible across regions to facilitate concerted responses to HPAI outbreaks across national borders.

Surveillance activities should be linked with risk analysis and opportunities presented by concerns over influenza A, EIDs and potential pandemics should be exploited to put in place, restructure and operationalise comprehensive surveillance systems where and when needed.

Communication messages and training programmes need to be customised to target local social, cultural, political and environmental concerns and should be formulated by technical and social scientists working together based on the prior understanding of the behavioural determinants and capacities for compliance of human communities.

Using the OH approach, efforts need to be continued to maintain and further develop PP involving all levels — from grass-roots up — of the livestock and health sectors. They should target not only HPAI, but also other EIDs in humans and animals. This will be particularly
challenging when there are no signs that a new pandemic is imminent, and much more difficult than it was at the start of the HPAI emergency when it was perceived that a pandemic was about to happen. Mechanisms need to be found for sustained support to surveillance, diagnosis and response to EIDs, particularly in developing countries where other priorities take precedence for support from local resources. Expanding the scope from HPAI to EIDs and to OH will increase even more the relevance of the investments made so far. The OH approach should be rapidly translated into strategies, policies and actions at country, regional and international level.

Lessons learned from the GRAI should be applied to other complex issues of international concern. Global public policy networks supplementing international treaties and laws, engaging the public and private sector as well as the civil society and supported by key political actors have helped the collective approach and engagement to respond to influenza A(H5N1) and (H1N1) so far. These global governance tools could be used also in support of other global challenge of our times.

In an increasingly globalised world, people must learn to live again with infection uncertainty. Instead of assessing the probability of various health risks, we must be prepared for novel health hazards which could occur overnight. Countries, regions, and the world need to be prepared for these events on a long-term and sustainable basis and be ready to react with, or without, external political or financial support. Therefore, programmes that have been proposed to respond to the HPAI and influenza A(H1N1) crises should be integrated into countries’ development programmes and become intrinsically part of any new development project. The challenge will be to keep a collective, rather than individual, approach through networks that were set up for the GRAI and maintain coordination at all levels.

The EU, in particular, based on its history and experience in these matters, should continue to assist in upgrading animal and public health services at national and regional levels with regard to strategies, surveillance, diagnosis, control and communication and to promote inter-agency and cross-sectoral collaboration and partnership, all to be undertaken in the context of a One Health approach.
1. INTRODUCTION

1.1 BACKGROUND

The highly pathogenic avian influenza (HPAI) virus (H5N1), first identified in birds in China in 1996 and responsible for the outbreak of very severe disease in wild and domestic birds, has been circulating in 15 Asian countries since 2003. By 2009, the virus had spread to 62 countries in Asia, the Middle East, eastern and western Europe and sub-Saharan Africa. In 12 of the 62 countries, only wild birds were infected. HSN1 has been declared endemic in Egypt and Indonesia, while parts of some other countries (Bangladesh, China and Vietnam) show signs of endemicity. The virus is spread through a combination of wild bird movements and trade in poultry and has led to the deaths of millions of poultry and caused billions of dollars of economic damage.

In recent years, a number of studies have estimated the economic impact of HPAI in different countries. Especially hard hit have been the countries of East and South-East Asia such as Cambodia, China, Indonesia, Laos and Vietnam. Research has shown that the poultry industry in these countries had suffered big losses due to HPAI outbreaks and their consequences. According to one source, from late 2003 to mid 2005, more than 140 million birds had died, or had been culled, in the affected countries of South-East Asia, resulting in the economic loss of more than USD 10 billion to the poultry industry of that region.

The macroeconomic impact has been much greater for countries that export poultry and their products. But at the microeconomic level, impact has been important for poor farmers. Verbiest and Castillo (2004) and the FAO (2004) cited by Rushton and others, stated that macro impacts will be greater for a poultry exporting country such as Thailand, where between 0.5 and 1.5% of gross domestic product (GDP) growth could be lost depending on the length of the outbreak. Two outbreaks in the United States have been estimated to have cost USD 65 and 140 million in disease control and loss of poultry (FAO, 2004). In Thailand, it is estimated that agricultural growth halved during the year of the outbreak (FAO, 2004). In Hong Kong, the 1997 outbreak led to the slaughter and destruction of the entire poultry flock of 1.5 million birds and is estimated to have cost hundreds of millions of dollars when taking into account the knock-on effects on the general economy (FAO, 2004). In general, Verbiest and Castillo (2004) state that HPAI is relatively unimportant at the macro level because the poultry sector is not of great importance to the economies in South-East Asia and this view would be supported by the robust growth of the countries most badly affected by the disease in 2004. However, Verbiest and Castillo (2004) recognise that HPAI would have strong micro impacts particularly in regions where smallholder farmers are dependent on poultry production and would have difficulties in overcoming the costs of culling and restocking in the face of an outbreak.

The magnitude of the losses depended on the severity of the outbreaks and on the relative size of the countries’ poultry sector in the national economies of these countries: ranging from about 0.6% of GDP for countries like Thailand and Vietnam to around 2% of GDP in the case of the Philippines. The economic loss suffered by Vietnam, for example, was from around 0.1 to 0.2% of GDP because of a 15% decline in its poultry output as a result of AI outbreaks in that country.

The direct economic costs of AI included losses of poultry due to the disease and measures to control it through culling birds. Other losses resulted from a reduction in egg production and decreased activities in the distribution chain. The costs of prevention and control, including costs of poultry vaccines, medications and other inputs such as hiring of workers for culling, clean-up, surveillance and diagnosis, were also part of the direct economic costs of AI. In addition, costs were borne by governments for partially compensating poultry owners and encouraging them to report outbreaks.

The economic impacts of AI extended not only to farmers but also to other actors along the value chain such as poultry traders, feed mills and breeding farms. Amongst farmers, in many poor countries, the hardest hit had been backyard and small commercial producers. For example, in Vietnam, where backyard farmers made up the bulk of poultry producers, individual rural households had been mostly affected and their losses only partially compensated by the government. Poor households seemed to have suffered disproportionately.

Poverty alleviation programmes in many developing countries provide micro-credit to poor households to engage in income-generating activities such as poultry. Micro-credit borrowers, most of whom are poor women, have suffered from the impact of AI and, in many cases, lost their livelihood. In Bangladesh, for example, beneficiaries, for whom poultry was the only source of income, had to take up other income-generating activities like fish cultivation after their birds were lost due to AI outbreaks. Some of them could not engage
in any occupation as they were in debt. Many poultry farms supported by NGO programmes incurred losses due to stock depletion and falling prices and had to close down \(^{15}\).

Humans are rarely infected with HPAI and only occasional transmission between humans has been documented. However, if the HPAI (H5N1) virus were to undergo genetic change and be capable of continuous transmission from one human to another, like the influenza A(H1N1) pandemic 2009 virus (a mixture of pig, poultry and human genome segments), a much more severe influenza pandemic resulting in millions of deaths and billions of dollars in economic costs \(^{12}\) could be seen. The influenza A(H1N1) pandemic 2009 caused by a mild virus with a low (1.3 \%) case fatality rate had caused 5 700 deaths worldwide by 25 October 2009 \(^{13}\). However, another influenza pandemic virus, such as H5N1, could have higher pathogenicity and transmissibility and, therefore, be much more devastating in its impact on human lives and sustainable development globally. In a moderate pandemic flu scenario, studies have suggested that the economic losses from illness and death in the first year of the pandemic could amount to 1.3 \% of world GDP or more. Combined with preventive costs of close to 2 \% of GDP, total costs could exceed 3 \% of world GDP in a moderate pandemic scenario \(^{14}\) (WB, 2009). Burns and others \(^{15}\) suggest that the cost of a global influenza pandemic could range from 0.7 to 4.8 \% of global GDP according to the severity of the outbreak. The lower estimate is based on the Hong Kong flu of 1968–69, while the upper is benchmarked by the 1918–19 Spanish flu. In the case of a serious flu, 70 \% of the overall economic cost would come from absenteeism and efforts to avoid infection. Generally speaking, developing countries would be hardest hit, because higher population densities, relatively weak healthcare systems, and poverty accentuate the economic impacts in some countries.

The possibility of an influenza pandemic, as a result of the HPAI (H5N1) outbreak in birds, became a serious concern in late 2005/early 2006 because of the increased dissemination of poultry outbreaks around the world and, consequently, the increased number of human infections and deaths. The Commission, in close cooperation with successive European Union (EU) presidencies, has been one of the main driving forces behind the ‘global’ response to the AI crisis, with the objectives of mitigating its consequences (negative impact on the livelihoods of many poultry smallholders), limiting the risks it carries (including a pandemic of human influenza originating from AI that would affect the whole world) and responding to the objectives delineated at the International Meeting on Avian Influenza and Human Pandemic Preparedness in Geneva from 7 to 9 November 2005 and confirmed at the International Pledging Conference on Avian and Human Pandemic Influenza in Beijing on 17 and 18 January 2006.

The Commission, as co-host, played an important role in the major high-level international conferences in Beijing (January 2006), Vienna (June 2006), Bamako (December 2006), New Delhi (December 2007) and Sharm el-Sheikh (October 2008). These important political meetings combined ministerial sessions with high-level technical exchanges and pledging sessions. By November 2008, the international community had pledged a total of more than USD 3.03 billion globally, in the fight against HPAI and the preparation for a possible pandemic. After the Sharm el-Sheikh conference during 2009, pledges of support increased sharply as a number of development partners pledged an additional USD 1.2 billion, mainly in response to the influenza A(H1N1) pandemic. The total cumulative pledges for supporting avian/animal and pandemic influenza thus stood (at the end of December 2009) at USD 4.3 billion \(^{16}\). The EU with a contribution of EUR 413 million in grants is the second largest global donor (in cash grants, the first). The Commission on its own pledged and committed almost EUR 245 million: EUR 65 million of which has been allocated to support specific influenza research projects (2001–07). Since 2007, the Commission has further supported, with over EUR 40 million, a number of larger research projects on viral or infectious diseases in general, within which influenza plays an important role. The latter funds are part of a EUR 100 million budget for emerging epidemics research (2002–08).

From the start, the Commission designed its external response to the AI crisis from the point of view that gave priority to sustainable results and, therefore, to a medium and long-term vision. The approach, therefore, aimed at increasing countries’ and regions’ capacities to plan and develop, in a sustainable way, their own strategy for surveillance, response, information exchange, development and implementation of appropriate technical answers. This approach is now largely shared by a number of other financial backers. The Commission, followed by others, decided to finance not only AI in the future but all cross-border diseases caused by highly pathogenic agents and emerging or re-emerging diseases in the fields of animal and human health.

The initial support from the Commission primarily aimed at strengthening national level development, increasing coordination between all sectors involved, among them the medical and veterinary sectors, and financing integrated national action plans (INAPs) in human and animal health, including the communication aspects. Since the second half of 2007, actions have focused more on cross-border cooperation in animal and human health, addressing API and other highly pathogenic or emerging diseases. As from the New Delhi conference, the Commission, in coordination with the Senior UN System Coordinator for API, Australia, Canada, the United States and others started promoting the One World, One Health™ or One Health approach as an avenue for the future.

\(^{11}\) Chakma, D., Rushton, J. Rapid Assessment on Socioeconomic Impact due to Highly Pathogenic Avian Influenza in Bangladesh, FAO Bangladesh, June 2008.

\(^{12}\) An A(H5N1) pandemic could cost the global economy some USD 2 trillion (FAO et al., 2008). Seasonal influenza epidemics are estimated to cause 250 000–300 000 deaths annually worldwide. The cost of a moderate influenza epidemic in France alone had been estimated in 2007 to be EUR 16.6 billion (European Commission, Directorate-General for Research (2007a)).

\(^{13}\) http://www.who.int/csr/don/2009_10_30/en/index.html

\(^{14}\) WB, 2009.

\(^{15}\) Burns et al., 2006, 2008.

1.2 RATIONALE FOR THE ASSESSMENT

In January 2006, the first International Ministerial Conference on Avian and Human Pandemic Influenza was hosted in Beijing by the Chinese Government, co-organised by China, the Commission and the WB in coordination with UNSIC, the WHO, FAO and OIE. The conference was organised to promote, mobilise and coordinate political and financial support from the international community for the national, regional and global response to HPAI, and to support efforts at all levels to prepare for a possible influenza pandemic. The pledging conference drew on strategic recommendations developed by the international community including the FAO/OIE/WHO/WB-sponsored International Meeting on Avian Influenza and Human Pandemic Preparedness held in Geneva from 7 to 9 November 2005. In the Beijing Declaration issued at the conference, participants subscribed to the following, which best describes the overarching goal of the international effort on HPAI:

A long-term strategic partnership between the international community and the countries currently affected or at risk in which adequate and prompt financial and technical support is mobilised to complement the efforts by countries and regions, particularly developing countries. Areas of emphasis will include both immediate and longer-term measures. In the short term, priority will be given to helping countries contain, control and eliminate the virus in affected poultry and prepare for a possible pandemic. Priorities will be given to improving surveillance and detection capabilities, increasing public awareness and fostering community resilience, promoting vaccine research and development, developing stockpiles of human anti-viral, assisting with response and containment measures in the event of an outbreak and mitigating social, psychological and economic impacts on the population. In the longer-term, priority will be given to developing capacity and infrastructure in animal and public health sectors, as well as undertaking complementary reforms in related sectors at all times that there is a need. The international community should conduct analysis and provide detailed guidance on a range of important issues — such as the appropriate structure for compensation systems, stockpile, monitoring and evaluation — that respond to individual country circumstances.

Most evaluations conducted since the Beijing conference have, except for the study on the gender aspects of the AI crisis launched by the Commission and, to a certain extent, the external evaluation of UNSIC, concentrated in a rather qualitative way on the use of financial inputs, commitments and disbursements (WB), on outputs (WB-UNSIC), or on the impact of HPAI on family poultry production. Despite repeated requests from the main stakeholders and financial contributors (among them the Commission, Japan and the United States), the GRAI has not succeeded in putting in place a methodology and a set of indicators for quantifying outputs and outcomes. Neither has there been any evaluation of the outcomes (direct effects) and impacts (indirect effects, broad range and/or long term) of the GRAI.

It seems obvious to the stakeholders and actors of the GRAI that actions have had many broad-ranging and mid to long-term effects: for example, better coordination between animal and human health services; better recognition of the importance and need for prevention and preparedness within the whole disaster management cycle; increased political interest in zoonotic and emerging infectious diseases. The coordinated GRAI has federated actors and set up a network which has broader effects than only API. The many outcomes and multiple impacts deserve to be assessed.

This evaluation primarily aims to provide an overall independent assessment of the outcomes and the impact of the GRAI (including activities of political and technical coordination and financial and technical assistance for HPAI control and pandemic preparedness) towards the overarching goal developed at the International Meeting on Avian Influenza and Human Pandemic Preparedness in Geneva from 7 to 9 November 2005 and confirmed at the International Pledging Conference on Avian and Human Pandemic Influenza in Beijing on 17 and 18 January 2006. It has been conducted at global, regional and country level through desk study analysis, inference and fieldwork conducted in Africa and Asia. Although the assessment has a particular focus on Asia, it was considered that a comparison with the situation in at least one country of the African continent was needed.

The specific objectives of the evaluation are to:

- assess the outcomes against inputs of the GRAI globally, regionally and in a set of countries selected from different regions of the world and infer the overall impact worldwide from these findings;
- seek evidence to answer the following questions:
  - Are there objectively verifiable outcomes and already impacts of the GRAI that go beyond the short-term hard and soft outputs of the investments made in the context of the GRAI?
  - What impact is likely to be observed in the coming years as a consequence of the global AI response?
  - Is this impact going beyond AI? Is it going beyond emerging diseases prevention and control?
  - Is this verifiable, in particular for the organisational and financial inputs given by the Commission since 2005?
  - Could these outcomes have been achieved without the provision of international assistance under the GRAI?
  - Could these outcomes have been achieved in a more substantive manner had the international assistance been provided:
    - In a different way?
    - In a different amount?
• assess the overall impact and relevance of international assistance under the GRAI for the achievement of its overarching goal;
• conduct an initial analysis of the likely longer-term impact of international assistance under the GRAI and identify lessons that may be applied to similar initiatives in the future.

In reaching these objectives, the evaluation will at all times consider national, regional and global levels and the coordination framework within which the international assistance was provided.

1.3 METHODOLOGY

In this assessment, the term ‘outcome’ is taken to mean ‘a result or effect of an action or situation, a final product or end result’. The term ‘impact’ is taken to mean ‘a powerful effect that something, especially something new, has on a situation’.

The assessment is based on:
• a review of the literature (background documents, national integrated plans and previously produced reports);
• interviews with international, regional and national key informants, face-to-face or by telephone (representatives of national authorities, financing organisations, implementing UN agencies and NGOs);
• visits to case study countries, regional hubs and international headquarters.

The assessment is based on the Commission Guidelines for Evaluation and, therefore, followed the two-step approach as described in the terms of reference (Annex 1). The evaluation was conducted by a team of four consultants, at the initiative of the Coordinator for the Commission AI external response (Directorate-General for External Relations), the EuropAid Cooperation Office and the Commission delegations in the countries visited.

The first step, which resulted in the production of an inception report, consisted of a desk study of the existing background documents and previously produced reports. (NB During the following stages, more documents were consulted.)

Important documents consulted during the assessment included:
• UNSIC-WB Global Progress Reports on the Avian Influenza response (January 2006–October 2008);
• the first internal evaluation of the FAO on the avian influenza response (14 September 2007);
• the review of the Consolidated Action Plan for Contributions of the UN System and Partners (to the API response), UNSIC (17 September 2007);
• the evaluation of United Nations System Influenza Coordination (UNSIC) final report submitted 22 July 2008 (Barnaby Willitts-King, Angela Smith, and Les Sims);
• the quarterly and six-monthly progress reports on the Avian and Human Influenza Facility (World Bank) from 2005 to 2009;
• the study on the Gender Aspects of the Avian Influenza Crisis (European Commission, June 2008);
• A Guide for Monitoring and Evaluation Avian Influenza Programmes in South-East Asia (USAID, Measure Evaluation, September 2008);
• On economic impact of the AI crisis: Avian Influenza in Vietnam: chicken-hearted consumers? (Figuier, M., and Fournier, T., 2008);

A complete list of all documents consulted during the consultancy is presented in Annex 6.

The team was required by the terms of reference to select and propose, on the basis of the desk study, three case study countries, one in South-East Asia, one in South Asia and one in Africa. The selected countries, together with a detailed in-country methodology would form a proposal for the second phase of the assessment consisting of visits to the selected case study countries.

During the inception phase, the team realised the limitations it would impose upon itself in achieving the objectives of the assignment if it were to follow the terms of reference and select only three countries to visit. It was noted that there are many differences between regions as well as between countries, even within the same region, with regard to exposure to API and responses. The team, therefore, decided on a more regional approach to the study which would allow for a more comprehensive review of the GRAI, and proposed to select two countries per region, thus six in total. In each region one regional hub — namely Bangkok, Thailand, New Delhi, India and Nairobi, Kenya, which are bases for major international organisations, as well as one case study country in each hub, was selected and the travel schedule was adapted accordingly. This proposal is included in the Inception Report (Annex 4). The travel schedule was accompanied by a list of international organisations and financial institutions with details of the key people at their headquarters to be approached for personal or telephone interviews during or after the fieldwork.

It was requested that the case study selection avoid countries where significant reviews and thus literature was already available such as, for example, Indonesia or Vietnam. Therefore, in South-East Asia, Cambodia was selected for the study. Cambodia has experienced outbreaks of avian influenza since 2004, with the first outbreaks reported on 24 January 2004 10.

The case of Cambodia is interesting because of its geographical situation between two countries, Thailand and Vietnam, which, at the early stage of the epizootic in 2004 and 2005 were among the most affected. Cambodia, a good example of inclusive multi-partner coordination, developed a national strategy

10 http://www.oie.int/eng/info_ev/en_AI_factoids_(H5N1)_Timeline.htm
which encompassed key elements of avian influenza control and pandemic preparedness. Control of avian influenza was, however, impeded by the lack of compensation mechanisms which impacted surveillance, early detection and the control of infections in both animals and humans. A strong communication strategy, which tried to offset the lack of compensation, has been taken as an example by other countries many times. Finally, Cambodia was one of the first countries to understand and consider the importance of cross-sectoral preparedness for a pandemic. It included its disaster management agency, the National Committee for Disaster Management (NCDM), in the national strategy to address avian and pandemic influenza.

In South Asia, the case study countries included both Bangladesh and India as there were, at the time (May 2009), API outbreaks both sides of the border between West Bengal and Bangladesh. In India, the disease had also spread to Assam and Sikkim and across its border with Nepal. Here was an example of an outbreak which crossed international boundaries, requiring a regional, as well as a national, approach to control. India is an emerging economic and political power, important strategically in a region which has unsettled areas. India is keen to show its place as an important, good and willing player in the global partnership on API. As such, it has been the seat of regional and international meetings of political and technical importance. There is resolve in India to tackle its API problem using its own resources. In addition, New Delhi is the seat of the WHO South Asia Regional Office. Bangladesh suffered its first outbreak of API in March 2007 which continued until July that year. A second outbreak occurred from September 2007 to May 2008 with 47 out of 63 districts affected. Bangladesh is one of the five countries of the world where avian influenza is deeply entrenched, thus considered enzootic 19.

In Africa, Uganda was selected for the study. Like the majority of African countries Uganda has not reported any outbreaks of HPAI (H5N1). Nevertheless, Uganda has been keen to prepare for outbreaks of API following reporting of cases in poultry in southern Sudan in 2006. Uganda is one of the few African countries which had its INAP fully funded. In addition, Uganda is an example of a country which used its preparedness for API to also address another EID — the 2007 Ebola fever outbreak — increasing, therefore, the advantage gained from the assistance received through the GRAI and, mainly, from the Commission, WB and USAID. Finally, Uganda is interesting to study as a growing country which is keen to increase its role in the subregion.

One of the specific objectives of the terms of reference was to seek evidence to answer the following questions from the terms of reference (TORs):

- Could these outcomes have been achieved without the provision of international assistance under the GRAI?
- Could these outcomes have been achieved in a more substantive manner had the international assistance been provided:
  - In a different way?
  - In a different amount?

In pursuing this objective, evaluation questions were drafted based on this list, the briefing at the Commission and a first analysis of the key documents, i.e. the Global Strategy for the Progressive Control of Highly Pathogenic Avian Influenza from 2005. Most evaluation questions were further specified by means of sets of judgement criteria. These judgement criteria spell out the aspects used to judge the merits of the GRAI programme. The evaluation questions were formulated to cover the Development Assistance Committee of the European Commission’s (DAC) five evaluation criteria (relevance, efficiency, effectiveness, impact and sustainability), as well as the additional Commission criteria of added value and coherence.

The evaluation questions used to guide the team during the fieldwork were:

1. How far has the GRAI enhanced national, regional and international communication and collaboration between agencies to control trans-boundary (re-)emerging infectious animal and human diseases?
2. To what extent has the GRAI reduced the incidence of API in poultry?
3. To what extent has the GRAI limited the dissemination of the virus from birds to man?
4. To what extent has the GRAI enhanced increased food safety and a robust regional and international trade in poultry and poultry products?
5. What success has the GRAI had in preventing the introduction or establishment of API in non-infected at-risk countries?
6. How has the GRAI effectively prepared the world for emerging diseases and pandemics?
7. To what extent have GRAI funding modalities and resources ensured efficient and timely outbreak control in infected countries, effectively increased preparedness in countries at risk and improved the overall level of preparedness?
8. To what extent, and how, has choice of funding modalities made by the Commission allowed progress towards the achievement of its short and long-term objectives?
9. Considering successful actions in various supported areas (political, technical multi-sectoral coordination,
technical and financial assistance for API control and pandemic preparedness), what impacts have been observed, how have these impacts been achieved, what were the conditions of success, and to what extent are the lessons transferable?

A comprehensive set of interview questions was developed to assist the team in collecting information from interviewees. These are presented in Section 4.5 of the Inception Report in Annex 4.

Once the inception report was approved, travel arrangements were made for the second step of the assessment. Due to a tight schedule and organisational setbacks, two members of the team travelled ahead to Bangkok, Thailand, to prepare the ground for the rest of the team, who joined them later, and to conduct meetings with representatives of the Commission and national and major regional international institutions. The team then travelled to Cambodia, the case study country in South-East Asia. In Cambodia, representatives of the Commission, national authorities, implementing UN and crisis response partners, and the WB were interviewed and field and poultry market visits were conducted.

A similar programme was followed in South Asia where Delhi, India, was the place of call to obtain a regional perspective, and Kolkata and the border area with Bangladesh (West Bengal), for the local and trans-border perspective. The Indian-Bangladeshi border, an outbreak area at the time of the mission (June 2009), together with Bangladesh would serve as the South Asian case study area. In Delhi, representatives of the Commission, UN, and an NGO were interviewed and in Kolkata, representatives of local government and an NGO were interviewed. Field and poultry market visits were also carried out. In Dhaka, representatives of the Commission, national authorities, UN, crisis response organisations, the WB, NGOs and the private sector were interviewed and a visit to a poultry market was undertaken. Bangladesh was also used as a study country for a cost-benefit analysis of its response to API (Annex 7).

Due to organisational difficulties, only three team members travelled on to Africa for the final part of the country visits. Although Africa has mostly been safeguarded from API, the continent is indispensable for a global evaluation. Moreover, the limited attention given to Africa compared to Asia gave ample opportunity to assess the level of preparedness of the continent for an imminent pandemic.

An East African regional perspective was obtained in Nairobi, Kenya, where consultations were held with the Commission, the Inter-African Bureau for Animal Resources from the African Union (AU-IBAR), representatives of major international stakeholders, UN and research organisations. From Nairobi, the team travelled to Uganda, the final case study country, which had been selected for reasons of its advanced preparedness despite an absence of API outbreaks. In Uganda, interviews with representatives of national authorities, the Commission and the WB were conducted.

A complete list of organisations met and consulted, together with their location and method of contact, is presented in Table 1.

Table 1: Organisations met and consulted, location and method of contact

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<tr>
<th>Place</th>
<th>Interviewee(s)</th>
<th>Method of contact</th>
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<tbody>
<tr>
<td>Bangladesh</td>
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<td>DAI (NGO)</td>
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<td>FAO</td>
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<td>Institute of Epidemiology Disease Control and Research (IEDCR) and National Influenza Centre</td>
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<td>Royal Danish Embassy</td>
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<td>RTM (NGO)</td>
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<td>UNICEF</td>
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<td>WHO</td>
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<td></td>
<td>World Bank</td>
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<tr>
<td>Belgium, Brussels</td>
<td>European Commission, External Relations Directorate-General</td>
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<td></td>
<td>European Commission, EuropeAid Co-operation Office</td>
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<tr>
<th>Place</th>
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<td></td>
<td>National Veterinary Research Institute (NaVRI)</td>
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<td>Smallholder Livestock Production Programme</td>
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<td></td>
<td>UNICEF</td>
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<td></td>
<td>UNRC Office, avian and pandemic influenza focal point and coordination officer</td>
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<td>WHO</td>
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<tr>
<td>France, Paris</td>
<td>OIE</td>
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<tr>
<td>India</td>
<td>Block Veterinary Office</td>
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<td></td>
<td>CARE Kolkata</td>
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<tr>
<td></td>
<td>CARE India (disaster management team)</td>
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<td></td>
<td>District Veterinary Office, Howrah</td>
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<td></td>
<td>EC Delegation Delhi</td>
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<td></td>
<td>Kolkata Department of Animal Resources Development (DARD)</td>
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<td>Ministry of Public Health</td>
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<td></td>
<td>Poultry farmer, Paniara, GP Beldubi</td>
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<td></td>
<td>Sub-Centre Medical Officer, Howrah</td>
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<td></td>
<td>WHO South East Asia Regional Office (SEARO)</td>
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<tr>
<td>Italy, Rome</td>
<td>Animal Production and Health Division, FAO</td>
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<td>Kenya</td>
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<td>FAOECTAD Regional Animal Health Centre</td>
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<td>ILRI USAID-supported programme</td>
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<td>Red Cross Regional Office (IFRCC)</td>
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<td>Rockefeller Foundation</td>
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<td>SPINAP Team at AU-IBAR</td>
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<td></td>
<td>UNOCHA Regional Office for Pandemic Influenza Coordination (OCHA-PIC)</td>
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<td></td>
<td>USAID</td>
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<td>AusAID</td>
<td>Meeting</td>
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<td>Ministry of Agriculture, Thailand</td>
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<td>OIE</td>
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<td>Thailand Rockefeller Foundation</td>
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<td></td>
<td>UN Office for Coordination of Humanitarian Affairs (UNOCHA) non-health pandemic preparedness, PIC team</td>
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<td>UNICEF</td>
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<td>UNSIC</td>
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<td>USAID</td>
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The results, conclusions and recommendations of this evaluation are produced from a synthesis of the facts and opinions presented in the literature reviewed and the informants consulted from grass-roots level in the case study countries, regional centres, and at international level.

The itinerary for the mission is presented in Annex 2, a list of persons met/interviewed in Annex 3 and the aide-memoire in Annex 5.

Realising that the limited country case studies could still lead to subjective and/or biased statements, the deductions inferred from countries interviews and observations were then compared with a broad range of surveys, studies and the international literature on API and EIDs in order to balance conclusion and guarantee objectivity. Bibliographic reference is presented in Annex 6.

<table>
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<tr>
<th>Place</th>
<th>Interviewee(s)</th>
<th>Method of contact</th>
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<tr>
<td>Singapore</td>
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<td>Switzerland Geneva,</td>
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<td>Telephone interview</td>
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<td>WHO</td>
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<tr>
<td>Uganda</td>
<td>Directorate of Animal Resources, Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)</td>
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<td>Ministry of Health</td>
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<td>World Bank</td>
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<tr>
<td>UK, London</td>
<td>Veterinary Clinical Sciences Department, Royal Veterinary College</td>
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<tr>
<td>USA, New York and Washington</td>
<td>Former Special US Representative for Avian and Pandemic Influenza</td>
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<td>UNICEF</td>
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<td>World Bank</td>
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2. ANALYSIS AND RESULTS

2.1 HOW FAR HAS THE GRAI ENHANCED NATIONAL, REGIONAL AND INTERNATIONAL COMMUNICATION AND COLLABORATION BETWEEN AGENCIES TO CONTROL TRANS-BOUNDARY (RE)-EMERGING INFECTIOUS ANIMAL AND HUMAN DISEASES?

2.1.1 International communication and collaboration

Internationally, the GRAI has led to the development of a global strategy proposed by the WHO, FAO and OIE at the Geneva conference, November 2005, and further revised through various follow-up technical meetings. The political endorsement of this serious crisis led to a major financial mobilisation through the pledging meetings that accompanied the international ministerial conferences of Beijing, January 2006, Bamako, December 2006, New Delhi, December 2007, and Sharm el-Sheikh, December 2008. It ensured high-level global political engagement, as defined in the Beijing Declaration and reinforced at the following high senior officials meeting in Vienna, June 2006, and the ministerial conferences mentioned above, to establish a coordinated and effective basis for limiting the social, economic and health impacts of API. It led to a strong and sustained commitment and collaboration by the international community and key crisis response partners, particularly, the Commission and the United States, but also Australia, Japan, and the multilateral and regional banks.

The regular global encounters allowed the adoption of political, technical and financial courses of action. Accountability of states and international organisations was reflected through regular stocktaking and progress reports. These regular political and technical conferences improved the sharing of information and the level of common knowledge and understanding of states and partners.

The OIE, FAO and WHO, as well as other UN agencies such as the United Nations development programme (UNDP), United Nations Office for the Coordination of Human Affairs (UNOCHA), UNICEF, the World Food Programme (WFP) and the Office of the United Nations High Commissioner for Refugees (UNHCR) worked with governments and other international organisations to develop strategies and work plans based on the global strategy proposed in Geneva in November 2005. Actively supported by API political drivers, a strong partnership emerged between the international technical agencies with mandates in human health and animal health and agencies working on emergency management (UNDP, UNOCHA and others). This close collaboration was important in ensuring that various sectors and partners aligned their interests in the objective of a global containment effort.

The OIE and FAO collaborated with many international, regional, multilateral and bilateral organisations to increase the chances of success of their mission. The OIE and the Inter-American Institute for Cooperation in Agriculture, for example, elaborated the PVS tool to assess the degree of countries’ compliance with the Terrestrial Animal Health Code; and the OIE and FAO, supported by Japanese funds, initiated, in April 2005, the OFFLU joint network of expertise on avian influenza.

OFFLU’s objectives are:

(i) to ensure that avian influenza virus sequences are accessible to the entire scientific community and, therefore, promote the global sharing of virus strains and sequences by world scientists, international organisations and countries;

(ii) to offer technical advice and veterinary expertise to Member Countries to assist in the diagnosis, surveillance and control of avian influenza;

(iii) to collaborate with the WHO influenza network on issues relating to the animal-human interface;

(iv) to highlight avian influenza research needs, promote their development and ensure coordination.

Sharing information about infections and virus was, and is still, not an easy matter because of the political, economic and social consequences at domestic, regional and international level. The FAO, OIE, WHO and partners’ proactive joint efforts, supported by the GRAI, enhanced transparency through new networks such as the global early warning system for major animal diseases (GLEWS). They also promoted the increase in vaccine research and production and the creation of new vaccine plants to increase access. While there have been difficult times and tense discussions, particularly on the issue of intellectual property rights and sample sharing, significant progress on the principle of public goods has been progressively achieved. The creation of the intergovernmental meeting on benefit-sharing, even if complicated by difficult discussion, is, by itself, a demonstration that countries and partners recognise collaboration is the only way to solve global problems.

Following recognition that no single UN agency could manage the global response to API, Dr David Nabarro was appointed as the United Nations System Senior Coordinator for Avian and Human Influenza by the UN Secretary-General in September 2005 to help ensure that the UN System works optimally to support the national, regional and global efforts to address the threats posed by API. The Coordinator’s work draws on, and enhances implementation of, the technical strategies for influenza action that are spearheaded by the FAO, WHO and OIE.

The UN Secretary-General set up a steering committee on API chaired by the Deputy Secretary-General and composed of the heads of the UN agencies to whom the Senior UN System Coordinator for Avian and Human Influenza reports. The coordinator is supported by a small coordination team resourced from various governments.

20 Interviews — European Commission, Directorate-General for External Relations; UNSIC, Geneva.
21 See footnote 20.
22 Interview — Animal Production and Health Division, FAO, PIC, Geneva.
23 Interview — Animal Production and Health Division, FAO.
24 http://www.offlu.net/
25 Interviews — WHO (Geneva); SEARO (Thailand); UNSIC; OIE.
26 Interview — UNSIC.
The aim of the UNSIC office is to ensure that the UN system responds as one to national, regional and global challenges in relation to influenza, therefore ensuring cooperation and coordination within the UN system in support of the various initiatives under way to address the avian flu epidemic and the threat of a human pandemic. This office has been, from the beginning, very much involved in the good coordination and development of the global meetings and has, therefore, helped in raising the profile of the issue on the global agenda, in setting global standards, and in the gathering and sharing of information through the elaboration with the WB of regular progress reports on API activities and the accountability of international institutions and states.

The WB has helped to channel financial contributions for support to API programmes, reviewed states’ investment proposals and provided technical assistance in collaboration with the UN and other response partners. Following the international meeting in Geneva in November 2005, the WB estimated the costs of responding to API threats at the country, regional, and global levels over a three-year period, and identified the financing gaps in developing countries of different income levels that could be faced at different phases of the disease. In order to provide a solid cushion of capital contribution and commitments, at the request of the Commission, the WB created a multi-donor trust fund (MDTF) labelled the Avian and Human Influenza Facility (AHIF). The AHIF was created to assist countries in meeting financing gaps in their API INAPs when domestic and existing bilateral or multilateral funding resources were unable to fill the gap.

Such global mobilisation and coordination has essentially been possible because of the influence of key international actors who tied good coordination with funding. Canada is, for example, instrumental in pushing for a coordinated approach to One Health. USAID, through the human pandemic preparedness (H2P) programme has achieved increased coordination and coherence between UN agencies and NGOs on the issue of whole of society pandemic preparedness. The Commission has supported the development of countries’ INAPs.

However, coordination problems at the global level were repeatedly identified as impeding progress at the country level by a study in 2007 on coordination of avian and human influenza activities. It observed that ‘coordination between the respective headquarters of UN agencies and the WB must be improved if progress is to be made on country-level coordination. At the moment, mixed messages, costly duplication and high transaction costs as a result of inefficiencies at the global level are hindering action at the country level’ and concluded ‘to improve this situation and ensure that high-level coordination is developed and mainstreamed, the mandate of the office of the UN system influenza coordinator (UNUSIC) should continue with a renewed focus on effective coordination among respective UN headquarters and World Bank headquarters’.

Some key informants therefore question the sustainability of inter-agency coordination once funding is no longer available. Other informants, however, ascertain that these partnerships have provided enough evidence of the added value of joint work to change peoples’ mindsets and therefore impact on the way future work on global matters such as One Health will be conducted.

The coordinated approach to HPAI (H5N1), although sometimes difficult, has been very effective considering the issue. It has created new partnerships which have been essential in obtaining results. In addition, the concept of a ‘task force’ as a way to collaborate between agencies and partners has proven effective, flexible and rapid in dealing with complex multi-sectoral matters of international concern. As a key informant stated, “It brought back the notion that the results are more important than the processes.” This concept, which is more a movement, can move very fast and therefore be very effective. Such a concept/movement is also applied to the global food crisis and can be applied to other topics of global importance such as climate change. This concept is also valid at ministerial level: a new problem of significant importance does not need the creation of a new minister but can be solved through a task force approach. So, HPAI (H5N1) had a huge and important institutional impact, demonstrating that when a new global problem arises, it is not necessary to respond by creating new institutions, organisations or agencies, but that a task force can do the job faster and more easily because of its speed of reaction and administrative lightness. It is about a new culture of response and it is revolutionary in its approach.

Conclusion

The GRAI has been very influential in promoting coordination at all levels as required in regard to the complex multi-sectoral and global nature of, and approach to, the response to avian and pandemic influenza and the inherent involvement of multiple actors for effective results.

28 World Bank, Avian and Human Influenza financing needs and gaps, 21 December 2005.
29 Interviews — European Commission, Directorate-General for External Relations, Brussels; UNSIC; WHO; World Bank, Washington and Cambodia.
32 Brad Herbert Associates, 2007, A study on coordination of avian and human influenza activities, UNSIC.
33 Interview — Developing Country Policy and Advocacy, Global Health Programme.
37 Responses to Avian Influenza and State of Pandemic Readiness, fourth UN-WB progress report, October 2008.
2.1.2 Regional communication and collaboration

Ideally, pandemic planning should be coordinated with other countries in the region whose actions could have a cross-border impact. Cross-border preparations appear to be mixed regionally. Evidence from a survey of Middle East and North African INAPs indicates that only 44% (7 of 16) of the plans have included details about regional/cross-border preparations. Similarly, an analysis of national plans by the London School of Hygiene and Tropical Medicine identified that only a small minority of African countries have entered into collaborative agreements with their neighbours. However, the European Centre for Disease Prevention and Control has identified that 64% of European countries have undertaken joint policy work with neighbouring countries.

Regional coordination has been more difficult to achieve, partly because:

- regional institutions such as the Association of South-East Asian Nations (ASEAN), South Asian Association for Regional Cooperation (SAARC) or African Union (AU) do not yet have sufficient management capacity;
- countries within these regional institutions do not share the same capacities and or political and economic interests in coordinating and sharing information;
- various regional or subregional groups were involved in different plans and strategies: in Africa, for example, in addition to the AU, the economic communities such as the Southern African Development Community (SADC), Economic Community of West African States (ECOWAS) and the East African Community (EAC) have become involved;
- in Asia, in addition to ASEAN, subgroups such as Mekong Basin Disease Surveillance (MBDS) or the Ayeyawady – Chao Phraya – Mekong Economic Community (EAC) have become involved.

The multiplicity of (sub)regional initiatives and the lack of regional management capacity have led international organisations and crisis response partners, with their different mandates and interests, to support different plans or strategies: this has hindered a coherent and harmonised regional approach.

For example, while the Australian government’s overseas aid programme (AusAID) and USAID supported ASEAN plus three countries (ASEAN+3), their strategy was different from the WHO South-East Asia Regional Office (SEARO) and Western Pacific Regional Office’s (WPRO) Asia-Pacific strategy for emerging diseases (APSED) programme for EIDs. Inevitably, this caused problems at country level with countries pertaining to several (sub)regional initiatives receiving funds for strategies which were not always complementing each other. UNSC in Asia and the Pacific was, however, instrumental in bridging the various (sub)regional initiatives and in ensuring that information and lessons learned benefited countries. UN agencies such as UNOCHA and others, and the International Federation of the Red Cross (IFRC) also tried to harness partners regionally to improve whole of society pandemic preparedness. The Asian Development Bank (ADB) was involved with donor coordination in Asia-Pacific. All these initiatives led to the development of an informal and loose network of ministers and technical experts who have shared information and experience over time. This network proved useful at strategic times, such as in the early days of the A(H1N1) pandemic when important information was both formally and informally shared. Nevertheless, the fourth UN-WB progress report presented in Sharm el-Sheikh described regional coordination and information sharing as particularly low in Asia-Pacific and concludes that regional or cross-country coordination is generally insufficient.

2.1.3 National communication and collaboration

At country level, the establishment of national task forces or committees with technical subgroups and the development of INAPs have been important coordination tools to ensure the inclusive and coherent involvement of all necessary actors and sectors in the definition and implementation of national strategies. Such tools have been adopted almost worldwide and have significantly enhanced:

- high-level political attention and involvement with direct link to prime minister level in times of emergency;
- collaboration between Ministries of Agriculture and Health and a comprehensive approach from the animal and public health sectors;
- additional attention to the need for effective and harmonised public and programme communication;
- a single nationally owned strategy to tackle a multi-sectoral problem, where there is room for support from all actors, while avoiding incoherence and duplication.

However, in some countries such multi-sectoral involvement has been limited to the animal and public

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39 Interviews — EC Delegations (Bangladesh, Cambodia, India and Thailand); AusAID.
40 Interviews — UNSIC, Bangkok and Cambodia.
41 Avian and Pandemic influenza coordination, A resource guide for UN country teams, UNSIC, 2008.
Both political drivers and the UN System strongly supported these processes: in Asia for example, the UN Resident Coordinator Offices, supported by UNSIC, have been instrumental in helping governments’ and partners’ task forces to operate with coordinated and inclusive approaches as well as improving information sharing between them. API was, for example, used as a case study to define good practices of, and guidance for, UN support to coordination at country level. With the help of the WB, response partners and the UN, national plans were budgeted in detail and response partners invited to pledge in order to assure cost efficiency through coordinated financial support, avoiding overlapping and duplications.

Communication is another example of improved multi-sectoral coordination through the formation of working groups where all sectors and partners were invited to ensure a comprehensive approach to tackle the features of the disease in animals and humans. They discussed how to address the uncertainties and the unknowns of the disease through increased awareness and appropriate attitudes for prevention, protection and management of isolated cases and outbreaks. Coordination of communication has been supported by the GRAI in recognition of the need for harmonised and integrated messages through a multiplicity of intervening parties.

### Conclusion

At national level, the GRAI has stimulated a level of inter-sectoral collaboration and coordination between national entities and response partners that has not existed before.

2.1.4 Development and implementation of national and (sub)regional policies on API control

#### 2.1.4.1 Introduction

Although HPAI (H5N1) has been active in many countries over the last five years, it has not so far mutated or reassorted to become a human pathogen capable of creating a pandemic as was feared. While this could still happen, stakeholders in the GRAI have come to realise that efforts to respond to epidemics of AI in poultry, and to prepare for a possible pandemic caused by H5N1, have sensitised people to the need for preparedness for emerging (or re-emerging) infectious diseases, including emerging zoonoses coming from domestic and/or wild animal populations in general. The extent to which the GRAI has sensitised and prepared regions and countries for these threats has influenced the development of national and (sub)regional policies for API and other EIDs control.

Through the GRAI, UN organisations have been encouraged to work together and adapt their organisations for improved emergency response and support to development and implementation of regional policies for API control. The WHO, working with the OIE and FAO, has developed an extensive network of international collaboration. The FAO has been stimulated through the GRAI to improve its institutional framework for emergency response through the CMC, whose core professional staff is fully funded by USAID, usually for three years, plus some staff funded by the FAO. It has also established Emergency Centres for Trans-boundary Animal Diseases (ECTADs) at central, regional, and in countries where AI is endemic at national level. Through these centres, the FAO has been implementing a policy of establishment of INAPs with development of contingency plans and communication strategies. The contingency plan is related to the quantity of resources needed for the response to, and control of, an outbreak. All contingency plans now include an element of communication which is a key aspect of the plans. The FAO continues to backtrack the INAPs and may assist in contingency planning for diseases other than AI.

Most API response partners have supported AI control at national level, and therefore partner coordination at country level is better than at regional level.

The WHO has prepared a generic outline of a national plan for influenza pandemic preparedness which can help countries prepare a plan through consensus building with the Ministries of Agriculture, Livestock and Animal Husbandry as well as other relevant stakeholders and partners. It has also established teams that are ready to go to countries on missions to assist in the preparation of plans.

In 2004, countries did not have consolidated national disease control plans. Now, having responded to the AI emergency, most countries have INAPs for API, but structures for pandemic preparedness plans sometimes only include the Ministries of Agriculture and Health. As soon as avian and human cases have diminished some countries may lose interest in pandemic preparedness.

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44 Interviews — Cambodia, Thailand.

45 Avian and Pandemic influenza coordination, A resource guide for UN country teams, UNSIC, 2008.


48 http://www.searo.who.int/LinkFiles/Avian_Flu_Preparing_influenza_pandemic_plans_Step_by_step_approach.pdf

49 Meeting — AusAID, Bangkok.
The One Health concept was promoted and expanded through informal discussions held at the International Ministerial Conference of New Delhi, December 2007, and addressed more formally in the final host statement of the subsequent Sharm el-Sheikh Ministerial Conference in October 2008. Relayed and actively promoted by the European Commission, Canada, the United States, and other major stakeholders, it has begun to influence policymaking on API control at (sub)regional and national levels and is being extended to other EIDs.

2.1.4.2 South-East and South Asia

Regional clades (distinct biological groups) of HPAI (H5N1) indicate the requirement for a policy of collaboration and the need for cross-border projects. For example, the clade in South Asia has caused disease on both sides of the Bangladesh/West Bengal border and has extended into Nepal.

The Association of South-East Asian Nations (ASEAN), supported by AusAID and USAID, developed a regional strategy for the first phase of AI control in 2006: a second phase extends until 2010. Despite this, the AHIF midterm evaluation indicates the lack of a regional approach, ‘there is no strategy, monitoring or regional coordination’.

To address the deficiencies in regional approaches to development of policies and strategies for API control:

- additional support to improve regional coordination will soon be provided by the Commission through the ASEAN and SAARC secretariats;
- the WHO, together with the FAO’s regional ECTAD, has developed a regional strategy for the control of zoonoses;
- through the UN agencies, workshops are held on pandemic simulation exercises. These have been tabletop exercises at both regional and country level.

On the wider front, since 2010, APSED, supported by the WHO Regional Offices (SEARO and WPRO), has been tackling emerging infectious diseases in humans, a specific component of which is zoonoses. Funding is mostly from AI programmes.

2.1.4.3 Africa

AI control programmes have been able to produce good results because they have built on capacity developed by previous programmes such as the Commission-funded Pan-African programme for the control of epizootics (PACE) implemented between 2000 and 2005.

Pandemic preparedness is only just starting in Africa, but with the occurrence of A(H1N1), countries are changing their priorities. However, most countries are not yet ready for a pandemic (with the possible exception of South Africa).

AU-IBAR is taking the lead in regional preparedness for emerging zoonotic diseases (EZDs), providing coordination between countries and funds to address regional issues.

Implementing a policy of joint animal health (AH)-human health (HH) rapid response to outbreaks, USAID supports joint WHO-FAO development of RRT training. Veterinarians and doctors are trained together to identify index cases in Ethiopia, Kenya, Rwanda, Tanzania and Uganda. This training has been translated into French for use in francophone West African countries since September 2009.

Partly resulting from AI, it is now clear that a policy of cross-border collaboration and coordination is essential. The Rockefeller Foundation and the regional economic communities (e.g. ECOWAS, SADC and EAC) are working on cross-border issues — key areas are communication and awareness, and surveillance.

Regarding reporting, Rockefeller has started using peer encouragement and peer pressure in Africa as was used in the MBDS programme in South-East Asia. Human health surveillance is now expanding to include the One Health concept. Knowledge and experience transfer from the MBDS is needed, especially in the veterinary sector. Open reporting is often suppressed by trade issues. The question is: How to use the IHR as a precedent to report AH trans-boundary animal diseases (TADs)? There are competing agendas regarding trade and food security.

The steering committee of the sub-Saharan support programme for integrated national action plans (SPINAP) has agreed to address the funding of cross-border issues. A workshop was held in Zanzibar with veterinary officers from different countries to look at information exchange.

The International Livestock Research Institute (ILRI) is undertaking risk maps for API in Africa (likelihood of introduction and likelihood of spread) and identifying hot spots to guide regional policy. This links with the FAO on disease recognition and supports a policy of disease information networking with collaboration on cross-cutting issues. An output has been a workshop on reporting and information exchange between countries.
Mechanisms for the development and implementation of national and (sub)regional policies on API control have been put in place through the GRAI and were helpful with regard to influenza A(H1N1) control. Through the GRAI, API control policies are being further developed to make provision for EIDs generally and take account of the One Health concept. While through the GRAI, much donor support has been put into policy development at regional and national levels, it remains to be seen if the policies of regional collaboration and coordinated multilateral response to API or an EID remain in place without continuing international support and in the current absence of a pandemic threat.

### 2.1.5 Time between discovery of disease and information sharing (with neighbouring countries)

The bulk of shared disease information flows from country to country via the websites and activities of international organisations (WHO, FAO, OIE, and bilateral agencies). A significant constraint is the incompatibility of databases.

In South-East and South Asia cross-border and subregional collaboration between AHIF countries was found to be limited, and largely confined to the actions and initiatives of international organisations (WHO, FAO, OIE, and bilateral agencies). There have been several attempts to share information through, for example, ASEAN, the MBDS programme, ACMECS, the Asian Partnership for Emerging Infectious Diseases Research (APEIR) 64, and the Asia-Pacific Economic Cooperation (APEC). However, with regard to the AHIF strengthening subregional disease information systems, the AI portfolio has not sufficiently addressed the subregional scope of disease information sharing, as the AI projects, in line with the WB-AHIF policy, have a country focus 65.

However, cross-border issue meetings are held by the WHO in Bangkok with countries in South-East Asia and cross-border collaboration is in the process of development 61. Information-sharing mechanisms put in place through the MBDS programme are showing multiple benefits: monitoring and progress with IT systems is starting to enable real-time reporting in pilot border areas. The province of Yuan in China is the biggest detractor of the programme but Cambodia, Laos, Thailand and Vietnam are very transparent. Due to its limited resources, Laos is keen on partnerships. There is a lot of peer learning and pressure, resulting in fast and informal reporting 67 which should reduce time between discovery of disease and information sharing with neighbouring countries.

Information sharing between Bangladesh and India on API needs improving and is being addressed by direct communication between Bangladesh and West Bengal (meeting in April 2009) and at higher levels through meetings to discuss cross-border issues between Delhi and Dhaka 62.

In Africa, open reporting, and therefore disease information sharing, is often suppressed by trade issues 66. However, the FAO has started, and supports epidemiology and laboratory networks in each of the three regions (Eastern Africa, Western Africa and Southern Africa) 64. Partly resulting from AI, it is now identified that cross-border collaboration and coordination is essential. The Rockefeller Foundation and the regional economic communities (e.g. ECOWAS, SADC and EAC) are working on cross-border issues, including the key areas for information sharing: communication and awareness, and surveillance.

Regarding cross-border reporting, Rockefeller has started peer encouragement and peer pressure in Africa as the MBDS programme in South-East Asia.

The steering committee of the sub-Saharan SPINAP has agreed to address funding of cross-border issues. A workshop was held in Zanzibar with veterinary officers from different countries to look at information exchange 65.

Work on the time between discovery of disease and information sharing is being undertaken through the development of:

- open-source networks with different electronic information gathering and reporting systems developed by systems research applications (SRA) — information gathered is to be transmitted to AU-IBAR;
- Animal Health Information System (AHIS) — a one-year project supported by SRA with AU-IBAR and ILRI to test different methods of information gathering and transmission to a central database and, at AU-IBAR SRA, the development of an open-source network (thus requiring no licence), testing is taking place in Ghana, Mozambique, Rwanda, and Uganda;
- open-source network for ARIS 66 for two-way transmission of information making use of cell phone links — data sheets are to be developed by the ILRI 67.

In Uganda, the time between discovery of disease and information sharing is being pursued through the multi-sectoral National AI Task Force. Its membership includes representation from the Uganda Wildlife Authority and the University. The task force is developing surveillance and reporting strategies, assisted by the Disaster Management structures of the Ministry of Health.

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59 All human health disease surveillance programmes.

60 AHIF midterm evaluation report.

61 Meetings — Institute of Epidemiology Disease Control and Research (IEDCR) and National Influenza Centre, Bangladesh; Rockefeller Corporation, Bangkok.

62 Meetings — Institute of Epidemiology Disease Control and Research (IEDCR) and National Influenza Centre and FAO, Bangladesh.

63 Interview — Rockefeller Foundation, Nairobi.

64 Interview — FAO-ECTAD Regional Animal Health Centre, Nairobi.

65 Meetings — AU-IBAR, Nairobi.

66 An electronic animal health and production information system developed for inter-African use by PACE.

67 Meeting — ILRI, Nairobi.
Agriculture, Animal Industry and Fisheries (MAAIF), Uganda.

projects should be promoted in partnership with developing countries and international organisations such as the OIE and FAO would be essential, and the European Technology Platform for Global Animal Health was set up by the Commission when it was realised that alliances with non-European countries were needed. In 2004, to tackle major animal diseases in the developing world and in Europe, an almost tenfold increase of technology and training was observed.

In the sixth framework programme (FP6), 2002–06, an almost tenfold increase in the EU contribution (almost EUR 100 million) was spent on a set of new projects launched in both the animal and human health sectors on API. In FP6 there are projects for HPAI (H5N1) vaccine development for avian and human species, improved diagnosis and early warning systems, ecology and pathogenesis of HPAI infections, studies of migratory birds, HPAI (H5N1) virus survival, reinforcement of the laboratories network for avian and human influenza, virus virulence, pathogenicity, replicability and transmissibility, on drugs resistance and new drugs against ribonucleic acid (RNA) viruses and transfer of technology and training.

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Conclusion

Through the GRAI and the interventions of international agencies and NGOs, disease information sharing between countries is generally improving, reducing the time from discovery of disease to sharing the information with neighbouring countries.

2.1.6 Collaborative design and implementation of research programmes

Research projects established as a result of the GRAI have brought together scientists from different countries through networks, often including developing countries, especially those where API is a particular problem.

An example of this is the Asian Scientist and Researchers’ Network for API which has been initiated and funded by the Canadian International Development Research Centre (IDRC) (CAD 5–6 million). Member countries of the network are Cambodia, China, Indonesia, Laos, Thailand and Vietnam. Topics include research on: migratory birds; API control measures; the socioeconomic impact of API; rearing of backyard chickens (behaviour change communication); and on various policies, ranging from vaccination of poultry to Tamiflu stockpiling.

Research commissioned by the Commission provides a useful example of what has been undertaken, mostly in response to the GRAI. For over five years, the Commission has supported research on influenza in both humans and animals. Under the fifth framework programme for research (FP5), 1998–2002, approximately EUR 6 million were spent on avian and pandemic influenza in 22 institutions and national reference laboratories in eight European countries.

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In the Commission’s seventh framework programme (FP7), 2007–13, while both API and HPAI are dealt with for the first time, a heading on increasing risk of epizootic and zoonotic diseases was introduced for the purpose of addressing any unforeseen threats from infectious diseases.

Commission-funded research has supported API projects that include development of vaccines and antivirals, preparation for an influenza pandemic and the development of a European Vigilance Network for the management of antiviral drug resistance.

In the animal field, the Commission supported two projects, ESNIP (2001–04) and ESNIP 2 (2006–08), to establish a European surveillance network for influenza in pigs which studied the epidemiology of the swine influenza virus, diagnostic techniques and the public health risk of influenza in swine through international collaboration between European partners and Hong Kong and the United States. The AVIFLU project (2002–06) involved six European partners developing diagnostic tools, investigating pathogenesis and research approaches to vaccination.

When the threat of a major pandemic became apparent, the Commission developed the international FLUAID research project to follow the AVIFLU project which is a cooperation between European partners and Australia, Indonesia, Pakistan, Thailand, South Africa and Vietnam. The FLUAID project is investigating:

- prototype strains for an EU vaccine bank and companion diagnostic tests;
- evaluation of antigenic drift in the presence and absence of vaccination;
- penside tests;
- pathogenesis of HPAI in ducks and quail;
- transmission in presence and absence of vaccination in different species and breeds;
- support to developing countries by improving diagnostics and outbreak management.


69 WHO and Ministry of Public Health, Bangkok.

70 http://ec.europa.eu/world/avian_influenza/


73 http://www.ist-world.org/ProjectDetails.aspx?ProjectId=1f4af9be64ec452884609223449edc01


Moving on from API, Commission research projects have a wider focus: the Healthy Poultry project (2004–07) studied the development of new integrated strategies for prevention, control and monitoring of epizootic poultry diseases and the Epizone project (2006–10) is establishing a network of excellence for epizootic disease diagnosis and control. This joint research programme, involving collaboration between EU countries, China, Turkey, and the FAO, is studying preparedness, prevention, detection and control of epizootic diseases, diagnostics, intervention strategies, risk assessment, surveillance and epidemiology, and undertaking training.

The Commission’s Lab-on-Site project (2004–08) researched new and emerging technologies for improved laboratory and on-site detection of OIE listed viruses in animals and animal products.

Another example of the expansion of research programmes from AI to EIDs and with multi-country, multi-partner collaboration is certainly demonstrated by USAID’s new emerging pandemic threat global programme and particularly the sub-component PREDICT AND IDENTIFY. Through PREDICT, ‘USAID and partners monitor for and increase local capacity in geographic “hot spots” to identify the emergence of new infectious diseases in high-risk wildlife such as bats, rodents, and non-human primates that could pose a major threat to human health. These activities build on USAID-supported surveillance of wild birds for HPAI (H5N1), and address more broadly the role of wildlife in facilitating the emergence and spread of new disease threats’. IDENTIFY partners USAID with the WHO, FAO, and OIE to ‘support the development of laboratory networks and strengthened diagnostic capacities in the geographic “hot spots” for new emergent diseases’.

Thus, through the GRAI, a considerable volume of research has been directed at influenza and API. At the beginning of the HPAI epidemic, research was particularly focused on API, but now the focus is expanding to highly-pathogenic emerging and re-emerging diseases in general.

### Conclusion

Through the GRAI, a considerable volume of research has been directed at influenza and API. Research collaborations involving many different countries (including those where AI has become entrenched) have been started through the GRAI. They have been very productive, introducing new ideas and techniques with regard to API control in fields of both traditional and social sciences. At the beginning of the HPAI epidemic, research was particularly focused on API, but now the focus is expanding to highly-pathogenic emerging and re-emerging diseases in general.

### 2.1.7 Sharing of expertise, goods, services

National, regional and international communication and collaboration between agencies to control trans-boundary (re-)emerging infectious animal and human diseases have led to sharing of expertise, goods and services as the following examples show.

- Thailand has provided technical assistance to various neighbouring countries, including assistance to improve laboratory capacity in Myanmar and North Korea (supported by WHO) and laboratory equipment in Cambodia and Laos (supported by FAO).
- In 2006, Thailand also organised an experience-sharing week with the AU and African countries under the United Nations development programme (UNDP) South-South Cooperation, funded by France.
- UNICEF is providing behaviour change communication (BCC) programmes which individual countries must customise.
- In sub-Saharan Africa, the ALive partnership of regional and international institutions, civil society, response partners and research and training institutions involved in livestock development, facilitates the development and sharing of expertise. Through ALive, the WB organised a large epidemiology and laboratory workshop in May 2009. This built on the basis laid by the FAO for providing trained staff for API control in the region.
- Additionally, the Global framework for progressive control of trans-boundary animal diseases (GF-TADs), a joint FAO/OIE initiative, facilitates regional alliances and sharing of goods, facilities and expertise with regard to AI.
- Information Systems are being developed to share expertise, goods and services between countries and across regions. For example, in Africa, ARIS, which is being upgraded to use open-source software and for harmonisation with the World Animal Health Information System (WAHIS) and the animal health information system designed by the FAO, TADinfo, through support from USAID and SPINAP, are facilitating sharing of expertise between countries.

### Conclusion

Partly through the GRAI, and also through other initiatives (e.g. ALive and GF-TADs), there has been an increase in sharing of goods, services and expertise related to API. The latter has been fostered by regional training schemes and international and regional communication networks.

78 [http://www.epizone-eu.net/default.aspx](http://www.epizone-eu.net/default.aspx)
80 Emerging Pandemic Threats, USAID.
81 Interview — WHO and MoH, Thailand.
82 Interview — UNICEF, Bangkok.
84 [http://www.fao.org/Ag/againfo/programmes/en/empres/A(H1N1)/Ectad.html](http://www.fao.org/Ag/againfo/programmes/en/empres/A(H1N1)/Ectad.html)
85 Interview — AU-IBAR, Nairobi.
2.1.8 Sharing of virus genome data

There are five WHO Collaborating Centres for Reference and Research on Influenza, one each in Australia, Japan and the United Kingdom, and two in the United States. The OIE has designated nine laboratories as AI Reference laboratories that function as centres of expertise and for standardisation of diagnostic techniques (distributed around the world, in Australia, Canada, China, Germany, India, Japan, Italy, the United Kingdom and the United States). These laboratories are responsible for characterising virus isolates by sequencing their RNA, enabling them to be assigned to clades, which helps to explain their origin and movements and also to inform on selection of potential vaccine candidates. To assist in this process, and to complement the Global Influenza Surveillance Network (GISN) which has existed since 1952, the WHO has established an influenza virus tracking system that indicates what HPAI (H5N1) viruses/specimens have been shared with the WHO, where they are located and what progeny materials have been generated. After analysis and development, viruses/specimens, progeny materials and candidate vaccine viruses have been distributed 86.

The problem has arisen that some countries have been unwilling to forward the viruses isolated in their territories to collaborating centres as they regard them as their intellectual property from which there is a potential for profit and other benefits to be had from materials and vaccines produced from their isolates which they may forfeit. This is hampering international sharing of information on HPAI (H5N1). Following requests by Indonesia and international organisations, the WHO has set up an interdisciplinary working group on pandemic influenza preparedness to prepare proposals for the sharing of influenza viruses and access to vaccines and other benefits which reached agreement on most elements of a pandemic influenza preparedness (PIP) framework. However, further work needs to be undertaken on some key remaining elements with significant divergences between developed and developing countries 87.

Conclusion

While there have been difficult discussions, and the contentious issues regarding sharing of virus genome data have not all been resolved, addressing this issue through the GRAI is an important example of communication and collaboration which has been stimulated by the GRAI.

2.1.9 Membership of regional organisations/partnerships

2.1.9.1 Asia

An outcome of the GRAI is that the regional UNSIC team plus UNOCHA have become responsible for coordination and exchange of information between countries and on strengthening laboratories. The hope is to create skills which are used on a wider scale and have a broader scope than just for EIDs. Programmes are designed by an expert group on communicable diseases in ASEAN, including how to structure the regional programme and prioritise projects and responses 88.

ASEAN provides member countries with learning opportunities (including monitoring and evaluating) for developing regional programmes. The hope is to create skills which are used on a wider scale and have a broader scope than just for EIDs. Programmes are designed by an expert group on communicable diseases in ASEAN, including how to structure the regional programme and prioritise projects and responses 89.

ASEAN is leading developments with A(H1N1) communication and information sharing between countries and on strengthening laboratories. In addition, SOPs have been prepared for 13 diseases agreed by the ASEAN+3 90.

ASEAN+3 is strengthening partnerships between its members by:

- establishing hotlines between national health authorities of its member countries for sharing of data and information to enable coordinated disease control responses;
- establishing joint outbreak investigation and joint response teams across countries, where appropriate;

86 https://apps.who.int/fluweb/fluTrack
88 Meetings — EC Delegations (Bangladesh, Cambodia, India, Thailand).
89 Meeting — Rockefeller Foundation, Thailand.
90 Interview — AusAID, Bangkok.
91 ASEAN+3 is a group of the original countries in ASEAN (Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam) plus China, Japan and Korea.
92 WHO and Ministry of Public Health, Bangkok.
• strengthening collaborative researches on influenza in order to generate evidence for effective policy intervention in responses to epidemics, through active participation in the current regional collaborative research networks such as the ASEAN+3 EID programme of the ASEAN secretariat, the MBDS network and the Asian Partnership on Emerging Infectious Diseases Research (APAIR/APEIR) 93.

2.1.9.2 Africa

The Commission is making a big impact with its regional approach. In Africa, the regional SPINAP can be viewed as an innovative way for the Commission and AU-IBAR to cooperate and communicate with AU-IBAR country members on a single issue, which in turn brings a new set of management challenges and responsibilities for AU-IBAR. Progress has been made and now AU-IBAR can be seen as an active partner and knowledge base that can be used as a trustworthy continental hub for information collection and knowledge generation that supports development of country INAPs for AI. However, the following constraints have been recorded:

• weakness in coordination between countries;
• each country has its own response mechanism;
• information is not shared 94.

Sub-Saharan Africa also has the ALive 95 platform for sharing information among member countries. ALive was set up and hosted by the WB but it has now been transferred to AU-IBAR which serves as the ALive secretariat 96. It is seen as the primary mechanism linking response partners and countries and coordinating the allocation of funds to combat animal diseases and strengthen veterinary departments. SPINAP works with ALive partners and USAID, the WHO and FAO with formal and informal working relationships.

Each of the regional organisations of economic communities in Africa hosts an FAO-ECTAD which addresses TADs, including AI. The FAO’s Greater Eastern African Region ECTAD is based at AU-IBAR, Nairobi, and there are regional ECTADs in North, West and Southern Africa 97.

In Africa, there is a regional component of the global GF-TADs joint initiative which is operated through a partnership of the FAO and OIE. Combining the strengths of both organisations in the fight against TADs worldwide, the ultimate aim of the programme is to control and eradicate the most significant animal diseases including those transmissible to humans 102.

Conclusion

In South-East Asia, during the period of the GRAI, regional communication and collaboration has been strengthened by regional organisations and partnerships and, while not fully responsible, the GRAI has contributed to this strengthening. In South Asia, through SAARC, regional communication and collaboration is only just beginning. But communication and collaboration should improve in both South-East, and South Asia through a programme to improve regional coordination supported by the Commission on highly pathogenic emerging diseases which supports both ASEAN and SAARC. In Africa, while the ALive platform and GF-TADs initiative are responses to threats of animal diseases generally, SPINAP is a direct outcome of the GRAI.

2.1.10 Availability of resources

While the GRAI has been supported mostly by grants, the largest donors being the United States, Japan and the Commission 98, the multilateral development banks, notably the World Bank, played a critical role in supporting country programmes, providing loan financing when adequate grant funding was not available. Moreover, these programmes were to address both the emergency response to EIDs and the medium-term development necessary to sustain response capacity. However, reports from two of the case study countries (Bangladesh and Cambodia) describe delays in the implementation of emergency response by the WB 99. Because of problems encountered in government contracting of UN agencies, the WB and UN agencies negotiated a long overdue agreement on fiduciary aspects of emergency operations 100.

Outcomes

Communication between countries and international agencies was significantly advanced by the GRAI through its international conferences and pledging meetings.

UN agencies learnt to communicate better between each other and with other stakeholders and form partnerships to combat API through the GRAI. Notably, as a result of the GRAI, organisations such as the OIE and FAO undertook joint activities through, for example, OFFLU.

Communication and partnerships brought about through the GRAI have established networks such as the GLEWS between the FAO, OIE and WHO.

93 Joint Ministerial Statement of the ASEAN+3 Health Ministers Special meeting on Influenza A(H1N1) Bangkok, 8 May 2009 (http://www.aseansec.org/22543.htm).
94 Interview — EC Delegation, Nairobi.
96 http://www.au-ibar.org/documents_public/ALiveGA4_Speech_AUIC.pdf
97 Interview — FAO-ECTAD, Regional Animal Health Centre, Nairobi.
99 Meetings — MoH, WHO and FAO, Phnom Penh; EC and World Bank.
100 Correspondence with the World Bank, Washington.
Pivotal in establishing communication and collaboration between international agencies has been the appointment of the United Nations System Senior Coordinator for Avian and Human Influenza by the UN Secretary-General.

Key international actors have joined forces through the GRAI and coupled good coordination and policymaking with funding. Boosted by the successes of the API international response, they are today pushing for a coordinated approach to the One Health strategy to control trans-boundary (re)emerging infectious animal and human diseases.

International agencies, including those of the UN, and particularly the FAO, have adapted their structure and management to be able to respond to EIDs, particularly zoonoses and coordinate their response with others.

Facilitated by UNSIC, international agencies and the World Bank have adapted to coordinate their responses to EIDs by reducing competition and working together.

At regional level, through the influence of the GRAI, communication and collaboration is improving, for example, in Africa, the AU is increasingly collaborating with the economic communities. However, insufficient regional coordination and information sharing, especially in the Asia-Pacific region, was described in the fourth UN-WB progress report presented in Sharm el-Sheikh and by some key informants.

At national level, the GRAI has stimulated unprecedented communication and collaboration between Ministries of Agriculture and Health with coordination of activities and in some countries this extends to other Ministries and organisations through disaster management committees. However, in many countries, the communication and collaboration does not extend further than the central level. Often focus remains on HPAI and is slow to extend to trans-boundary (re)emerging infectious animal and human diseases generally and pandemic preparedness.

Stimulated by the GRAI and donor activity, many countries have developed national policies on API and produced INAPs which require AH and HH services to work together with regard to surveillance, diagnosis, control and stamping out of the disease.

With the realisation that many EIDs, including AI, are trans-boundary diseases, affected countries are learning to exchange information with their neighbours and coordinate their control activities and regional approaches to EID control though these activities are patchy.

Through the GRAI, laboratory capacity has been strengthened, both with regard to bio-containment and diagnosis. Networks of laboratories have been established to exchange expertise, results and materials.

Training programmes, especially those which integrate AH and HH, have increased the number and quality of human resources and increased coordination between Ministries of Agriculture and Health.

Through the GRAI, international and regional networks have been established or strengthened for information exchange and sharing expertise.

Novel epidemiological concepts and tools have been developed and shared through the GRAI. Examples of their use can be seen in wildlife studies, particularly with regard to waterfowl, and value-chain analysis of poultry production and marketing in relation to AI risk analysis.

**Impacts**

The changes that have been made within international organisations to respond and collaborate regarding EIDs, and the development of a One Health strategy, are enabling them to react faster and more effectively in the face of new EIDs.

The development of coordinated responses to API is leading to enhanced national and regional capacities to manage disasters generally.

The INAPs that countries have produced for avian and human influenza which require AH and HH services to work together with regard to surveillance, diagnosis, control and stamping out of the disease may, in many cases, prove to be generic and applicable to other EIDs.

Human resources development through training programmes, especially those which combine AH and HH personnel, carried out by the GRAI should enhance capacity for emergency response to EIDs generally.

The development of laboratories and laboratory networks has led to faster and more accurate diagnoses of API. While concentration on diagnosis of API has caused some neglect of laboratory work on other diseases, the improvements should have an overall positive impact on laboratory diagnosis, both in AH and HH.

The international and regional networks that have been established or strengthened by the GRAI have improved capacity to respond to API and other EIDs.

The novel epidemiological concepts and tools that are being developed and shared through the GRAI are enabling enhanced surveillance and risk assessment with regard to API and other EIDs.

The wildlife studies undertaken through the GRAI have increased multi-sectoral awareness and knowledge regarding wildlife as a reservoir for disease which may affect livestock and man.

The value-chain analysis of poultry production and marketing that has been undertaken through the GRAI has provided an appreciation of the role of these activities in the spread of API and other diseases and indicators regarding how the risk of spread along these chains can be mitigated through coordinated actions by the different stakeholders in the public and private sectors.
2.2 TO WHAT EXTENT HAS THE GRAI REDUCED THE INCIDENCE OF AI IN POULTRY?

2.2.1 HPAI infections

The large investments and support from the international community through supply of goods and services (e.g. assistance with prevention and outbreak control, upgrading of epidemiology and laboratory services, supply of equipment, and human resources development), have assisted countries in (gradually) controlling, and at least temporarily eradicating HPAI from poultry in domestic flocks, as can be observed in the annual outbreak reports from the OIE. After an initial increase in the number of infected countries from 11 in 2004 to 60 in 2006, the number of countries with reported outbreaks has slowly diminished to 27 in 2008 and 10 in 2009. Three of the latter ones reported outbreaks in wild birds only. All this investment and support has, however, not been able to prevent the disease from becoming firmly established in some countries and becoming entrenched in China and Vietnam where the first outbreaks were reported in January 2004, and possibly in Bangladesh reducing in number and, more importantly, in severity. Does this mean that the virus has mutated to a less infective strain, or is the poultry population becoming more resistant? OFFLU (2009) established that an antigenic drift has occurred from traditional H5 viruses to the viruses identified in Indonesia and mixed messages on the epidemiology of AI in poultry, particularly in the village scavenger sector, are being reported. Regional ECTAD staff in Bangkok believe that AI in village chickens can now produce mild or subclinical disease, but results of studies in Indonesia, conducted for USAID and the WB by the ILRI, indicate that this is not the case and that only 0.3% of infected chickens recover. However, as cases in man may be regarded as sentinels for disease in the poultry population, it is interesting to note that while WHO data of laboratory-confirmed human cases showed a trend in line with the increase and decrease in the number of infected countries up to 2008, this trend has not continued in 2009, perhaps indicating that the challenge of disease from poultry populations is not decreasing. It has been established (Waisbord, 2008) that immediately following an AI outbreak, there is a sudden increase in risk perception about the impact on human health, which may explain the few human cases at the height of an outbreak. Waisbord further mentions that studies suggest that in terms of human risk, many people do not feel that AI poses any tangible risk to them or their communities and therefore risk perception and precautionary measures may diminish over time. Backyard poultry farmers, who are used to regular poultry deaths, often think that AI, which to a large extent resembles Newcastle disease, has ‘only relative importance’ and thus their risk perception is low. This phenomenon was even found in Indonesia and Vietnam, two countries where, since 2003, there have been scores of infected and dead birds as well as human fatalities.

However, much is still unknown. For instance, why are the outbreaks in Bangladesh reducing in number and, more importantly, in severity? Does this mean that the virus has mutated to a less infective strain, or is the poultry population becoming more resistant? OFFLU (2009) established that an antigenic drift has occurred from traditional H5 viruses to the viruses identified in Indonesia and mixed messages on the epidemiology of AI in poultry, particularly in the village scavenger sector, are being reported. Regional ECTAD staff in Bangkok believe that AI in village chickens can now produce mild or subclinical disease, but results of studies in Indonesia, conducted for USAID and the WB by the ILRI, indicate that this is not the case and that only 0.3% of infected chickens recover. However, as cases in man may be regarded as sentinels for disease in the poultry population, it is interesting to note that while WHO data of laboratory-confirmed human cases showed a trend in line with the increase and decrease in the number of infected countries up to 2008, this trend has not continued in 2009, perhaps indicating that the challenge of disease from poultry populations is not decreasing. It has been established (Waisbord, 2008) that immediately following an AI outbreak, there is a sudden increase in risk perception about the impact on human health, which may explain the few human cases at the height of an outbreak. Waisbord further mentions that studies suggest that in terms of human risk, many people do not feel that AI poses any tangible risk to them or their communities and therefore risk perception and precautionary measures may diminish over time. Backyard poultry farmers, who are used to regular poultry deaths, often think that AI, which to a large extent resembles Newcastle disease, has ‘only relative importance’ and thus their risk perception is low. This phenomenon was even found in Indonesia and Vietnam, two countries where, since 2003, there have been scores of infected and dead birds as well as human fatalities.

2.2.2 Veterinary services

It has become clear that countries with mainly commercial poultry production systems and well-developed veterinary services, with strong early disease detection and response capacities, can effectively control and eliminate HPAI, examples being Australia (1997), the United States (2004), the Netherlands (2003) 111. Countries that have had the most difficulty in achieving effective control are those with weak veterinary capacities and major risk factors, such as high chicken and duck densities, high agricultural population densities, intermediate purchasing power per capita, and intermediate chicken production output/input ratios as can be observed in, for example, South-East Asia and Egypt, where outbreaks continue to (re)occur. The larger the percentage of backyard and village poultry, in relation to commercial production systems with possibilities for better bio-security, the less successful eradication is.

101 http://www.oie.int/downld/AVIAN%20INFLUENZA/A_AI-Asia.htm
102 Infected countries are countries that have reported infections in domestic poultry and/or wild birds or other infected animals to the OIE.
103 Reporting date: 10 September 2009.
104 Localities that host the greatest persistence have been characterised by high chicken and duck densities, high agricultural population densities, intermediate purchasing power per capita, and intermediate chicken production output/input ratios (FAO, press bulletin, 11 November 2009).
105 A disease is only endemic (continuously occurring) in a country, according to OIE standards, once the Chief Veterinary Officer, being the Delegate of the OIE Member Country, has declared the disease as such to the OIE.
106 Uganda Ministry of Agriculture, personal communication.
107 See Annex 7.
108 Personal communications in Bangkok and Nairobi.
109 By the peak of the outbreak in Vietnam in 2004, about 45 million birds had already died due to disease and culling (Velasco et al., 2008).
All 22 countries that have experienced more than 10 reported outbreaks have mixed commercial/backyard production systems, mainly backyard systems and/or unstable political systems.

Government restructuring programmes in the 1990s, notably in sub-Saharan Africa, with the decentralisation and privatisation of civil services required by the International Monetary Fund (IMF) and the WB, has decimated public veterinary services in many developing countries as private service providers often limited their activities to pets in major cities, for example Ethiopia and Zambia. This has left many countries with limited services, (understaffed, under-equipped and under-funded) and unable to adequately fulfil the public and private good services needed to quickly detect and control and other emerging diseases. To rebuild systems destroyed many years ago, for example in Uganda, not only requires long-term political commitment with adequate annual budgets to the veterinary and livestock services, but also continued donor support in the form of assistance to mainstream preparedness for emerging infectious animal and human diseases in country development programmes, as well as short-term financial support to assist in upgrading the systems. However, the fourth UNSIC/WB Global Progress Report (UNSIC, WB, 2008a) mentioned that although there has been continued support from major donor nations, the number of funding institutions and countries pledging money to sustain the HPAI (H5N1) efforts has, since the Beijing conference, gradually diminished. Continued international support is nevertheless essential to ensure that GRAI interventions in countries achieve long-term sustainable impacts.

The rapid spread of the disease in the early years in many developing countries, clearly demonstrated the inadequacy of their veterinary services to cope with the problem at hand. Increasing outbreaks of wildlife diseases in domestic livestock, for example rabies, foot-and-mouth disease (FMD) and Rift Valley Fever (RVF), mean people slowly become aware of the need for good, well-functioning, veterinary services, not only because of the growing threat of emerging zoonoses, but also, inter alia, through increasing consumption and sale of wild and bush meat, but also to assist poverty alleviation as more people become dependent on livestock to sustain their livelihoods. The importance of the impact of disease on the livelihoods of small farmers is being stressed more and more, notably by the Commission.

Joint FAO/OIE/WHO/WB rapid assessment missions and subsequent missions to develop INAPs highlighted the status of veterinary and public health services. The PVS tool, developed by the OIE to assist countries to assess all aspects of their veterinary services and which is being applied with financing from the World Fund for Animal Health and Welfare, has been key in indicating the flaws in civil veterinary systems. The creation of the World Fund for Animal Health and Welfare (of which the Commission has been, since the end of 2008, a full member of the advisory board as well as the first financial contributor) and the improvement of the OIE’s Terrestrial Animal Health Code, especially the AI part related to surveillance, better detection and notification, are direct results of the GRAI, which should contribute to improvement of veterinary services. The World Fund for Animal Health and Welfare has enabled the OIE to carry out many PVS missions. By 20 January 2010, 100 countries had officially requested the OIE to undertake an assessment mission, of which 91 had been completed.

**Table 2: OIE PVS missions**

<table>
<thead>
<tr>
<th>Region</th>
<th>Official requests</th>
<th>Missions completed</th>
<th>Reports available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>44</td>
<td>39</td>
<td>31</td>
</tr>
<tr>
<td>Americas</td>
<td>17</td>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>Asia-Pacific</td>
<td>15</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Europe</td>
<td>11</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Middle East</td>
<td>13</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>91</strong></td>
<td><strong>59</strong></td>
</tr>
</tbody>
</table>

Source: OIE (January 2010)

Once the in-depth assessment is conducted, a country can request a subsequent gap analysis. These additional missions, in September 2009, have been conducted in 35 countries. All countries in Asia, with the exception of Malaysia and Thailand, have at least undergone an in-depth assessment.

### 2.2.3 Disease diagnosis and control

In many developing countries, poultry was often not included in any Livestock Act, for example in Zambia. This absence may have caused problems in the control of AI, when legal grounds for indemnification were lacking. In this respect, the fourth UNSIC/WB Global Report says ‘Legislation and regulations related to animal disease prevention and control are very often outdated, incomplete, obsolete or even non-existent in some cases. This undermines any programme directed towards early detection and rapid response mechanisms’ (UNSIC and the WB, 2008a). Programmes assisting governments in implementing their INAPs, for example the Commission-funded SPINAP in Africa and the World Bank-financed and AHIF-financed projects globally, include components to review and, if necessary, revise legislation. Regional OIE offices provide regional capacity-building workshops for government officials, which include, inter alia,
legislation and governance, emergency management and response, and communication.\textsuperscript{118}

The absence of, or insufficient, indemnification or compensation is cause for under- or non-reporting of AI. This was the case in, for example, Cambodia, where the 2008 outbreak was discovered by a human sentinel case. Similarly, in the trans-border movement of poultry (healthy and/or diseased) — as happened, for instance, in Vietnam, where, initially, non-uniform provincial rates were applied.\textsuperscript{119} In Egypt, only registered farms were eligible for compensation, thus poultry owners were dumping their dead or diseased birds in the streets. Compensation was paid to infected farms at a rate of 166% of the market price, resulting in a depletion of the allocated fund within two to three weeks.\textsuperscript{120} Worldwide, there is a great variety of compensation schemes, policies and payment mechanisms, and little effective compensation payment. The FAO, in collaboration with the WB, carried out several studies. The outcome of these studies (World Bank, 2006b) is a guideline presenting different compensation schemes and best practices. Brandenburg et al. (2009) mention in relation to AHIF compensation in Asia, ‘Six countries have earmarked AHIF funds for compensation, although very little has been disbursed. Compensation funds are standby funds that may or may not be disbursed and the mechanisms for their effective utilisation have been problematic in most API projects. The logistics to identify claimants, substantiate claims and develop transparent reimbursement procedures are significant, require a large human resource input and carry a relatively large operating overhead. Financial management issues arise where large amounts of cash are distributed to hundreds of claimants. Transparency is often less than optimal. The AHIF-financed compensation funds held by Indonesia (USD 2.5 million) and Afghanistan (USD 2.41 million) have not been disbursed. In Afghanistan, this was due to there being no outbreaks after the AHIF grant was approved. In Indonesia, compensation was directed to smallholder poultry farmers only, but the claim application procedures were so complicated that very few bothered to apply and compensation payment was discontinued in 2009.’ But also, ‘On the positive side, Lao PDR, which holds USD 115 000 in AHIF-financed compensation funds, has been able to disburse claimants within three weeks of claims being made, by having district governments pay claimants upfront, using the compensation fund as collateral. The project then reimburses the districts involved with all due speed. This arrangement requires solid trust between district and project management to work well’. As many AHIF programmes come to an end, unspent money may have to be returned to the Commission.\textsuperscript{121}

It has been established that a major cause for the spread of AI has been through the legal and illegal movement of poultry, within countries and across borders. To prevent unauthorised trans-border movement of poultry (e.g. for compensation purposes), regional agreements should be made on whether or not to compensate, and the percentage of the market price to compensate farmers. Regional bodies like ASEAN and SAARC could take the lead in developing regional compensation schemes. Examples of differences in one region: Cambodia does not pay compensation, Thailand pays 75%, Laos 60% and Vietnam pays 50% of the market price.

This mission recommends establishing regional compensation policies to avoid trans-boundary movement of poultry (healthy or diseased) for compensation purposes.

Up-to-date laws and regulations cannot prevent unauthorised movement if there is not, at the same time, a proper functioning regulatory system which maintains the rules and regulations. The establishment of API task forces, which include many relevant ministries, has helped countries in controlling outbreaks, but since these task forces have been established for a single disease, it is doubtful whether they will survive once the API projects or the financial support finishes. Countries such as Bangladesh and Cambodia, which have based the task force on existing NCDMs, have more chance of sustaining the knowledge, experience and inputs than countries that created new systems.

More emphasis should be given to capacity-building of local structures to incorporate general emergency preparedness policies and strategies in order to cope with unexpected health hazards. Sustainability of achieved efforts depends on strong political commitment, with dedicated people possessing a long-term vision (institutional memory) and adequate yearly government budgets and possibly donor support.

In some countries, there may still be reluctance to report AI, because of perceived damage to the poultry export market. However, the GRAI has been instrumental in better and more direct exchange of disease information between neighbouring countries, better coordination of trans-boundary outbreaks of disease in both animal and human health, and in the control of cross-border movements of livestock. Good examples can be found in South-East Asia between Thailand and its neighbouring countries and in East Africa between Uganda and its neighbours (the latter information exchange may also be attributed to the Commission’s PACE programme). However, there are other areas where there is room for considerable improvement: for example, when countries have to learn of their neighbours’ outbreaks via the OIE website, as in the case of Bangladesh and India. In Africa, as a whole, coordination and information sharing between countries is limited due to different response mechanisms and the lack of uniform reporting systems.\textsuperscript{124}

\textsuperscript{118} OIE Bangkok, personal communication.
\textsuperscript{119} McLeod and Riviere Cinnamond, Compensation in HPAI control programmes: issues and options, FAO, ppt.
\textsuperscript{120} Professor Hassan Aidaros, HPAI (H5N1) in Egypt and lessons learned, SPINAP Technical Workshop, East Africa, ppt.
\textsuperscript{121} EC Delegation, Bangkok, personal communication.
\textsuperscript{122} In Egypt, there are incentives for commercial producers to clean up and not to report (Nairobi, personal communication).
\textsuperscript{123} Personal acquaintances and friendships developed during regional training courses and meetings enhance regional reporting (personal communication, MAAIF, Uganda).
\textsuperscript{124} Personal communications, mission fieldwork Africa.
Over the years, different control strategies have been applied, stamping out, culling and ring vaccination as well as large-scale vaccination campaigns. In Vietnam, vaccination initially appeared successful as the country remained disease-free for six months; however, vaccination could not prevent re-emergence of the virus. New outbreaks were often reported \(^{125}\) to occur in unvaccinated duck populations; however, the implementation of vaccination programmes appears to be largely inefficient in the backyard and in the small commercial sectors \(^{126}\). In Indonesia, the efficacy of poultry vaccines has been questioned as an antigenic drift has impacted on protection by H5 vaccines in the field \(^{127}\).

The GRAI has been conducive to equipping national and regional laboratories and training their staff to undertake API diagnosis by use of RT-PCR and, in some cases, to isolate and characterise HPAI (H5N1) virus using sequencing. The increased diagnostic capacities worldwide were regularly reported as major outputs of the GRAI. However, many countries in Africa and the Americas rely on regional and international laboratory access and a surprising number of countries reported no laboratory access nationally or regionally, despite the available resources at international level. Countries with HPAI (H5N1) infection experience have higher proportions of access to national laboratory capacity than non-infected countries (UNISIC and the WB, 2008a). Regional laboratories in Africa are less developed than those in Asia and they are not yet accredited. Laboratory facilities in East Africa were reported to be weak and not standardised \(^{128}\).

The GRAI has enabled countries to develop national contingency and emergency pandemic preparedness plans and to test those plans through simulation exercises. Most of these simulations have been tabletop exercises, for example in Armenia in 2007 \(^{129}\).

### 2.2.4 Disease surveillance

Active AI surveillance programmes, for economical reasons the major source of virus detection, are mainly being carried out in the commercial poultry sectors and in epidemiological hot spots, like wet (duck) markets and migratory and wild bird resting areas. Wild bird surveillance is often carried out in collaboration with national and international ornithological and nature/wildlife societies and research institutes (e.g. Afghanistan, Zambia). Collaboration between these institutions and veterinary services was uncommon before the GRAI due to conflicting interests. To justify or reject the blame generally placed on migratory birds as the major cause for the worldwide spread of HPAI required bird trapping and screening, an expertise usually not found in veterinary services. This new form of collaboration is a clear output of the GRAI and, in the light of One Health and the major threats that diseases originating in wildlife may pose to the international community, likely to be sustainable provided the international community continues to make some efforts in this direction. Migratory bird movement across international borders are major disincen-

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### 2.2.5 Studies and research

The investments and efforts made in the early years of the GRAI (2005 and 2006) have been unable to prevent the introduction of HPAI to non-infected countries. Despite major research investments, causes for introduction of HPAI in 'new' countries are still not exactly known. Different routes of virus introduction have been established through investigation: internal movement of ducks and poultry, particularly through live bird markets, and illegal movement across international borders are major contributors to the spread of the disease. Migratory

\(^{125}\) Government outbreak reports.

\(^{126}\) Velasco et al., 2008.

\(^{127}\) Daniels, P., OFFLU Technical activity on HPAI vaccination, ppt.

\(^{128}\) Rockefeller Foundation, personal communication.

\(^{129}\) Collaborative FAO/WHO programme.

\(^{130}\) VAHWs in Bangladesh receive BDT 5 000 and BDT 1 000 for use of a mobile phone; PDS: travel costs and per diems.

\(^{131}\) The EC-funded Strengthening of Livestock Services project in Pakistan, for example, was supposed to consolidate PDS surveil-

lance started by the FAO for rinderpest, but was unable to pay for the high per diems paid by the FAO in view of programme sustainability (Dieleman, personal experience).
waterfowl have also been implicated in the global spread of the disease, although the epidemiological significance of HPAI (H5N1) virus infection of wild birds and other species, including pigs and cats, is not well established. Wild bird surveillance studies by the Global Avian Influenza Network for Surveillance (GAINS) through the testing of tens of thousands of wild and migratory birds have found only a few HPAI (H5N1)-positive birds. In 2007, the Commission (European Commission, 2007a) funded, through the NEW-FLUBIRD research project, the establishment of a network for the early warning of influenza viruses in migratory birds in Europe. This network, inter alia, brings together the expertise of virologists and ornithological organisations worldwide to study the contribution of migratory birds to the spread of influenza viruses and the possible human and animal health threats.

Most research, for example by the Commission, OFFLU and the FAO, has mainly focused on virus biology and on establishing effective diagnostic tests and prevention and control measures (e.g. animal and human vaccination). All those studies and research have resulted in more information and better diagnostic tests and research tools than was available prior to the HPAI (H5N1) crisis. However, studies on environmental issues related to HPAI have received much less attention. It is still not clear yet how and where viruses survive in the environment; in Bangladesh, for instance, seasonality of outbreaks is observed, causing new outbreaks after prolonged periods of freedom from infection.

The Commission’s FLURESIST and Europe-Asia RIVERS research programmes aim to provide data on the prevalence and survival of different avian influenza viruses in the environment (water, soil, air, poultry litter, and commodities), through the establishment of the effect of physical parameters (e.g. pH and temperature) and of possible reservoirs and concentrators (e.g. gastropods and bivalve molluscs) in aquatic biotopes.

FAO studies since 2009 are the main drivers behind HPAI (H5N1) persistence in different agro-ecological contexts across the globe. Preliminary results of their research would suggest that the interconnection of agro-ecological variables that define the HPAI (H5N1) epidemiology may differ per country and that the emergence of new influenza viruses may depend on the agricultural sector from which they arise as well as the broader ecological contexts in which livestock farming takes place. Preliminary conclusions would therefore suggest that effective disease management requires the collaboration of a wide array of stakeholders including veterinary services. This would, once more, be a plea for the One Health approach.

Questions related to renewed HPAI outbreaks after periods of disease-freedom, or human disease without a poultry disease history have gradually created the realisation that a more holistic (integrated technical and sociological/anthropological) demand-driven, prioritised and linked with political issues, approach to research is required, which is, inter alia, embodied in the One Health concept. Initiatives in this direction have, for example, been developed in Asia through the Asian Partnership on Avian Influenza Research/Asian Partnership on Emerging Infectious Diseases Research (APAIR/APEIR) network with funds from the IDRC.

This mission recommends designing more holistic research programmes, which embody technical and applied research topics and incorporate technical and sociological/anthropological researchers.

### 2.2.6 Networks

Networks have been established and strengthened as a result of the GRAI. An example is the FAO/OIE laboratory network OFFLU, which enables exchange of information and samples between laboratories and ensures they work to common standards through quality control and quality assurance: transfer of influenza strains between laboratories has, however, faced problems due to issues of fair benefit-sharing. Indonesia, for example, initially refused to submit local isolates for vaccine production.

Major outputs of the GRAI are the creation within the FAO of the Crisis Management Centre (CMC) and the combined FAO/WHO GLEWS for major animal diseases. These institutions have a major impact on responses to disease outbreaks worldwide due to their rapid deployment of interdisciplinary teams. The GRAI has also been instrumental in improving collaboration between animal and human health services through the establishment of joint task forces at government level and in some countries, for instance in Thailand and Uganda, combined RRTs have been established. A majority of countries share information between animal and public health sectors during outbreaks. More infected countries established formal animal/public health mechanisms than non-infected countries but collaboration is mainly restricted to communications and training (e.g. Ethiopia, Rwanda, Tanzania, and Thailand and Uganda) and, to a lesser extent, joint outbreak investigations’ (UNSIC the WB, 2008a). Regional coordination is made possible through personal connections. Many respondents, however, mentioned the far from optimal collaboration at country levels (national and/or field level) and the limited chance for sustainability without external funding. Government RRTs seldom incorporate AH and PH staff, as veterinarians are investigating chickens and the PH staff screen farmers and trace contacts. Where combined RRTs are operating, this is done either to increase search capacity (Thailand) or to optimise the use of available funds. In general, Health Ministries have a long history in active disease surveillance and have larger budgets and more staff than livestock/veterinary departments in Ministries of Agriculture. Moreover, there is no ingrained culture of cooperation between the two disciplines either in developing countries or in the developed world and, sometimes, there is even distrust.

133 USAID provides training programmes for combined animal and human health teams in Asia and Africa.
134 Personal communications, mission field visits.
135 Personal communications, mission field visits.
136 As an example, in 2006, the Ministry of Health in Zambia reluctantly gave the lead of the national AI task force to the Ministry of Agriculture, with the proviso that they would take over as soon as any human case was be detected (WB Rapid Assessment Mission, August 2006, Dieleman, personal communication).
New disease reporting networks have been developed such as the global network WAHIS, managed by the OIE in Paris and the Asia Regional Animal Health Information System (ARAHIS), a regional reporting site for endemic situations operated by the OIE in Singapore. The network to collect and exchange animal health information in Africa, ARIS, is to be upgraded through SPINAP and USAID funding. The aim is to make ARIS compatible with other animal health information systems, such as TADInfo and WAHIS. Programmes to simplify and enhance disease reporting and exchange of other (e.g. market) information through the use of mobile phones, digital pens and short message service (SMS) gateways are being developed and/or tested. A disadvantage is that maintenance of these services requires continued funding which many developing countries are unable to provide.

This mission recommends establishing uniform (global/regional) low-cost and open-source reporting systems to enhance and simplifying disease reporting (from remote areas).

### 2.2.7 Capacity-building

The GRAI has put increased focus on epidemiology and surveillance, early detection and response. Training courses are provided by an array of bi- and multilateral development organisations, (inter alia, FAO and USAID) and NGOs (inter alia, Vetaid and VSF in Africa, AVSF in Asia), both at institutional and grass-roots level. The FAO has been involved in short regional training courses in epidemiology and laboratory diagnostics, including the provision of equipment. Besides its regional programmes, the FAO implements several AHIF-financed country programmes in which epidemiology is a major component. The FAO is backstopping surveillance and control activities in 13 countries in South and South-East Asia and supports epidemiology networks in three African regions (West Africa, East Africa and Southern Africa). A big laboratory and epidemiology workshop, however, organised by the ALive platform in May 2009, revealed that many of the staff originally trained had disappeared.

In Bangladesh, it was reported that in the public sector, staff are moved every 8 to 10 months. Many of those VAHWs have received training in AI since the start of the HPAI (H5N1) crisis. For example, in Cambodia, the FAO provides four-day courses (disease recognition, reporting, and providing information to farmers) plus refresher training to the existing VAHWs (± 10 % of which are women). A negative aspect of the strong focus on AI is that VAHWs, which had originally been trained in ruminant, swine and poultry diseases, fail to report any other (important) disease they may encounter. USAID, in combination with the Rockefeller Foundation, started a farmer-to-farmer (one month peer trainer) programme in Kenya, using volunteers from African countries and the United States, in which bio-security and safe slaughter, disease awareness, general poultry management, enhancing feed quality, marketing, and enhancing farmer groups/associations are taught.

This mission recommends placing (specific) training programmes in a broad cadre of disease prevention, detection and control and avoiding a strong single-disease focus.

The GRAI has been instrumental in training API disease recognition and control at all levels including grass-roots level. Improved sampling and testing is generally reported as a major result. Training in safe poultry production, including bio-security, marketing, nutrition and husbandry did not have a similar positive effect. In particular, programmes addressing the village scavenger and the small commercial backyard production sectors did not have the anticipated results because gender aspects and target group specificity were not taken into account. Since 2007/08, several organisations have started educational and training programmes designed for specific target groups (for instance, for market vendors in Bangladesh by the AED), or incorporated in improved

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137 Personal communication, FAO Regional Animal Health Centre, Nairobi.
138 Personal communication, EC Delegation, Dhaka.
139 OIE, personal communication
140 Personal communication, SSLP, Phnom Penh.
livelihood programmes (for example, smallholder poultry production programmes implemented by AVSF and the Vietnam Women’s Union). Research (Hickler, 2008; Waisbord, 2008) has established that family prosperity and well-being are the major drivers for change.

### Outcomes

The GRAI has created and provided a cohesive response to avian influenza in poultry related to the international OIE standards, through increasing worldwide early warning and crises management systems, diagnostic capacities and creating collaborations between different disciplines such as veterinary and wildlife organisations.

The outcome of combined FAO/WB compensation studies is a guideline presenting different compensation schemes and best practices.

The outcomes of the GRAI — be it in the Global Strategy for the Progressive Control of HPAI from 2005, the revised Global Strategy for Prevention and Control of Highly Pathogenic Avian Influenza (H5N1) from 2007, or the API Consolidated Action Plan for Contributions of the UN System from 2006 — have been formulated in such a way that most outputs and several outcomes have been achieved, as they relate to systems development or studies. However, to ensure any impact, these systems must be used and sustained, and as one of the respondents mentioned, “Impact does not depend on technical issues alone, but also on political and others”. It could, therefore, be questionable if these outcomes will result in any impact beyond central organisational and government levels or in long-term sustainability.

The large investments and support from the international community have enhanced government services for the early detection, control and, at least temporarily, the eradication HPAI from poultry in domestic flocks, thereby reducing the disease incidence in poultry: something which could not have been achieved at this scale and pace without the large contributions of the GRAI. However, all the provisions and assistance could not prevent the disease from firmly establishing and becoming entrenched or endemic in some countries and the increasing numbers of human infection in 2009 indicate that HPAI is far from controlled, let alone eradicated. And although undoubtedly a large part of the reduction in outbreaks in poultry may be attributed to the combined efforts of the GRAI, much is still unknown about the virus epidemiology and survival. Moreover, reporting fatigue and failure to improve bio-security at smallholder and grass-roots level, combined with the high staff turnover of trained people and limited government resources, makes a lasting impact at this point in time doubtful. It has also been established that the strong single-disease focus has not stimulated thinking beyond AI and, therefore, any impacts observed would probably not go beyond AI.

Could the outcomes have been achieved in a more substantive manner had the international assistance been provided in a different way? Outcomes could possibly have had a more lasting impact, given the limited resources of many governments, if more emphasis had been placed on training and supporting regional economic and development structures to stimulate regional approaches to control emerging infectious diseases in concerted actions.

### Recommendations

Establish regional compensation policies to avoid cross-border movement of poultry (healthy or diseased) for compensation purposes.

Design more holistic research programmes, which embody technical and applied research topics and incorporate technical and sociological/anthropological researchers.

Establish uniform (global/regional) low-cost open-source reporting systems to enhance and simplify disease reporting (from remote areas).

Enhance regional cooperation through the development of regional preparedness plans and rapid response teams to address disease outbreaks in concerted actions.

Place (specific) training programmes in a broader cadre of disease prevention, detection and control and avoid a strong single-disease focus.

#### 2.3 TO WHAT EXTENT HAS THE GRAI LIMITED THE DISSEMINATION OF THE VIRUS FROM BIRDS TO MAN?

##### 2.3.1 Animal and human health collaboration

The GRAI has stimulated and improved collaboration between animal and human health specialists at global, regional and national levels. Cooperation and collaboration at grass-roots level is country-dependent and variable as discussed previously. The efforts of the GRAI to prepare for a possible pandemic have clearly reaped rewards, as could be seen during the influenza A(H1N1) pandemic 2009 when countries were quick to launch prevention and control measures.

The increased collaboration, the upgrading of animal and human health systems at national levels, the reduction in the number of outbreaks, and the
time required to control outbreaks once they occur may all have had a positive effect on the reduction of a global human H5N1 pandemic threat. The limited number of human H5N1 cases diagnosed over the past six years is seen by many respondents as a diminished global threat of a human pandemic due to influenza A(H5N1), even with the occurrence of the 2009 A(H1N1) pandemic, and is mentioned as an important outcome of the GRAI. But is this really the case? Despite good examples of information and equipment sharing, as well as the efforts of combined rapid response and surveillance teams, outbreaks of AI (at least in Cambodia) may come to light through human sentinel cases.

2.3.2 Risk studies

Much remains unknown about human HPAI infections. Despite frequent and widespread contact with poultry, transmission of HPAI (H5N1) from poultry to humans is very rare. Even in a country like Indonesia, where the disease is endemic and the population lives in close quarters with its poultry, the number of human infections is relatively low. Van Kerkhove (2009a) remarks, however, that the high case fatality rate may be overestimated, indicating that the actual number of human infections may be higher, as yet, results of relatively few seroprevalence studies in humans are available to determine subclinical or asymptomatic cases in countries affected by HPAI (H5N1) outbreaks in domestic poultry or wild bird populations. In December 2009, however, a US-sponsored seroprevalence study was under way covering approximately 9,000 AI infected people in Vietnam. Van Kerkhove (2009a) also mentions that studies indicate that the transmission of HPAI (H5N1) from poultry to humans is limited to individuals who may have been in contact with the highest potential concentrations of virus shed by poultry, thus suggesting a threshold virus concentration needed for effective transmission. She further states that circulating HPAI (H5N1) strains have not yet mutated to transmit readily from either poultry to human or from human to human. However, three family clusters with no evidence of sustained H2H transmission were documented in 2009.

Modes of virus transmission to humans can be quite varied throughout different countries. Direct routes may include contact with aerosolized virus and infected poultry blood or body fluids via food preparation practices; consumption of uncooked poultry products; or through the care of poultry (either commercial or domestic).

Little is understood about HPAI (H5N1) transmission via indirect routes, though van Kerkhove (2009a) mentions studies which suggest an association between exposure to a contaminated environment and infection either through ingestion, conjunctival or intra-nasal inoculation of contaminated water or soil, or via fomites on shared equipment or vehicles transporting products between farms. She further mentions that the results of available studies indicate that indirect exposure to poultry through the environment may play a role in transmission. The Commission’s FLURESIST and RIVERS research programmes (European Commission, 2007a) are, inter alia, investigating virus survival in animal carcasses, commodities and the environment. Van Kerkhove also remarks that demographic differences in human cases between countries may lie in different poultry contact patterns, and, furthermore, that variation in H5N1 incidence by age may be due to a combination of exposure and differences in age-related intrinsic immunologic susceptibility to infection, pre-existing immunity against human influenza A virus and/or clinical presentation of disease. Fatality rates for women can be significantly higher than for other groups with up to three quarters of all infected women dying; for example, in Egypt, 73% of deaths have been in adult women. This has been ascribed to their greater contact with live birds and delay in seeking care.

In suspected human outbreaks of H5N1, this mission recommends undertaking combined (human public and animal health sectors), rapid, systematic and standardised collection of detailed exposure information on poultry contact patterns (direct and indirect) in order to understand and determine human H5N1 infection routes.

2.3.3 Communication

The GRAI has assisted countries in developing and improving their communication systems. In collaboration with other UN agencies and partners, UNICEF has conducted advocacy with governments at national/federal, state, and district level to raise awareness about API and coordinate roles and responsibilities. Waissbord (2008) mentions that UNICEF has had a protagonist role in strengthening countries’ capacity in communication and social mobilisation, but that results of the activities vary across countries depending on local factors, mainly government leadership, structure, resources and partners. He further mentions that while some countries have shown a strong commitment to API prevention and control (including communication activities), other national governments did not engage appropriately, but also that significant progress has been made in coordinating with government units (e.g. Ministry of Agriculture; in Africa notably through WB-managed assessment and INAP missions), and with the FAO, partners that UNICEF (regional and country offices) had never worked with in the past. API control and prevention has required the development of new partnerships with different technical expertise and the development and implementation of communication activities in a short period of time, particularly in countries that had outbreaks. These new partnerships have resulted in strengthened capacities for outbreak and risk communications among Ministries of Agriculture.

Behaviour change communication

From the beginning, messages were developed to make the general public and poultry producers aware of the dangers of HPAI, both to human beings (by, inter alia, UNICEF, World Bank, FAO, OIE) and their society at large. This was achieved by a combination of media coverage, awareness raising campaigns, and interagency cooperation. The work of the FAO, OIE, and UNICEF, among others, resulted in the development of a comprehensive strategy for effective communication, which included technical support, training of key government officials, and the publication of guidelines and best practices. The GRAI has assisted countries in developing and improving their communication systems. In collaboration with other UN agencies and partners, UNICEF has conducted advocacy with governments at national/federal, state, and district level to raise awareness about API and coordinate roles and responsibilities. Waissbord (2008) mentions that UNICEF has had a protagonist role in strengthening countries’ capacity in communication and social mobilisation, but that results of the activities vary across countries depending on local factors, mainly government leadership, structure, resources and partners. He further mentions that while some countries have shown a strong commitment to API prevention and control (including communication activities), other national governments did not engage appropriately, but also that significant progress has been made in coordinating with government units (e.g. Ministry of Agriculture; in Africa notably through WB-managed assessment and INAP missions), and with the FAO, partners that UNICEF (regional and country offices) had never worked with in the past. API control and prevention has required the development of new partnerships with different technical expertise and the development and implementation of communication activities in a short period of time, particularly in countries that had outbreaks. These new partnerships have resulted in strengthened capacities for outbreak and risk communications among Ministries of Agriculture.

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Waisbord (2008) reports that many KAP studies found low levels of knowledge about the forms of virus transmission among birds and from birds to humans and that studies demonstrated that an increase in knowledge does not necessarily translate into effective behavioural changes due to a host of social, economic and political reasons. He further writes that even when awareness increases, the majority of people do not have either an increased sense of urgency about AI prevention or a higher risk perception related to the impact of AI on humans or poultry, and that this was even observed in Indonesia and Vietnam, two countries where, since 2003, there have been an infinite number of infected and dead birds as well as many human fatalities. Zwart et al. (2007) found, in a comparative study between Europe and Asia, a reduced risk perception in relation to the proximity to the disease and thus higher HPAI (H5N1) risk perceptions in Europe than in Asia. Waisbord (2008) also mentions that in terms of human risk, people do not feel that AI poses any tangible risk to them or their communities. Because people think that AI has ‘only relative importance’ as, for example, Newcastle disease, risk perception is low.

He also reports that all studies mention a considerable knowledge-practice gap and, furthermore, that the likelihood of putting the key behaviours into practice is not similar for all four advocated key behaviours: available evidence suggests that influencing cooking practices and, to a significantly less extent hand-washing, is more likely than modifying existing farming practices and reporting behaviours. In contrast to hand-washing and cooking practices, no significant behaviour changes were found in poultry raising or in bio-security and the reporting of suspected AI cases, as a result of the communication intervention. An obvious, yet important factor, that Waisbord mentions is the low level of bio-secure farming and disease reporting in all surveyed countries. Four factors that seemingly discourage reporting are: (i) low risk perception; (ii) fear of the economic consequences of reporting; (iii) lack of clear information about follow-up actions (e.g. culling, killing, compensation amount and procedures) and actual post-reporting experiences; and (iv) a strong distrust of authorities.

Despite many education and communication programmes by the UN system (e.g. UNICEF, FAO), bilateral financiers and/or development organisations (e.g. USAID, CIDA, Japan) and NGOs (e.g. AVSF, AED, CARE), studies on the effectiveness of messages and knowledge, awareness, practice (KAP) surveys carried out by many organisations (inter alia AED and UNICEF), showed that messages (easily recited by backyard poultry farmers) which have created knowledge and/or awareness, have had little effect in reducing risks or changing methods of poultry management in the backyard and village production sectors, as the messages were often rather more aimed at educating about AI than promoting behavioural changes based on evidence about farmers’ obstacles and motivations. A study by Hickler (2008) in Cambodia revealed that messages would only have an effect if they present a logical rationale (why it makes sense to do things differently from the audience’s point of view) instead of a technical one. Messages should thus be more in line with the recipients’ logical behaviours. In this respect, the peer programme as currently practised by USAID in Africa may be more successful. Waisbord (2008) further states that programmes established to improve livelihoods have been most successful in creating bio-secure poultry production systems. An example of such a programme is that implemented in Vietnam by the Vietnam Women’s Union in collaboration with AVSF (Velasco et al., 2008).

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Inter alia, Bagnol, 2007; Hickler, 2008; KAP studies by, for example, AED and UNICEF; Velasco et al., 2008; Waisbord, 2008.
The study by Hickler (2008) in Cambodia has shown that backyard farmers encounter the priority messages as a set of imperatives and that when a rationale is provided, it is often a technical one. Hickler mentions that a technical rationale is great for identifying practices to promote, discourage, or target through communication strategies, but that it will never be able to convince anyone why, from his or her point of view, it makes sense to do things differently to how they have done for years or even generations. He further mentions that communication strategies, and not only in Cambodia, need to promote an additional sort of ‘awareness’, the awareness of why a practice or investment makes sense from the point of view of the audience. Perhaps most importantly, messages regarding animal-to-animal transmission need to connect with local values and priorities, something that should be easy considering how intimately poultry is woven into households’ lives. Hickler states that for the smallholder farmer in rural Cambodia, values like ‘the sake of humanity’ or ‘civic responsibility’ are not going to get much local traction. Instead, the results of Hickler’s study suggest that ‘family prosperity and well-being’ is by far the best candidate for linking priority messages to a value for which people would indeed go to great lengths.

Waisbord (2008) further remarked that communication should also address attitudes, such as low risk perception and the stigma surrounding reporting, and that it should be integrated with initiatives that aim to reduce

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149 At a FAO extension meeting for village women in Kandal province attended by the mission, women were particularly interested in the human symptoms of a H5N1 infection.
structural obstacles that discourage healthy practices. Sowath Ly et al. (2007) remarked that behaviour change involves a comprehensive and multidisciplinary intervention, which combines risk perception communication with feasible and practical recommendations, including economic considerations. Because lack of knowledge does not appear to be a factor, intervention programmes must include feasible options for resource-poor settings that have limited materials for personal protection (water, soap, rubber gloves and masks) and must offer farmers alternative methods to work safely with poultry on a daily basis. Waisbord also remarked that messages should clearly tell people what benefits they would reap if they were to practice healthy behaviours. Benefits should not be limited to conventional public health goals such as ‘achieving healthy communities’ or ‘preventing disease’; they should also consider a host of social and economic rewards that may be associated with specific behaviours.

In 2009, the notion is growing that target groups need to be addressed with more or less tailor-made communication and training programmes, such as those carried out by the USAID/AED AI.Comm programme in Bangladesh. In this programme, vendors, transporters, slaugh- terers (home and professional) and consumers receive their own specific messages and training activities, instead of a one-size-fits-all message. However, specific gender aspects are not yet addressed in those training programmes and messages.

2.3.4 Safe poultry production

Besides the awareness-raising programmes, training programmes for safe poultry production and restructuring programmes for the poultry sector have been developed and, with more or less success, implemented. The FAO has been, and is, promoting the restructuring of the poultry sector in order to establish safe and viable production systems. In several countries, for example Thailand and Vietnam, poultry farmers were stimulated or forced by governments and/or large poultry companies to improve and upgrade and/or replace their farms in order to establish more bio-secure production systems. These measures have had a positive effect on the (large) commercial poultry sectors and the hygiene standards but also resulted in a negative effect on the income of contract farmers in Vietnam, for instance. Thailand’s export market was soon regained after the initial outbreaks. FAO studies in Viet- nam showed an initial change in consumer preferences towards processed and cooled poultry meat from supermarkets and other outlets in urban centres, although the accompanying marketing infrastructure at the time still needed development. Few people, however, could afford to purchase cooled and processed meat (products) from supermarkets. In Indonesia, people still prefer, despite the many infected chickens, local free-range chickens (Ayam Kampung). Measures by the Vietnamese government to completely ban poultry production and wet markets from urban areas, has so far experienced limited success as illegal selling points and slaughter are still present in major cities due to the preference for live poultry and fresh meat. However, the government of Vietnam expects that the demand for freshly killed live poultry will diminish over time. Scoones and Forster (2008) mentioned that in Lagos, Nigeria, authorities withdrew a live-poultry marketing ban after mar- ket traders besieged government offices. Negative livelihoods effects brought about by restructuring of the poultry sector have also been observed, for instance among smallholder farmers in Vietnam, who are unable to upgrade or move their farms to production centres in low populated areas (Velasco et al., 2008) or small-scale producers (mainly women) in Jakarta, Indonesia, who saw their income decline by an estimated 32 % with resulting negative impacts on the household budget, due to a ban on poultry keeping in residential areas. Safe poultry production in the smallholder sector would profit most from integrated livelihood programmes with poultry production components.

This mission recommends developing communication messages and training programmes, designed by working groups composed of technical and social scientists, based on social, cultural, political and environmental values and contexts of the intended target group.

### Outcomes

The GRAI has been instrumental in developing and implementing strategic communication for awareness and behaviour change, through, inter alia, developing contents for public awareness and social mobilisation campaigns, strengthening capacities for outbreak and risk communications among Ministries of Agriculture and establishing regional/national Stop AI partnerships (including ministries, the media, NGOs and the private sector).

The GRAI has created social mobilisation for awareness and behaviour change through the development of behaviour change strategies and prototype communication materials.

The GRAI has enhanced collaboration between animal and public health sys- tems, which has improved communication and the exchange of information in a number of countries. The improved communication and information exchange may have contributed to a reduction in the virus load of the poultry population and thus to a possible reduction in virus dissemination to man. However, it has become evident over the years that little investigation has taken place and few data are available concerning asymptomatic human H5N1 infections via direct or indirect routes or human disease prevalence. It cannot, therefore, be established if, and to what extent, the GRAI has limited virus dissemination from birds to man. Human infections, which function as sentinel cases for poultry outbreaks, do not indicate this is the case.

To reduce or even prevent virus dissemination from bird to bird and from bird to man, the GRAI has assisted countries in developing or improving their communication systems. UNICEF, in collaboration with others, has conducted advocacy with governments at all levels to raise awareness about API and

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538 Velasco et al., 2008.


535 FAO, 2008a, Avian influenza control programme in Indonesia, Annual report.
to coordinate roles and responsibilities. This has resulted in the development of new partnerships with different technical expertise, and the development and implementation of communication activities in short periods of time, par-
ticularly in countries that had outbreaks. The established partnerships have resulted in (strengthened) capacities for outbreak and risk communications among, in particular, Ministries of Agriculture, which can be objectively verified in those countries where the UNICEF coordination has been successful. The established or improved communication systems in Ministries of Agriculture may have a lasting impact, which could go beyond AI, provided funds remain available to safeguard institutional memory.

Social mobilisation with technically accurate messaging has resulted in an objectively verifiable impact as many KAP studies clearly demonstrate the high levels of knowledge and awareness of the contents of the messages. How-
ever, the anticipated behaviour change stemming from those messages has not been achieved: thus, the massive financial inputs have not contributed to a possible limitation in virus dissemination. Information from a number of KAP studies was already available in early 2007 (USAID/AED); however, lit-
tle adaptation to the four key messages has taken place and it is only since 2009 that a trend has been observed in the further diversification of messages. The anticipated impact (changed behaviour supported by accurate messaging and effective social mobilisation) could possibly have been achieved in a more substantive manner had social scientists been involved in the design of the BCC messages. To achieve behaviour change, multidisciplinary intervention programmes must combine risk perception communication with local values and priorities, feasible and practical recommendations including social, cultural, gender and economic considerations for resource-poor settings, and must offer farmers who have limited materials for personal protection alternative methods to safely work with livestock on a daily basis.

Recommendations

Undertake, in suspected human outbreaks of H5N1, combined (human pub-
lic and animal health sectors), rapid, systematic and standardised collection of detailed exposure information of poultry contact patterns (direct and indir-
ect) in order to understand and determine routes for the infection of humans by H5N1.

Develop communication messages and training programmes, designed by working groups composed of specialists from technical and social sciences, based on social, cultural, gender, political and environmental values and contexts of the intended target group.

2.4 TO WHAT EXTENT HAS THE GRAI ENHANCED INCREASED FOOD SAFETY AND A ROBUST REGIONAL AND INTERNATIONAL TRADE IN POULTRY AND POULTRY PRODUCTS?

Trade movements of poultry are now considered to be the main route of transmission of API, the second being wild birds 153.

In a country, such as Thailand, with a large poultry production industry which is dependent on exporting, the impact of API has caused the poultry industry to adapt its manufacturing processes. Instead of marketing and exporting whole, uncooked carcasses which may har-
bour and transmit HPAI (H5N1) virus, poultry meat is now cooked and processed into a variety of products which are acceptable for regional and international trade. While processing eliminates the possibility of live virus being transmitted, it also generally increases the hygiene and safety of the products and is adding to their value 154.

With regard to regional trade, there is often considerable informal and scarcely regulated marketing of poultry across international borders and the GRAI and other ini-
tiatives, for example to control foot-and-mouth disease (FMD), are encouraging focus on cross-border movement of livestock with the introduction of regulation, inspec-
tion and control. The OIE, supported by AusAID in South-East Asia, is setting standards for regional trade in live-
stock and their products but, for example, in Cambodia, which imports its hatching eggs, day-old chicks and duck-
lings from Vietnam, sufficient money and resources for the control of cross-border trade are not being allocated. This also applies to trade between Thailand and Vietnam. Despite the outcomes of the GRAI, in South-East Asia, with the exception of Thailand, countries like Cambodia need to raise their sanitary and phytosanitary (SPS) stand-
ards which currently limit their opportunities for legitimate regional trade in poultry and poultry products 155.

In South Asia, there is a similar problem of containment of API with informal movement across the international bor-
der between India (West Bengal) and Bangladesh follow-
ing a cattle trade route out of India. This is beginning to be add-
ressed through the GRAI by regional meetings to dis-
cuss coordinated cross-border API control activities between India, Bangladesh and Nepal and may be addressed by SAARC with support from the Commission 156.

In Africa, disease constraints in all classes of livestock are obstacles to regional and international trade. The OIE is advocating the establishment of disease-free zones for the production of safe commodities from livestock, and the Norwegian Agency for Development Cooperation (NORAD) has made a study on the potential for production zones for regional trade, and trade to partners 156.

153 Interview — AU-IBAR, Nairobi.

154 Interview — Veterinary Clinical Sciences Department, Royal Veterinary College, London.

155 Interviews — EC Delegations (Bangladesh, Cambodia, India, Thailand); UNSIC, WHO and the Ministry of Public Health, AusAID and Rockefeller Foundation, Thailand; Ministry of Health and NaVRI, Cambodia; Institute of Epidemiology Disease Con-
trol and Research (IEDCR) and National Influenza Centre, RTM International, AI.COMM and USAID, Bangladesh; FAO, Myanmar; FAO-ECITAD Regional Animal Health Centre and AU-IBAR, Nairobi.

With regard to API, risk-based surveillance and rapid response preparedness is focused on trade routes, areas of high poultry population density, and routes of wild, migratory birds. However, trade issues may still interfere with the reporting of API in some African countries, and politicians who have interests in the poultry industry can hamper surveillance and control activities.

Recognising the importance of food safety, the FAO is advocating safe poultry production, and is supported in this by funding from USAID and AusAID. For example, the FAO-ECTAD in Nairobi has a safe poultry production and bio-security expert on its team.

2.4.1 Restructuring of the poultry sector

For descriptive convenience, the poultry industry in developing countries has been categorised by the FAO/OIE into four sectors depending on size, levels of industrialisation and commercialisation and bio-security as follows:

- Sector 1: Industrial integrated system with high-level bio-security and birds/products marketed commercially (e.g. farms that are part of an integrated broiler production enterprise with clearly defined and implemented standard operating procedures for bio-security);
- Sector 2: Commercial poultry production system with moderate to high bio-security and birds/products usually marketed commercially (e.g. farms with birds kept indoors continuously; strictly preventing contact with other poultry or wildlife);
- Sector 3: Commercial poultry production system with low to minimal bio-security and birds/products enter live bird markets (e.g. a caged layer farm with birds in open sheds; a farm with poultry spending time outside the shed; a farm producing chickens and waterfowl); and
- Sector 4: Village or backyard production with minimal bio-security and birds/products consumed locally.

One of the early reactions to HPAI, particularly in developing countries, was to view backyard/free-range/scavenging poultry (Sector 4) as one of the main problems contributing to the entrenchment of the disease. This, in early 2006, lead to proposals for poultry sector restructuring (initially seen simply as the move to industrial production (Sectors 1 and 2)) with, perhaps, the cessation of backyard poultry keeping or, at least, a move towards semi-industrial or industrial production with reduction in Sector 4 poultry production, seen as a necessary step if the disease is to be controlled. This has subsequently been found not to be possible and unsuitable. The restructuring of the poultry industry to move away from Sector 4 production has an adverse effect on Millennium Development Goals 1 and 3.

While restructuring of the poultry sector has been advocated, very little has happened. The exception is in Thailand where CP, the largest poultry producing company, has rationalised and integrated the different components of its business. This required better management and marketing skills. While it is some way towards compartmentalisation, the process is not complete.

Having a large and highly commercial poultry industry, Thailand has mainly relied on its own resources for the control of HPAI. The Thai government’s primary development goal with respect to poultry production is a growth of Sectors 1 and 2 to meet domestic consumption and a growing export trade. Contrary to early advice from the FAO, it has not resorted to the use of prophylactic vaccination because it is feared that the use of vaccine will further damage the large poultry export business which exists in Thailand. Because there is no appreciable export market of poultry from Indonesia, adoption of vaccination there has not been a problem.

Initially, the Vietnamese government banned the keeping of ducks, but due to their importance, particularly in Sector 4, and for their use in the rice production system, the ban was unenforceable and only succeeded in excluding ducks from HPAI control measures. This ban has been lifted and ducks may be kept provided they are declared and recorded by the Communes and District Veterinary Services. A ban on keeping poultry in Sector 4 has been discussed, but more than 70% of poultry keepers have less than 50 chickens and nine million households have backyard poultry, illustrating the importance of the sector and the impracticality of attempts to ban it.

A ban remains on keeping poultry in municipalities, but the Department of Livestock Production acknowledges that it will take time to enforce. Bans have also been placed on keeping poultry in municipalities in Egypt and Indonesia but how well are they enforced? (Wilsmore et al., 2007)

2.4.2 Restructuring of the market and value chain

The poultry industry is mostly backyard and Sector 3 in countries affected by API, for example, Bangladesh, Egypt, Indonesia and Vietnam, and while restructuring to exclude backyard poultry production has been discussed, little has been done because of the associated social and enforcement problems involved.

With regard to restructuring within Sector 4 in Kenya, USAID funds for the GRAI are supporting a one-year farmer-to-farmer trial programme for safe poultry production which includes marketing through farmer groups and associations and training of municipal inspectors along the supply chain. The project establishes links between farmers, the marketing sector and small-scale producers.

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159 Interview — European Commission, Directorate-General for External Relations, Brussels.
160 Interview — Veterinary Clinical Sciences Department, Royal Veterinary College, London.
161 Interview — Veterinary Clinical Sciences Department, Royal Veterinary College, London.
exporters. Commercial farms sell to hotels, while chickens from Sector 4 are sold in Nairobi markets and small shops. One of the project’s aims is to limit the transport of live chickens and instead to establish regional slaughterhouses with inspection, and thus bring safe slaughtered chickens to the capital Nairobi. The project uses SMS messages to forward chicken market prices. With recognition of trade in poultry as being a major cause of spread of the HPAI (H5N1) virus, an outcome of the GRAI has been to stimulate studies of value chains to define them and identify and quantify risk points along them so that interventions can be planned and implemented which minimise the risks.

Value chain analysis is being used by livestock economists as a way to better understand the contribution and importance of, and possible links between, different systems of poultry production, including backyard production. It is being used to assess the impact of HPAI disease and control measures used against it on different actors in the poultry value chain and it is also being used to assess the impact of industry restructuring on them.

In Indonesia, for example, three studies were completed in 2008 in North Sumatra, Bali and Jakarta. The studies included evaluations of the movements of live poultry as well as poultry products and by-products that may have a role in diseases spread. The Bali study elucidated and mapped the chains for commercial layers, commercial broilers, village chickens, commercial ducks and songbirds while the study in North Sumatra elucidated and mapped the chain of broilers, village chickens, layers, male layers, ducks and quail as well as distribution chains for pet birds, feed and manure. In Jakarta, the focus was on broiler chickens, layers (and eggs), kampung chickens (and eggs), ducks (and eggs) throughout the greater metropolitan area encompassing Jakarta. The distribution of poultry feed and manure was also mapped. The maps and information from the study are being used to develop and strengthen effective API prevention and control policies and interventions in these provinces.

The association between backyard poultry keeping (and other aspects of poultry value chains) and HPAI control is based on an understanding that different systems of poultry production and marketing can carry different levels of risk for disease transmission and maintenance. Therefore, intervening to alter the way that poultry value chains operate (restructuring and other regulatory interventions such as ‘bio-security’ or ‘risk reduction measures’) can reduce risk of disease, contributing to its control. However, until 2007, formal risk analysis and value chain studies had not been linked together. This represents an imbalance in methodological approach, since whilst the value chain analysis will allow estimation of the impact of any interventions on the value chain actors and poultry production, risk analysis is needed to estimate their impact on disease risk (disease control benefit).

The FAO is using socioeconomists to undertake value chain analysis. In Kenya, these studies are also being undertaken at the ILRI. They are exploring ways in which risk analysis can be introduced to, and linked with, the value chain approach to understanding disease and its control in the poultry sector.

2.4.3 Influence on other livestock species and products

In many countries, API has had a major effect on the poultry industry. As soon as API was mentioned in the media, the consumption of eggs and poultry fell, resulting in a fall in prices, which was bad for an industry which may have already suffered losses through birds dying or being culled. Initially, the decrease in demand for poultry and their products led to significant decreases in their prices, causing substantial losses for producers. The decrease in demand, however, was short lived and demand for poultry products soon returned to pre-API levels or higher. The appearance of the disease in the short term led to an increased demand for red meat and fish with a consequent increase in their prices. In Egypt, there was an initial reduction in consumption of poultry products of about 70%, associated with an increase in demand for other alternatives with a significant increase in their prices. There was also a problem of unemployment (an estimated 10% of around 1.5 million plus one million temporary or part-time workers in Egypt) in the poultry industry as a result of the disease, resultant culling, and some producers going out of business because of the fall in prices for poultry meat and eggs. This has also adversely affected poultry feed and drug suppliers.

In Indonesia, the Committee on World Food Security 2006 reports that, in 2004, the combined effect of 50% to 60% lower prices and 40% lower sales volumes meant income reductions of 70% to 80% for traders and employment opportunities dropped by 40% on larger poultry farms. In 2005, an FAO study looked at the impact of HPAI in five South-East Asian countries including Indonesia. It identified Sector 3 as the most affected by HPAI outbreaks and estimated the loss in terms of birds lost alone, from July 2003 to 2005, to be between USD 16.2 and 32.4 millions (with 16.2 million poultry killed or stamped out in control efforts). The report mentions also drops of between 45 to 60% in the demand for day-old chicks and feed inputs during

162 Interview — USAID, Nairobi.
the outbreaks and a reduction of just over a third in the employment in the poultry industry. Another report from the United States Department of Agriculture (USDA) (2007) refers to a diminution of 11% in poultry consumption from fears of HPAI in 2004 only. In 2008, the National Committee for Avian Influenza Control and Pandemic Influenza Preparedness (KOMNAS FBPI) estimated the total economic losses from HPAI since 2004 at IDR 4 trillion or USD 3.7 billion 170.

Poultry prices have subsequently increased, not so much through a return of consumer confidence, but due to the major increases in poultry feed costs faced by producers which still keep many out of business. This has forced Egypt and some countries in Asia to import poultry from countries which have not been exposed to API, such as Brazil 171.

2.5 WHAT SUCCESS HAS THE GRAI HAD IN PREVENTING THE INTRODUCTION OR ESTABLISHMENT OF API IN NON-INFECTED AT-RISK COUNTRIES?

2.5.1 Contingency plans and emergency preparedness in place

Through the GRAI, awareness of API has been successfully introduced in both developed and developing countries. As a result, many countries have introduced integrated national action plans (INAPs). In 2008, according to a global survey conducted by UNSIC, 140 of 146 countries (35 of 36 in Africa, 27 of 28 in the Americas, 23 of 24 in Asia-Pacific, 39 of 42 in Europe/Central Asia and 16 of 16 in the Middle East/North Africa) have developed INAPs which they can implement if the need to contain and eliminate outbreaks of API arises 171. In those countries that have controlled and eradicated outbreaks of API, success is in part due to demographic and environmental factors that are not conducive to maintenance of the disease, i.e. they do not have a large human populace closely associated with sizeable poultry populations in backyard production in subsistence economies, a high proportion of which are domestic waterfowl such as ducks and geese. Where these conditions are found, it has been easier for the disease to become endemic, for example in Egypt and Indonesia 172. Another factor in favour of containment and elimination of HPAI (H5N1) from countries in the developed world is that they have the human, financial and physical resources available for emergency preparedness and rapid reaction to implement the INAPs.

With respect to the developing countries, the GRAI has created awareness and encouraged and assisted them in developing INAPs with the help of international organisations and crisis response partners. For example, the OIE has conducted workshops on emergency preparedness and, in Africa, the ALive programme, as well as the Commission-supported SPINAP, assists governments in preparing INAPs and helps them strengthen their surveillance, diagnostics and human resources so that they have the capacity to implement the plan when the need arises. In general, there are now national contingency plans in place for API and, with regard to human health, countries were taking the opportunity to adapt them and test them for influenza A(H1N1) response at the time of interviews in June 2009 173. There remains a need for further development of effective regional contingency plans. The FAO has also supported the development of contingency plans together with communication strategies and, generally, contingency plans contain an element of communication. However, in Africa, not all countries have made contingency plans, and in some of those that have, they have not yet been accepted by the government and some are not funded due to pressing demands from other sectors. There also remains concern over whether many of the developing countries that have developed INAPs have the resources to implement them 174. As of 2008 for example, Uganda was the only country which had received commitments to fully cover the INAP USD 14 million budget. These commitments included a proposal for an International Development Association (IDA) loan of USD 10 million 175.

There has been regional coordination of activities: in South Asia, SAARC now has regular meetings with CVDs from the region 176. In South-East Asia, Thailand has been actively seeking regional coordination. It has also strongly supported subregional programmes such as MBDS and ACMECS but results are variable due to the different capacities of countries in the region, as well as differences in economic and political interests 177. ASEAN supported by USAID, AusAID and the ADB is also very involved; it concentrates on longer-term, regional standardisation and coordination efforts and the AusAID programmes are directed to any EIDs rather than just API 179.

In Africa, SADC and ECOWAS have been active in seeking a regional approach to API control and the Eastern Africa Community contacted every country in its region to find out what emergency preparedness is available. With regard to regional information sharing, in Africa, ARIS is being upgraded to use open-source software for harmonisation between it, WAHIS and TADInfo through USAID and SPINAP support 179.

Despite assistance, INAPs have been slow to be developed in Africa, and as a result, SPINAP, for example, has so far only disbursed 46 % of its funds, but already the availability of funding and the awareness of the need for contingency planning and emergency preparedness is being applied to other EIDs. For example, Liberia is turning to SPINAP to assist with preparedness for an A(H1N1) response 180.

In Africa, SPINAP’s first priority is animal health. In this respect, it is assisting with emergency simulations, equipment supplies and vaccine preparedness. A problem is that in sub-Saharan Africa, there is not enough focus on pandemic preparedness. INAPs are mostly focusing on AI. UNOCHA has been advocating pandemic preparedness in INAPs and SPINAP is reportedly prepared to support non-health pandemic preparedness 181.

Through the GRAI, surveillance and reporting has been improved in the animal and human health fields, including reporting to the OIE and WHO. However, outbreaks in poultry may not be reported to the OIE from those countries that have declared API to be endemic in their poultry populations, for example Egypt and Indonesia 182.

In South-East Asia, through the GRAI, community animal health workers (CAHWs) have been trained in API outbreak response and veterinarians have been trained in outbreak investigation. The establishment of diagnostic laboratories for API through the GRAI has supported the diagnosis of other diseases such as FMD and classical swine fever in some countries, but in others it is claimed that diagnostic capacity for API has been obtained at the expense of other laboratory activities. Some of the laboratories now have good enough facilities and expertise to become regional reference laboratories for API 183.

As time passes, coupled with donor fatigue, levels of surveillance and emergency preparedness may fall as other threats are prioritised. Thus, countries that have successfully avoided introduction and establishment of API may become more vulnerable 184.

2.5.2 Absence of human and avian cases

Table 3 shows the temporal and spatial trends of the AI epidemic, indicating which countries have had outbreaks and in which year. Where names of countries are in blue, this indicates that they are experiencing outbreaks for the first time. The table also indicates whether outbreaks were in domestic poultry or wild birds. It can clearly be seen that most new outbreaks were diagnosed, both in domestic poultry and wild birds, in 2006. This stimulated the organisation of international conferences on avian and pandemic influenza and, importantly, the Beijing pledging conference that year, which initiated the GRAI. Since then, the table shows that the number of countries with infections of poultry has decreased from 40 in 2006 to nine in 2009, with only one newly infected country, namely Nepal.

A similar trend can be seen in human cases of API (Table 4) in that they peaked in 2006 and since then have been falling although, worryingly, this trend has reversed in 2009 with the number of humans affected already exceeding the number in 2008 by 60 % (44 reported human cases of highly pathogenic influenza HPAI (H5N1) in 2008 and 72 in 2009). That incidence of human cases is correlated with diagnosed outbreaks of AI in poultry has been observed at national level. For example, in Egypt, where there is a seasonal trend in diagnosed poultry outbreaks, human cases closely follow the same seasonal trend 185 (Wilsmore, personal observation). Therefore, without the increase in human cases recorded in 2009, there might have been justification for ascribing a reduction in numbers of human cases to activities through the GRAI to reduce outbreaks of AI in poultry. Let us note that the GRAI has not been able to help in reducing the human infection case fatality rates (CFRs) which remained high in 2009. Egypt is the country which presents the lowest

176 Interviews — USAID, Thailand; FAO, Bangladesh.
177 Interview — MoH and Rockefeller Foundation, Thailand.
178 Interviews — AusAID and USAID, Bangkok; see also, for example, INCEPTION WORKSHOP.
180 Interview — AU-IBAR, Nairobi.
181 Interviews — AU-IBAR and UNOCHA Regional Office for Pandemic Influenza Coordination (OCHA-PIC).
182 Interview — OIE, Paris.
183 Interviews — FAO, Bangkok; NaVRi, Thailand; the OIE, Paris; ASEAN-ADB Project on Strengthening Regional Coordination in the Control and Eradication of Highly Pathogenic Avian Influenza (HPAI), ASEAN, Bali, Indonesia, March 2010.
184 Interviews — UN Office for Coordination of Humanitarian Affairs (UNOCHA) non-health pandemic preparedness (PIC team) and Japanese Embassy, Bangkok.
185 Wilsmore, personal observation.
CFR among its high number of human infections from HPAI (H5N1), while Indonesia has the highest CFR.\(^{186}\)

In Cambodia, it was observed that a human case of API was a sentinel for disease in the poultry population.\(^{187}\) The increased number of human API cases that occurred in 2009 may be where AI in poultry is not being diagnosed, possibly because of surveillance fatigue in countries where the disease has been declared to be endemic (Egypt and Indonesia) or because of lack of compensation schemes and social reasons for failure to report disease that occur at backyard poultry keeping level.\(^{188}\) The variability and sensitivity in space and time of API surveillance systems makes it difficult to draw correct conclusions on the results and performance of reporting by different countries.

### 2.5.3 Conclusion

Since the commencement of the GRAI, the numbers of countries reporting outbreaks of AI in poultry and API in humans has been decreasing yearly, but this cannot be clearly ascribed to the activities of the GRAI as it is also linked to the levels of surveillance and reporting.

#### Outcomes

What success has the GRAI had in preventing the introduction or establishment of API in non-infected at-risk countries? In countries that have the resources to mount INAPs in the face of an outbreak of API, through the GRAI they have been very successful in containing and preventing the establishment of API when it emerges. Through the GRAI, these countries have contingency plans and emergency preparedness in place coupled with improved diagnostic capability, and receive early warnings of disease threats through GLEWS, which provides the added value of combining and coordinating alert mechanisms of the WHO, FAO and OIE.

It is those countries in which the epidemiological factors are conducive to establishment and maintenance of API (large human populations keeping backyard poultry, particularly domestic waterfowl), that have been unable to prevent the introduction and establishment of API.

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<table>
<thead>
<tr>
<th>Year</th>
<th>Countries with outbreaks</th>
<th>Wild birds</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>Hong Kong, Korea</td>
<td>Hong Kong</td>
</tr>
<tr>
<td>2004</td>
<td>Cambodia, China, Indonesia, Japan, Korea, Laos, Malaysia, Thailand, Vietnam</td>
<td>Hong Kong</td>
</tr>
<tr>
<td>2005</td>
<td>Cambodia, China, Indonesia, Kazakhstan, Romania, Russia, Thailand, Turkey, Ukraine, Vietnam</td>
<td>Hong Kong, China, Mongolia, Croatia, Romania, Kuwait, Russia, Croatia</td>
</tr>
<tr>
<td>2006</td>
<td>Afghanistan, Albania, Azerbaijan, Burkina Faso, Cambodia, Cameroon, China, Côte d’Ivoire, Czech Republic, Denmark, Djibouti, Egypt, France, Georgia, Germany, Hungary, India, Indonesia, Iraq, Israel, Jordan, Kazakhstan, Korea, Laos, Malaysia, Myanmar, Niger, Nigeria, Pakistan, Palestine, Poland, Romania, Russia, Serbia/Montenegro, Sudan, Sweden, Thailand, Turkey, Ukraine, Vietnam</td>
<td>Austria, Azerbaijan, Bosnia/Herzegovina, Bulgaria, China, Côte d’Ivoire, Croatia, Czech Republic, Denmark, Egypt, France, Germany, Greece, Hong Kong, Hungary, Iran, Italy, Mongolia, Poland, Romania, Russia, Serbia/Montenegro, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom</td>
</tr>
<tr>
<td>2007</td>
<td>Afghanistan, Bangladesh, Benin, Cambodia, China, Czech Republic, Egypt, Germany, Ghana, Hungary, India, Indonesia, Japan, Korea, Kuwait, Laos, Malaysia, Myanmar, Pakistan, Poland, Romania, Russia, Saudi Arabia, Thailand, Togo, Turkey, United Kingdom, Vietnam</td>
<td>Germany, France, Hong Kong, Japan, Pakistan, Poland</td>
</tr>
<tr>
<td>2008</td>
<td>Bangladesh, Cambodia, China, Egypt, Germany, Hong Kong, India, Indonesia, Iran, Israel, Korea, Laos, Nigeria, Pakistan, Russia, Saudi Arabia, Thailand, Togo, Turkey, Ukraine, Vietnam</td>
<td>Hong Kong, Japan, Switzerland, Ukraine, United Kingdom, Vietnam</td>
</tr>
<tr>
<td>2009</td>
<td>Bangladesh, China, Egypt, Hong Kong, India, Indonesia, Laos, Nepal, Vietnam</td>
<td>Côte d’Ivoire, Germany, Hong Kong, Mongolia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>New country with H5N1 human infection</th>
<th>Global number of reported cases</th>
<th>Global number of reported deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>China, Vietnam</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2004</td>
<td>Thailand</td>
<td>46</td>
<td>32</td>
</tr>
<tr>
<td>2005</td>
<td>Cambodia, Indonesia</td>
<td>98</td>
<td>43</td>
</tr>
<tr>
<td>2006</td>
<td>Azerbaijan, Djibouti, Egypt, Iraq, Turkey</td>
<td>115</td>
<td>79</td>
</tr>
<tr>
<td>2007</td>
<td>Laos, Myanmar, Nigeria, Pakistan</td>
<td>88</td>
<td>59</td>
</tr>
<tr>
<td>2008</td>
<td>Bangladesh</td>
<td>44</td>
<td>33</td>
</tr>
<tr>
<td>2009</td>
<td></td>
<td>72</td>
<td>32</td>
</tr>
<tr>
<td>Total</td>
<td>15 countries with reported human cases</td>
<td>467</td>
<td>282</td>
</tr>
</tbody>
</table>

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**Notes:**

- \(^{187}\) Interview — Smallholder livestock production project, Cambodia.
- \(^{188}\) Interviews — FAO and UNICEF; Thailand; AI.COMM, CARE, World Bank and Royal Danish Embassy, Cambodia.
- OIE reports of outbreaks (http://www.oie.int) with Egypt and Indonesia added in the latter years since, having declared AI to be endemic, they are not under obligation to report outbreaks to OIE.
- http://www.who.int
2.6 HOW HAS THE GRAI EFFECTIVELY PREPARED THE WORLD FOR EMERGING DISEASES PANDEMICS?

"H5N1 taught the world to expect a pandemic and plan for this event. The world is better prepared for an influenza pandemic than at any time in history."

(Who Director-General Margaret Chan at the ASEAN+3 Health Ministers’ special meeting on influenza A(H1N1) in Bangkok, Thailand, 8 May 2009)

"Coordinated efforts to respond to disasters usually begin only after the disaster has occurred, but concerns of a global pandemic caused by the highly pathogenic avian influenza virus H5N1, arising shortly after the 2003–04 SARS crises, created an unprecedented opportunity to develop the planning and coordination for a pandemic in advance of the event."

(Denis Caroll to US Congress, USAID, 2009)

The international mobilisation and engagement of countries and partners in pandemic preparedness led to important achievements, a good demonstration in terms of preparedness and response is at least demonstrated by the response to the influenza A(H1N1) pandemic 2009. These achievements have proven the value of preparedness and therefore offer a good lesson for the management of future health hazards.

2.6.1 Planning

Based on the global strategy, WHO technical guidelines and their updates, in line with the new IHR 2005, and building from regional strategies such as APSED (WPRO-SEARO), the International Strategy for Disaster Reduction (ISDR) and the World Health Organisation Regional Office for Africa (AFRO), countries worldwide entered into a process of development of national plans. In line with international recommendations for an integrated approach, plans encompassed animal health, public health, communication, coordination and to a certain but lesser extent non-health pandemic preparedness.

This work, supported by technical agencies, development partners and other stakeholders has been significant in helping developing countries to better understand the issue at stake, with its many uncertainties and interdependencies. The plans have enabled high-level political attention and involvement. They have also enabled governments to identify not only the strategies to implement but also the multiple parties which should be involved and the systems to engage all actors and include all elements of the response in a coherent and synergic manner. In addition to technical questions, political, socio-economical and legal issues had to be resolved. These plans have therefore formed the basis of the work at national level. At regional and international level, they serve as a basis for experience sharing and the identification of lessons learned and good practices. These plans have been tested through simulation exercises, and sometimes, adjusted. The extent of the success of these plans in improving pandemic preparedness varies from country to country, as discussed below.

2.6.2 Surveillance and early warning systems

In the public health sector, surveillance networks have expanded at grass-roots level through the involvement of village health volunteers (Bangladesh, Cambodia, Thailand), civil society organisations (such as the Red Cross in Thailand, NGOs in Bangladesh, or the various women, youth, or farmers’ unions in Vietnam) and the whole community (Indonesia and some provinces of Vietnam). Event-based surveillance through, for example, hotlines, supplemented routine surveillance to detect unusual events (all countries visited or interviewed).

Countries visited have added sentinel sites for influenza-like or severe acute respiratory illnesses (SARI) to their health infrastructure (Cambodia: four sites as of June 2009, to be extended to six sites in preparation for influenza A(H1N1); Bangladesh: 10 sites to cover 20 markets in Dhaka and 12 sites in hospitals; Uganda: three sites). This is, however, not a worldwide process: in Africa, for example, AFRO reported (in May 2009) only 15 African countries with sentinel surveillance for influenza.

Countries, however, have not always linked this strengthened surveillance with risk as noted by Coker and Mournier-Jack (2006) in their evaluation of plans in Asia, Africa, Europe and South America, which could have increased sensitivity and cost-efficiency.

As required by the IHR, human influenza caused by a new subtype (such as the HPAI (H5N1)) has been included in the list of diseases of international concern which require direct notification (all countries contacted).

In Asia, bilateral agreements or support from the private sector have often assisted in developing electronic support to speed up surveillance and reporting as well as data analysis and, therefore, increase the odds of early detection, particularly of clusters of cases (Bangladesh, Cambodia). Completeness (e.g. comprehensive inclusion of all key health actors in the reporting systems) and the running costs of these systems are still challenging many of the Ministries of Health interviewed. In Cambodia, for example, the private sector, while an important provider of healthcare, is not included in the strengthened surveillance system and this is the case in many other countries (Vietnam, for example).

Collaboration with the animal health sector has generally been recognised as important for surveillance. As mentioned in the fourth UNSIC and WB Global Progress Report, 2008, and developed in Section 2.2.6 of this report.

193 The referred report does not mention the sentinel sites in Uganda (our Africa case study country), which reported three sentinel sites active since 2007, during interview in July 2009.

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191 Implemented in 43 out of 46 African countries as of May 2009 (WHO AFRO, 2009).
report, it seems, in practice, to have happened mainly at times of infections and less in other cases.

In general, however, routine surveillance systems have been strengthened by the GRAI, but, as of July 2009, surveillance is much more apt to detect single cases of avian influenza than to early detect clusters of influenza A(H5N1) cases. Clusters can be a sign of human to human transmission and, therefore, could provide early evidence of a possible influenza pandemic. This limitation is mainly due to incomplete and fragmented surveillance systems. It is corroborated in various WHO country evaluations and reports (such as WHO-WPRO, 2008) and interviews.

In addition, many key informants question the effectiveness of surveillance strengthening through training and equipment — the inefficacy of surveillance is a long-standing difficulty deeply rooted in lack of trust in the system or of confidence in its utility, which requires longer-term investment and system reform to rectify. In Africa, for example, it is considered that there are a number of important weaknesses in national preparedness plans, including robust surveillance systems: 'Current surveillance capacity is limited, poorly strategically focused and lacking operational clarity’ (Ortu et al., 2008). We can therefore question how well the systems of routine surveillance that were already problematic, have been further strengthened by the GRAI. Evidence is, for example, demonstrated by the delayed reporting of human cases in the early phase of the influenza A(H1N1) pandemic in Africa compared to the rest of the world.

Even if not yet everywhere fully fledged, countries’ strengthening of the surveillance systems has, however, helped to regularly feed a global early warning system as requested under the new IHR and through global networks for outbreak data sharing and investigation such as the global outbreak alert and response network (GOARN). With the exception of some temporary reluctance related to problem of benefit-sharing discussed below, countries regularly reported to the WHO new confirmed cases and clusters which enabled them to update and assess the evolution of the situation globally. The influenza A(H1N1) pandemic 2009 reminded the world how fast and regular update of cases A(H1N1) during an outbreak are essential for a worldwide early response and improved readiness for pandemics, and provided evidence of the importance of global early warning.

As for case confirmation, there has been a unique investment in the upgrade of laboratories for expanded, earlier and quality detection of influenza A(H5N1) by RT-PCR. As of October 2008, 80 % of countries in Asia report having access to RT-PCR at national level compared to 51 % in Africa and 43 % in the Americas (UNSDC and the WB, 2008). In Africa, the network of regional laboratories has also expanded and been linked to the WHO system of influenza surveillance to increase and speed up access. For example, in West Africa, the Abidjan, Côte d’Ivoire, laboratory was upgraded to referral regional laboratory to supplement the capacity of the Dakar, Senegal, Institut Pasteur.

Laboratory testing, while obviously the key element in the diagnosis of influenza among other acute respiratory illnesses, is expensive. Developing countries have identified the sustainability of supply of reagents, tests and equipment to support their surveillance and response strategy as a challenge (all MoH interviewed). Countries (Cambodia, Uganda) report that while they have ‘today’ facilities to detect influenza A(H5N1) they still do not have reliable facilities for other, simpler, routine laboratory activities; they question the relevance of the investments in regard to their population burden of diseases.

To improve surveillance, early detection and laboratory confirmation, countries established, at central and decentralised levels, RRTs with capacity to investigate infections and exposures, survey communities at risk, and to adequately and rapidly collect and send samples for laboratory analysis.

These RRTs, in combination with the laboratory upgrade, decreased the time taken for laboratory confirmation. In countries visited in June and July 2009 (Bangladesh, Cambodia, and Uganda), when national laboratories had been revamped and RRTs established, the time of case confirmation through RT-PCR after the report of suspected case varied between 24 to 48 hours while, previously, confirmation by referral laboratories in the region could have taken as long as two weeks. However, an important exception is Indonesia where samples of suspected cases of H5N1 have to be sent in one single laboratory in the capital and reconfirmed by a second laboratory. Hospitals where suspected patients are surveyed have sometimes to wait two weeks before receiving confirmation of HPAI (H5N1) infections.

While there have been important efforts and many initiatives at subregional and regional level to strengthen cross-border surveillance (for example in South-East Asia, through ACMECS, MBDS, ADB, APSED and ASEAN-supported programmes as well as bilateral agreements between neighbouring countries), results have been hampered by the difference of capacities and sometimes interests between countries. If measurable results are still missing, informants highlighted the creation of ‘a network of focal persons who have learned to know each other and have developed bonds’. This network helps in formal/
informal information sharing and, for example, has proven to be effective during the early phase of the influenza A(H1N1) pandemic when countries exchanged information on suspected cases arriving at entry points 200.

## Outcomes

Countries have an increased chance of detecting cases of avian influenza and, to a lesser extent, pandemic influenza.

Countries benefit from faster reporting systems.

Countries’ routine surveillance systems are stronger and this also impacts the surveillance of other communicable diseases beyond influenza.

The capacity to quickly confirm suspected cases of H5N1 through RT-PCR has significantly increased and has therefore improved the capacity for early detection and confirmation of human cases of avian influenza nationally, regional and internationally. This could be easily extended to other infectious diseases.

As a result of the GRAI, in countries where laboratory capacity exists at national level, the time between the identification of a suspected case, the reporting to central level and the laboratory confirmation of an infection by influenza A(H5N1) through RT-PCR has been significantly reduced.

All the above elements have strengthened the global early warning system.

Therefore, the GRAI has supported acceleration of countries’ compliance with the International Health Regulations (2005).

## Recommendations

Countries should ensure better and further links between surveillance and risks.

Countries should seize the present opportunity of Influenza A and other health hazard concerns and attention to restructure and improve the operationalisation and comprehensiveness of their surveillance system where this still appears weak and insufficiently reliable.

### 2.6.3 Pandemic preparedness in the health sector

Preparedness status varies from country to country; however, in less developed countries, ‘pandemic preparedness’ activities have been much more focused on the management of the sporadic cases of avian influenza than on the management of a pandemic.

In Africa, countries’ initial plans drafted in 2006 were at least considering an influenza pandemic mainly after Nigeria and other West Africa countries experienced HPAI infections from February 2006. However, the structure for the INAPs proposed through the technical experts’ revision of these initial plans under the ALive programme in 2007–09 (WB et al., 2007) did not propose to address pandemic preparedness but only surveillance, early warning system and case management of sporadic cases of HPAI. These INAPs represented the main tool for African governments to leverage and assure international attention and resources to respond to the influenza A(H5N1) threat as, for example, the Commission-funded SPINAP 201. Informants interviewed at the early phase of the influenza A(H1N1) pandemic on this topic mentioned, however, that SPINAP was open to amend countries request for funding and provide resources and support to countries in Africa for response to the 2009 A(H1N1) pandemic 202.

In Asia, and as of June 2009, Asian countries had made more progress on rapid containment — with expansion of trained and equipped RRTs at decentralised levels for rapid investigation and management of early cases, hospital case-management, use of Oseltamivir for rapid containment, and simulation exercises (UNSIC 2008, WHO-WPRO, SEARO, 2008) — rather than on the management of a pandemic Phase 5 and 6 203 (Bangladesh, Cambodia). For example, a WPRO progress report on the state of pandemic preparedness presented the results of an assessment in eight developing and seven developed countries in June 2008 using a survey tool designed to determine the status of readiness. The survey found that 50 % of developing countries (n = 8) had achieved, in surveillance and response, a level of capability ≥ 2 (which was the level WHO-WPRO expected countries to achieve in this area in 2008) for averting avian influenza as well as for rapid containment. Only 12 % of them had achieved similar level of capability for pandemic response. Eighty-six per cent of developed countries (n = 7) had achieved the level of capability ≥ 2 in surveillance and response for averting avian influenza and for rapid containment versus 71 % for pandemic response.

Rapid containment is, of course, critical as the SARS pandemic demonstrated; it is also important to delay the disease’s transmission and therefore allow additional time for readiness. However, in the influenza A(H1N1) pandemic 2009, containment appears to have been temporally successful in some countries (Japan and Mexico) but not in others (Australia and the United States) (Boni, M. et al., 2009). In addition to containment, preparedness for a pandemic response is therefore essential and aims to minimise the overall number of cases and deaths as well as other related pandemic impacts, on for example society, economy, or security.

Increased readiness to respond to a pandemic, when it occurred, focused more on the preparedness of referral hospitals than on decentralisation and, as of June 2009, had barely focused on engaging and mobilising communities for preparedness and response, (with the

200 Interviews — Cambodia, Kenya and Thailand, June and July 2009.

201 Informal communications in East and West Africa, July and August 2009.


203 Interviews — Bangladesh, Cambodia, June 2009.
exception of outbreak communication) 204. It is, however, well known that communities, on the front line of the response should be the main focus of engagement, as their attitude in front of outbreaks can significantly influence its propagation.

During our field visits in June 2009 for example, both Bangladesh and Cambodia were working on expanding their pandemic plan to include preparedness and response to Phases 5 and 6 and also to consider influenza viruses other than influenza A(H5N1). These new plans were examining in depth the use of scarce resources and the protection of the most vulnerable. The plans also considered more social distancing measures in addition to the use and distribution of antivirals and the use of vaccines. These global planning efforts were triggered by the WHO announcing on 11 June (the first day of our field visits) the Phase 6 of the influenza A(H1N1) pandemic 2009. Plan development or readjustment were based on the WHO updated guidance on pandemic influenza preparedness and response issued in April 2009.

Our travel to countries which were preparing and addressing their first cases of influenza A(H1N1) allowed us to observe the large discrepancies in strategies adopted by countries to detect cases and mitigate the dissemination and impact of infections, as well as to protect against cases of influenza A(H1N1). For example, detection at borders and, principally, in airports varied from thermo-scan screening and extensive written investigation to no detection at all (all 11 international airports visited). Informants at all levels also described different methodologies for infection control, and social distancing measures to contain disease dissemination 205. Stigmatisation was often described by informants as an important factor in individuals’ health-seeking and caring behaviours 206.

Countries interviewed also discussed how their pandemic preparedness activities had mostly focused on preparing for a possible HPAI (H5N1) pandemic rather than on any (re-)emerging infectious diseases with pandemic threat, as proposed by regional and global programme, for example, WHO-APSED or ASEAN. This point will be further discussed in Section 2.6.7.

Countries also recognised how pandemic preparedness had been addressed through a vertical, programmatic approach within the health sector rather than comprehensively 207. Cambodia, for example, explained how ‘infection control guidelines were developed only for the HPAI (H5N1) virus, while a more comprehensive and efficient approach would have been to develop a comprehensive infection control guideline for all infectious diseases including influenza’. Cambodia also recalls how, in 2008, a dengue fever outbreak was difficult to tackle because resources in the health sector were very much diseases/programme earmarked 208.

On the other hand, Uganda’s pandemic preparedness approach tends to learn from other public health hazards, such as Marburg disease or Ebola fever. Uganda acknowledges that its increased capacity to address public health emergencies through the influenza A(H5N1) pandemic preparedness activities, in addition to previous experience with Ebola fever and Marburg disease outbreaks, improved its response to the 2007 Ebola fever outbreak 209; for example the national influenza centre and the national task force were used for the 2007 Ebola fever outbreak. Uganda’s approach to integrate influenza A(H5N1) pandemic preparedness within a broader scope of communicable diseases and health hazards may be related to less international support and, therefore, fewer resources, as well as less political pressure to demonstrate influenza A(H5N1) pandemic preparedness activities.

Furthermore, health sector staff interviewed recognised the need for a multi-sector approach to pandemic preparedness and other unknown health hazards in support and complement to any optimal health sector response. This will be discussed in Section 2.6.4.

Subregional and regional stockpiles of Tamiflu also mainly focused on rapid containment. In South-East and South Asia, this was true for stockpiles irrespective of management by the WHO in New Delhi and Bangkok, or ASEF or ASEG in Singapore. This rationale relies on the limited number of antiviral doses in the stockpile, insufficient to address all needs during a pandemic 210. An informant, however, mentions that the use of regional stockpile may be adjusted with the influenza A(H1N1) pandemic 2009 211. A statement from Japan 212, the main contributor to the Singapore stockpile, in 2009, corroborates this amendment.

In Asia, subregional and regional activities tend to integrate influenza A(H5N1) pandemic preparedness strategies into a broader context of emerging infectious diseases better than what has been achieved so far at country level 213. Regional funds for influenza A(H5N1) have, for example, also been used for the Nipah virus outbreak in Bangladesh, or for rabies in Bali as well as for Dengue or Chikungunya in South-East Asia 214. Regional approaches and funds therefore balance countries’ vertical Influenza A approaches and offer more scope for sustainability. This will be discussed further in the conclusion below.

204 Interviews — all countries, June and July 2009.
205 Interviews — Bangladesh, Cambodia, India, Kenya, Thailand and Uganda, in June and July 2009; personal communication in July and August 2009.
206 Interviews — Bangladesh, Cambodia, India; and personal communication, Vietnam.
207 Interviews — all countries, June and July 2009.
208 Interviews — June 2009.
210 Interviews — Cambodia and Thailand, June 2009.
211 E-mail interview, September 2009.
212 Japan’s international cooperation on pandemic influenza, June 2009.
213 Interviews — Belgium, India, and Thailand, September 2009.
Outcomes

The GRAI has increased countries’ capacity by improving knowledge, skills, tools (guidelines, SOPs, simulation exercises, coordination, drugs stockpiles), and equipment for rapid containment and, to a lesser extent, for the management of an influenza pandemic. This comment was valid at the time of field visits in South-East and South Asia as well as East Africa, in June 2009, at the early phase of influenza A(H1N1) pandemic in these countries. It is likely, however, that as countries had to respond to a full-blown (although of moderate severity) influenza A(H1N1) pandemic, their pandemic readiness and response capacity had improved between the time of visits and interviews and the time of finalisation of this report in December 2009.)

Countries also increasingly acknowledge the pressing need for a less vertical, programmatic approach and a more ‘comprehensive health sector, within a whole of society’ pandemic preparedness and implementation plan which also addresses other pandemic threats.

Recommendation

Countries should improve their comprehensive approach to pandemic preparedness within the health sector and should address all threat and health hazards rather than only focus on highly pathogenic avian influenza (H5N1) — and, as of 2009, on A(H1N1) pandemic.

2.6.4. Whole of society pandemic preparedness

The whole of society’s pandemic preparedness has not yet been given sufficient attention (WHO (2009) and interviews 215). As already mentioned, early response to the avian influenza crisis focused first on addressing the influenza A(H5N1) virus infections in poultry and in humans rather than on preparing for a pandemic; then the focus was on health sector pandemic preparedness rather than on a multi-sector approach to preparedness.

The concept of a whole of society pandemic preparedness was slower to mobilise engagements and investments. Strategies, guidelines and support tools development, as well as the identification of key actors were therefore delayed. Liaisons with and support from international, regional and national institutions, organisations and experts on emergency and disaster prevention, preparedness, response and recovery helped to bring the subject of pandemic preparedness to a higher level of attention and to better define potential impacts, and therefore related needs and prevention and mitigation actions.

A broad partnership between UN agencies, the IFRC and more than 20 NGOs, proactively supported by the United States (H2P), the United Kingdom and, in Asia, Australia, is working on cross-sector pandemic preparedness support to governments. This partnership is helping to harmonise messages and tools such as the ‘readiness framework’ which emphasises the interdependence of all sectors of society at all levels before, during and after a pandemic and suggests five key principles: (i) a whole of society approach; (ii) preparedness at all levels; (iii) attention to critical interdependencies; (iv) a scenario-based response; and (v) respect for ethical norms (WHO, 2009). Simulation exercises, aimed at increasing countries’ understanding and awareness of the necessity to start developing plans and relevant strategies for a whole of society readiness, have also helped to sensitise governments (Cambodia, Ethiopia, Indonesia, and Tanzania, for example). However, the improvement in countries’ pandemic preparedness, mainly in the non-health sector is just beginning and only starting to reach targets 214.

The increasing number of countries who included business continuity in their plan in 2008 — 69.2 % of countries studied — compared to 49.6 % in 2007 (UNSIC, PIC, 2008) demonstrates the work in progress.

The fourth UNSIC-WB Global Progress Report on the response to avian influenza and the state of pandemic preparedness mentions, based on their 2008 survey that ‘few governments have gone so far as to plan for non-health pandemic preparedness. This is mainly true for the low income countries that lack resources and have other priorities’. In addition, several key informants note that when countries have started to work on establishing cross-sectoral preparedness, their work has not yet been decentralised to the village/community levels where pandemic preparedness is essential 217.

Linkage with government disaster management institutions (Cambodia) has allowed earlier and sustained work on this subject. In Cambodia, early work supported by the WHO and Australia on multi-sector preparedness through a pilot project in Siem Reap (2007) has raised awareness of both national and local authorities as well as the public and the private sector, and has led to further refinement of plans and collaboration. Similar work is starting to be replicated in other provinces. However, limited and delayed funding has hampered initial enthusiasm and additional investments are necessary to ensure longer-term effectiveness of the ongoing efforts 218.

At the regional level, a comprehensive approach to cross-sectoral pandemic preparedness is developed by ASEAN supported by Australia and the United States. In 2007, ASEAN began to assist Member States in monitoring the transition from WHO Phases 1–3 to Phases 4–6 levels of preparedness and response-readiness. In August 2008, the ASEAN Technical Working Group of Pandemic Preparedness and Response (ATWG/PPR) produced the Guide to ASEAN Indicators to Assess National Multi-sectoral Pandemic Preparedness and Response. Tailored to the region, these indicators described the minimum structures and mechanisms that should be functioning at different levels of pandemic preparedness and response-readiness. A pilot cross-sector simulation exercise was tested in Indonesia and further work focuses on refining

217 See footnote 216.
218 Interviews — Cambodia and Thailand, June 2009.
tools and indicators to assess level of readiness. In addition, ASEAN has included pandemic preparedness in its Agreement on Disaster Management and Emergency Response (AADMER) which was ratified by all 10 Member States and entered into force on 24 December 2009. The AADMER is a regional framework for cooperation, coordination, technical assistance, and resource mobilisation for disaster risk reduction and is the first legally binding Hyogo framework for action-related mobilisation for disaster risk reduction and is the first coordination, technical assistance, and resource mobilisation for disaster risk reduction and is the first legally binding Hyogo framework for action-related instrument (ASEAN, 2010).

### Outcomes

Governments and partners are increasingly aware and recognise the importance for a whole of society (beyond the health sector) pandemic preparedness to prevent and/or mitigate the multiple impacts of pandemics.

Strong partnerships for comprehensive, extended coverage and additional coherence and flexibility to deal with issues requiring a multi-sectoral and multilevel approach have emerged from the GRAI.

The GRAI has stressed the pressing needs for additional investment in the whole of society pandemic preparedness.

### Recommendations

Further high-level political sensitisation is needed to maintain and increase attention to the importance of a whole of society pandemic preparedness.

Increased, longer-term investments and efforts, including operational research, on cross-sectoral, non-health pandemic preparedness are required to achieve tangible results in the prevention and mitigation of the multiple impacts of pandemics.

#### 2.6.5 Risk and outbreak communication

From the very beginning of the avian influenza crisis, communication activities received substantial attention and funding which developed within governments and their partners over the years. Field visits, interviews and extensive literature demonstrate that preparedness for outbreak communication is addressed across continents (Asia and Africa) and resulted in identification and preparation of key messages as well as communication strategy, tools and actors.

Intense and early work on communication allowed for higher awareness but had less impact on behavioural change as already discussed in Section 2.3. However, several surveys realised by communications actors to better understand the cause of, and improve, behavioural changes identify lessons learned and evidence-based best practice. These lessons learned have helped the readjustment of strategies and improved preparedness, including for the response to the influenza A(H1N1) pandemic in 2009 (WHO, UNICEF, 2009).

The first key lesson came from the realisation that awareness-raising was not linked to change of behaviour mainly, in the case of avian influenza, because of the risks and benefit perception (Benefits of changing behaviour in order not to be infected from sick birds, Hickler, 2007; Waisbord, 2008).

Some of the lessons learned in order to decrease the transmission from birds to human through effective communication are also applicable in the case of human to human transmission. To complement the lessons discussed in Section 2.3, we note (from Waisbord, 2008):

- the need for precisely defined communication systems and strong partnerships such as the:
  - establishment of multi-sector, multi-partner coordination committees linking at least the Ministries of Health, Agriculture, Information and Education;
  - development of messages based on prior understanding of communities’ behavioural determinants as well as communities’ capacities for compliance;
  - specification of messages according to target group and their preoccupations;
  - joint development and harmonisation of messages among partners;
  - coordination of different programme components such as mass media, community media, outreach efforts, training of health and media professionals, mobilisation of civil society and faith-based organisations.

- the need to integrate pandemic communication with other communication initiatives in human health, and into the development of social norms to maximise impact and sustainability.

These lessons have already been applied for the refinement of pandemic preparedness communication strategies and adapted for the influenza A(H1N1) pandemic preparedness (Bangladesh, Cambodia, and Thailand).

It is interesting to note that while the good level of awareness resulting from the early communication activities on HPAI might not have led to sustained behavioural changes during avian influenza infections due to the risk/benefit perception, it might, nevertheless, have increased the probability of compliance during a human emergency such as a pandemic because of the perceived higher risk for the human population. As such, the influenza A(H1N1) pandemic created at its early stage a certain level of panic. This influenza A(H1N1) pandemic 2009 appeared later to be mild and this may impact the way people may perceive future pandemic messages. The 2009 pandemic has also shown that communication has an additional role to play in the control and mitigation of early panic, of stigmatisation and on mobilisation for effective social distancing.

Another lesson learned relates to communication with the media and the need to contain rumours and unconfirmed information. Media training and regular media updates by designated and well informed focal communication persons...
have helped. Lessons learned on rumour management from the HPAI (H5N1) crisis have also been integrated into the influenza A(H1N1) pandemic plans and response at all levels.

2.6.6 Pharmaceuticals and research

Early negotiations on the trade-related aspects of intellectual property rights (TRIPS) and public health allowed an increased global production of Oseltamivir and a more affordable price for all (Russell, 2005; Henderson, 2005; WTO, 2005). Donations (Roche and countries) and the establishment of Tamiflu stockpiles also increased poorer country accessibility to drugs and equipment. However, discrepancies persist. At the time interviews were conducted in June and July 2009, Cambodia reported a stockpile of 71 000 treatment courses, including a first WHO distribution from the regional stockpile for influenza A(H1N1) control, Thailand could treat 500 000 people, and Uganda reported 1 000 treatment courses with 40 000 in the pipeline for the treatment of influenza A(H1N1). Meanwhile, the United States had 70 million treatment doses by mid 2008 (University of Minnesota, CIDRAP news, 25 April 2008).

Operational logistics for drugs distribution have also improved over the years. In April 2007, for example, an emergency management exercise was organised in Cambodia to test the ability of the WHO and ASEAN to mobilise, in the event of a pandemic, supplies of antiviral drugs and personal protective equipment provided by the government of Japan and stockpiled in Singapore. This exercise helped to improve operational guidance for stockpile distribution.

Influenza has also been the subject of numerous research projects, particularly on vaccine and drugs, as well as on the identification of better diagnostic tests. The Commission, for example, has invested more than EUR 100 million since 2001 on various influenza research projects (European Commission, Directorate-General for Research, 2007 and 2008). In the health sector, research focused on:

(i) Vaccine: the identification of safer, longer-acting, more broadly cross-protective against heterologous influenza clades and strains or against multiple pathogens such as a SARS and influenza or faster, cell-culture produced vaccine;

(ii) Diagnostic and surveillance: faster, easier, cheaper, ‘field user-friendly’ diagnostic tests, improved surveillance and early warning systems;

(iii) Biology: virus virulence, pathogenicity, replicability and transmissibility, on drugs resistance and new drugs against RNA viruses;

(iv) Networks: training, legal and socioeconomic issues.

Research and development (R&D) on vaccine resulted in new adjuvants to reduce the amount of antigen required per dose. Increased capacity to produce inactivated seasonal vaccine with a projection of 1.7 billion doses per year by 2014 (2008 production was 600–700 million doses per year, 2006 production was 350 million doses per year) will, of course, impact pandemic preparedness by reducing real-time production of a pandemic vaccine by 2014. At that time, global coverage should be attainable within 9–22 months and will increase availability of vaccine for developing countries (WHO, 2009).

Under the global action plan (GAP) to increase the supply of influenza vaccine, an international stockpile of pre-pandemic and pandemic vaccine is under study and consideration and through the initiative for vaccine research (IVR) started in February 2007. Supported by the ADB, Japan, and the United States, new vaccine plants are being developed in Brazil, India, Indonesia, Mexico, Thailand, and Vietnam, and plants in Africa and the Middle East are being proposed.

As a result of the Influenza A(H1N1) pandemic, this process has quickened. As of September 2009, seasonal vaccine production is ongoing in India and Thailand. In addition, many governments, manufacturers and foundations have pledged influenza A(H1N1) vaccine donations to the WHO for use in countries with no, or less access to vaccine. As of 2 February 2010, the WHO had received pledges of approximately 200 million doses of vaccine, 74 million syringes and USD 48 million for this operation.

While research has received substantial investment and attention, Van Kerkhove (2009) highlights how significant unknowns remain on the epidemiology of the disease (see also Section 2.3), the influence of genetic and/or immunological factors on transmission, or on the true interpretation of clusters, which require further investment.

Interview — Switzerland and Thailand, June and September 2009.

Interview — Cambodia, June 2009.

Interview — Thailand, June 2009.

Interview — Uganda, July 2009.
Vaccine production and availability also led to tensions between a market-driven approach to vaccine production versus a collective approach to global public goods and equity. Sharing of virus samples, needed for the better understanding of and further research into the virus, the disease, and preventive, protective and curative measures, has been hampered by countries’ demands for fair benefit-sharing and particularly better equity in the access to drugs and vaccine. The creation of an intergovernmental meeting on benefit-sharing demonstrates the willingness and offers an opportunity to resolve the problem (WHO, 2008 and 2009).

### Outcomes

The GRAI has supported the increase of more robust international stockpiles of antiviral which are improved although still globally insufficient.

The GRAI has increased the potential for availability of better influenza vaccine, diagnostic tests, treatment and diseases understanding through research, although the process is, as of 2009, hampered by unsolved questions on benefit-sharing and equity and decreasing willingness of some countries to share virus.

There is an increased vaccine manufacturing capacity with its potential impact on future increased diseases and pandemics protection.

As of December 2009, and in relation to the HPAI crisis, there is an increased international acknowledgment that inequity in health must be resolved at a faster pace.

### Recommendation

It is important for the international community to seize the present opportunity of influenza A, and other emerging disease pandemic concerns and attention, to push for further research, increased production and availability of global public goods such as pandemic risk prevention, global preparedness and protection understanding and capacity, and faster achievement on equity of access to health.

### 2.6.7 Conclusions: sustainability and increasing gains

The efforts under the GRAI for better preparedness for a possible influenza pandemic have achieved substantial results, as explained above. The impact of the GRAI on improved pandemic preparedness could certainly be measured by an analysis of the response to the influenza A(H1N1) pandemic 2009 or the achievements of countries in meeting the new IHR 2005.

The impact of the GRAI, however, is going far beyond the IHR and the influenza A(H1N1) pandemic and will be discussed in Section 2.9.

On pandemic preparedness, however, potential for additional and longer-lasting impacts of the GRAI could easily be achieved by further shifting countries’ programme focus beyond influenza to other EIDs and future health hazards coming from infectious uncertainties and therefore improve sustainability and maximise the gain of investments.

All the steps taken for the influenza A(H5N1) pandemic preparedness have positively impacted the response to the influenza A(H1N1) pandemic 2009. The improvement in surveillance (including at borders and entry points) and laboratory capacity, for example, strengthened early warning systems globally, allowed for close assessment of the evolution of outbreak dissemination, stimulated increased preparedness and therefore assured better management of the pandemic. The same has been discussed for the improvement on pharmaceuticals availability and access, or the lessons learned in outbreak communication.

However, the sense of urgency to respond to the influenza A(H5N1) threat and the rapid availability of important amounts of money which sometimes had to be disbursed quickly have fuelled countries’ adoption of vertical and costly approaches which question cost-efficiency and sustainability.

The GRAI has also enabled an extensive and rapid acquisition of new science and know-how on pandemic preparedness globally, mainly through research and lessons learned. These gains have, however, not yet all translated into related policies and strategies at country level. The impact of the GRAI on improved pandemic readiness at country level appeared, as of July 2009, more obvious in early detection, confirmation and warning than in an effective management of, and response to, a pandemic (although this may have changed as a result of the influenza A(H1N1)). For example, improved recognition of the need for a whole of society approach to pandemic preparedness and its related new know-how at global level have not yet been embraced by many countries. Similarly, the significant steps made towards increased availability of pharmaceuticals at global level have not yet resulted in adequate increased access to drugs and vaccine for all of those most at need. This is a work in progress which requires more time, attention and maintained investments and resources.

As discussed in Beijing in January 2006, there is a global recognition that efforts towards improving pandemic preparedness go beyond influenza to address new threats and health hazards in our globalised world such as EIDs. The GRAI, however, could only slowly shift countries’ attention from influenza pandemic preparedness.

In Asia, regional initiatives such as the WHO-APSED and the AusAID support to ASEAN+3 emerging infectious diseases programme have from the start targeted a holistic approach to EIDs and the Commission is about to supplement these programmes through the regional programme 2010–14 on highly pathogenic and emerging diseases in Asia through ASEAN and SAARC. Since 2002, the Commission has also been supporting a EUR 100 million research programme on EIDs (European Commission, Directorate-General for Research, 2008).

The United States is involved in longer-term capacity-building in epidemiology for animal and public health staff by including FETPs into university curricula in Asia (India, Thailand, Vietnam) and Africa (Senegal, Uganda). The new programmes of USAID on emerging pandemic threats aim to pre-empt or
combat, at their source, the emergence of new diseases from animals that pose a significant threat to public health. The international involvement of Canada is also in full support of tackling diseases at the animal, human and ecosystem interface. It is therefore clear that both political and technical leaders agree: it is important to sustain and maximise preparedness achievements.

The evolution of attention and work from influenza A(H5N1) to highly pathogenic and emerging diseases is progressively happening in Asian countries. Laos, for example, has already changed and expanded the scope of national plans and coordination committees from avian and human influenza to emerging infectious diseases (e.g. from the National Avian and Human Influenza Coordination Office (NAHICO) to the National Emerging Infectious Diseases Coordination Office (NEIDCO)). China also has developed a multi-disease contingency plan. In Africa, Uganda exploited gains from the GRAI to address other emerging diseases. African countries affected by Ebola fever, Marburg disease, Chikungunya and other infectious health hazards, would find the additional incentive to embrace a pandemic preparedness programme if available funds would encompass other highly pathogenic emerging diseases.

Therefore, further expansion of the scope of the GRAI at country level, from tackling avian and pandemic influenza to all other high-impact (re-)emerging infectious diseases and health hazards would enable countries to further benefit from all the science and know-how generated by the GRAI. Tackling all hazard preparedness would increase the relevance of the actual investments, the sustainability of present achievements and therefore offer greater impact for more people.

### Outcomes

The GRAI has supported the acceleration of countries’ compliance with the International Health Regulations (2005).

Countries have an increased chance of detecting cases of avian influenza and, to a lesser extent, pandemic influenza.

Countries benefit from faster reporting systems.

Countries’ routine surveillance systems are stronger and this also impacts on the surveillance of other communicable diseases beyond influenza.

The capacity to quickly confirm suspected cases of H5N1 through RT-PCR has significantly increased and has therefore improved the capacity for early detection and confirmation of human cases of avian influenza nationally, regional and internationally. This could be easily extended to other infectious diseases.

Due to the GRAI, in countries where laboratory capacity exists at national level, the time between the identification of a suspected case, the reporting to central level and the laboratory confirmation of an infection by H5N1 through RT-PCR has been significantly reduced.

The GRAI has increased countries’ capacity by improving knowledge, skills, tools (guidelines, SOPs, simulation exercises, coordination, drugs stockpiles), and equipment for rapid containment and, to a lesser extent, the management of an influenza pandemic. (This comment was valid as of the time of field visits in South-East and South Asia as well as East Africa, in June 2009, at the early phase of influenza A(H1N1) pandemic in these countries. However, it is likely that, as countries had to respond to a full-blown (although of moderate severity) influenza A(H1N1) pandemic, their pandemic readiness and response capacity had improved between the time of visits and interviews and the time of finalisation of this report.)

Countries also increasingly acknowledge the pressing need for a less vertical, programmatic approach and a more ‘comprehensive health sector, within a whole of society’ pandemic and preparedness and implementation plan which also addresses other health hazards.

Governments and partners are increasingly aware and recognise the importance for a whole of society (beyond the health sector) pandemic preparedness to prevent and/or mitigate the multiple impacts of pandemics.

Strong partnerships for comprehensive, extended coverage and additional coherence and flexibility to deal with issues requiring a multi-sectoral and multilevel approach have emerged from the GRAI.

The GRAI has stressed the pressing needs for additional investment in the whole of society pandemic preparedness.

The GRAI has improved outbreak communication strategies and systems, and particularly a better harmonisation of outbreak protection messages and dissemination strategies among partners and actors.

The GRAI has supported the increase of more robust international stockpiles of antivirals which are improved although still globally insufficient.

The GRAI has increased the potential for availability of better influenza vaccine, diagnostic tests, treatment and diseases.

There is an increased vaccine manufacturing capacity with its potential impact on future increased diseases and pandemics protection.

The HPAI crisis has stimulated an increased international acknowledgment that inequity in health must be resolved at a faster pace.

### Recommendations

It will be important to increase the relevance, assure the sustainability of results and maximise the gains of the GRAI by further shifting countries’ programme focus from influenza A pandemic preparedness and response to a more holistic approach of prevention and preparedness for future health crises caused by high-risk or high-impact pathogens and, therefore, seize present opportunity of influenza A and other emerging disease pandemic concerns and attention to:
• ensure comprehensive surveillance system restructuring and operationalisation where needed;
• ensure further linkage between preparedness particularly surveillance and communication and people’s perceived risks and benefits;
• improve the comprehensive approach to pandemic threats and health hazards within the health sector and sustain collaboration with and across all other sectors;
• further sensitise high political level on the need for a whole of society pandemic preparedness and increased, longer-term investments and efforts, including operational research, on cross-sectoral, non-health emergency preparedness;
• further research the potential to increase the production and availability of global public goods such as risk prevention, preparedness and protection science and capacity globally, as well as faster achievement in a more equitable and fair access to health for all.

2.7 TO WHAT EXTENT HAVE GRAI FUNDING MODALITIES AND RESOURCES ENSURED EFFICIENT AND TIMELY OUTBREAK CONTROL IN INFECTED COUNTRIES, EFFECTIVELY INCREASED PREPAREDNESS IN COUNTRIES AT RISK AND IMPROVED THE OVERALL LEVEL OF PREPAREDNESS?

2.7.1 Multi-donor financing framework

The modalities of funding the GRAI were developed through a multi-donor financing framework, which was a flexible and responsive mechanism for channelling financial and technical support at country, regional and global levels. Prior to the Beijing International Pledging Conference on Avian and Human Influenza, two complementary papers were prepared to serve as a basis for the response of international stakeholders in Beijing. One paper (WB, 2006a) estimated the magnitude of the financing that the funding countries and agencies would need to provide, while the other paper (WB, 2006b) set out a framework for channelling the funds in keeping with the development partners’ varying mandates and concerns.

The total financing gap to be filled for addressing the issue of API at the country, regional and global levels was initially estimated at USD 1.2 billion over a three-year period. This estimate was subsequently revised upwards to USD 1.2–1.5 billion because of the rapidly growing number of HPAI (H5N1)-infected countries supplemented by increasingly pressing needs to put in place adequate preparedness response capacity, particularly in Africa. To meet this financial gap, it was envisaged that all sources of external funds from international stakeholders would need to be combined and development finance partners would need to work together. The framework focused on the coordination of activities and funding of development partners, which had to be done under various terms (grants, loans and credits) and channels, including a trust fund facility at the WB.

In 2009–10, the influenza A(H1N1) pandemic added to the financing gap. It was estimated that around USD 1.48 billion would be required to meet the immediate challenges posed by A(H1N1) in 95 least-resourced countries and also for a number of middle-income countries such as Argentina and Mexico that had initiated pandemic response actions.

2.7.2 Pledges, commitments and disbursements by international stakeholders

The international pledging conferences in Beijing (January 2006), Bamako (December 2006), New Delhi (December 2007) and Sharm el-Sheikh (October 2008) resulted in total pledges of USD 3.03 billion globally in the fight against HPAI and preparation for a possible pandemic. After the Sharm el-Sheikh conference, during 2009, pledges of support increased sharply as a number of development partners (Australia, Belgium, Germany, Japan, the United Kingdom, the United States, the African Development Bank and the World Bank) increased their previous pledges to developing countries by USD 1.2 billion, mainly to respond to the influenza A(H1N1) pandemic. Thus, from late 2005 to the end of 2009, the total cumulative pledges for supporting avian/animal and pandemic influenza programmes reached USD 4.3 billion. Two thirds of the pledges were in the form of grants.

Detailed published data on pledges, commitments and disbursements until the end of December 2009 are available and reported in the draft fifth Global Progress Report compiled by UNSIC and the World Bank.

According to the draft fifth Global Progress Report, as of 31 December 2009, from the total cumulative pledges of USD 4.3 billion, development partners had committed USD 3.9 billion: of this, USD 2.7 billion had been disbursed by mid 2009. This means about 91% of the pledges had been committed and 70% of the commitments disbursed. About 52% of this disbursement was in cash, while 48% was given in kind (for instance, in the form of personal protection equipment (PPE) and other supplies for building the response capacity of recipient countries). These rates of commitment and disbursement have been higher than those of responses to other major rapid-onset disasters and demonstrated the resolve of the international community to contain and control the spread of API.
Table 5 shows the amounts committed and disbursed by major international stakeholders as of 31 December 2009. The table shows that bilateral funding countries accounted for 67% of the commitments and 83% of disbursements. The largest funding country was the United States, which committed and disbursed USD 1.4 billion, accounting for 41% and 52% of the total commitment and disbursement respectively. The Commission committed USD 322 million (8%) and disbursed USD 242 million (9%).

Table 6: Distribution of commitments by types of recipients, as of 31 December 2009

<table>
<thead>
<tr>
<th>Recipients</th>
<th>(million USD)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country programmes</td>
<td>1 560</td>
<td>40</td>
</tr>
<tr>
<td>AHI Facility</td>
<td>127</td>
<td>3</td>
</tr>
<tr>
<td>Regional programmes</td>
<td>395</td>
<td>10</td>
</tr>
<tr>
<td>International organisations</td>
<td>1 145</td>
<td>29</td>
</tr>
<tr>
<td>Others</td>
<td>673</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>3 900</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 6 shows that 40% of the committed funds were to be used directly by recipient countries. More than a quarter of the funds (29%) were committed to international organisations like the WHO, FAO, OIE and UNICEF and others that were responsible for providing technical support at various levels of GRAI activities. Regional programmes were to receive 10% of the committed funds, with 3% of the committed funds meant for the AHIF for channeling to country programmes.

The bilateral funding countries, together with the Commission, committed USD 2.9 billion which constituted about 75% of all commitments. These were in the form of grants. About 86% of the commitment (USD 2.5 billion) had been disbursed as of 31 December 2009.

The multilateral development banks (MDB) committed USD 979 million — almost 25% of total commitments — which was to be used primarily in the form of loans. Of this, USD 232 million (or 24% of the amount committed by MDBs) had been disbursed as of 31 December 2009. The WB was the biggest lender in this category: it committed USD 898 million. However, it disbursed only USD 174 million, which was only 19% of its commitment.

2.7.3 Recipients of committed and disbursed funds

The GRAI funds were targeted to the following categories of recipients:

- developing countries (country programmes)
- AHI Facility
- regional programmes
- international organisations
- others (e.g. NGOs).

Commitment is the result of an agreement between the funding entity and recipient for a designated purpose: a commitment is a firm decision that prevents the use of allocated amount for other purposes. Disbursement is the actual budget transfer or release of funds to the recipient for an intended purpose.

Out of the USD 1 560 million committed to country programmes, USD 625 million, or 40 %, was committed by bilateral funding countries and the Commission as grants, while the remaining USD 935 million, or 60 %, was meant to be given as loans by the MDBs.

Data published by UNSIC and the WB 234 show that the main recipients of the funds committed to country programmes, including funds from AHIF and Japan’s Policy and Human Resources Development (PHRD) trust fund, were meant to be Cambodia, India, Indonesia, Mexico, Nigeria, Turkey, and Vietnam.

If we look at the published data from a regional perspective, we find that 38 % of the country programme funds were committed to countries in Latin America and the Caribbean. Most of that commitment went to Mexico to respond to the influenza A(H1N1) pandemic and to strengthen its system to deal with such emergencies. The East and South Asia region received 37 % of commitments. About 11 % of total commitments went to countries in Eastern Europe and Central Asia, whilst countries in sub-Saharan Africa, the Middle East and North Africa received around 14 % of the commitments. About 45 % of the committed funds for the country programmes were reported to be in the form of grants and in-kind assistance, while the remainder (55 %) was committed as loans by MDBs according to the fifth Global Progress Report.

As mentioned earlier, the international organisations received commitments of USD 1 145 million from various funding sources. As of 31 December 2009, USD 1 006 million, or 88 % of the committed funds, had been disbursed (Table 7). The biggest recipient was the WHO, which received 59 % of the disbursed funds, followed by the FAO (17 %), UNICEF (7 %), OIE (5 %) and a number of other organisations (17 organisations (11 %).

Table 7: Commitments and disbursements received by international Organisations, as of 31 December 2009

<table>
<thead>
<tr>
<th>Organisations</th>
<th>Commitments (million USD)</th>
<th>%</th>
<th>Disbursements (million USD)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO</td>
<td>704</td>
<td>61</td>
<td>596</td>
<td>59</td>
</tr>
<tr>
<td>FAO</td>
<td>191</td>
<td>17</td>
<td>174</td>
<td>17</td>
</tr>
<tr>
<td>OIE</td>
<td>54</td>
<td>5</td>
<td>47</td>
<td>5</td>
</tr>
<tr>
<td>UNICEF</td>
<td>75</td>
<td>6</td>
<td>75</td>
<td>7</td>
</tr>
<tr>
<td>Other organisations</td>
<td>122</td>
<td>11</td>
<td>115</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1 145</strong></td>
<td><strong>100</strong></td>
<td><strong>1 006</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>


The disbursed funds were targeted at the following broad areas of activities:

- animal health, bio-security and sustainable livelihood;
- human health and pandemic preparedness;
- information, education and communication (IEC);
- support for implementation, monitoring, evaluation and internal coordination;
- other activities.

More than half (54 %) of the committed funds was targeted at human health and pandemic preparedness, while less than a quarter (22 %) went to animal health activities. About 7 % of the committed funds were meant for supporting IEC activities. The rest went to support programme implementation, monitoring and evaluation, and internal coordination (7 %), and other activities (10 %). This includes and therefore mainly reflects the international response to the influenza A(H1N1) pandemic 2009.
2.7.4 Lessons learned and good practices in the funding modalities

The resources provided to build under-funded public and veterinary health services have already resulted in improved surveillance systems, better diagnostic laboratories, more skilled human resources in public and animal health sectors, improved response capacity for HPAI and other infectious diseases, and increased public awareness in at-risk communities in many countries. Overall, there has been a reduction in HPAI outbreaks.

Initially, and in addition to mobilising a significant amount of funds for the implementation of the response to HPAI (H5N1) worldwide, the Beijing Conference, which was co-hosted by the People’s Republic of China, the Commission and the WB, as well as the creation of the AHIF helped to stimulate countries to finalise their integrated national action plans by early January 2006 in order to present them at the international pledging conference in Beijing. The mobilisation of a sufficient amount of flexible funds also increased the opportunity for countries to develop and implement strategies on API and thereby allowed countries to follow international recommendations and norms.

Disbursements of loans from the WB and other multilateral development banks have been faster than those for their regular programmes but slower than the disbursements of bilateral donors. Since the loans were usually provided for long-term activities that were financed by national governments, their processing and negotiations took time in some cases. The recipient countries’ administrative/financial weaknesses in the treatment of external support also added to the delays in WB funding.

Also, the service fees charged by UN agencies, the WHO and FAO were considered to be too high. Disagreements over these issues delayed the signing of subcontracts and project implementation in several countries.

The aim of the WB funding modality was to fill the gaps in the financing of national plans, where donor grant funding was inadequate. Bilateral agencies like USAID

Pledges to the AHIF amounted to USD 127 million by nine countries and the Commission (Table 8).

Table 8: Confirmed pledges to the AHIF

<table>
<thead>
<tr>
<th>Development partner</th>
<th>Currency</th>
<th>Pledge</th>
<th>Share of total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>AUD</td>
<td>10 500 000</td>
<td>6.68</td>
</tr>
<tr>
<td>China</td>
<td>USD</td>
<td>2 000 000</td>
<td>1.57</td>
</tr>
<tr>
<td>Estonia</td>
<td>EUR</td>
<td>21 344</td>
<td>0.02</td>
</tr>
<tr>
<td>European Commission</td>
<td>EUR</td>
<td>70 930 000</td>
<td>76.46</td>
</tr>
<tr>
<td>Iceland</td>
<td>USD</td>
<td>200 000</td>
<td>0.16</td>
</tr>
<tr>
<td>India</td>
<td>USD</td>
<td>1 670 000</td>
<td>1.31</td>
</tr>
<tr>
<td>Korea (South)</td>
<td>USD</td>
<td>1 000 000</td>
<td>0.79</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>USD</td>
<td>3 000 000</td>
<td>2.36</td>
</tr>
<tr>
<td>Slovenia</td>
<td>EUR</td>
<td>30 000</td>
<td>0.03</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>GBP</td>
<td>7 000 000</td>
<td>10.62</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>USD (equivalent)</td>
<td><strong>127 million</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

This will allow for better predictability and planning. In three years, by which time HPAI could be managed routinely. The international community should continue its current efforts to address the risk of a worldwide influenza pandemic. The One Health framework recommends that to sustain programmes that will address the control of any emerging or re-emerging diseases of animals and humans, particularly zoonoses, as in the One Health concept.

Many of the emergency aid programmes to tackle API are approaching the end of their project activities. A decrease in the availability of funds whilst the HPAI (H5N1) pandemic threat remains unchanged suggests ‘donor fatigue’ with regard to API.

While USAID funding of API has been emergency funding dependent on annual review and approval of funding by the US Congress, from now on, half of the budget to support API control activities is to be a regular commitment rather than emergency funding. This will allow for better predictability and planning. In addition, except for the five countries where HPAI is still deeply entrenched in 2010 (Bangladesh, China, Egypt, Indonesia and Vietnam), the focus will be on pandemic threats rather than just API.

It has been suggested that the current pandemic caused by influenza A(H1N1) virus, while being a predominantly human health problem, may stimulate international stakeholders to continue their activities to control HPAI (H5N1) virus but, generally, there appears to be a shift from specific to holistic funding approaches. This implies moving from funding programmes to control HPAI (H5N1) to programmes that will address the control of any emerging or re-emerging diseases of animals and humans, particularly zoonoses, as in the One Health concept.

The Commission’s choice of funding modalities has played a significant role in achieving the short and long-term objectives. The AHIF, which is a multi-donor financing mechanism administered by the WB, has been established to fill financing needs and gaps that remain.

2.8 TO WHAT EXTENT AND HOW HAS THE EUROPEAN COMMISSION’S CHOICE OF FUNDING MODALITIES ALLOWED PROGRESS TOWARDS THE ACHIEVEMENT OF ITS SHORT AND LONG-TERM OBJECTIVES?

2.8.1 Contribution of the European Commission to GRAI funds

The Commission has pledged and almost committed EUR 245 million to GRAI funds. About EUR 71 million, or 29%, of its funding has gone to the AHIF, which is a multi-donor financing mechanism administered by the WB. The remaining funds have been targeted to country programmes, regional programmes, international organisations and others.

The main purpose of the AHIF was to minimise the risk and socioeconomic impact of avian influenza and other zoonoses and of possible human pandemic influenza in developing countries that lack adequate internal resources and capacity to prevent and control the disease. The AHIF was intended to support the preparation and implementation by recipient countries of INAPS designed to reduce the social and economic impact of AI and minimise the possibility of a human influenza pandemic. The AHIF consists of a multi-donor financial framework aimed at filling financing needs and gaps that remain.
unmet from loans, credit and grants made available to developing countries from other sources. As of 31 December 2009, a total of USD 127 million has been contributed to this facility by the Commission and nine other funding countries (Australia, China, Estonia, Iceland, India, Korea, Russian Federation, Slovenia and the United Kingdom). The Commission is the biggest contributor to this fund with a share of 76%. As of 31 December 2009, the facility has provided grants to the tune of USD 88 million to more than 40 countries.

2.8.2 Observations on AHIF funding modalities

The MDTF/AHIF was intended to complement, not substitute for, existing financial arrangements. It provides a collective good and limits competition for influence which characterises some bilateral assistance. It also promotes burden-sharing and the reduction of each crisis response partner’s risk. The aim was to enable the WB to make economies of scale by carrying out a large number of activities, establishing uniform procedures and building up a common body of data. This is in line with the Paris Declaration. The creation of the AHIF also helps to solve the problem of financing programmes in countries that are not eligible for regular World Bank financing, such as Cuba, Myanmar and North Korea. The AHIF, for example, provided funding for AHI initiatives in Myanmar and the West Bank and Gaza.

The development of detailed INAPs providing a longer (three-year) financing framework has been key to mobilising resources and ensuring partner coordination and quick identification of gaps and needs. They also have the potential to be a good tool to monitor and assess achievements against funding. They are therefore key to assuring ownership, coherence and synergy and to avoid wastage and overlapping of resources for improved cost-effectiveness and cost-effectiveness. They have proved extremely helpful, for example, in avoiding overlapping of laboratory support and redirecting funds to less attractive interventions such as law making or compensation funds.

Such coordination tools (strategic plans) have not been established at the regional level and stakeholder coordination and easy evaluation of financing needs and gaps have been reported missing and overlap of support has also been reported (for example, AusAID, USAID, ADB and Commission support for ASEAN).

Disbursement of grants from the WB-administered AHIF has been slow. Although the WB’s management procedures of AHIF were fully compliant with AHIF regulations, implementation and disbursement were significantly delayed. The delays occurred at the stages of AHIF grant appraisal and approval by the WB and in the processing of grants by governments of the recipient countries. One study found that, on average, the WB took 101 days to appraise and approve the grants, while recipient governments took twice that time (208 days) to process the grants. Thus, the combined delay, on average, was 309 days. These delays have hampered grant effectiveness and shortened the usable lifespan of grants.

Due to the above procedural and other reasons, implementation of the WB-supported projects in two of the countries visited by the evaluation team was delayed. In Bangladesh, the animal health component of the AHI project was delayed by two years. The total funds approved for the project constituted USD 19 million: an IDA loan of USD 16 million and an AHIF grant of USD 3 million, the latter entirely contributed by the Commission. As a result of the delay only USD 1.33 million, or 7% had been spent as of mid 2009: USD 1 million from the IDA loan and USD 328 976 from the AHIF grant. Similarly, in Cambodia, the API project was delayed by three years and only 6% of the USD 12 million approved funds have been disbursed. Out of the USD 2 million contributed by the Commission as an AHIF grant, only USD 236 976 has been disbursed, as of 30 June 2009.

In another case study country — Uganda — a USD 12 million (EUR 7.7 million) API project was developed with emergency funding of a USD 2 million (EUR 1.3 million) grant, to be supported by the AHIF, and USD 10 million (EUR 6.4 million) from the IDA. The WB approved the loan in June 2008 but Uganda’s parliament did not approve it until the beginning of 2010. The World Bank explained that the grant has been tied to the credit in order to ensure that the project objectives would be fully achieved while activities identified for funding through the AHIF were considered priority activities. This is particularly disappointing for governments in Africa who had little funding access other than the AHIF and SPINAP to address H5N1 in Africa. USAID support is also present in Africa but USAID cannot fund governments directly and has to act through NGOs and/or universities.

2.8.3 Results and conclusions from recent evaluations by the European Commission

2.8.4.1 Asia

When countries received AHIF financing they often sought to use it for contracts with UN agencies (WHO, FAO). This has often raised issues related to service fees charged...
by these agencies that the governments, on advice of the WB, deemed to be far too high. Furthermore, several of the partners have been unable to comply with the WB’s procurement and auditing procedures. These disagreements have resulted in lengthy delays in subcontract signing and project implementation in several countries. Even though the WB has signed a waiver with its partners regarding these matters, it remains to be seen whether these issues have been satisfactorily resolved at the operational level.

Implementation and disbursement for several projects is significantly behind schedule although, overall, the programme is on track and, in many cases where disbursements are slow, there is nevertheless substantial progress on the ground. WB-supported project sustainability will require strong government commitment, as shown by including line items in national budgets to cover the incremental costs of upgrading infrastructures; the introduction of fees-for-services schemes to cover the incremental costs of upgraded services and facilities, especially targeted at private sector operators who can afford to pay; and the restructuring of veterinary services to define the roles of public and private services with the aim to render both sides of these services more cost-efficient. The sustainability of the inter-ministerial coordination mechanisms is not ensured as they were established to implement API projects and may be disbanded after project closure, especially if they are funded by the API projects and, therefore, have a time-limited mandate. The exceptions are projects linked to a National Disaster Management Agency, as is the case in Bangladesh and Cambodia, which are integral institutions embedded in, and financed by, the government. Other exceptions are when countries have expanded their coordination task forces to also tackle other emerging infectious diseases or zoonoses as, for example, the case in Laos or in the special province of Yogyakarta, Indonesia. The WB project managers should discuss the sustainability issue with their clients and develop, perhaps supported by a study, the necessary sustainability mechanisms.

2.8.4.2 Evaluation of SPINAP in Africa

SPINAP has experienced important delays. At present, the delays are mainly concentrated at the national level, either in implementation, disbursing, or financial and technical reporting. Some of the national coordinators and accountants show a lack of motivation for the execution of SPINAP. Some countries accumulated serious delays at the start of activities after receiving funds as the national coordinator or the accountants left the programme after SPINAP training. In most of the countries, SPINAP is currently the only source of grant funding apart from the government (salaries etc.) for the implementation of INAPs. USAID has invested money on API prevention and control in Africa but it cannot give money directly to the government; instead funds are channelled through NGOs or universities (FETP, RRT training, communication, surveillance, etc.).

Outcome

The contribution of the European Commission to the AHIF is making a significant impact on national veterinary and medical capacity-building against new and emerging highly infectious threats in the East and South Asia regions. However, at the regional and subregional levels, this impact is felt only indirectly through Commission support to UN partners and other development agencies. Sustainability of any gains made at the national and regional levels will not be assured unless concrete measures are developed by recipient countries and organisations to ensure their sustainability.

2.9 CONSIDERING SUCCESSFUL ACTIONS IN VARIOUS SUPPORTED AREAS (POLITICAL, TECHNICAL MULTI-SECTORAL COORDINATION, TECHNICAL AND FINANCIAL ASSISTANCE FOR API CONTROL AND PANDEMIC PREPAREDNESS), WHAT IMPACTS HAVE BEEN OBSERVED, HOW HAVE THESE IMPACTS BEEN ACHIEVED, WHAT WERE THE CONDITIONS OF SUCCESS, AND TO WHAT EXTENT ARE THE LESSONS TRANSFERABLE?

2.9.1 New or stronger systems

To support an effective response to the threat from the influenza A(H5N1) infections, many systems were established or strengthened. They identify, understand, and address the consequences of the dissemination of the influenza A(H5N1) virus.

The following systems were created or strengthened.

1. Systems for joint international research and exchange of information and technologies such as OFFLU. These systems are important for achieving progress in the understanding and knowledge of diseases.
2. Systems for early detection of the disease when it appears in communities of birds or humans, supplemented by systems to systematically and promptly inform about the appearance of the disease in a given community. Such early detection and reporting gives influenza A(H5N1) virus-affected or threatened communities the opportunity to react early and therefore minimise the infections’ transmission and impacts. This is, for example, proposed in the Terrestrial Animal Health Code or in the IHR or further specified in GLEWS.
3. Systems to timely, effectively, and cost-efficiently control the disease in birds and humans such as technical task forces at international level (FAO/ OIE CMC, or the WHO-GOARN); at regional level (ASEAN, AU-IBAR or the regional animal health centres that have been created in Rome (2004), Beirut (2007), Nairobi (2007), Bamako (2006), Tunis (2007), Gaborone (2007), Kathmandu (ongoing) and Bangkok (2005)); and at national level (through the national multidisciplinary task-force/committees and their technical subgroups and the integrated national plans).

247 Interview — UNSIC Bangkok and phone call to FAO Myanmar as well as personal communications.
4. Systems that link partners and make them work together to assure coherence, comprehensiveness, cost-efficiency and synergy. This point will be further discussed in the following Section 2.9.2.

5. Systems to sensitise communities at all levels, including political leaders, and to mobilise efforts and resources such as the United Nations Secretary-General’s (UNSG) appointment of a UN System Influenza Coordinator supported by a small team, the WB MDTF/AHIF or the Development of INAPs.

Not all the systems mentioned in this non-exhaustive list have been established because of the concerns related to the rise of the HPAI (H5N1) virus and its pandemic threat. GOARN, for example, was created in April 2000 to assist countries with disease investigation and control. Not all these systems were fully fledged and ready to assume their function at full capacity as of September 2009. The regional animal health centre in Kathmandu, for example, was still in development. We have already discussed, and will keep demonstrating, that if efforts and supports are not sustained further, some of these systems may not survive or be able to deliver the long-term public good they are expected to. More needs to be done to achieve this aim. However, many of these systems have already proven effective toward the achievement of their objective and would be useful in addressing other emerging infectious diseases or other national or international crisis threats. The GRAI supported the establishment or strengthening of these systems by bringing technical guidance, and offering lessons learned or evidence-based good practices for their development. The GRAI also provided political and financial support. In addition, as it broadens its scope to One Health, and mainstreams the response to HPAI into other development programmes for risk reduction, hazard preparedness or poverty alleviation, the GRAI gives opportunities for a continued refinement and further development of these systems. Thus, the GRAI is also providing opportunities to increase their effectiveness and sustainability.

2.9.2 Partnerships and collaboration

As stated above, the GRAI created or strengthened systems helping partners to better work together to assure coherence, comprehensiveness, cost-efficiency and synergy. Most of the results of the GRAI were achieved through groups of people working jointly. Partnerships and networks were created at all levels. They include horizontal and vertical networks that are bilateral, multilateral, regional and global. They involve various actors with different expertise, from different sectors, targeting different groups and with different resources and capacities. They were set up for the collection and sharing of information, for policy coordination, for rule-making, for strategy implementation, for technical assistance and training, among other purposes.

Examples of partnerships are numerous. Many have already been discussed in the previous sections.

1. At country level, the national task force/committees uphold inter-ministerial collaboration as well as joint work with and between development partners the UN agencies, NGOs, civil society, and, to a lesser extent, the private sector. These task forces facilitated, for example, the development of integrated national plans and strategies, the development of guidelines, tools, and budget and the designation of complementary roles and responsibilities at all levels.

2. At regional level, subregional and regional partnerships were strengthened for and by their response to avian influenza. This is the case in Asia for MBDS or ASEAN, or, in Africa, for AU-IBAR, and the multi-agency regional animal health centres. These partnerships bolstered the exchange of information, of lessons learned and of best practices between countries. They shared the burden of costly and/or difficult strategies and activities such as research and/or stockpiles of drugs and equipment, and therefore increased cost-effectiveness.

3. At the international level, partnerships helped raise the HPAI agenda to high political levels, to determine global policies, strategies and standards, to improve science and to mobilise resources. This will be discussed further in Section 2.9.7.

Partnerships were, and are, necessary to respond quickly and comprehensively to the complexities of this animal and public health threat, both in terms of response as well as of prevention/mitigation of potential impacts. Partnerships were strongly bolstered by key political actors — the Commission and the United States, but also Australia, Canada, the DFID (United Kingdom), and the ADB. Sometimes, collaboration became a condition for funding — for example, in the case of the US-supported programme H2P, strong partnership between UN agencies, the IFRC and NGOs was a condition sine qua non for political support and financial resources.

Partnerships and collaboration had many positive results, for example: (i) complementary decisions and actions; (ii) coherence and harmony of messages and programme; (iii) flexibility essential to deal with uncertainties; (iv) increased knowledge and know-how via permanent exchange of information and experience; and (v) increased coverage of needs through the significant mobilisation of resources used whilst avoiding duplication.

Although not always smooth and easy, these partnerships promoted and supported by the GRAI have greatly influenced the perception of the added value and/or the benefits of working together. They have created a culture of collaboration among partners at all levels. The GRAI in particular, achieved unprecedented collaboration between the animal and public health sectors as well as with disaster management institutions and also, although to a lesser extent, with civil society and the private sector. It will be important to sustain these partnerships in prevention, preparedness and response to other future health hazards.

Complex international issues in our globalised world demand a different approach of international cooperation and collaboration within and between governments and with other actors/stakeholders. The GRAI positively demonstrated new ways of working together with tremendous potential for future actions on complex issues.
issues in today’s world.

2.9.3 International Health Regulations

Among the international systems supported by the GRAI, the International Health Regulations deserve special acknowledgement.

It was the 1995 World Health Assembly (WHA) which called for the revision of the 1969 International Health Regulations in relation to globalisation, the increase of international trade and travels, and their movements of goods and persons, as well as the emergence and re-emergence of infectious pathogens threatening international health. The emergence of severe acute respiratory syndrome (SARS) in 2003 activated the revision process and the new IHR were adopted on 23 May 2005 by the 58th WHA to come into force on 15 June 2007.

‘The purpose and scope of the IHR (2005) are to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade’ (58th WHA, 2005). The new IHR set out the basic public health capacities states must develop, strengthen and maintain at the primary, intermediate and national levels in order to detect, report and respond to public health risks and public health emergencies of international concern.

The new IHR offer a new global health governance framework that promotes collective interests above national interests. They radically transformed the international law applicable to identifying and responding to the international spread of diseases. They do not, however, obligate state parties to raise financial resources for increasing public health capacity around the world, especially in developing countries. A failure to generate sufficient resources to support national and international surveillance and response capacities would therefore undermine potential contributions to global health.

The dissemination of the influenza A(H5N1) virus, concomitant with the IHR presentation to the WHA, reinforced its adoption. The WHO benefited from the concerns of the governments and the international community over the threat of an influenza pandemic to stress the importance of the IHR’s endorsement and rapid implementation. National influenza pandemic preparedness plans were used also as a base for planning to meet the new IHR requirements and to assess their application in the management of specific health risks (WHO, CSR, 2007). The GRAI leveraged their implementation.

In Asia, interviews with WHO staff confirmed the use of the API fund and programme to tackle the lack of resources for, and therefore enable, the implementation of, the IHR 2005. In Africa, the review of the national plan for avian influenza supported by the ALive Programme directly referred and linked these plans with the IHR. The 61st WHA discussed how the intense activity in the area of preparedness and response for avian and human pandemic influenza was used by WHO regional offices as an entry point to bolster implementation of the regulations and to raise awareness on the synergies between pandemic preparedness and implementation of the regulations.

The GRAI supported policies, strategies, partnerships, research and systems to improve countries’ capacity for early detection, confirmation, reporting and response to public health risks and emergencies of international concern as required by the IHR 2005.

The GRAI has therefore:

1. contributed to countries’ compliance to the IHR;
2. produced ‘global public health goods’ such as more accurate information on potential trans-border dissemination of communicable diseases or other events that could constitute a public health emergency of international concern (58th WHA, 2005), and improved knowledge for better international response;
3. contributed to the improvement of global health and global health governance.

Although the influenza A(H1N1) pandemic 2009 is bringing additional attention and contributions to the IHR, it is clear, however, that the IHR requirements are only partially met so far (SEARO, WPRO, 2008). Countries need more time; commitment and willingness to change will require more and sustained efforts and investments (WHA 2009). The IHR are, however, particularly relevant in our increasingly globalised world where there will be more unexpected occurrences of health hazards. People will have to learn to live again with infectious uncertainties and, therefore, we must be prepared for health hazards which we currently ignore but which could appear overnight. Countries, regions and the world need to be prepared for these ‘events’ on a long-term and sustainable basis and also be ready to react with or without external political or financial support. This is what is proposed by the IHR along with the promotion of a collective, rather than individual, approach to these health hazards of, and in, our globalised world.

2.9.4 Pharmaceuticals and equity in access to health

The pandemic threat and the international interest it inspired offered opportunities to further the debate about inequalities in access to health. More precisely, in the present context, the timely access to scarce pharmaceutical resources such as antiviral drugs and vaccines was further promoted. The issue is complex and demands sophisticated negotiations to balance the political and economic concerns of individual states, or the profit-driven pharmaceutical companies with a global public health solidarity movement which views the sharing of information, viruses, science and technologies as international public goods that benefit all.

The influenza A(H5N1) crisis offered momentous achievements in the recognition of the limited and unequal access to drugs and vaccine for developing countries and the need for solutions. This debate is not new. Pandemics appear, however, to offer unique opportunities to (re-)sensitise the international community on the question of equity in health.

Many questions are still unresolved in these regards, and the debate is ongoing within the intergovernmental meeting on benefit-sharing which require and search for creative solutions as well as good will and efforts from all.

Several initiatives supported by political actors and pharmaceutical companies working within the GRAI enabled the establishment of a global stockpile of antiviral with the WHO. It was complemented in Asia by additional donations to the regional stockpile, supported by a well-tested, strong operational system with clear but flexible rules for use. Stakeholders have also invested time and resources in research for better treatment, tests and vaccine. We have already mentioned the European Community’s investment of more than EUR 100 million for influenza only, and a similar amount on EIDs (Section 2.6.6).

A significant achievement with a promising impact for access to vaccines is the work on the establishment of a global stockpile of influenza A(H5N1) vaccine as well as the ongoing increase of vaccine production capacity. The establishment of influenza vaccine plants in new economies such as Brazil, India, Indonesia Mexico, Thailand and Vietnam, will be expanded. In September 2009, negotiations for similar plants opening were ongoing in Africa and the Middle East. The process is speeding up with the influenza A(H1N1) pandemic and seasonal vaccine production which was already under way in India and Thailand. The influenza A(H1N1) pandemic 2009 is, of course, also bringing a new dimension to the debates and initiatives stirred by the HPAI (H5N1) crisis. Vaccine donations of influenza A(H1N1) vaccine by countries such as Australia, Brazil, France, Italy, New Zealand, Norway, Switzerland, the United Kingdom and the United States (these countries had given 300 million doses of influenza A(H1N1) virus pandemic vaccine to the WHO as of September 2009) for distribution in developing countries to balance vaccine with the limits of healthcare services.

The GRAI achieved momentous results in terms of vaccine production and access, but also acknowledged the need of further and faster practical solutions for better equity and better access to health for all.

2.9.5 Economic impact and poverty reduction

The GRAI impact on the economy through the prevention of further dissemination of HPAI and increased pandemic preparedness and research is obvious. The FAO et al. (2008) estimate that HPAI (H5N1) has already cost over USD 20 billion in economic losses and that an influenza pandemic caused by this virus could cost the global economy around USD 2 trillion. Annex 7 presents our case study on the impact of AI on the poultry industry in Bangladesh.

Experience with previous outbreaks such as SARS (2003) indicates that there are two major types of socioeconomic impacts. Firstly, service sectors such as tourism, retail trade, transport, and entertainment register initial impact. During the SARS outbreak, these costs were estimated to have reduced GDP by 1.5–2.5 % in the second quarter of the year (i.e. 0.3–0.5 % of annual GDP) in affected economies such China, Hong Kong (China), Singapore, and Taiwan (China). Secondly, if preventive actions fail to stop an influenza pandemic, the costs of illness can include medication and hospitalisation, and indirect costs, which include losses to economic production as a result of the illness or death of workers. In a moderate pandemic flu scenario, studies have suggested that the economic losses from illness and death in the first year of the pandemic could amount to 1.3 % of world GDP or more. Combined with preventive costs of close to 2 % of GDP, total costs could exceed 3 % of world GDP in a moderate pandemic scenario (WB, 2009).

Burns et al. (2006, 2008) suggest that the cost of a global influenza pandemic could range from 0.7 to 4.8 % of global GDP according to the severity of the outbreak. The lower estimate is based on the Hong Kong flu of 1968–69, while the upper was benchmarked on the 1918–19 Spanish flu. In the case of a serious flu, 70 % of the overall economic cost would come from absenteeism and efforts to avoid infection. Generally speaking, developing countries would be hardest hit, because higher population densities, relatively weak healthcare systems, and poverty accentuate the economic impacts in some countries.

As of 1 June 2009, the WB estimated that most of the economic costs of the influenza A(H1N1) epidemic were concentrated in Mexico, in the transportation sectors: ‘Air travel to and from Mexico is down by 80 %, and hotels in popular resorts report vacancy rates as high as 80 %. Overall, tourism revenues are down an estimated 43 %, increasing Mexico’s external financing gap because tourism is an important source of foreign currency. […] Should recent levels of disruption in the commerce, restaurant, hotel, and transportation businesses in the Mexico City region (representing 30 % of the country’s GDP) persist, they could reduce second-quarter GDP by as much as 2.2 %.’

In addition to its direct impact in preventing further HPAI infections in poultry and mitigating potential pandemic’s impacts, the GRAI, by promoting additional efforts and investment, including research on EIDs and other pandemic threats further impacts poverty reduction. Karesh et al. (2005) estimated that the rash of emerging or re-emerging livestock disease outbreaks around the world since the mid 1990s, including bovine spongiform encephalopathy (BSE), FMD and AI, has cost the world’s economies over USD 80 billion. Similarly, the GRAI efforts and advocacy for better equity in health access and outcome, as discussed above, is also a positive determinant of sustainable development and, therefore, poverty reduction globally.

2.9.6 ‘Beyond H5N1’

As per the long-term perspective anticipated at Beijing, the GRAI has worked on broadening the scope of the response to the HPAI (H5N1) crisis and on balancing the perspective of an emergency with the need for a more
developmental approach. The results from the GRAI have progressively offered opportunities to go "beyond" and to maximise the gains from the investments made so far, to ensure longer-term sustainability and to increase the impact of the GRAI.

The first approach to the HPAI (H5N1) crisis at country level was rather vertical due to the rapid dissemination of the HPAI virus. However, key governments’ partners, regional institutions and international organisations kept promoting the use of the knowledge and understanding, of the systems and partnerships, as well as of the resources obtained from GRAI to address (re-)emerging infectious diseases and other health hazards emerging in our globalised world.

From H5N1 to A(H1N1)

The swift response to the influenza A(H1N1) pandemic 2009 made it clear: countries pertinently relied on and adapted the HPAI (H5N1) virus pandemic plan lessons learned and related acquisitions (such as national plans and strategies, systems and partnerships, guidelines and standard operating procedures (SOPs), outbreak communication messages and structures, people trained, drugs and equipments, procurement and logistics, funds and mobilisation procedures) to improve readiness for and to respond to the influenza A(H1N1) pandemic 2009. The, so far, smooth response to the influenza A(H1N1) pandemic also helped revitalise the planning and preparedness process initiated for the HPAI (H5N1) crisis. The study of the response to the influenza A(H1N1) pandemic 2009 is, and will, contribute to better identification and analysis of the strengths and weaknesses of the present pandemic preparedness plan. The study should lead to plan revision and ultimately result in better evidence-based strategies and plans.

From influenza to emerging infectious diseases, One Health

The GRAI also exploited the attention given to the HPAI (H5N1) crisis to further sensitize the international community and policymakers to the urgent need to address the rise of new or re-emerging infectious diseases at the animal-human-environment interface with a more holistic and comprehensive approach, the One Health concept.

Changes in the ecosystem due to population growth, economic development, and increased farming as well as demand for, and production of, animal food, intensification of trade, movement of people and goods and climate change pose new threats. They, therefore, require the world to adapt to the prevention and detection of, preparedness and response to, these changes and threats. EID events are dominated by zoonoses (60.3 % of EIDs): the majority of these (71.8 %) originate in wildlife. They are increasing significantly over time (Jones et al., 2008). The past decades’ increase in emergence or re-emergence of infectious disease, mostly coming from animals and due to the ecosystem changes (Garrett, 1994; De Salle, 1999; Gibbs, 2005; Glenn et al., 2008) call for a more integrated approach of these components.

The GRAI successfully used the example of the HPAI (H5N1) crisis to energise and further increase recognition that strengthening animal and public health systems would achieve more and better results if they were approached with recognition of the human-animal-environment interconnectedness. The international attention and interest caused by the influenza crisis provided an opportunity to promote further the added value of a multidisciplinary strategy to predict and prevent, track and control, manage and, where possible, eliminate risks including infectious diseases within a larger ecological context that includes humans and animals, interacting in a complex, ever-changing natural environment. The HPAI (H5N1) provided an important concrete example of the need for and the added value of a concept of integration that has long existed but needed more evidence of its effectiveness to appear as ‘the health paradigm of our time’ (Kaplan and Echols, 2009).

The GRAI encouraged the One Health concept to be further translated into strategies and actions. In recognition that HPAI (H5N1) was one of a series of EIDs that continue to appear on a regular basis with unpredictable consequences and with the potential to cause huge epidemics and pandemics, the International Ministerial Conference on Avian and Pandemic Influenza (IMCAPI) in New Delhi proposed that the global community address, simultaneously with HPAI, the larger problem of EIDs. Thus, at the sixth IMCAPI in Sharm el-Sheikh, October 2008, the UN, WB and OIE proposed a strategic framework to contribute to One World, One Health™ building on the Manhattan principles or recommendations previously issued by experts in a One World, One Health™ meeting organised in 2004 by the Wildlife Conservation Society and the Rockefeller University. The strategic framework proposes to address the potential threat of EIDs at the animal-human-ecosystems health interface, underpinned by enhanced disease intelligence, surveillance and emergency response systems at the national, regional and international levels, and supported by strong and stable public and animal health services, and wildlife monitoring (FAO et al., 2008). The framework has been accepted and become widely recognised. It has quickly inspired new seminars and workshops to better define practical ways to apply the strategy with a multidisciplinary approach at all levels. Despite the broad recognition of the One Health concept, let us note that key informants question the likelihood of sustaining sufficient mobilisation of funds and long-term inter-agency coordination, which they say was mainly possible because of the perceived imminence of the HPAI pandemic threat compared to other EIDs which require more developmental and longer-term approaches.

From pandemic preparedness to risk reduction and all hazards preparedness

UNOCHA, one of the key UN agencies working on cross-sectoral pandemic preparedness stated in 2007 that ‘Integration of preparedness activities into generic preparedness planning would offer broad potential benefits for an effective response in the short and long terms.’

251 In comparison to the 20th century, which often treated animal and human diseases as separated entities (Monath, 2009).

252 Phone interview, January 2010.
The WHO, in the April 2009 updated guidance for pandemic influenza preparedness and response, also calls for integration of pandemic preparedness and response into national emergency framework to encourage sustainable preparedness. The WHO states, ‘If approached in an astute fashion, pandemic preparedness can contribute significantly to other development goals such as strengthening the resilience of infrastructure and overall disaster preparedness. Further research into adaptable policies may be necessary.’

Building on the lessons learned from the SARS crisis, the GRAI was initiated in recognition that the rapid dissemination of HPAI could lead into the next pandemic and that it was therefore crucial to prepare in order to mitigate its impacts on health, society, economy and security. The GRAI promoted the need to identify early potential risks of future pandemics and other health hazards for prevention and/or improved preparedness. The global sensitisation, mobilisation and investments for pandemic prevention and preparedness reaffirm the importance and the value of the principles for risk reduction and emergency preparedness as set in the Yokohama Strategy for a safer world in 1994, and in the Hyogo framework for action 2005–15: Building the resilience of nations and communities to disasters. Pandemic preparedness is obviously part of the international approach to all hazards risk reduction.

Correlation between pandemic preparedness and risk reduction and emergency preparedness is getting stronger, providing opportunities for the concept of risk reduction to benefit from the international attention to influenza pandemics. The efforts for risk reduction and preparedness should be better recognised globally as international public good and continue to receive sustained and high levels of attention. Some of the pandemic preparedness strategies, such as surveillance, risk communication and multi-sectoral pandemic preparedness, would benefit from an integrated approach better linked to ‘risks’. They could also be addressed in a more sustained manner as the Hyogo framework for action 2005–15 promotes the mainstreaming of risk reduction into development plan.

**Living with infectious uncertainty**

In an increasingly globalised world, people will have to learn to live again with infectious uncertainty. Instead of assessing the probability of various health risks, we must be prepared for health hazards which we currently ignore but which could appear overnight. Countries, regions and the world need to be prepared for these ‘events’ on a long-term and sustainable basis and also be ready to react with or without external political or financial support. Therefore, programmes proposed to respond to the HPAI (H5N1) and influenza A(H1N1) crises should be integrated in countries’ developmental projects and become an intrinsic part of any other developmental project. The challenge will be to keep a collective, rather than an individual approach, and the networks that were set up for the GRAI. The global response to the HPAI threat and the influenza A(H1N1) pandemic has not only set the basis for this sustained work, but has also offered the proof that this can be achieved.

**2.9.7 Global governance**

Dealing with matters of international concerns such as the HPAI (H5N1) dissemination and pandemic threat requires a careful and complex approach. The nature of the problem entails challenges of different natures: (i) technical, to identify effective and evidence-based strategies and interventions selected according to the needs and the context; (ii) institutional, to ensure the systems and their management are in place to deliver the needed interventions; and (iii) political, to pressure for implementation, to assure availability of resources and to facilitate the work that needs to be done (Nabarro, 2005). International public health security is both a collective aspiration and a mutual responsibility (Chan, 2007).

The successes of the GRAI in addressing the HPAI (H5N1) crisis had an evident impact on global governance as an effective response in mobilising worldwide attention, efforts, and resources, as well as in achieving multidisciplinary and multi-partner collaboration. These successes are due to various global governance tools and actors willing to supplement each other rather than compete.

The new IHR apply recent concepts of global health governance (GHG) — which includes non-state actors in the governance process of global public good for health (GPGH) — under which public health governance should not serve the interests of the great powers but should produce globally accessible health goods and services (Fiddler, 2003; Gostin, 2004). Similarly, the Terrestrial Animal Health Code was revised in consideration of the HPAI problem and related demand for regulation to transparency.

International norms and regulations, as well as international organisations, by their structures and constituencies can, however, not be binding or enforcing. They have to be supported by the development of networks and partnerships as ‘global public policy networks’ (Slaughter, 2004) for multilateral governance. We have previously discussed partnerships and networks and their achievements.

In global governance, global public policy networks offer a flexible and relatively fast way to conduct the business of global governance, coordinate, and even harmonise national governance action while initiating and monitoring different solutions to global problems. Because they are decentralised and dispersed, they are incapable of exercising centralised coercive authority. They support regulation by information, which allows regulators to move away from traditional command-and-control methods and, instead, provide individuals and corporations with the information and ideas they need to understand how to improve their own performance against benchmarked standards. These networks are the ideal mechanism of international cooperation on international problems that have domestic roots, as they directly engage the participation and the credibility of the individuals who must ultimately be responsible for addressing those problems (Slaughter, 2004). They help governments and multilateral agencies to manage risks, take advantage of opportunities presented by technological change, to be more responsive to their constituents, and promote change within bureaucracies (Slaughter, 2004).
Today, the only way most states can realise and express their sovereignty is through participation in the various regimes that regulate and order the international system. Isolation would mean that a state’s potential for economic and political influence would not be realised (Chayes and Chayes, 1998). States accept common institutions and rules. They can hardly do otherwise if they are to receive political recognition, be allowed to trade freely and attract investment, much less to be recipients of aid (Keohane, 2003). One of the problems of the good functioning of global governance, however, is the diversity in states’ capacity for effective domestic governance which has international impact. Governments must be able not only to negotiate treaties but also to create the capacity to comply with them.

On the HPAI agenda, key political actors, international organisations and financing institutions helped to deal with such matters. The WB, key political actors and bilateral partners helped in the global mobilisation of the financial resources necessary to help weaker states to stay engaged and to participate in international efforts. The WHO, FAO and OIE, the ‘technical agencies’, played a significant role in the establishment of global standards and the improvement of the capacity of states to respond to API. They developed strategies and offered technical advice which considered states’ interests and limitations. Their close collaboration ensured that public health and agriculture aligned their interests in the objective of a global containment effort. The appointment of a senior coordinator on influenza by the UNSG demonstrated the UN’s high political attention to the issue of avian and pandemic influenza and ensured that the UN speaks with one voice through a joint comprehensive multi-sectoral strategy. It put the issue on the global agenda, set global standards, the gathering and sharing of information and increased accountability at all levels (UNSCIC, 2006).

This international movement has clearly influenced the effectiveness of the response. The Commission, the United States, and UNSCIC engaged in a unique collaboration based on complementarity and collectivity. This high-level political involvement, translated into the definition of common objectives, both political and technical, and in the unprecedented international mobilisation. This unique partnership crystallised in January 2006 at the WHO/FAO/OIE global strategies guided by political leadership at the highest level […] subscribe to a long-term strategic partnership between the international community and the countries currently affected or at risk. Beijing succeeded in building a consensus on the need to articulate actions to combat HPAI (HSN1) at: (i) national level, with the setting up of structures for inter-ministerial coordination and preparation of national integrated action plans; (ii) subregional and regional levels, with the involvement of intergovernmental bodies; and (iii) global or international level, with the swift activation of networks of key political actors, crisis response partners and international organisations.”

Subsequent political meetings in Vienna, Bamako, New Delhi and Sharm el-Sheikh allowed for the assessment of progress and obstacles, updating of scientific and evidence-based strategies and raising additional pledges. It is this effective international and multilateral engagement for cross-sectoral coordination that also enabled projection and further engagement for EIDs and other high risks within the One Health approach/movement.

However, some important partnerships were limited or slow, particularly within the private sector but also within civil society, which had limited involvement in the elaboration of the international principles or recommendations. Earlier engagement with the private sector, mainly with respect to further improvements in the availability of public goods such as drugs, vaccine and diagnostic tests at global level, could have prevented the problem of virus sharing and patent agreements and decrease tensions. Earlier work with civil society would have improved outcomes at the community/grass-roots levels and created additional solutions to address equitable access to, and outcome from, public health services and goods. Earlier involvement of the private sector and civil society would have also helped in broader and faster achievements on business continuity and whole of society preparedness. Exploitation of the interest and experience of the private sector in maintaining business and addressing crisis would have been opportune for government and communities. Civil society representatives could have achieved earlier and broader results in preparing communities to delay the dissemination and to mitigate the impact of a pandemic.

However, civil society and the private sector have been increasingly involved in the global response to avian and pandemic influenza with promising work such as H2P, technological transfer for new vaccine plants, and the establishment of stockpiles of drugs and vaccine. They are, therefore, providing opportunities for greater impact.

2.9.8 Conclusions

In summary, the GRAI has effectively managed to place the issue and threat of emerging diseases and other unknown health hazards on the global agenda, it facilitated the negotiating and setting of global standards, it gathered and disseminated knowledge (to link participants with access to different knowledge bases), it offered the opportunity to develop markets that have the potential to produce increased public goods (vaccines, treatments, tests, but also health, economy and stability), and it offered innovative implementation mechanisms for traditional intergovernmental treaties. “The approach on avian and pandemic influenza offers some important perspectives on big issues of the moment. These include: how to respond to uncertain threats which have transnational implications; how to cut across the emergency-development divide, making sure that crises result in longer-term responses, as well as dealing
with immediate needs; how to balance interests and priorities between ensuring health and safety as well as livelihood and how to operate effectively in a complex multilateral system with and beyond the UN (Scoones and Forster, 2008).

**Impacts**

The GRAI has supported the establishment or strengthening of systems to effectively prepare for, and swiftly respond to public health emergencies and other matters of international concerns.

In particular, the development of multilateral partnerships with excellent results on resources mobilisation, increased coverage of needs, cost-efficiency, flexibility, coherence, harmony, and synergy demonstrated the benefits of working together and created a ‘culture of collaboration’ among partners at all levels.

The support for wider and faster compliance for the International Health Regulations not only contributed to countries’ compliance to the IHR but also produced ‘global public health goods’ such as better information and know-how about events that could constitute a public health emergency of international concern. Therefore, the GRAI contributed to the improvement of global health and global health governance.

The GRAI has increased access to, and production of, scarce pharmaceuticals and vaccines, as well as provided new opportunities to further the debate on unequal access to health.

The GRAI had a positive impact on the global economy by decreasing the number of HPAI infections globally, improving preparedness and capacity for influenza pandemic mitigation, and also through its call for further investments in One Health and for better equity in health access and outcomes for all.

The GRAI allowed for a swift response to the influenza A(H1N1) pandemic 2009.

The GRAI further sensitised the international community and policymakers on the need to address the rise of new or re-emerging infectious diseases at the animal-human-environment interface with a more holistic and comprehensive approach to health, such as the One Health concept. Similar impact could operate on risk reduction and emergency preparedness of which principles are reaffirmed by the global sensitisation, mobilisation and investments for pandemic preparedness.

The GRAI offered a good example of effective global governance in dealing with complex matters of international concerns such as the threat posed by the dissemination of the HPAI (H5N1) virus.

The GRAI has effectively managed to place the issue of emerging diseases and their threat on the global agenda: it facilitated the negotiating and setting of global standards, it gathered and disseminated knowledge, it offered the opportunity to strengthen markets that have the potential to produce increased public goods such as vaccines and science, and it offered innovative implementation mechanisms for traditional intergovernmental treaties. Thus the approach on avian and pandemic influenza offers some important perspectives on big issues such as the response to uncertain threats which have transnational implications: the balance between the emergency-development divide and response, and the equilibrium between health and safety priorities versus livelihoods, as well the effective approach to effective operations in a complex multilateral system.

**Recommendations**

Ensure sustained international attention, technical support and funding to maintain and expand successes of the GRAI on pandemic preparedness.

Ensure further translation of the One Health concept into practical policies and strategies with clear operating procedures for easy implementation at country, regional and international level. Particularly, inter-sectoral cooperation should be further clarified and systematised to adequately and comprehensively address EIDs and other high-impact health crises at the animal-human-environment interface. This will demand sustained political attention, additional technical norms and thus investments and efforts at all levels.

Exploit the opportunity offered by the influenza A(H1N1) pandemic 2009 in addition to the international attention for the HPAI (H5N1) and other EIDs pandemic threats to increase the availability of global public goods (such as vaccine, drugs and science) through research, technical transfer and increased capacity-building of developing countries for the global fight against pandemics and other high impact health hazards and crises.

Expand the GRAI outcomes and gain by further ensuring that programmes proposed by the GRAI be integrated in countries’ developmental projects and become intrinsically part of any developmental project so that countries, regions, and the world can be better prepared for health hazards which we currently ignore but that, in our increasingly globalised world, could appear overnight. Particularly ensuring a sustained global collective approach such as promoted by the IHR.

Use lessons learned, good practices and the impact of the GRAI on international systems, partnerships, norms and regulations, as well as global governance, to address other complex issues of international concerns, such as other risk/hazard reductions and preparedness. Global public policy networks supplementing international treaties and laws, engaging the public and private sector as well as civil society and, supported by key political actors, have helped the collective approach and engagement to respond to HPAI (H5N1) and influenza A(H1N1) so far. These global governance tools could be used also in support of other global challenge of our times such as climate change, for example.
3. CONCLUSIONS

1. Although avian influenza has become endemic in a few countries, the GRAI has limited the number of AI outbreaks in poultry worldwide through improved disease detection and rapid control, and this may have limited the number of human H5N1 cases over the past six years.

2. The biggest crisis response partners to the GRAI have been the United States (USD 1.6 billion), the World Bank (USD 0.9 billion), Japan (USD 0.4 billion) and the European Union (USD 0.3 billion). By December 2009, the United States had disbursed USD 1.4 billion; Japan, USD 0.4 billion; the European Union, USD 0.2 billion; and the World Bank, USD 0.2 billion. Through the multi-donor financing framework to fund the GRAI, in which, between January 2006 and November 2008, USD 3.03 billion was pledged, about 91% of the pledges had been committed and 70% of the commitments disbursed by 31 December 2009. These high rates of commitments and disbursements demonstrate the unprecedented resolve of the international community to combat API.

3. Disbursement of loans from multilateral development banks has been faster than for their regular programmes but slower than disbursements from bilateral donors. Since these loans were usually provided for long-term activities that were financed and implemented by national governments, their processing and negotiations took time in some cases. The disbursement of grants from the World Bank-administered AHIF has also been slow in some instances. In two of the case study countries visited by the study team, Bangladesh and Cambodia, implementation of the World Bank-supported projects was delayed by 2–3 years, and only around 6–7% of the approved funds was spent.

4. In some countries (Uganda is an example), World Bank facilities have tied grant money coming from the AHIF to loans from the WB, while activities identified for funding through the AHIF were considered priority activities. In Uganda, this causes indignation as, other than the AHIF and SPINAP, there is little funding directly to governments to address H5N1 in Africa: USAID money is present in Africa but goes mostly to NGOs rather than through government.

5. Emergency programmes were needed for HPAI (H5N1) as it spread worldwide. Other EIDs have not yet reached this point and, therefore, may not need emergency responses: long-term preparedness for them is more appropriate and, therefore, WB funding mechanisms for them may be more appropriate.

6. The GRAI has resulted in an improvement of the Terrestrial Animal Health Code of the OIE, related to avian influenza, veterinary services and disease control, enabling better notification of outbreaks and sharing epidemiological information. It has supported the development of GLEWS, a joint system that builds on the added value of combining and coordinating the alert mechanisms of the WHO, FAO, and OIE while linking networks from the international community and stakeholders, to assist in prediction, prevention and control of zoonotic disease threats through sharing epidemiological information and results of risk analysis.

7. The GRAI has established or strengthened international and regional networks for information exchange and sharing expertise and increased collaboration between research institutes to determine origins of HPAI virus infections. A good example is FLUWEB, the joint OIE-FAO network of expertise on influenza, established in 2005 to support international efforts to monitor and control infections of avian influenza in poultry and other birds and to share biological material and data to support early development of human pandemic vaccines. With the emergence of the influenza A(H1N1) virus in humans in 2009, containing genetic components similar to swine and avian influenza viruses, the network resources are being mobilised to support international efforts to combat this new threat.

8. International agencies, including those of the UN, especially the FAO with its establishment of ECTADs and the CMC have adapted their structure and management to be able to respond to EIDs, particularly zoonoses.

9. Generally, international agencies have adapted to coordinate their responses to H5N1, with further adaptation to address EIDs in general, by reducing competition and working together. This process has been particularly facilitated by the establishment and operations of UNSIC and also through the influence of political stakeholders and crisis response partners who have requested coordination.

10. Through experience of the GRAI, international agencies are further translating the One Health concept into practical strategies and guidance. With the realisation that many EIDs, including AI, are trans-boundary diseases, affected countries are learning to exchange information with their neighbours and coordinate their control activities and regional approaches to EID control, although these activities are patchy. The changes that have been made within international organisations to respond and collaborate regarding EIDs, and the further development of the One Health framework, are enabling them to react faster and more effectively in the face of new health hazards such as EIDs.

11. There is greater awareness among authorities and public bodies of the necessity for, and governance of, good well-functioning veterinary services and these are being enhanced through the creation of the World Fund for Animal Health and Welfare enabling the OIE through PVS missions to assess national veterinary services and identify gaps in their capacities.

12. Collaboration between animal and human health systems and veterinary and wildlife (including ornithological) organisations at global and national levels is improved.

13. Stimulated by the GRAI and crisis response partner activity, the majority of countries have developed national policies on API and produced INAPs which require AH and HH services to work together. Countries are also learning to test their emergency preparedness by conducting simulation exercises, though these and other studies reveal that there remain large gaps in their capacities to implement their INAPs. The process of producing INAPs for API, which requires AH and HH services to work together, will have developed capabilities to enable development of appropriate INAPs for other EIDs.
14. There has been general awareness of the importance of communication programmes to develop and deliver messages concerning good husbandry and bio-security with regard to disease control for many years. Through the GRAI, the realisation of the importance of communication programmes to develop and deliver messages to promote behaviour change with regard to husbandry and bio-security was reinforced with respect to containing AI and minimising the risk of it spreading to the human population. But, while communication programmes generally have successfully reached poultry producers and consumers, they have had little success in promoting the required behaviour changes because, although technically sound, they lack relevance for most target groups.

15. Restructuring programmes for the poultry sectors and market chains have been proposed, but there has been little successful implementation, with the exception of Thailand where restructuring of poultry production for export and, to a lesser extent, poultry production for the domestic market has been driven by the importance of the country’s export trade.

16. Disease surveillance and control has been improved at grass-roots level through human resources development and training programmes. Training programmes, especially those integrating AH and HH, have increased the number and quality of human resources. Human resources developed through training instigated by the GRAI should enhance capacity for emergency preparedness and response to any health hazards such as EIDs.

17. The development of laboratories and laboratory networks has led to faster and more accurate diagnoses of avian and human influenza. While concentration on the diagnosis of API has caused some neglect of laboratory work on other diseases, the improvements should have an overall positive impact on laboratory diagnosis, both in AH and HH. Early confirmation has been tremendously improved by upgrading laboratories for detection of H5N1 through RT-PCR and in bio-containment so that almost all countries in Asia can safely perform confirmation of H5N1 through RT-PCR at national level. We can, therefore, observe an increase in the speed of detecting, reporting and confirming cases of avian influenza and, to a lesser extent, the early detection of clusters and early signs of potential pandemics.

18. More research information and research tools are available than before H5N1 and, globally, there is increased diagnostic capacity and there are more and better diagnostic tests. The novel epidemiological concepts and tools that are being developed and shared through the GRAI are enabling enhanced surveillance and risk assessment with regard to API and other EIDs. Novel disease reporting systems are being developed and tested.

19. The wildlife studies undertaken through the GRAI, particularly with regard to waterfowl, have increased awareness and knowledge regarding wildlife as a reservoir for disease which may affect livestock and man.

20. The value chain analysis of poultry production and marketing that has been undertaken through the GRAI has given an appreciation of the role of these activities in the spread of API and other diseases and indicators regarding how the risk of spread along these chains can be mitigated.

21. The advances in vaccinology which have been made through the GRAI have enabled the development of vaccines against AI and capacity for their production has been expanded. These advances can be applied to development and production of vaccines against other diseases.

22. RRTs have been trained and established in all countries visited and regional and national stockpiles of drugs and PPEs have been put in place through the GRAI. The RRTs are enabling rapid response to API and potentially other EIDs.

23. While availability of drugs has increased globally, there are still discrepancies between wealthy and poor countries. The same applies to the availability and production of vaccine. These subjects have led to difficult discussions on the sharing of global public goods, which are not yet resolved. It has, nevertheless, also led to proposals for global vaccine stockpiles and the opening of new vaccine plants in several countries with a potential increase in vaccine availability as a substantial step towards better equity in health.

24. Compensation guidelines have been produced which should enhance control of HPAI. The WHO and FAO in developing countries through implementation of appropriate compensation mechanisms.

25. As of July 2009, while there has been significant improvement in preparedness for a pandemic from the H5N1 virus, preparedness has mainly focused on early detection and containment rather than on increased readiness to face a pandemic. In addition, increased preparedness is more obvious:
   - in some segments of the public health sector;
   - in the public health sector rather than in the whole of society;
   - at central level rather than in the grass-roots communities.

26. In addition, at country level, pandemic preparedness has very much focused on the HPAI virus rather than on preparedness for other health hazards such as highly pathogenic emerging infectious diseases. The results achieved so far have proved valuable in the response to the influenza A(H1N1) pandemic. They could, however, be easily maximised if the scope of the work done for H5N1 could expand to encompass and be sustained for preparedness and response to other health hazards such as EIDs and other pandemic threats. Although this shift is supported by most partners at national and international level, the expansion of the H5N1 programme to encompass other EIDs at country level is only slowly being implemented.

27. In the public health sector, surveillance networks have expanded mainly at grass-roots level, and routine surveillance systems have been strengthened by the GRAI which also accelerated compliance to the IHR. However, surveillance for single cases of AI is often much more developed than for early detection of pandemic influenza and surveillance could have been more linked with risks.

28. Other health sector readiness is much more focused on better management of human cases of AI and on rapid containment rather than on better management of a pandemic. In addition, readiness is much improved at the level of referral hospitals rather than at communities’ level.
29. Readiness does not, however, encompass all sectors, and, while the public health sector is better prepared to face a pandemic than before, the same is less obvious for the rest of society where pandemic preparedness has not always been a source of interest. The notion of a whole of society readiness took a long time to attract attention, support and resources and, while the concept receives increased attention, non-public health pandemic readiness, mainly of poorer countries, still requires significant investments.

30. The GRAI has, however, led to an increased acknowledgment of the pressing need for a comprehensive health approach, and a broad cross-sectoral pandemic preparedness and efforts for better preparedness for H5N1 have achieved valuable results which proved useful in the swift and smooth response to the A(H1N1) pandemic. There is, however, potential for additional and greater gains if the GRAI manages to shift country programme focus from HPAI (H5N1) to EIDs and beyond, to other unknown health hazards of our globalised world, and therefore broaden the aim for sustained efforts. The expansion of the scope of the HPAI (H5N1) programme to zoonotic and re-emerging disease and other health hazards, as proposed since the international conference in Beijing, 2006, would increase the relevance of the actual investments, the sustainability of the activities initiated, and a longer-term source of interest and resources. The HPAI (H5N1) and influenza A(H1N1) have proven that the move can be done quickly and effectively.

31. The GRAI has supported the development of various systems to respond to public health emergencies such as a pandemic which have proven effective in achieving their aim and which can be used for many other opportunities, from the preparedness for other HPEDs to the reduction of, or preparedness for any other hazards.

32. In particular, the GRAI has supported the development of multidirectional and multi-sectoral partnerships and networks of which positive results in resources mobilisation, increased coverage of needs, cost-efficiency, flexibility, coherence, harmony, and synergy have greatly demonstrated the benefits of working together and have created a ‘culture of collaboration’ among partners at all levels. The GRAI particularly achieved unprecedented temporary collaboration between the animal health and the public health sectors as well as with disaster management institutions.

33. The GRAI has leveraged the implementation of the IHR requirements. By providing funds, supporting systems, strategies, guidance, partnerships, research and other tools for the strengthening of surveillance, early detection, confirmation and reporting, as well as of readiness to respond, the GRAI has increased countries’ capacity to detect, report, assess and respond to public health risks and potential public health emergencies of international concern as required by the IHR. The GRAI has therefore:

- contributed to countries’ compliance with the IHR;
- produced global public health good, such as more accurate information on potential trans-border dissemination of communicable diseases or other events that could constitute a public health emergency of international concern, and on improved knowledge for international response;
- contributed to the improvement of global health and of global health governance.

34. The GRAI also offered opportunities to further the debate about inequalities in access to health and, more precisely, the timely access to scarce pharmaceutical resources such as antiviral drugs and vaccine. Principally the GRAI, even if still shackled by difficult discussions on samples and benefit-sharing, led to the ongoing increase of vaccine production capacity through the opening of influenza vaccine plants in new economies. This process, which is taking an additional dimension with the influenza A(H1N1) pandemic, has made important steps in realising, and also in researching practical solutions for, better equity in health for all.

35. As per the long-term perspective anticipated at the Beijing conference, the GRAI has worked on broadening the scope of the HPAI (H5N1) crisis and on balancing the perspective of an emergency with the need for a more developmental approach. The gains from the GRAI have progressively offered opportunities to go beyond H5N1. The impact of the work initiated by the GRAI in a swift response to the influenza A(H1N1) pandemic is clear. Furthermore, the activities of the GRAI sensitised the international community and increased political consideration for the growing need to strengthen animal health and public health services at all levels and to promote the development of a framework to address the risk of emerging infectious diseases at the animal-human-environment interface. The technical framework that was developed to translate the One Health concept into policies and strategies was supported by the GRAI. The GRAI has also helped further awareness that in our increasingly globalised world, people will have to learn to live again with infectious uncertainty and therefore be prepared for health hazards which are unknown but which could occur overnight. Countries, regions, and the world need to be prepared for these ‘events’ on a long-term and sustainable basis and also be ready to react with or without external political or financial support. The good results of the GRAI to prepare and respond to the HPAI H5N1 and influenza A(H1N1) crises show it is possible to integrate preparedness and response programmes in countries’ developmental projects and make these programmes an intrinsic part of any other developmental project. However, the challenge will be to keep a collective rather than an individual approach and networks that were set up for the GRAI.

36. Finally, the GRAI, from the successes in mobilising worldwide attention and efforts, significant level of resources, multidisciplinary, multi-sectoral, multi-partners integration and collaboration, had an evident impact as an example of effective global governance in dealing with matters of international concerns such as the emergence of the influenza A(H1N1) virus.

37. The GRAI has effectively managed to place the issue of emerging diseases and their threat on the global agenda, it facilitated the negotiating and setting of global standards, it gathered and disseminated knowledge (to
link participants with access to different knowledge bases), it offered the opportunity to strengthen markets that have the potential to produce increased public goods, and it offered innovative implementation mechanisms for traditional intergovernmental treaties. Therefore, it produced sounder standards, better information and offers a potential for more complete markets.

38. In summary, the approach on avian and pandemic influenza offers some important perspectives on big issues of the moment. These include how to respond to uncertain threats which have transnational implications; how to cut across the emergency-development divide, making sure that crises result in longer-term responses as well as dealing with immediate needs; how to balance interests and priorities between ensuring health and safety as well as livelihoods; and how to operate effectively in a complex multilateral system with and beyond the UN.

39. The development of coordinated responses to avian and human influenza is leading to enhanced national and regional capacities to manage disasters generally. Communication and coordination systems and tools are in place at global, and to a lesser extent at regional and country levels.

What impact is likely to be observed in the coming years, as a consequence of the global AI response?

- Increased awareness of the growing number of EIDs and the threat they pose to both animal health (and therefore livelihoods) and human health, as well as a potential broader, multi-sectoral impact on society, economies and security.
- This should be linked with increased investments for improved (quality, speed, and comprehensiveness of) mapping of EIDs, surveillance, epidemiology, reporting, research, prevention, preparedness and response. This is happening in, for example, the following programmes: AusAID EIDS+3; EU ASEAN-SAARC HPED programme; USAID and the new emerging pandemic threats programme; the One Health movement supported by Canada and others.
- Further recognition that EIDs are emerging from changing interactions between the environment, animals and humans, and therefore further recognition for the need to work jointly to provide comprehensive understanding of and answers to the rise of EIDs and the threats they pose.
- Another impact is further recognition of the benefit of prevention and preparedness for emergencies rather than response only, therefore increased efforts for emergency prevention and preparedness by communities at all levels.

Is this impact going beyond AI? Is it going beyond emerging diseases prevention and control?

- The impact of the response to AI benefits the control of other diseases of animals and humans. In humans, the systems strengthened by the GRAI could benefit any communicable diseases. Better reporting and analysis of data can benefit the health system as a whole.
- Improved coordination at the international level between key international actors should benefit any other issue of international concern beyond EIDs, particularly when synergy is achieved between political leaders, technical advisors, donors and implementers.

Is this verifiable in particular for the organisational and financial inputs given by the Commission since 2005?

- The Commission has acted as a political driver and has helped in improving international coordination.
- The Commission has also helped by ensuring that technical advice has been translated into action at country level, by supporting the development of plans, supporting technical agencies such as the OIE and providing funds for technically sound plan implementation.
- Through its important investment in research, the Commission has also helped improve the knowledge and the techniques to better prevent, prepare and respond to AI and other EID threats.
- The Commission is now helping to strengthen the regional approach to control of these diseases.
5. **Could these outcomes have been achieved without the provision of international assistance under the GRAI?**

- The international assistance has provided not only technical advice and know-how, but also political leadership and funding to implement strategies.
- It has been important in decreasing the global dissemination of the disease but has not succeeded in eradicating it from most affected countries.
- It has been important in transmitting technical understanding and know-how to national level and sharing best practices and lessons learned as they arise.
- It has been key, though not always successful, in supporting coordinated approaches at national level.
- It has been important in providing the expertise and the funds for improved surveillance, reporting and laboratory analysis/confirmation but has been less successful in supporting sustainable outbreak preparedness and response (compensation funds, systematic culling of sick birds, improved animal husbandry or meat production — multi-sector and multi-disease prevention and preparedness).

6. **Could these outcomes have been achieved in a more substantive manner had the international assistance been provided:**

   (i) **In a different way?**
   (ii) **In a different amount?**

- There are now decreasing funds available for API control, even for the most affected countries. Attention is decreasing with ‘flu fatigue’. The approach needed to be less response-oriented and more inclusive of other infectious diseases, not only API, to be more cost-effective and sustainable.
- The feeling is that the assistance was provided mainly to prevent infections and a pandemic in most developed countries. As a result, problems with virus/information sharing and vaccine availability, for example, have damaged some of the initial good relationships. It is important to improve the assistance to be a truly global public good.
5. RECOMMENDATIONS

1. There is a need for more balanced holistic research programmes embodying technical and applied research topics. Combined human and animal sector research would help to further understand and determine human H5N1 infection routes through rapid, systematic and standardised collection of detailed exposure information on poultry contact patterns (direct and indirect) in suspected human outbreaks of H5N1.

2. Regional compensation policies must be established to avoid cross-border movement of poultry (healthy or diseased) for compensation purposes.

3. Uniform (global/regional) low-cost and open-source reporting systems should be set up to enhance and simplify disease reporting (from remote areas).

4. Regional cooperation should be enhanced through the development of regional preparedness plans and rapid response teams to address disease outbreaks by concerted actions.

5. Communication messages and training programmes based on social, cultural, political and environmental values and contexts of the target group should be further developed. Message design should be undertaken by working groups composed of technical and social sciences.

6. In suspected human outbreaks of H5N1, combined (human public and animal health sectors), rapid, systematic and standardised collection of detailed exposure information of poultry contact patterns (direct and indirect) should be undertaken, in order to understand and determine human H5N1 infection routes.

7. The European Commission, with its long experience in strengthening veterinary and livestock services, should continue to play a major role in assisting countries in upgrading their veterinary services and to develop international, regional and national capacity in surveillance, diagnosis, communication and control strategies in public and animal health to prevent, detect and respond to disease outbreaks, ensuring functioning national emergency response capacity, as well as a global rapid response support capacity; to promote inter-agency and cross-sectoral collaboration and partnership; to conduct strategic research; all to be undertaken in the One Health context.

8. It will be important to increase the relevance, assure the sustainability of results and maximise the gains of the GRAI by further shifting countries’ programme focus from influenza A pandemic preparedness and response to a more holistic approach of prevention and preparedness for future health crises caused by high-risk or high-impact pathogens. Therefore, seize the present opportunity of Influenza A and other emerging disease pandemic concerns and attention to:

(i) ensure comprehensive surveillance system restructuring and operationalisation where needed;

(ii) ensure further linkage between preparedness, particularly surveillance and communication to risk;

(iii) improve the comprehensive approach to pandemic threats within the health sector and across all other sectors;

(iv) further sensitise high political level on the need for a whole of society pandemic preparedness and increased longer-term investments and efforts, including operational research, on cross-sectoral, non-health pandemic preparedness;

(v) further research the potential for increasing production and availability of global public goods such as pandemic risks prevention, preparedness and protection understanding and capacity globally and faster achievement on equity of health access and health outcomes.

9. The One Health concept should be further translated into practical policies and strategies with clear operating procedures for easy implementation at country, regional and international level. Particularly, inter-sectoral cooperation should be further clarified and systematised to adequately and comprehensively address EIDs and other high-impact health crises at the animal-human-environment interface. This will demand sustained political attention, additional technical norms and, thus, investments and efforts at all levels.

10. The opportunity offered by the influenza A(H1N1) pandemic 2009 in addition to the international attention for the HPAI H5N1 and other EIDs pandemic threats should be exploited to increase the availability of global public goods (such as vaccine, drugs and science) through research, technical transfer and increased capacity-building of developing countries for the global fight against pandemics and other high impact health hazards and crises, in order to reach a more equitable and fair access to health for all.

11. The GRAI outcomes and gains should be expanded by further ensuring that programmes proposed by the GRAI be integrated in countries’ developmental projects and become intrinsically part of any developmental project so that countries, regions, and the world can be better prepared for health hazards which we currently ignore but that, in our increasingly globalised world, could appear overnight, particularly ensuring a sustained global collective approach such as promoted by the IHR.
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