
Foreword

The Food and Agriculture Organization of the United Nations's (FAO) response to the H5N1 strain of highly pathogenic avian influenza (HPAI) emergency, which began in January 2004, demonstrated global leadership, regional cooperation and national action. FAO and the World Organisation for Animal Health (OIE) took the lead role in coordinating international response to HPAI control at the animal source. In consultation with the World Health Organization (WHO), FAO and OIE developed The Global Strategy for Prevention and Control of H5N1 HPAI in 2005.¹ This strategy is updated regularly based on knowledge advancements in science, socio-economics and policy. Many technical guidelines, best practices and recommendations for the control of HPAI have been produced jointly, notably on the good governance of veterinary services, compensation policies, vaccination issues, the migratory behavior and field investigations of wild birds, and on biosecurity measures in the diverse poultry sector. To implement the strategy, FAO subsequently developed a Global Programme for the Prevention and Control of H5N1 Highly Pathogenic Avian Influenza² in 2006–2008. The programme aimed to address the required immediate and short-term interventions, while improving capacities for longer-term sustainable approaches to eliminate H5N1 HPAI from poultry. Since 2009, there have been increased efforts to understand and incorporate other important dimensions beyond traditional disease responses so that currently FAO's HPAI programme is an integrated, multidisciplinary approach which more fully includes vital aspects of disease control, such as biosecurity, socio-economics, public-private partnerships, wildlife aspects, understanding drivers of disease, and advocacy and communication.³

FAO's global programme implementation in countries directly affected by the disease outbreaks has been crucial to the success of the HPAI response, as well as to capacity-building for prevention, detection and response in over 130 countries. In 2004, the HPAI response required immediate and short-term interventions, while improving capacities for longer-term sustainable approaches which address the risk of recursion, endemic areas'/countries' needs, risk of additional emerging infectious diseases (EIDs) or incursions of transboundary animal diseases (TADs). To ensure countries' long-term success for HPAI and other diseases, FAO's work currently focuses on strengthening the animal health infrastructure, and developing capacity for surveillance, early warning, detection and timely response – a hallmark of the efforts expressed under the FAO Emergency Prevention System (EMPRES, 1994) for Transboundary Animal and Plant Pests and Diseases principles. Prevention and control has been achieved by also focusing efforts at the community level, taking into account local circumstances, livestock production and marketing practices, census and demographics, customs and traditions, economies and governing structures. Despite these advances, endemic foci continue to pose a threat to the global community. Building upon successes and lessons

¹ Available at <http://www.fao.org/avianflu/documents/UNresponse.pdf>

² Available at <http://www.fao.org/docs/eims/upload/234952/GlobProg2006.pdf>

³ Available at <http://www.fao.org/docrep/010/ai380e/ai380e00.htm>

learned, FAO is working towards implementation of a pathway for progressive control of the disease in endemic countries tailored to the specific country and regional needs. Each pathway works toward consolidation of the disease situation and the progressive shift to containment and reduction of threats in the production environments.

Since early 2011, FAO has taken a broad, multisectoral, collaborative One Health approach and is currently implementing the strategic Action Plan (AP) 2011–2015 entitled: Sustainable animal health and contained animal-related human health risks – in support of the emerging One-Health agenda.⁴ The AP extends the successful efforts and lessons learned from FAO's eight-year response to HPAI to other animal diseases that threaten animal and human health, rural populations and livelihoods. The goal of this plan is to establish a robust global animal health system that effectively manages major animal health risks, paying particular attention to the animal-human-ecosystem interface, and placing disease dynamics into the broader context of agriculture and socio-economic development and environmental sustainability.

FAO could not have accomplished these advances alone. The collaboration with WHO and the OIE has been crucial along with the technical and financial support received from many partners. Technical partners are too numerous to list here, but their invaluable contribution is gratefully acknowledged. Special gratitude is extended to the FAO Reference Centres for the provision of technical and advisory services to FAO member countries, to FAO and partners, and to the global understanding of dynamic disease for influenza viruses and other threats to food security and health. Financial support is provided by: Asian Development Bank (ADB), African Union Interafrican Bureau for Animal Resources (AU-IBAR), Australia, Bangladesh, Belgium, Canada, the Civilian Research and Development Foundation (CRDF), the Common Fund for Humanitarian Action in Sudan, China, the European Union, France, Germany, Greece, International Livestock Research Institute (ILRI), Ireland, Italy, Japan, Jordan, the Republic of Korea, Nepal, the Netherlands, New Zealand, Norway, the Organization of the Petroleum Exporting Countries (OPEC) Fund for International Development, Saudi Arabia, Spain, Sweden, Switzerland, the United Kingdom of Great Britain and Northern Ireland, United Nations Assistance Mission in Afghanistan (UNAMA), the United Nations Development Group Office (UNDGO), the United Nations Development Programme (UNDP), United Nations Development Programme Administered Donor Joint Trust Fund (UNJ), United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), the United States of America, Viet Nam and the World Bank (WB).

Gratitude is extended to these countries, institutions and funding partners which further FAO's mission for a healthier world through sustained agricultural development, better nutrition and natural resource management.



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⁴ This AP was endorsed by the programme committee in March 2011 (available at <http://www.fao.org/docrep/meeting/021/ma145e.pdf>).

Acronyms and abbreviations

ADB	Asian Development Bank
AECID	Spanish Agency for International Cooperation for Development
AED	Academy for Educational Development
AGA	Animal Production and Health Division (FAO)
AHC	Animal Health Clubs
AHI	avian and human influenza
AIWs	avian influenza workers
AP	Action Plan
ASEAN	Association of Southeast Asian Nations
ASF	African swine fever
AU-IBAR	African Union Interafrican Bureau for Animal Resources
BCC	behavioral change communication (Egypt)
CAHO	community animal health outreach
CAHW	community animal health worker
CBPP	contagious bovine pleuropneumonia
CCHF	Congo-Crimea haemorrhagic fever
CDC	Centers for Disease Control and Prevention
CERF	Central Emergency Response Fund
C-FETP	China Field Epidemiology Training Program (Public health)
CHF	Common Humanitarian Fund (Sudan)
CIS	Commonwealth of Independent States
CMC-AH	FAO/OIE Crisis Management Centre for Animal Health
CRDF	Civilian Research and Development Foundation
CVO	chief veterinary officer
DAFF	Department of Agriculture, Fisheries and Forestry (Australia)
DAH	Department of Animal Health (Viet Nam)
DLS	Department of Livestock Services (Bangladesh)
DVE	duck virus enteritis
EAC	East African Community
ECOWAS	Economic Community of West African States
ECTAD	Emergency Centre for Transboundary Animal Diseases
EDPLN	Emerging and Dangerous Pathogens Laboratory Network (WHO)
EIDs	emerging infectious diseases
EMPRES	Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases
EMPRES-i	Global Animal Disease Information System
EPT	Emerging Pandemic Threats Program

ERV	Ebola-Reston virus
EU	European Union
EUFMD	European Commission for the Control of Foot-and-Mouth Disease
FAO	Food and Agriculture Organization of the United Nations
FETPV	Field Epidemiology Training Programme for Veterinarians (China)
FLI	Friedrich-Loeffler-Institut, Germany
FMD	foot-and-mouth disease
GARC	Global Alliance for Rabies Control
GEF	Global Environment Facility (FAO)
GEMP	Good Emergency Management Practices
GETS	Gathering Evidence for a Transitional Strategy (FAO/USAID funded project)
GFN	Global Foodborne Infections Network (WHO)
GF-TADs	Global Framework for the Progressive Control of Transboundary Animal Diseases
GIS	geographic information system
GISAID	Global Initiative on Sharing Avian Influenza Data
GLIPHA	Global Livestock Production and Health Atlas
GLEWS	Global Early Warning and Response System (FAO/OIE/WHO)
GLW	Gridded Livestock of the World
GOVS	General Office of Veterinary Services
HAI	human-animal interface
H1N1	Pandemic (H1N1) 2009 (subtype of Influenza virus A)
H5N1	Subtype of the Influenza A virus
H9N2	Subtype of the Influenza A virus
HPAI	highly pathogenic avian influenza
HPED	highly pathogenic and emerging diseases
hVPRRS	highly virulent porcine respiratory reproductive syndrome
HVT	herpes virus of turkeys
IAEA	International Atomic Energy Agency
IDENTIFY	USAID FAO/OIE joint laboratory and surveillance programme
IEC	Information Education and Communication
IGAD	Intergovernmental Authority for Development
ILRI	International Livestock Research Institute
iNGOs	international non-governmental organizations
IRD	Influenza Research Database
IVM-AH	Influenza Virus Monitoring Laboratory Network for Animal Health (Indonesia)
IZSVe	Istituto Zooprofilattico Sperimentale delle Venezie
LAC	Latin America and the Caribbean
LBM	live bird markets
LIMS	laboratory information management system
LPAI	low pathogenic avian influenza
M&E	monitoring and evaluation
MDGs	Millennium Development Goals

MENA	Middle East and North Africa
MoALR	Ministry of Agriculture and Land Reclamation (Egypt)
MTA	material transfer agreement
NDV	Newcastle disease virus
NGOs	non-governmental organizations
NLQP	National Laboratory for quality control on poultry production (Egypt)
NVS	National Veterinary Service (Indonesia)
OFFLU	OIE/FAO joint network of expertise on avian influenza
OIE	World Organisation for Animal Health
OPEC	Organization of the Petroleum Exporting Countries
OpenFluDB	Openflu database for human and animal influenza virus
PCP	progressive control pathway
PDSR	Participatory Disease Surveillance and Response
PPP	public-private partnership
PPR	peste des petits ruminants
PRP	Partners for Rabies Prevention
PWB	Programme of Work and Budget
REMESA	Reseau Méditerranéen de Santé Animale (Mediterranean Animal Health Network)
RTE	real-time evaluation
RT-PCR	real-time polymerase chain reaction (lab test)
RVF	Rift Valley fever
SAARC	South Asian Association for Regional Cooperation
SADC	Southern Africa Development Community
SARS	severe acute respiratory syndrome
SIB	Swiss Institute of Bioinformatics
SMS	short message service
SO-B	strategic objective B
SO-I	strategic objective I
SOP	standard operating procedure
SSM	sequence similarities map
SVD	Schmallenberg virus disease
TAD	transboundary animal disease
TFCA	Transfrontier Conservation Areas
TOT	training of trainers
UMA	Union du Maghreb Arabe
UN	United Nations
UNAMA	United Nations Assistance Mission in Afghanistan
UNDGO	United Nations Development Group Office
UNDP	United Nations Development Programme
UNICEF	United Nations Children’s Fund
UNJ	United Nations Development Programme Administered Donor Joint Trust Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs

UNSC	Senior United Nations System Coordinator for Avian and Human Influenza
VAHW	village animal health worker
VBD	vector-borne diseases
VVW	village veterinary workers
WAHID	World Animal Health Information Database (OIE)
WB	World Bank
WHO	World Health Organization
WHO GAR	World Health Organization Global Alert and Response
WHO–SEARO	World Health Organization–South-East Asia Regional Office
WILD	Wildlife Investigation in Livestock Disease and Public Health
WNV	West Nile virus

Executive summary

The Food and Agriculture Organization of the United Nations (FAO) has been in the forefront of the global effort to fight highly pathogenic avian influenza (HPAI) over the last eight years since its emergence in Southeast Asia. FAO's collaborative HPAI global programme has significantly contributed to limiting the impact of the disease, establishing stronger national systems and strengthening regional coordination for disease preparedness, prevention and control. With the continuous support of the international donor community, national governments, regional and international organizations, development agencies and international development banks, sustained coordinated action has progressively reduced the number of countries affected by H5N1 HPAI and the disease has now been eliminated from most of the countries in the world. This result was achieved by assisting national veterinary services to develop preparedness and contingency plans, by improving surveillance systems that interface between animal and public health authorities, by acquiring laboratory resources and disease diagnostic capacity, by developing response capabilities, communication and awareness and by promoting biosecurity along the value chain.

Since the emergence of zoonotic H5N1 HPAI, the disease situation has evolved considerably. Currently, H5N1 HPAI is endemic in Bangladesh, China, Egypt, Indonesia, Viet Nam and large parts of eastern India. A number of countries in Asia, including the Lao People's Democratic Republic, Cambodia, Myanmar and Nepal, also experience regular, but sporadic, outbreaks. A number of elements that inhibit progress towards disease control, prevention and elimination from the poultry sector are common to endemically infected countries/regions. The major identified challenges in endemic countries fall into three groups: (1) the structure of the poultry sector (i.e. production and marketing or trading methods); (2) weaknesses in veterinary services and animal production services; and (3) insufficient commitment from the public and private sectors to elimination of the virus. Measures have been introduced in these countries to address the major identified challenges, but all require further long-term commitments and investment if the virus is to cease being a threat to human health and safe and efficient poultry production. To move forward, each of the endemically infected countries should implement activities that take them closer to virus elimination and reduce the prevalence of disease in poultry and humans, progressively building upon the gains made since they first reported cases of the disease.

In the past few years, a newer variant of the H5N1 virus, referred to as clade 2.3.2.1, has emerged and expanded its geographic range from Southeast Asia to East Asia, South Asia and Eastern Europe. Some variants of clade 2.3.2.1 are different enough from other H5N1 avian influenza clades so that poultry vaccinations are becoming ineffective in some countries. This clade appears to have evolved in domestic poultry in China with altered characteristics and a higher virulence in wild birds. The virus clade 2.3.2, in its various forms, exists in China and may continue to expand its geographic range from Southeast Asia to other regions.



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The information generated from isolation, and genetic and antigenic characterization of a large number of viruses in Asia and other parts of the world, coupled with the information on disease outbreaks, has improved our understanding of the virus's evolution and its implications with regard to its spread, infectivity and suitability for use in development of vaccines. The current trends in evolution present a number of concerns and work will need to continue on surveillance and virus isolation and characterization.

Changes in the virus and technical challenges with current vaccines, especially to prohibit or protect infection ducks, as well as the need for vaccine options and flexibility per production settings, necessitate improved vaccine tools. Vaccination discussions and guidance at the global level would benefit endemic countries' further development of comprehensive, sound vaccination policies with clearly defined exit strategies.

Successful animal health programmes involve engagement and partnership from all levels. Also, countries require sufficient and sustained investment in animal health services. Essential aspects include capacity to prevent, prepare, detect and respond (e.g. adequate numbers of trained personnel, surveillance and laboratory capacity, appropriate biosecurity, and vaccination tools), coordination, communication and socio-economic analysis to understand the causes or drivers of disease.

Coordination must be at all levels – local, national, regional and global. Global efforts provide frameworks in a systems approach upon which more targeted regional, national and local disease prevention, detection, control, response or eradication plans are efficiently designed, implemented and monitored, including required adjustments made with inputs from the private sector. Regional HPAI and other disease plans have centred on communication, coordination, surveillance, and data gathering and analysis. In 2011, FAO conducted or supported annual regional coordination meetings in all regions where FAO projects exist (North Africa, West/Central Africa, Eastern Africa, Southeast Asia, and South Asia). Pathogens and vectors do not recognize political or geographical boundaries and today's globalized world increases that reality. Animal movement, trade and human movement as well as endemic, emerging and re-emerging pests and diseases around the world will demand a continuing and improved level of global and regionally coordinated infrastructure and discussion.

Additionally, FAO's activities have fostered collaborations at the local and national level. For example, before the pandemic threat, in many countries, the ministries of agriculture, human health, wildlife, environment or food safety did not work together. To deal effectively with HPAI at the national level, many countries put interministerial structures of coordination into place to enable a national systems approach to respond better to the threat. While HPAI and the potential of a pandemic served as the impetus for initial or improved intergovernmental coordination, the experiences of coordination between animal health and human health authorities in dealing with HPAI also bode well for future collaboration. Foundations have been laid for these authorities to better address other animal diseases, zoonotic diseases and for collaboration on possible emerging infectious diseases. Additionally, interministerial and cross-sectoral collaborations develop trust among partners and cross-pollinate areas of expertise.

The HPAI systems approach has matured to apply a methodical systems framework approach to foot-and-mouth disease (FMD) which culminated in the development of the FAO/OIE progressive control pathway for FMD (PCP-FMD) in 2011.⁵ The approach is currently in process for other high impact diseases such as brucellosis, contagious bovine pleuropneumonia (CBBP), peste des petits ruminants (PPR) and rabies. PCPs help countries ascertain where they are in regards to the particular disease, so that they can then progressively reduce the impact and load of the disease agent through improved risk management based on surveillance studies and targeted interventions. PCPs are a working tool in the design of country, and some regional, control programmes.

Activities in 2011 also included extensive efforts for integrated training of field and laboratory personnel in design and analysis of surveillance data to improve coordination at country and regional levels, including the Field Epidemiology Training Programme for Veterinarians (FETPV) and the laboratory and epidemiology networks. FAO expanded FETPV to develop a human-wildlife-environment interface module, which will be delivered to more than 45 countries by mid-2012.

Surveillance is now a risk-based, targeted and more comprehensive approach that recognizes the dynamic and complex nature of today's world. Current activities are to integrate environmental and food safety data into the wildlife, livestock, poultry and duck data so that a more integrated comprehensive picture of a particular disease or pathogen can be used to better inform decisions, which, in turn, leads to improved results. Included in this activity are innovative means of data collection (e.g. mobile devices, participatory approaches) that reflect today's global world and provide flexibility for the structures of each country and local community.

FAO has been emphasizing the need to shift away from didactic, top-down communication towards processes and tools that are driven by deeper community participation and voluntarism. The communication strategies developed are also tailored for the multiple stakeholder levels, outlets and consumers.

HPAI highlighted the importance of understanding stakeholder behaviour and how it can affect disease spread as well as its management and control. Incentives for stakeholders

⁵ In 2011, the FAO FMD PCP became a joint FAO/OIE tool and forms the backbone of *The global foot and mouth disease control strategy: strengthening animal health systems through improved control of major diseases* published in July 2012 (available at <http://www.fao.org/docrep/015/an390e/an390e.pdf>). For more information on PCP-FMD see <http://www.fao.org/ag/againfo/commissions/en/eufmd/pcp.html>



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and the context within which they operate must be understood and taken into account. Successful disease control interventions or programmes, require stakeholder engagement up front, a detailed value chain assessment, control impact assessments and economic cost/benefit analysis, including assessment for other livestock subsectors. Engaging and including stakeholders from the beginning will enable practical sustainable solutions, balancing disease control needs with human livelihood needs. Socio-economic work is now concentrating on improving the understanding of the livelihoods, demands and decisions made by livestock producers, on the economics and relationships they have across the value chains, and on identifying gaps in technologies within this context. Additionally, these efforts will provide useful information to improve many of the outstanding biosecurity issues in endemic countries.

While much progress has been made, HPAI remains a significant threat to the poultry industry, destabilizing agriculture in countries where backyard farming of domestic ducks is common, impacting the food security and livelihood of millions of people and maintaining a very real potential for emergence of a pandemic human influenza. Despite the fact that nearly all H5N1 human infections to date appear to have been the result of transmission of the virus from poultry to people, the continued presence in poultry in numerous countries, its tendency to quickly mutate and change, its ability to infect humans and its continuing high case fatality rate remain a concern. A continued pandemic potential is extra troubling given the mounting evidence of increasingly active bi-directional swine-human virus genetic exchange in the form of reassortments of H3 and H1 viruses. Also, it appears that 2011 marked an increase of avian origin H5N1 and H9N2 virus segments into the swine gene pool.

None of the successes against H5N1 HPAI and other transboundary animal diseases (TADs) could be possible without technical, policy and funding partnerships. At its peak, FAO's HPAI global programme comprised 168 donor-supported projects, of which 64 remain active, with more than half of them in Asia. Coordination and partnerships at the local, national, regional and global level have been essential in the eight-year HPAI effort in all countries. Coordination and a concerted, sustained effort are vital in endemic areas. FAO has played a central role in forging and coordinating partnerships among a number of players and stakeholders involved in the control of HPAI and other high impact emerging and re-emerging infectious diseases.

These have included partnerships with national governments, non-governmental organizations (NGOs), donors, national and international research institutes, regional organizations and other international developmental and technical agencies.

These collaborative efforts to address the problem of H5N1 HPAI have clearly yielded significant results. Yet much work remains to be done to further address ongoing influenza threats as well as other zoonotic and TADs.

Due to the H5N1 HPAI pandemic experience, the global conversation has begun to move away from emergency response against individual diseases towards including more measured and integrated action for the long-term prevention of endemic, emerging and re-emerging infectious diseases. FAO has taken the lessons learned from the HPAI global programme and is applying this knowledge in approaches to the control of other emerging infectious diseases (EIDs) and high impact TADs, in addition to HPAI. This work is being done in the context of a One Health strategic framework, the FAO Action Plan (AP) (2011–2015) entitled, Sustainable animal health and contained animal-related human health risks – in support of the emerging One-Health agenda.⁶ The goal of this plan is to establish a robust global animal health system that effectively manages major animal health risks, paying particular attention to the animal-human-ecosystem interface, and placing disease dynamics into the broader context of agriculture and socio-economic development and environmental sustainability.

One Health addresses threats and reduces risks of emerging and re-emerging infectious disease through a collaborative, international, cross-sectoral, multidisciplinary approach. FAO has taken the lead in advocacy to develop regional and local mechanisms and platforms for intersectoral work and the AP, in part, is designed for local level implementation. A suite of tools, such as simulation exercises, risk assessment along value chains, and livestock field schools are available to bring together different relevant sectors to identify strengths and weaknesses of the coordination, cooperation and communication for emergency preparedness. The actions recommended are risk-based and tailored to the local context engaging the people involved through participatory processes. The AP promotes a proactive approach to disease risk management. All actions of the AP aim at sustainability and ownership by countries and regions and range from immediate to long-term actions with a developmental perspective.

Advocacy initiatives at the country and regional level provide a wider focus on infectious diseases of high impact and facilitate information sharing, improved evidence-based decision-making and a more strategic and effective long-term prevention and response capacity for animal, human and zoonotic pathogens.

To date, the One Health approach has been used to address infectious diseases, but it has been recognized that this framework can be used across disciplines to address a wider range of issues across the three health domains. While the etiology of One Health stems from infectious diseases, it is clear that the application of this approach can contribute to ensuring global food security.

⁶ Endorsed by the programme committee in its 106th session in March 2011, this AP proposes a programme in five technical areas of work supported by three functional areas of work with key actions to deliver the expected results (available at <http://www.fao.org/docrep/meeting/021/ma145e.pdf>).

Introduction

This fifth report on the FAO global programme on HPAI covers the period 2011–2012 and provides an overview of the disease situation, the activities conducted and the strategic approach with respect to the reduction of infection in endemically infected countries. This report will be the last that focuses primarily on the HPAI global programme. As introduced in the fourth HPAI global report, FAO has taken the lessons learned from the six-year HPAI response and has begun applying this knowledge in approaches to the control of other EIDs and high-impact TADs in addition to HPAI. Specific highlights will focus on current efforts that build upon successes, capacity and knowledge gained in the HPAI response as well as learning from continued challenges. This work is being done in the context of a One Health strategic framework.

One Health is a collaborative, cross-sectoral, multidisciplinary approach to addressing threats and reducing risks of endemic, emerging and re-emerging infectious diseases. More specifically, it acknowledges the animal-human-ecosystem interface, and places disease dynamics into the broader context of agriculture and socio-economic development and environmental sustainability. FAO developed a strategic AP (2011–2015) entitled, Sustainable animal health and contained animal-related human health risks – in support of the emerging One-Health agenda.⁷ Progress was made in 2011 to put the plan into action at the local field level, with further development underway in 2012. This report will highlight a few areas of advancement. It is anticipated that future reports will focus on this holistic arena of FAO's activities which recognizes the animal-human-ecosystem interface and contributes to the prevention, detection and containment of major animal diseases and related human health risks globally. FAO is committed to animal health and natural resource management and to increasing sustainable livestock production.

This report does not reiterate the detailed matters covered in the previous reports, especially those in the comprehensive Fourth Report January to December 2010: Global Programme for the Prevention and Control of Highly Pathogenic Avian Influenza.⁸ For further information, readers are advised to refer to these reports⁹ and to the avian influenza section on the FAO website.¹⁰

The activities of the HPAI global programme and all other animal health activities in this report are carried out in conjunction with partner organizations and donors and are intimately linked to the FAO strategic framework¹¹ which is detailed in The Director-General's Medium Term Plan 2010-13 and its biennial Programme of Work and Budget 2010-11 (PWB).¹² The activities of the HPAI programme and One Health AP contribute to the medium

⁷ Available at <http://www.fao.org/docrep/meeting/021/ma145e.pdf>

⁸ Available at <http://www.fao.org/docrep/014/i2252e/i2252e00.pdf>

⁹ Available at <http://www.fao.org/avianflu/en/strategydocs.html>

¹⁰ Available at <http://www.fao.org/avianflu/en/index.html>

¹¹ Available at <http://ftp.fao.org/docrep/fao/meeting/017/k5864e01.pdf>

¹² Available at <http://www.fao.org/docrep/meeting/017/K5831E.pdf>

term plan's strategic objective B (SO-B): Increased sustainable livestock production and strategic objective I (SO-I): Improved preparedness for, and effective response to, food and agricultural threats and emergencies.

Global and local, multisectoral, multidisciplinary coordination and collaboration is crucial for achieving the goals outlined, and FAO has a variety of mechanisms for interaction with partner organizations which are utilized in the global programme and the AP (including the tripartite FAO/OIE/WHO agreement to advance the One Health agenda at the global level, the FAO/OIE Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs), the FAO/OIE/WHO Global Early Warning and Response System (GLEWS), the OIE/FAO joint network of expertise on avian influenza (OFFLU), the Crisis Management Centre-Animal Health (CMC-AH), FAO Reference Centres and the Joint FAO/International Atomic Energy Agency (IAEA) Programme on Nuclear Techniques in Food and Agriculture,¹³ among others.

¹³ Available at <http://www.naweb.iaea.org/nafa/index.html>