

The background of the cover features a large, stylized FAO logo. It is a symmetrical emblem with a central vertical axis. The left half is a solid dark purple, while the right half is a lighter purple with a fine grid pattern. The emblem consists of a central stem-like shape with several large, rounded, leaf-like or petal-like shapes branching out from it, creating a sense of growth and balance.

SECOND REAL TIME EVALUATION OF FAO's WORK ON THE HIGHLY PATHOGENIC AVIAN INFLUENZA

EVALUATION REPORT

FAO Office of Evaluation

February 2010

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Acronyms

AED	Academy of Educational Development
AGA	Animal Production and Health Division
AGAH	Animal Health Service
AGAL	Livestock information, sector analysis and policy branch
AGAP	Animal Production Service
AVET	Applied Veterinary Epidemiology Training
CG	Consultative Group
CHL	Communications for a Healthy Living
CMC	Crisis Management Centre
CTA	Chief Technical Advisors
CVO	Chief Veterinary Officer
DLS	Department of Livestock Services
ECTAD	Emergency Centre for Transboundary Animal Diseases
FAO	Food and Agriculture Organization of the United Nations
FCC	Food Chain Crisis Emergency framework
FETPV	Field Epidemiology Training Program for Veterinarians
FMD	Food and Mouth Disease
GAINS	Global Avian Influenza Network Strategy
GF-TAD	Global Framework for the progressive control of Transboundary animal diseases
GLEWS	Global Early Warning System for Major Animal Diseases
HPAI	Highly Pathogenic Avian Influenza
HQ	FAO headquarters
INAP	Integrated National Action Plans
KAP	Knowledge, Attitudes and Practices
LDCC	Local Disease Control Centre
M&E	Monitoring and Evaluation
NGO	Non Governmental Organizations
NSWP	National Strategic Working Plan
OFFLU	Joint OIE/FAO network of expertise on animal influenza
OIE	World Organization for Animal Health
OWOH	One World One Health
PDSR	Participatory Disease Surveillance and Response To be completed
PPLPI	Pro Poor Livestock Policy Initiative
PVS	Performance of Veterinary Services
RAP	Regional Office for Asia and the Pacific
RTE	Real Time Evaluation
SMS	Short Message Service
TAD	Transboundary Animal Diseases

TCE	Emergency Operations and Rehabilitation Division
UMA	Maghreb Arab Union
WCS	Wildlife Conservation Society
WHO	World Health Organization
WI	Wildlife International

Executive Summary

This report describes the Second Real-Time Evaluation (RTE2) of the responses of the Food and Agriculture Organization (FAO) of the United Nations to the occurrence of Highly Pathogenic Avian Influenza (HPAI), conducted by an independent external evaluation team. In reviewing the FAO avian influenza programmes and activities, the evaluation team has been blessed with the privileges of hindsight. The RTE2 team recognizes that some of the comments and judgements it makes are aided by experiences gained by many people as the programmes in different countries have evolved.

RTE2 has attempted to provide a forward looking approach to the evaluation, using experiences and observations of the performance of FAO's programmes over the last few years to recommend to FAO, its members and its partners, on how to optimize FAO's future contributions to the control of Highly Pathogenic Avian Influenza (HPAI), of other priority disease threats, and to global pandemic preparedness. The evaluation team adopted an open consultative approach, seeking opinions and feedback from the widest possible range of stakeholders in the different countries visited.

The RTE2 has been conducted in three phases. These included an in-depth preparatory phase entailing the assembly and synthesis of background information at country and programmatic levels, an independent evaluation of the largest FAO HPAI initiative (the Participatory Disease Surveillance and Response programme in Indonesia), and a series of missions to FAO headquarters, member countries (Nigeria, Côte d'Ivoire, Egypt, Bangladesh, Cambodia and Vietnam) and (sub-) regional ECTAD offices (located in Bamako, Nairobi and Bangkok). The latter missions were conducted in two stages, first in Africa and then in Asia, and included the holding of regional stakeholder workshops (held in Nairobi and Bangkok) at the end of each regional mission.

In the inception report, the RTE2 team developed a framework for the evaluation and provided details on the criteria for assessing the relevance, efficiency and effectiveness of FAO's contribution to national preparedness and response programmes. The framework, which was expanded as a result of the RTE2 team interactions in the field, has six pillars, considered to be central to any preparedness and response programme:

- a) Policy development and programme coordination;
- b) Disease surveillance mechanisms;
- c) Disease diagnosis, differential diagnosis and infection characterization;
- d) Disease control and eradication;
- e) Epidemiological data synthesis, analysis, presentation and use; and
- f) Disease prevention.

The RTE2 team then assessed the achievements of the FAO country programmes in terms of the milestones included in the FAO/OIE Global strategy, and consider the broader implications of the preparedness and response measures on wider disease surveillance capacity, and on pandemic preparedness. Finally, the team considered the implications on broader agriculture, livestock and poverty reduction aspirations of the countries studied.

As mandated in the terms of reference, the RTE2 reviewed FAO's HPAI programmes at the country level in particular, to allow for greater detail and focus on the efficiency and effectiveness of HPAI preparedness and response mechanisms in the field.

Our emerging messages for each of the countries and (sub-) regional ECTAD units visited are targeted at those groups, with contributions discussed, strengths and weaknesses identified, and a series of country/region-specific recommendations made. We also have broader messages emerging from a synthesis of the multiple country assessments and from the regional stakeholder workshops, which are targeted at FAO as a whole.

At the country level, the RTE2 sees effective and maturing relationships between FAO's HPAI programmes and their government partners in all countries visited. These relationships generally acknowledge FAO as the leading international partner on technical issues related to HPAI preparedness and response, and draw on FAO's in-country, regional and in some cases international (headquarters) advice.

The RTE2 finds that substantial progress has been made in the preparedness and response mechanisms directed at HPAI. This has occurred at several levels. These include improved planning and policy development, better communications and collaborations between national and international partners, greater capacity in the field services of veterinary authorities, greater laboratory capacity, and in many cases progressively increasing credibility of the national livestock services. In most cases, these improvements have also been accompanied by reductions in the numbers of outbreaks of HPAI in poultry, and the number of human cases occurring. The reported progress certainly owes much to the commendably high level of commitment, engagement and tenacity of FAO's in-country teams and the support received from FAO units at HQ and in the regions. As noted in the country reports, however, it is difficult to assign a direct cause and effect relationship between FAO's contributions and the decreasing incidence of HPAI in most countries. The limited availability of good quality data and systems to monitor and evaluate the effectiveness of FAO-supported activities, together with the low priority often given at country level to learning from experiences, have been major contributors to this.

The disease and the responses to it have also seen a change in the awareness of the importance of livestock enterprises to building national economies and to enhancing processes of pro-poor growth. The spread of outbreaks of HPAI across Asia and Africa has raised awareness of the rapid growth of poultry industries that had been taking place during

the years prior to their occurrence. Of the countries visited, this factor was particularly important in Indonesia, Bangladesh, Egypt and Nigeria, all of which have the full range of poultry enterprises from backyard to industrial.

The major overall weakness has been the lost opportunity of adding greater substantive strategic value to many of the preparedness and intervention approaches that FAO has supported in individual countries. FAO could arguably have exploited more its comparative advantage as a widely experienced, well recognized international body working on HPAI in so many different settings with many different sets of expertise. Furthermore, in several settings FAO was seen to pursue a rather narrow uni-disciplinary approach to emergency responses to HPAI at country level. International disease response mechanisms, including the One World One Health (OWOH) initiative, increasingly demand broad multidisciplinary approaches, and FAO has the inherent capacity to deliver these.

The RTE2 believes that there are four main, and interrelated, contributors to these weaknesses.

The first is the inadequacy of strategically-applicable support tools on HPAI preparedness and response to country programmes, such as situation analysis, active and passive surveillance standards and cost effectiveness guidelines, policy tools dealing with issues such as compensation, and the stronger application of value chain analysis in risk-based surveillance and in impact assessment. The evaluation team felt that FAO, in collaboration with its development partners, could have pulled together a more structured set of support tools, building on the general guidelines put forward in the early years, to bring greater value to country programmes. The availability of such tools, which need to be built and tested over time to ensure universal applicability, would support the process of adding strategic value to FAO's country approaches. The RTE2 team notes that this inadequacy did not prevent a number of recommendations from being made and implemented in some countries, but notes that this area offers substantial opportunities for new initiatives.

The second is the inadequate integration of the livestock (poultry) production, marketing, livelihoods' attributes and socio-economic aspects of the preparedness and response mechanisms with the veterinary aspects in the support provided, and the missed opportunity of developing more integrated multidisciplinary approaches. This element has been compounded by the continued weak and inadequate engagement of the private poultry sectors as a true partner. For example, results of FAO value chain studies, HPAI impact studies or poultry sector data and reviews, with some exceptions, have yet to be effectively used, integrated and ultimately influence programme development and implementation at country level. Shortcomings in the multidisciplinary approach, in particular the building of strong and effective working relationships between staff and consultants from different disciplines, are evident from and highlighted in this report. It is important for FAO to explore ways to improve the existing processes for building and

supporting multidisciplinary teams and to engage with other agencies so as to avoid segregation of efforts across disciplines. This will require engagement of compatible experts from a range of disciplines in policy formation and implementation at an early stage in future disease control and preventive programmes.

The third is the missed opportunity to learn lessons from experiences in countries where FAO is engaged, promoting and learning from successes, even if they had nothing to do with FAO. The RTE2 team notes that new iterations of global and regional strategies and some country strategies clearly indicate that many lessons have been taken on board, including the need for a shift towards longer term programmes in endemically infected countries (which is evident in documents issued by FAO and UN partners from 2007 onwards), but considers that there has been inadequate uptake and cross-fertilization of these and other lessons at country level. The need for more sharing of lessons and cross-fertilization between field programmes was echoed by FAO staff in the Bangkok workshop. The effective compensation programme in Nigeria, the innovative SMS gateway system in Bangladesh and the Pen Digital Technology in southern Africa are illustrative examples of experiences that might lend themselves to be further mainstreamed and potentially applied in other settings in the future.

The fourth is the lack of a common ground between the implementation of emergency response programmes to deal with immediate dangers of diseases which present a risk to humans, and the now urgent need to capitalise on the substantial investments which have been made to ensure that they also address broader longer term livestock development and human wellbeing issues. The majority of projects reviewed by the evaluation team were indeed formulated with a narrow focus on emergency preparedness or response to control avian influenza. While several donors have required specificity to HPAI in their support, in a majority of cases there has been inadequate consideration by FAO of how measures can be made more broadly applicable to other priority diseases, and to broader livestock development aspirations of countries concerned. Furthermore, there is clear evidence that some donors are quite amenable to exploiting the short-term nature of project funding to revise the emphasis of activities, and this deserves greater attention by FAO in iterative dialogue processes with donors.

The RTE2 team concludes that FAO has demonstrated the capacity to provide strong leadership and performance in supporting countries in avian influenza preparedness and response, and should continue to work in this area to ensure that the important gains made so far are not lost. Rather than these gains are further exploited in continued efforts to bring HPAI under control, and to extend the benefits of investments made into broader areas of improved animal health and human wellbeing.

In addition to the more than 70 recommendations made in each of the country and (sub-) regional ECTAD reports, the RTE2 makes a series of broad recommendations, listed below.

In subsequent sections of the report on each of the 6 pillars, the evaluation team provides specific recommendations for each area analysed in the report.

- 1. The development of a more integrated and multi-disciplinary approach to international, regional and country level programmes.** It is recommended that FAO adopt centrally, regionally and nationally a much clearer and more cohesive multidisciplinary approach to HPAI responses, and indeed to all activities of ECTAD. This approach should be built upon mutual trust, recognition and engagement of the multiple disciplines of agricultural economics, epidemiology, laboratory sciences, communications etc. that form part of the contributions appropriate for a leading UN organization and result in measurably stronger interactions (such as joint projects, publications or events) with relevant FAO units (including AGAH, AGAL, AGAP, the Investment Centre, etc.)
- 2. The development of a clear and cohesive interface between emergency responses to HPAI.** It is recommended that FAO strengthen the interface between emergency responses and development programmes at the country level, to ensure that there is effective harmonization of the emergency responses to HPAI and the longer term development aspirations of governments in the livestock health sector.
- 3. The exploitation of HPAI capacity built to cater for broader preparedness and response programmes for other priority livestock diseases.** It is recommended that FAO urgently seek to broaden the range of impacts from recently installed HPAI capacity development to the wider sphere of other livestock diseases of priority in each country. This will require FAO to engage at a different level with its member countries and development partners to explore jointly the sustainable benefits that can be achieved by such an approach.
- 4. Regular updating of strategies, approaches, protocols on the basis of outcomes and impacts.** It is recommended that FAO place greater emphasis on learning from its engagement over five years in HPAI preparedness and response, and on using this learning to regularly review and update, as appropriate, its strategies, approaches and operating procedures at country level. This should be done by paying much more attention to how well definable outputs and achievements have been met, with a view of feeding back such learning to global and regional strategies.
- 5. Active engagement with the private poultry sectors in affected countries.** It is recommended that FAO take a much more pro-active role in assisting governments in engaging with the private poultry industry sectors at various levels to improve the effectiveness and credibility of the HPAI preparedness and response programmes. This is important both at the higher levels of sectors 1 and 2 of the poultry industry in countries such as Bangladesh, Cambodia, Côte d'Ivoire, Egypt, Indonesia, Nigeria

and Vietnam, and at the emerging sector 3 level in many countries. In particular, it is recommended that:

- a. FAO strengthen the technical base of ECTAD units serving endemic countries, with international consultants with strong knowledge and personal experience in commercial poultry enterprises, to advise and mentor on the design and implementation of preparedness and response initiatives; and
- b. FAO support the initiation or strengthening of small and medium holder poultry producer and marketer representation, with a view to strengthening the voice of small- and medium-scale poultry sector entrepreneurs, and to facilitate stronger linkages between them and government, and the more industrial enterprises. This ambitious recommendation is considered essential if FAO wishes to exploit fully its honest broker role, its responsibility to improving the effectiveness of HPAI control, and its need for support to poultry enterprises as implements of sustainable and inclusive growth and food security.

1. Introduction

This second real-time evaluation (RTE2) has attempted to provide a forward looking approach, using experiences and observations of the performance of FAO's programmes over the last few years to recommend to FAO, its members and its partners, on how to optimize FAO's future contributions to the control of Highly Pathogenic Avian Influenza (HPAI), of other priority disease threats, and to global pandemic preparedness.

FAO's HPAI global programme was started in 2004 following reports of H5N1 virus outbreaks in Southeast Asia. After a wave of outbreaks of HPAI in many regions of the world, there has been a progressive reduction in the number of countries affected, and the number of outbreaks recorded in most of the countries still affected. However, the disease stubbornly persists in some areas of Asia and Africa; it appears to be endemic in Egypt, Bangladesh, China, Indonesia, Vietnam and perhaps elsewhere. New influenza virus threats (particularly the H1N1 virus) have emerged since the first real-time evaluation was conducted in 2007¹. It was therefore necessary to assess the relevance and efficacy of continuing preparedness and response measures in the light of these dynamics.

As part of its global response, FAO established the Emergency Centre for Transboundary Animal Diseases (ECTAD), which was set up to complement the Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (EMPRES) and to strengthen FAO's capacity to respond to HPAI. ECTAD is run as a partnership between the technical division of Animal Production and Health (AGA) and the operational division of Emergency Operations and Rehabilitation (TCE), with overall leadership in the hands of the technical group. As of October 2009, the FAO HPAI programme includes over 160 projects, managing funds from 33 donors, with a total budget of over US\$ 300 million, employing over 500 staff and covering 95 countries. This presents a major task in terms of administration, finance and logistics.

The first real-time evaluation reviewed the entire HPAI programme of FAO, including institutional issues, global partnerships, global and normative work of the Organization as well as country-level assistance. In the report of a Peer Review Panel convened to assess the evaluation's work², the panel recommended certain adjustments in terms of the second RTE. It advocated that FAO place greater emphasis on monitoring progress at outcome and impact levels, rather than input and activity reporting, in order that issues of relevance, efficiency and effectiveness be accurately assessed in subsequent evaluations. The HPAI Consultative Group (HPAI-CG) at its meeting in January 2008³ suggested that the second RTE should focus on the assessment of country-level assistance to national HPAI preparedness

¹ <http://www.fao.org/pbe/pbee/common/ecg/362/en/HPAIRTEFinalReport.zip>

² Peer Review Panel Paper – Issues Arising and Priorities for the Future (September 2007).

³ Record of the Meeting of the Consultative Group for the Real Time Evaluation (RTE) of FAO's Work on the Highly Pathogenic Avian Influenza (HPAI), Wednesday 9 January 2008.

and control initiatives and specifically indicated that this evaluation should not focus on global partnerships and institutional issues.

The current evaluation has therefore focused primarily on country-level assistance provided through national interventions. Global and regional support from FAO headquarters and its decentralized offices has been considered in so far as they are linked to and affect field delivery at the country level. Standard Evaluation Criteria have been applied to assess the relevance, efficiency, effectiveness, sustainability and – to the extent possible - impacts of FAO's HPAI work. In assessing country-level work, the evaluation team has paid particular attention to the interface with global and regional programmes handled from FAO headquarters and from (sub-) regional ECTAD units, as well as to partnerships and gender aspects of the response. In addition, the second evaluation takes into account, and follows up on, the findings, conclusions and recommendations reached in 2007 relating to country-level activities, as well as the FAO management response and follow-up report⁴ to those recommendations.

One reason that the HPAI-CG recommended a focus on assessing country-level assistance to HPAI preparedness and response was due to the enormous task of assessing programmes at the global level, and that such a broad view may limit the level of detail attainable on any particular component of the programme. A country-level approach certainly opens the door to such detail. However, it is important to recognize that a “focus” on in-depth studies in seven affected countries and three (sub-) regional ECTAD units is also an enormous task. Nevertheless, it is hoped that by grappling with some of the fundamental issues affecting the contributions by FAO in each country or region, a different set of insights at a higher level of resolution has been provided. These have been complemented by desk studies on FAO's work in regions not visited by the evaluation team (particularly North and southern Africa).

The report comprises six specific country assessments, three (sub-) regional ECTAD assessments and an overview report. The earlier review of the Participatory Disease Surveillance and Response Programme (PDSR) is also presented as an annex. This overview report makes use of the evidence gathered in these reports and pulls together key issues emerging in the different country and regional assessments, as well as those raised in the stakeholders' workshops and desk reviews conducted during the preparatory phase.

⁴ <http://www.fao.org/pbe/pbee/common/ecg/362/en/Managementresponse.zip>

2. Evaluation process

The second RTE has been conducted in three phases. These included an in-depth preparatory phase entailing the assembly and synthesis of background information at country and programmatic levels, the evaluation of the PDSR programme in Indonesia, and a series of missions to FAO headquarters, member countries and (sub-) regional ECTAD offices. Additional details can be found in the evaluation's terms of reference and the inception report, both available in Annex 1.

Phase 1: In-depth preparatory phase (July 2008 – July 2009)

Given the emphasis on country-level assistance and the volume and variety of the programmes in countries, an in-depth preparatory phase was undertaken.

The first phase involved:

- i. A review of key documentation and materials available on FAO's Field Programme Management Information System and the Animal Production and Health Division (AGA) and the Emergency Operations and Rehabilitation Division (TCE) web sites;
- ii. Discussions with FAO staff at HQ and the field on the HPAI programme; and,
- iii. The conduct of preparatory missions.

The preparatory missions comprised visits to 10 countries (Kenya, Ethiopia, Egypt, Uganda, Thailand, Myanmar, Laos, Cambodia, Bangladesh and Vietnam) and to the (sub-) regional ECTADs in Nairobi, Tunis and Bangkok. The visits focused on collecting information about FAO HPAI activities, the Organization's role and partnerships and, identifying possible areas/issues for evaluation. The preparatory missions also paid particular attention to identifying key stakeholders who should be included in the interviews by the RTE2 team in phase 3.

Phase 2: Evaluation of the Participatory Disease Surveillance and Response (PDSR) Programme in Indonesia (May – July 2009).

An in-depth review of the PDSR programme in Indonesia was undertaken, involving a country-wide beneficiary assessment, the holding of extensive discussions with FAO staff and other stakeholders, accompanied by a series of field visits to different sites in the country. A separate report was prepared and submitted to FAO⁵, and a FAO management response⁶ was prepared. Ten of the 14 recommendations presented in the evaluation report were fully accepted and four were partially accepted. No recommendations were rejected by FAO management.

Phase 3: Full Independent Evaluation (August 2009 – February 2010)

The third phase has included the following:

⁵ <http://www.fao.org/docs/eims/upload/262940/PDSR%20evaluation%20report%2030%20July%20final.pdf>

⁶ http://www.fao.org/docs/eims/upload/264420/Management%20Response%20to%20PDSR%20Evaluation_Final_FAO_cleared_3Sept09.doc

- *Interviews with programme stakeholders*

The RTE2 team travelled to FAO headquarters to interview FAO staff and representatives of partner agencies involved in the programme during the period 15-22 September 2009. Some members of the RTE2 team then went to Paris to meet with the World Animal Health Organization (OIE) on 23 September 2009.

- *Documentation review*

The team has reviewed the extensive documentation available, and assembled an inventory of documents covering the different facets of FAO's HPAI programmes at national and regional levels. As part of this review, desk studies of FAO responses in areas not visited by the evaluation team (such as southern and North Africa) were conducted. Following the interviews with programme stakeholders and the documentation review the RTE2 team prepared an inception report for the evaluation which can be found in Annex 1.

- *Country and regional programme assessments*

A sample of countries and (sub-) regional ECTAD units was visited by the team. Countries included Nigeria, Egypt, Côte d'Ivoire, Bangladesh, Cambodia and Vietnam. Earlier in the process some members of the evaluation team had visited Indonesia to assess the PDSR programme. In addition, the ECTAD offices in Bamako, Nairobi and Bangkok were visited. In each country, the team met with a wide range of stakeholders, ranging from government departments, ministries of agriculture and health, laboratory staff, UN bodies, NGOs, private sector organizations, farmers and other private individuals engaged in poultry enterprises. The RTE2 team also established contact with former CTAs and key informants from within or outside FAO in each of the countries. For virtually all countries and (sub-) regional ECTAD visits there was a debriefing on the preliminary observations of the mission with the FAO team. The reports of these country and regional visits are presented in Annex 2.

- *Regional stakeholder workshops*

At the end of the missions to Africa/Near East and Asia, workshops were organized in Nairobi and Bangkok to discuss the preliminary observations of the team with FAO national and regional staff and to explore options for improved HPAI control with FAO's partners and government representatives. These workshops were forward looking, set under the general theme of "helping to shape future FAO responses to better meet national and regional requirements". The proceedings of the two workshops held are presented in Annex 3.

- *Peer review panel*

At the end of the evaluation process, a peer review panel met at FAO headquarters to comment and review the draft evaluation report. Feedback from the panel was taken into account by the RTE2 team in finalizing the evaluation report. The report of the peer review panel appears in Annex 4.

3. Evaluation framework

The RTE2 team presented a series of evaluation criteria in their inception report for assessing the relevance, efficiency and effectiveness of FAO's contribution to national preparedness and response programmes. Their Strategic Evaluation Framework itemised the three broad outputs pillars and FAO objectives, centred on contributions that have been made to:

- a) HPAI prevention and response;
- b) Broad surveillance system development; and
- c) Pandemic preparedness.

During the evaluation process, this framework was further elaborated and supplemented with components from various sources, in particular an operational matrix developed by FAO for use in Bangladesh. The framework now has six pillars, considered to be central to any preparedness and response programme:

- a) Policy development and programme coordination;
- b) Disease surveillance mechanisms;
- c) Disease diagnosis, differential diagnosis and infection characterization;
- d) Disease control and eradication;
- e) Epidemiological data synthesis, analysis, presentation and use; and
- f) Disease prevention.

For each pillar the evaluation team has identified candidate objectives and candidate outcomes, with the understanding that the specifics of these are likely to vary from country to country. In the same way, the team has identified candidate components in each of the six pillars (see Figure 1).

In assessing country-level assistance, the evaluation team has paid particular attention to the interface between national HPAI programmes and FAO ECTAD HQ, the contributions of the (sub-) regional ECTAD units, as well as the effectiveness of partnerships and the consideration given to gender aspects in the response.

In assessing the outcomes of FAO's HPAI field programme, the evaluation team took into account the short- and medium-term country-level outputs and outcomes of the updated Global Strategy for Prevention and Control of Highly Pathogenic Avian Influenza, developed in partnership by the FAO and the World Organization for Animal Health (OIE). It also took into consideration progress on the implementation of the First RTE recommendations as reported by FAO senior management (see Annex 5).

Figure 1. Framework for the assessment of national FAO HPAI programmes

	1 Policy development and programme coordination	2 Disease surveillance mechanisms	3 Disease diagnosis, differential diagnosis & pathogen characterisation	4 Disease control & eradication	5 Epidemiological data synthesis, analysis, presentation & use	6 Disease prevention
Objectives	The development of a clear and technically sound policy for HPAI preparedness and control, effectively communicated to all stakeholders	Establishment and revision of effective, sustainable and affordable surveillance systems for HPAI in target domestic and wild bird populations	Establishment and maintenance of internationally recognised laboratory capacity to confirm and where appropriate characterise HPAI infections	Plan and implement technically sound, effective affordable, sustainable and socioeconomically acceptable intervention measure to control or eradicate HPAI	Collect, synthesise and analyse data on the dynamics and impacts of HPAI, and use the outputs to inform policy and strategy for HPAI control	Put in place technically sound affordable and socially viable measures to minimise the risk of HPAI spread, and reduce the risk of human infection
Candidate components	1. Legal framework 2. National policy 3. National strategy 4. Contingency planning 5. Benefit:cost considerations 6. Research prioritisation 7. Industry development 8. Poverty reduction interface 9. Identification, engagement and communication with all stakeholders	1. Passive surveillance 2. Active surveillance 3. Wild bird surveillance	1. Sample collection & shipment 2. Cold chain viability 3. Lab facility development 4. Lab equipment & reagents 5. Lab network & interface 6. Capacity building of lab staff	1. Intervention measures (depopulation, decontamination disposal, movement control, awareness raising, vaccination poultry restocking, etc) 2. Compensation	1. Epidemiological data handling, processing and analysis 2. Data flow and communication 3. Data reporting, use and presentation 4. Poultry population demography 5. Outbreak investigation 6. Value chain studies 7. Risk assessment (based on Critical control points) 8. Socioecon impact	1. Biosecurity 2. Communication 3. Human protection 4. Vaccination 5. Farm/unit registration 6. Market and slaughter practices 7. Industry restructuring
Outcomes	Sound HPAI policy in place All stakeholders involved and informed	HPAI infection status effectively determined and internationally recognised	Optimal sensitivity and specificity of diagnostic tools established and results in international public domain	Disease outbreaks effectively contained and status recognised internationally	Quality data received and disease control strategy regularly updated through sound evidence base	Progressive reduction in disease incidence which is independently verifiable. No new human cases.

4. Assessment of national responses

Overview of country-level programmes

The task of the evaluation team was to review FAO's HPAI programmes at the country level in particular. Our emerging messages for each of the countries and regional ECTADs visited are targeted at the FAO programmes in those countries, with contributions discussed, strengths and weaknesses identified, and a series of country/region-specific recommendations made. The team also has broader messages emerging from a synthesis of the multiple country assessments and from the regional stakeholders' workshops, which are targeted at FAO as a whole.

At the country level, the RTE2 team sees effective and maturing relationships between FAO's HPAI programmes and their government partners in all countries visited. These relationships generally acknowledge FAO as the leading international partner on technical issues related to HPAI preparedness and response, and draw on FAO's in-country, regional and in some cases international (headquarters) advice. In all the countries visited, there is often some inherent tension in the relationship between the FAO programmes and their government hosts, underscored by the governments' wish to ensure that they are, and are seen to be, the leaders of the disease control processes. In some cases, this tension was coupled with a degree of jealousy held over the terms of service of FAO staff, such as with support given to the parallel system of Local Disease Control Centres (LDCCs) in Indonesia.

The RTE2 finds that substantial progress has been made in the preparedness and response mechanisms directed at HPAI. This has occurred at several levels. These include improved planning and policy development, better communications and collaboration between national and international partners, greater capacity in the field services of veterinary authorities, greater laboratory capacity and, in many cases, progressively increasing credibility of the national livestock services. In most cases, these improvements have also been accompanied by reductions in the numbers of outbreaks of HPAI in poultry, and the number of human cases occurring. The reported progress certainly owes much to the commendably high level of commitment, engagement and tenacity of FAO's in-country teams and the support received from FAO units at headquarters and in the regions. As noted in the country reports, however, it is difficult to assign a direct cause and effect relationship between FAO's contributions and the decreasing incidence of HPAI in most countries. Limited availability of good quality data and systems to monitor and evaluate the effectiveness of FAO-supported activities, together with low priority often given at country level to learning from experiences, have been major contributors to this⁷.

⁷ The RTE2 team noted that some country programmes were more advanced than others in this regard. In Indonesia the PDSR programme had developed a database with a built-in monitoring and evaluation (M&E) system which is now being used to monitor the effectiveness of the programme. In Vietnam there were a number of ongoing M&E initiatives. Projects in Egypt and other countries also had some M&E systems built in.

The FAO country programmes have also benefited from a closer collaboration at international level between FAO, OIE and WHO, in particular through the tools that this partnership has created and developed, notably GLEWS and OFFLU, which have provided certain specialized backstopping services.

The disease and the responses to it have also seen a change in the awareness of the importance of livestock enterprises to building national economies and to enhancing processes of pro-poor growth. The spread of outbreaks of HPAI across Asia and Africa made people aware of the rapid growth of poultry industries that had been taking place during the years prior to their occurrence. Of the countries visited, this factor was particularly important in Indonesia, Bangladesh, Egypt and Nigeria, all of which have the full range of poultry enterprises from industrial to backyard.

The major overall weakness has been the lost opportunity of adding greater substantive strategic value to many of the preparedness and intervention approaches that FAO has supported in individual countries. FAO could arguably have exploited more its comparative advantage as a widely experienced, well recognized international body working on HPAI in so many different settings with many different sets of expertise. Furthermore, in several settings FAO was seen to pursue a rather narrow unidisciplinary approach to emergency responses to HPAI at country level. International disease response mechanisms, including the One World One Health (OWOH) initiative, increasingly demand broad multidisciplinary approaches, and FAO has the inherent capacity to deliver these.

The RTE2 believes that there are four main, and interrelated, contributors to these weaknesses.

The first is the inadequacy of strategically-applicable support tools on HPAI preparedness and response to country programmes, such as situation analysis, active and passive surveillance standards and cost-effectiveness guidelines, policy tools dealing with issues such as compensation, and the stronger application of value chain analysis in risk-based surveillance, and in impact assessment. The evaluation team felt that FAO, in collaboration with its development partners, could have pulled together a more structured set of support tools, to bring greater value to country programmes. The availability of such tools, which need to be built and tested over time to ensure universal applicability, would support the process of adding strategic value to FAO's country approaches. The RTE team noted that this

In most cases, however, these systems were geared to collect "output" level data for specific activities and were doing so at irregular intervals, and without corrective action necessarily being taken. At regional level USAID has sponsored the development of a Guide for Monitoring and Evaluating Avian Influenza Programs in Southeast Asia (Measure, September 2008) with major inputs from the ECTAD unit at the FAO Regional Office for Asia and the Pacific (ECTAD-RAP). At the global level FAO has developed a logical framework to monitor achievements of the Global Programme. The RTE2 team noted that difficulties in getting good quality data have affected the operationalization of these very valuable frameworks and believe that greater interest and resources should be attached to the improvement of country-level M&E systems.

inadequacy did not prevent a number of recommendations from being made and implemented in some countries, but noted that this area offers substantial opportunities for new initiatives.

The evaluation team noted that some branches of FAO such as the Pro Poor Livestock Policy Initiative (PPLPI) programme have entered into multi-institutional partnerships on the livelihood and risk assessment aspects of HPAI, and there is undoubtedly a role for wider engagement with academic institutions in the different countries with programmes, international research institutions, and other partners to build a stronger science and evidence base to its country programmes.

The second is the inadequate integration of the livestock (poultry) production, marketing, livelihoods' attributes and socio-economic aspects of the preparedness and response mechanisms with the veterinary aspects in the support provided, and the missed opportunity of developing more integrated multidisciplinary approaches. This element has been compounded by the continued weak and inadequate engagement of the private poultry sectors as a true partner. For example, results of FAO value chain studies, HPAI impact studies or poultry sector data and reviews, with some exceptions, have yet to be effectively used, integrated and ultimately influence programme development and implementation at country level. Shortcomings in the multidisciplinary approach, in particular the building of strong and effective working relationships between staff and consultants from different disciplines, are also evident from and highlighted in this report. It is important for FAO to explore ways to improve the existing processes for building and supporting multidisciplinary teams and to engage with other agencies so as to avoid segregation of efforts across disciplines. This will require engagement of compatible experts from a range of disciplines in policy formation and implementation at an early stage in future disease control and preventive programmes.

The third is the missed opportunity to learn lessons from experiences in countries where FAO is engaged, promoting and learning from successes, even if they had nothing to do with FAO. The RTE2 team noted that new iterations of global and regional strategies and some country strategies clearly indicate that many lessons have been taken on board, including the need for a shift towards longer-term programmes in endemically infected countries (which is evident in documents issued by FAO and UN partners from 2007 onwards), but considered that there has been inadequate uptake and cross-fertilization of these and other lessons at country level. The need for more sharing of lessons and cross-fertilization between field programmes was echoed by FAO staff in the Bangkok workshop. The effective compensation programme in Nigeria, the innovative SMS gateway system in Bangladesh and the Pen Digital Technology in southern Africa are illustrative examples of experiences that could be further mainstreamed and potentially applied in other settings in the future.

The fourth is the lack of a common ground between the implementation of emergency response programmes to deal with immediate dangers of diseases which present a risk to humans, and the now urgent need to capitalise on the substantial investments which have been made to ensure that they also address broader longer-term livestock development and human wellbeing issues. The majority of projects reviewed by the evaluation team were indeed formulated with a narrow focus on emergency preparedness or response to control avian influenza. While several donors have required specificity to HPAI in their support, in a majority of cases there has been inadequate consideration by FAO of how measures can be made more broadly applicable to other priority diseases, and to broader livestock development aspirations of countries concerned. Furthermore, there is clear evidence that some donors are quite amenable to exploiting the short-term nature of project funding to revise the emphasis of activities⁸, and this deserves greater attention by FAO in iterative dialogue processes with donors.

In general terms, the RTE2 team found that:

- the capacity, level of engagement and effectiveness of governments is a common constraint to FAO's programmes on HPAI at the national level. Nevertheless, there has been a progressive reduction in HPAI in all the countries studied and beyond, and FAO's efforts are seen to have contributed to this;
- HPAI and the responses to it by FAO and other stakeholders have raised awareness of the growth and importance of poultry industries, and the importance of their contributions to national economies and pro-poor growth. This has generally raised awareness of the potential contributions of livestock enterprises as a whole;
- FAO has an impressive set of committed staff in the countries visited. As a result, FAO's leadership in animal health is recognized in these countries, FAO teams are generally seen as having been effective partners in HPAI preparedness and control, and this reputation has improved over time;
- there is an understandable diversity of approaches across the countries. It is considered that much would be benefited by greater comparisons of tools, approaches and experiences across countries and regions;
- there has been an inability of FAO as a whole to add substantive strategic value to many of the preparedness and intervention approaches that it has supported in individual countries;
- there has been inadequate exploitation of FAO's comparative advantage as a widely experienced, well recognized international body working on HPAI in so many different

⁸ Based on evidence gathered by its projects and on the recommendations of the RTE2 team in the evaluation of the PDSR programme in Indonesia, the FAO HPAI team successfully negotiated a redistribution of a substantial component of funding from PDSR to other priority activities.

settings with many different sets of expertise at its disposal; FAO was seen to still pursue a rather narrow multidisciplinary approach at country level;

- there has been a slow pace of evolution from emergency to broader responses that capitalise on investments made to tackle other transboundary, emerging and endemic disease threats.

The RTE2 team concluded that FAO has demonstrated the capacity to provide strong leadership and performance in supporting countries in avian influenza preparedness and response, and should continue to work in this area to ensure that the important gains made so far are not lost. Rather than these gains are further exploited in continued efforts to bring HPAI under control, and to extend the benefits of investments made into broader areas of improved animal health and human wellbeing.

General recommendations

Below the RTE2 team supplements the over 70 country-specific recommendations made in the country and (sub-) regional reports with five general cross-cutting recommendations based on the findings and conclusions included in this report. In subsequent sections of the report on each of the 6 pillars, the RTE2 team provides specific recommendations for each area that has been analysed in the report.

- 1. The development of a more integrated multidisciplinary approach to international, regional and country level programmes.** It is recommended that FAO adopt centrally, regionally and nationally a much more cohesive multidisciplinary approach to HPAI responses, and indeed to all activities of ECTAD. This approach should be built upon mutual trust, recognition and engagement of the multiple disciplines of agricultural economics, epidemiology, laboratory sciences, communications, etc. that form part of the contributions appropriate for a leading UN organization and result in measurably stronger interactions (such as joint projects, publications or events) with relevant FAO units (including AGAH, AGAL, AGAP, the Investment Centre, Legal Office, etc.), and measurably more sustainable outcomes.
- 2. The development of a clear and cohesive interface between emergency and development responses to HPAI.** It is recommended that FAO strengthen the interface between emergency responses and development programmes at the country level, to ensure that there is effective harmonization of the emergency responses to HPAI and the longer-term development aspirations of governments in the livestock health sector. Interface modalities will need to be regularly discussed in view of the ongoing FAO reform.
- 3. The exploitation of HPAI capacity built to cater for broader preparedness and response programmes for other priority livestock diseases.** It is recommended that FAO urgently seek to broaden the range of impacts from recently installed HPAI

capacity development to the wider sphere of other livestock diseases of priority to governments in each country. This will require FAO to engage at a wider level with national stakeholders, and at a different level with its member countries and development partners to explore jointly the sustainable benefits that can be achieved by such an approach.

- 4. Regular updating of strategies, approaches, protocols on the basis of outcomes and impacts.** It is recommended that FAO place greater emphasis on learning from its engagement over five years in HPAI preparedness and response, and on using this learning to regularly review and update, as appropriate, its strategies, approaches and operating procedures at country level. This should be done by paying greater attention to how well definable outputs and achievements have been met, with a view of feeding back such learning to global and regional strategies.
- 5. Active engagement with the private poultry sectors in affected countries.** It is recommended that FAO take a much more pro-active role in assisting governments to engage more effectively with the private poultry industry sectors at various levels. Such engagement would seek to improve the effectiveness and credibility of the HPAI preparedness and response programmes. This is important both at the higher levels of sectors 1 and 2 of the poultry industry in countries such as Bangladesh, Cambodia, Côte d'Ivoire, Egypt, Indonesia, Nigeria and Vietnam, and at the emerging sector 3 level in many countries. In particular, it is recommended that:
 - a. FAO strengthen the technical base of ECTAD units serving endemic countries, with international experts with strong knowledge and personal experience in commercial poultry enterprises, to advise and mentor on the design and implementation of preparedness and response initiatives; and
 - b. FAO support the initiation or strengthening of small and medium holder poultry producer and marketer representation, with a view to strengthening the voice of small- and medium-scale poultry sector entrepreneurs, and to facilitate stronger linkages between them and government, and the more industrial enterprises⁹. This recommendation is considered essential if FAO wishes to exploit fully its honest broker role, its responsibility to improving the effectiveness of HPAI control, and its need for support to poultry enterprises as implements of sustainable and inclusive growth and food security.

⁹ Farmers' organisations, societies and trusts have been used extensively as tools for empowering and giving a voice to smallholder entrepreneurs in many fields of agriculture, such as tea, coffee, beans and dairying. While many are driven by export incentives, some, such as the dairy example, build on improving services, credit opportunities and standards for domestic markets. The relatively rapid rise of the poultry sector has meant that these development tools have not received the attention they arguably deserve.

Below some general cross-cutting comments are presented on the key elements of an HPAI preparedness and response programme based on the framework detailed in the methodology section. The team then assess the achievements of the FAO country programmes in terms of the milestones included in the Global Programme, and consider the broader implications of the preparedness and response measures on wider disease surveillance capacity, and on pandemic preparedness. Finally, the team considers the implications on broader agriculture, livestock and poverty reduction aspiration of the countries studied.

a) Policy development and programme coordination

There are several components within this pillar of great relevance for HPAI prevention and control. From its interactions at field level, the RTE2 team considers the legal framework, the national policies and strategies, overall contingency planning, the poverty reduction interface, and the interaction with all stakeholders to have been the main areas of focus of FAO's work.

Legal framework

The RTE2 team was informed on several occasions that one of the major constraints to effective HPAI prevention and control was an inadequate, sometimes obsolete, legal framework for early detection, containment and control of the disease. This issue was more acute in countries that have undergone a decentralization of their veterinary services (such as Indonesia) and those with ill-resourced veterinary services (which, according to OIE's Performance of Veterinary Service (PVS) assessments, are many). FAO has reportedly been engaged in Cambodia, Laos, Egypt, Bangladesh, Indonesia and Vietnam in the revision and updating of legal frameworks for animal disease control. This area of work has generally focused not just on HPAI but also on the entire institutional and legal architecture of the country animal health system. The RTE2 team was informed of mixed results in each of the countries visited (for example, a review of the Government of Egypt's veterinary capacity and legislation conducted by FAO in 2007 has not been effectively followed through by FAO and its development partners), whereas Laos has already published its new veterinary law (in early 2008) which was prepared with major inputs from FAO.

As noted by the RTE2 team in Vietnam, legislative change in any field is slow, with an approximate 2-year lead time. Thus, there are and will continue to be opportunities for FAO's engagement in updating legal frameworks, particularly given the Organization's insights and experience of the livestock sector and regulations in developing countries. The deployment of the PVS tool is, in some countries, creating a conducive environment for legal reform and it is in the best interest of FAO to find ways to be involved in the follow-up process.

National policies and strategies

Policy development for disease control sits clearly under the auspices of national governments. FAO engagement in policy formulation, development and updating is necessarily dependent on a sound initial situation analysis, in taking stock of what could and should be moved forward by government, what can be done with strategic assistance, and where substantial FAO engagement would be most appropriate and most acceptable to governments. Key to this with regard to HPAI preparedness and response is the interface with governments' own policies, strategies and aspirations, with other FAO in-country activities, and with long-term national livestock development policies, should they exist. From its observations and discussions with local counterparts, the RTE2 team is not convinced that such a structured situation analysis has always been carried out, nor that such a process is regularly updated to make sure FAO's contributions continue to be pertinent and complementary to those of governments and other national or international organizations. This probably requires a different and more structured assessment than the periodic donor and international agency briefings that take place in most countries. FAO has developed clear strategies at the regional level in Asia; however, at the country level, Bangladesh, Vietnam and more recently Egypt are apparently the only examples in which FAO has undertaken well-structured consultations to develop and update its own strategy.

As far as overall HPAI and broader disease control policies are concerned, clearly there have been differences in emphasis, focus and operations depending on the HPAI status of a country, the strength and confidence of governments, among many other factors. All the countries visited by the RTE2 team had experienced endemic HPAI infection. At the Nairobi workshop, representatives of unaffected countries and regions reported the need to consider a timely diversification from the sole focus on HPAI preparedness to surveillance and response for other priority diseases if they were to sustain credibility and funding; this was particularly emphasized by ECTAD Gaborone regarding countries in southern Africa.

Understanding the evolving country status of HPAI is clearly a critical component of overall disease control policy development. In the FAO/OIE Global Strategy document, there is a classification of countries provided, giving three different groupings:

- i) those countries in which the virus has never been eliminated after the initial incursion(s) into poultry flocks (i.e. countries with endemic/entrenched infection);
- ii) those countries that have been or are recently infected and in the process of trying to eliminate infection; and
- iii) those countries currently free from infection.

The Global Strategy then outlines the requirements and actions for countries in each grouping (presented in Table 1, page 15). The evaluation team found this framework valuable, particularly in terms of highlighting the different requirements and actions

required in the different categories of disease status. However, the RTE2 team believes that consideration should be given to revisiting and potentially expanding the country groupings to better articulate the objectives of the classification, better capture the different disease dynamic characteristics, the different demands of each grouping, and the different cost implications of actions, as a transparent and action-orientated planning and communications tool for greater fine-tuning of the technical and financial support required.

A sound policy is clearly the basis for a sound programme, and FAO has played an important role in some national policy development and updating. This was particularly the case for Indonesia, for example, where strong leadership by FAO helped in the development (and recent updating) of the National Strategic Work Plan, and has been the case in Vietnam, where FAO has contributed substantially to the development and revision of the OPI. In some affected countries, FAO has engaged in developing particular elements of a policy (such as compensation schemes in Nigeria and Egypt), but it has not had the proactive structured approach that would have been necessary to develop and implement these policies in a timely way. This means not just visiting the country or sending one mission, but rather a structured programme of: a) missions that have adequate resources at their disposal to conduct the assessment and to follow up; b) missions that are primarily focused on government requests (and not just what FAO thinks is best). In some countries, this has been rendered of less importance than others, through strong government engagement and technical capacity (Nigeria and Vietnam), but in others (particularly Egypt) the lack of such a structured approach led to delays and lack of sound technical leadership in programme initiation.

A robust strategic framework/operational matrix is an important starting point, a planning and communications tool whose development and updating deserves greater attention than it has currently received in most country programmes. In their report on the PDSR programme, the RTE2 team highlighted the need for this in Indonesia, and considers it equally applicable elsewhere, to develop or evolve the existing operational frameworks into a clear strategic framework accompanied by derived work plans for all its activities, recommending that these be used as management, communications and planning tools. It also noted the importance of building upon and following up on new inter-agency planning documents such as the World Bank supported Integrated National Actions Plans (INAP) recently developed for several countries in Africa.

One important element of programme coordination and policy development is the level of interface with government, including the office location for FAO staff. The RTE2 team is of the opinion that the ideal setting was that seen in Bangladesh (which is apparently also found in Laos), in which the FAO team of international staff and national consultants is housed within the Department of Livestock Services (DLS). This gives the team direct daily access to senior staff in DLS, including the country Chief Veterinary Officer (CVO), as well as shared meeting facilities.

Some other countries had teams housed entirely in FAO offices (Nigeria, Côte d'Ivoire and Cambodia), while others (Egypt and Vietnam) had team leadership in FAO and some other staff within government offices. Clearly there are many mitigating circumstances relating to the availability of space, communications' facilities, basic services, distance between offices, etc., but the RTE2 team noted that the more integrated the FAO HPAI programme is with national structures, the better the partnership prospects are.

Contingency planning

As reported in the First RTE, following the spread of HPAI in south and southeast Asia, FAO set up several regional emergency assistance projects in Africa, the Middle East, Central Asia, Eastern Europe and the Americas. In Africa, and largely thanks to these initial (TCP) projects, a number of follow-up regional and national initiatives have been conducted in support of contingency planning.

The evaluation team was informed that although levels of preparedness still vary greatly among non-infected countries, some are now considered to have made much progress. The simulation exercises conducted by ECTAD Bamako in the past three years indeed show that countries such as Ghana, Senegal and Mali have all strengthened their response capacity and would be able to rapidly contain minor outbreaks, whereas countries such as Côte d'Ivoire, Liberia, Sierra Leone, Guinea and Guinea Bissau, all recently affected by civil wars, and least developed countries such as Togo, do still need major support to re-build the whole or specific parts of their disease response systems.

As part of contingency planning, ECTAD Nairobi has supported the development of compensation strategies in eastern African countries. These have been completed for southern Sudan and Tanzania. In Kenya and Tanzania, they have now been adopted at the veterinary department level, but the funding of such schemes remains a big issue. In Tanzania disaster management funds are being considered, while in Kenya a livestock development fund is under consideration. Uganda is the only country of the region where the compensation plans have been adopted as policy.

Poverty reduction interface

FAO has made a concerted effort to examine the impacts of HPAI and its control on the poorer sectors of society in the countries visited, and there is a plentiful bibliography emerging from these studies¹⁰. These have benefited substantially from the contributions of the United Kingdom-supported PPLPI, which comes to an end in March 2010, and from a few other German-funded initiatives at country level (such as in Cambodia, Egypt and Uganda). It is unclear to the RTE2 team how much the results of these studies feed into policy and strategy decisions. Clearly they play an important role in advocacy for

¹⁰ See in particular <http://www.fao.org/ag/againfo/programmes/en/pplpi/hpai.html> and <http://www.hpai-research.net/index.html>

consideration of the roles of poorer sectors of society in different aspects of poultry value chains, but their greatest use is arguably in ensuring that disease control interventions do not disadvantage the poor, and contribute to developments in national poultry enterprises that are pro-poor.

Identification, engagement and communication with all stakeholders

FAO has a crucial role as the “honest broker” in its member countries, and this responsibility extends down to the HPAI programmes. In all countries visited, without exception, FAO plays this role, and generally plays it well, ensuring that key players are informed through meetings, briefs and other tools. This is critical. Given the turnover in players, the changing dynamics of the disease, the constant need to seek additional funding, and the need to ensure the sustainability and broader applicability of measures put in place, it is important that FAO keeps an open mind with regard to the range of stakeholders it engages.

The evaluation team considers that reaching out to two broad groups of stakeholders deserves greater attention, and this is discussed further under the section on partnerships. These are the private sector poultry producers and service providers, and the academic institutions (both domestic and international) engaged in HPAI, or broader poultry health and development.

Conclusions

- The FAO country programmes have made considerable contributions in assisting governments with preparedness plans for HPAI, which are highly commendable.
- There is scope for extending such support to countries through the use of situation analysis procedures that help put HPAI and other ECTAD contributions in a broader national context.
- There is scope for the review and potential updating of the country classification procedure used in the Global Strategy document with a view to making it more action orientated in terms of its advice to governments, and to include consideration of the economic implications of, and returns to, the actions required.

Recommendations for the “Policy development and programme coordination” pillar

1. **Role in national animal disease policy development and revision.** It is recommended that FAO develop a much clearer, structured and transparent **situation analysis procedure** for its HPAI and other ECTAD activities at the national level, which is updated regularly. This procedure should assist FAO in understanding the role(s) it can play in supporting national disease preparedness and response policy development, and how such policies interface appropriately with other in-country activities of FAO, and with longer-term national livestock development policies, including Poverty Reduction Strategy Papers.

2. **HPAI planning, coordination and communication.** It is recommended that FAO develop a harmonized strategic framework for national preparedness and response mechanisms for HPAI, accompanied by derived work plans for all its activities, and that these interlinked and enhanced strategy and work plan frameworks be used as management, communications and planning tools broadly applicable for governments, FAO and other stakeholders.
3. **Classification of countries by risk and opportunity.** It is recommended that FAO consider revisiting the classification of countries presented in the Global Strategy document to ensure that the classification used is up-to-date, is action-orientated, and is designed to provide guidance to countries on the relevance and cost-effectiveness of their preparedness and response strategies.

b) Disease surveillance mechanisms

One of the cornerstones of FAO's work in preparedness and response to HPAI is in disease surveillance. Surveillance mechanisms are central to good intelligence on disease occurrence, to responsible international reporting of disease presence, and to a strong evidence-base to disease control strategies and policies. Traditionally, national surveillance systems for livestock diseases are built on regular reporting by veterinary services, which are clearly contingent on the capacity of veterinary services to gain access to relevant livestock production systems at appropriate intervals, and to have the necessary awareness and diagnostic skills, supported as appropriate by laboratory capacity. In all the countries visited by the RTE2 team, these so-called passive surveillance systems are generally weak, but have improved to varying degrees as a result of the funding support provided to respond to HPAI. This improvement has been in various elements, notably enhanced training of veterinary field staff (all countries), training of ancillary field staff such as paravets and community animal health workers (referred to by OIE as veterinary paraprofessionals) in Cambodia, Laos and Vietnam, for example, the strengthening of communications links between field and central veterinary services (Bangladesh), and between the field and central or regional laboratory capacity (Nigeria). Nevertheless, while improvements have definitely occurred, they are very modest in the light of what is required if these countries wish to have effective and sustainable systems of animal disease surveillance that meet the needs for effective HPAI control and beyond.

Given the waning priority being attached to HPAI in the majority of countries visited, even those in which HPAI remains endemic, there is a strong argument that passive surveillance needs to be broadened to address other national priorities to justify the considerable financial outlay, and even the survival of institutions and capacities newly established. This is important in the poultry sector, so critical to smallholder and emergent farmer livelihoods and national food security, with Newcastle disease, Gumboro disease and duck virus hepatitis (duck plague) still serious acting as constraints to the growing enterprises and

industries. But broadened surveillance is also of importance to other livestock sectors, given that in most of the countries included in this evaluation, multiple livestock enterprises served by a single set of veterinary services is the norm, particularly for the smaller-scale (sector 3) producers, and the backyard (sector 4) producers. The RTE2 team questions whether FAO has made the most of the funding and engagement opportunity presented by high levels of investment in HPAI preparedness and response to ensure that new surveillance mechanisms put in place are consistent with a broader set of national needs. In general this has not been the case; the RTE2 team recognizes that this has been influenced in many cases by donor requests for continued focus on HPAI, and in some cases by government pressures for continued focus on HPAI.

This also raises questions on FAO's capacity, initiative and track record in providing strategic support to passive livestock disease surveillance. Based on the 2008 FAO/OIE vademecum, which put FAO in charge of developing "strategies and best practice guides for developing countries", FAO arguably had the responsibility to develop overall standards and guidelines for surveillance (both in poultry and in other livestock populations) for specific diseases, and make these widely available as advice and support mechanisms to country programmes. The RTE2 team is of the opinion that more can be done in this area. Using a rudimentary example, each of the FAO Chief Technical Advisers (CTA) met was approached during the evaluation to provide the case definition of, and units for, an outbreak in both a temporal and spatial context; all were different, in terms of the denominator, the spatial unit and the temporal considerations. Understandably outbreak definitions do vary from country to country. This topic is not new, and has been considered by FAO during the rinderpest eradication programme, for example (see Mariner et al., 2003¹¹). FAO, perhaps in collaboration with OIE, should take some responsibility for seeking an appropriate degree of harmonization to aid in the interpretation of multiple country outbreak data. The harmonization of outbreak definitions should also be tabled for discussion among the countries engaged in HPAI preparedness and response, so that consensus can be reached and harmonization of indices sought.

The RTE2 team is unaware of FAO's policy on the relative appropriateness of passive versus active surveillance in different settings with different production systems and national capacities. The FAO Guiding Principles for HPAI Surveillance and Diagnostic Networks in Asia (2004) does not make reference to this issue and it does not appear to have been revised to take into account adequately emerging data on the efficacy and effectiveness of the sometimes innovative surveillance tools tested and promoted by FAO at country level. The RTE2 team suspects that six years later there is a need for a revision of the guiding principles and the development of more detailed guidelines to help mentor national strategy development, taking into consideration any major regional differences in approach. Such a

¹¹ Mariner, J.C., Jeggo, M., van Klooster, G., Geiger, R., Roeder, P.L. 2003. Rinderpest surveillance monitoring using quantifiable indicators. *Rev. Sci. Tech. Off. Int Epiz.*, 22, 837 – 847.

revision would also offer opportunities for FAO to strengthen the strategic support to country teams and partners on passive surveillance matters to improve the sensitivity, cost effectiveness and relevance to HPAI responses, particularly in those countries in which the disease remains endemic.

Many of the countries visited have augmented the passive surveillance system with different types of active surveillance, a number supported by FAO, in which new approaches to seeking HPAI cases have been initiated. The RTE2 team recognizes that passive surveillance systems may incorporate broader responsibilities for extension service duties, but a key measurable outcome on which they can be evaluated is case detection. The PDSR system in Indonesia terms its structured scheduled visits of the PDSR teams “active” surveillance, as it is (although nominally) risk-based. The scheduled visit surveillance detected only 5.6 percent of HPAI related events, as compared with the passive (call-out visits) surveillance which detected 94.4 percent of HPAI cases. Another initiative of particular interest was the active surveillance being undertaken in Bangladesh; the active clinical surveillance system has been developed for chickens using community animal health workers (CAHW), additional veterinarians and Upazilla Livestock Veterinarians, supported by an SMS Gateway electronic reporting system. Twenty-two of the 33 outbreaks during the period October 2008 – April 2009 were detected by the active surveillance. The time of teams is also used for raising awareness, and advising on biosecurity on commercial poultry farms. However, with the large number of village households and farms in Upazillas to be covered by three CAHWs per Upazilla, who visit a total of approximately 100 places per day, it would take well over a year to cover all of an Upazilla. Beyond this, the system is considered by some to be relatively expensive. The sensitivity of this approach would be high if all households were nominally or statistically covered within a limited time period, but in reality it is low because of the financial and logistical impracticalities of such an extensive coverage on a real-time basis. Thus, innovative approaches to surveillance are welcome.

The RTE2 team suggests that FAO should be playing a stronger role in discussing the merits of such approaches, their sensitivity, cost, sustainability, etc., to ensure that optimal advantage is taken of past FAO experiences in so many settings. A focus on the effectiveness of the different approaches will also be helpful for reviews of and feedback on disease persistence and spread.

Wild bird surveillance

FAO has a centrally managed wildlife programme based at ECTAD HQ in Rome. Investigations into the role of wildlife, notably migratory birds, have been conducted under the EMPRES programme and have brought a coordinated scientific base to regional assessments. This has included ecological, epidemiological, spatial and temporal analyses on the role of wildlife in H5N1 HPAI, which has entailed collaboration with departments of

agriculture, environment and health in several countries around the world. Coordination of wildlife surveillance has been conducted with three partners, CIRAD, Wetlands International (WI), and the Wildlife Conservation Society. Core activities have included capacity building in wildlife surveillance and spatial and temporal analysis (with provision of supporting manuals and documents), fostering the development of networks such as the Global Avian Influenza Network Strategy (GAINS), and participation in the Scientific Task Force in Avian Influenza. This collaboration has led to among other things the production of Guidelines for Wild Bird HPAI surveillance (2006) with the Wildlife Conservation Society (WCS) and the conduct of an epidemiologic survey of avian influenza in Africa by CIRAD (2008) to gather evidence on the role of wildlife in disease spread.

Surveillance at the start of the emergence of H5N1 in wild birds was broadly based, global and less focused. However, based on results during 2006-2008, from both FAO-led surveillance and that of other organizational programmes, (GAINS, United States Geological Survey, etc.), the Wildlife Unit focused its wild bird efforts on either endemic countries, or those with re-occurring outbreaks (such as China, Mongolia, India, Egypt and Nigeria).

The RTE2 recognizes many qualities of the wildlife unit at a global level, including the linkages it has with CIRAD, WI and WCS, the valuable insights it has gained with partners into wild bird migration and virus movement between outbreak areas, the moves into surveillance of an expanded range of pathogens such as West Nile virus, Japanese encephalitis and Crimean-Congo haemorrhagic fever, and the capacity building in the field in wild bird capture and surveillance procedures.

But it also recognizes the inherent difficulties of working with migrant wild bird populations, and the weaknesses in obtaining meaningful and representative data at a country level from the small numbers of live wild birds often from the opportunistic samplings that can be obtained. This means that interpretation of the role of wild birds in some of the countries visited has not been straightforward. At the country level, this is complicated by the wild bird work often being led by a different organization (such as WCS in Cambodia), whose objectives and chains of reporting to governments may be quite separate from those of FAO.

Conclusions

1. The FAO programmes have helped to strengthen national capacities for HPAI surveillance.
2. There is still scope for the substantial improvement of passive and active surveillance tools, and for a greater understanding of their relative merits under different circumstances of disease dynamics, technical capacity, infrastructural facilities and affordability.

3. There is a need for greater harmonization of disease occurrence indices to ensure optimal comparison of outbreak figures across countries and regions.
4. The capacities built with support from FAO have had undoubted spill overs on the potential for surveillance and response to other diseases, but this potential is being inadequately exploited in all countries visited.

Recommendations for the “Disease surveillance mechanisms” pillar

1. **Further development of strategic support tools.** It is recommended that FAO develop new standardized guidelines for surveillance of HPAI in different poultry populations and sectors, which could then provide greater strategic support to country programmes to improve the sensitivity, relevance and cost-efficacy of surveillance for HPAI.
2. **Harmonized units for detection, reporting and intervention.** Understanding the diversity of definitions used in countries in which FAO’s programmes operate, it is recommended that FAO use its international status to seek greater harmonization in the units of reporting HPAI and other diseases of poultry, ensuring optimal comparisons of disease outbreaks and interventions on sector, spatial and temporal grounds.
3. **Exploiting innovations and experiences in surveillance.** It is recommended that FAO give greater consideration to analysing and learning from new approaches and experiences in surveillance techniques, with the goal of improving the sensitivity, cost efficiency and sustainability of both passive and active surveillance tools, and their relevance to different settings.
4. **Broadening the relevance of surveillance tools established.** It is recommended that FAO actively and urgently seek ways of broadening the relevance of current and new surveillance tools and approaches to other transboundary, emerging and priority endemic diseases of importance in the countries in which HPAI programmes are operating. This should include active lobbying by FAO at country, regional and HQ levels with current and future donors to ensure optimal relevance and sustainability of capacity developed to date.

c) Diagnosis, differential diagnosis and pathogen characterization

The strengthening and, in some cases, the initial establishment, of diagnostic facilities capable of supporting HPAI preparedness and response have been a very prominent and effective part of FAO’s contributions in all of the countries visited. This has involved supporting the purchase and installation of equipment, provision of reagents, training of laboratory staff, facilitation of proficiency testing networks for PCR and HI testing, interactions between laboratory staff in regions and beyond through both formal and informal networks, training in (and funding for) sample collection and shipment, international sharing of virus isolates and the raising of scientific and risk awareness on

influenza viruses. In some countries (such as Vietnam), this has included supporting the development of a string of regional laboratories serving different parts of the country, and the evaluation of regional laboratory capacity with a view to the accreditation of regional laboratories. This has been one of the major products of the FAO's country-level initiatives. Nevertheless, it appears that most of the activities have had a relatively narrow focus on procuring equipment and building technical skills and competencies in a limited number of laboratories. In addition, in some countries there was some duplication of investment by other donors, and there were criticisms of the inadequacy or lack of budgets for maintenance and for replacing essential reagents. The evaluation team endorses the need for consideration of maintenance costs, but understands that an open-ended supply of reagents is often not feasible. It is understood that FAO is planning to tender for maintenance contracts in various countries/regions, and has offered in-laboratory capacity building for equipment maintenance in some countries.

The evaluation team noted that building diagnostic capacity for HPAI was still a priority area particularly in the World Bank-funded projects that FAO is helping to implement in several countries in Asia (notably Bangladesh, Cambodia, Mongolia, Laos and Myanmar). The RTE2 considers that FAO, in partnership with OIE, has an important role to play in developing and articulating the minimum and optimum diagnostic capacity to put in place in any given country (in terms of both laboratories and testing capacities within them), and placing these in a national context for each country with reference to factors such as the size of country, communications facilities, potential number of cases, level of endemicity, cold chain capacity, among others, in defining HPAI laboratory needs.

The RTE2 team was informed that considerations of broader laboratory diagnostic capacity for other diseases were generally not tabled with government partners at the initiation of laboratory capacity development initiatives, and with the possible exception of Indonesia, most laboratories have been unable to extend their capacities to other TADs, or even differential diagnosis of other poultry diseases. The evaluation team considers that FAO should be more pro-active in advocating for balanced investments and support in this area, while still maintaining the HPAI focus where it is needed. It is of course well understood by the RTE2 team that much of this has been dictated by the terms of the grants given, with a very high degree of specificity to HPAI, but it considers that this is very short-term thinking, and FAO has the responsibility to step up its lobbying for broader relevance of diagnostic capacities established as part of its global mandate.

Conclusions

- The support by FAO to the building of laboratory capacity for HPAI has been one of the stronger and more effective elements of FAO's national programmes.

- It will be important to define more clearly what the appropriate levels and standards of diagnostic capacity for HPAI are for different countries, given the wide range of diagnostic loads presented, depending on degree of endemicity, country size and communication logistics, field capacity, etc.
- The laboratory capacity built is not being adequately exploited for differential diagnosis of other poultry diseases, and for application to other emerging, transboundary or endemic livestock diseases of priority.

Recommendations for the “Diagnosis, differential diagnosis and pathogen characterization” pillar

1. **Standard diagnostic requirements for different countries.** It is recommended that FAO further develop, in collaboration with partners, a set of principles and guidelines on the minimum and optimum requirements for diagnostic facilities and capacities to put in place in any given country, the costs and returns from these, and how factors such as size of country, potential number of cases, level of endemicity, cold chain capacity among other factors can be taken into account in defining HPAI laboratory needs.
2. **Broadening diagnostic capacity.** It is recommended that FAO take active steps, including stepping up its advocacy, to continue to broaden the laboratory diagnostic capacities established for HPAI to include differential diagnosis of other poultry diseases, and to include consideration of overlapping and additional needs to respond to national diagnostic system demands for other transboundary, emerging and priority endemic diseases of importance in the countries in which HPAI programmes are operating.

d) Disease control and eradication measures

In September 2004, FAO published a manual with recommendations on the Prevention, Control and Eradication of HPAI in Asia¹². The disease control and eradication measures suggested were revisited in a technical workshop held in June 2007¹³. The non-mutually exclusive range of interventions and measures for HPAI control seen by the RTE2 at country level are many. They include: depopulation, carcass disposal and decontamination, poultry movement control, vaccination, awareness and communication, compensation, poultry restocking and human protection. FAO has been responsible for supporting intervention strategies in many countries, and in the training of a wide variety of field staff. In general, FAO has played a supportive rather than front line role, and in this section two points emerging from FAO’s engagement in the countries visited are discussed.

¹² <http://www.fao.org/docs/eims/upload//246982/aj126e00.pdf>

¹³ <http://www.fao.org/docs/eims/upload//232786/ah671e.pdf>

Strategy or front line, national or sub-national?

There is a wide variation in the level of engagement of FAO in disease control and eradication measures in different countries, from peripheral engagement in outbreak response strategies, to direct involvement in compensation policy development, to front line engagement in intervention activities. The PDSR district teams in Indonesia probably represent the most intensive level of FAO's field engagement in HPAI control interventions in any country, in which the teams, generally working in partnership with, and under the supervision of, the District Livestock Services (Dinas), use a set of six intervention (response/prevention) tools. These are: information, education and communication; focal culling with/without compensation; poultry confinement and species separation; application of biosecurity measures (cleaning and disinfection); movement control; and vaccination. The teams classify villages as 'Apparently Free', 'Infected', 'Suspect (14)', 'Suspect (60)', or 'Controlled'. This classification allows an internal evaluation of the impacts of interventions. However, it is likely that the response tools are having little overall impact on the control of HPAI, although arguably they may play a role in reducing the risk of virus exposure to humans in some settings. The intensity of the Indonesia team's engagement in the field has its basis in 2006 when the PDS approach was fielded to find poultry disease at a time when a large number of human cases had occurred. The need for that intensity of front-line engagement has probably passed, but the FAO team is making good use of it with sector 4 poultry enterprises to gather data on disease epidemiology and risk, and as an evolution into the provision of veterinary services for smallholders that meet a broader set of needs.

FAO's engagement in Côte d'Ivoire has also included some front line interventions in the form of the support given to the pilot vaccination programme carried out in the country. In the other countries visited, FAO's engagement in disease control operational activities have been at a more strategic level, which is probably very appropriate. However, there are arguably circumstances in which FAO might consider a more direct front line engagement along the lines of the Indonesia model. In some countries, the weakness of implementation of HPAI interventions is in the provinces/states/governorates (key examples are Nigeria, Egypt, Indonesia and Vietnam). This is particularly important in countries with decentralized veterinary systems, which all these countries mentioned have. The effective implementation of an integrated set of measures such as movement control, safe carcass disposal and live bird market decontamination, for example, remain a major challenge, particularly in the endemic countries visited (Bangladesh, Egypt, Vietnam and Indonesia).

FAO's attention has been on central policy and strategy development, and empowering national systems, but when it comes to the specifics of HPAI control and eradication in endemic/entrenched countries with a devolved system of government, there is often inadequate attention paid to transferring the principles advocated centrally to local levels,

and partially as a result of this endemic disease persists. Thus, in such circumstances, the RTE2 team feels that FAO should consider the potential to engage more at the sub-national level, where the need for greater strategic assistance is recognized, perhaps through piloting an intensive engagement in purposively selected states/provinces/governorates. In the Egypt country report, the RTE2 team recommends consideration and discussion with Egyptian authorities pursuing a governorate-level programme to explore in more detail and eventually tackle field-related bottlenecks to effective control.

Compensation

One of the areas which have been most controversial has been the issue of compensation as an effective control tool. Compensation schemes are seen by many to have several important roles to play in HPAI control. Key among these is to encourage reporting of disease when levels of compensation are fair and linked to market value, and to ensure that vulnerable smallholders or incipient commercial producers are not disadvantaged unfairly through extensive culling programmes. However, questions remain as to whether compensation schemes are effective in increasing transparency of disease occurrence.

FAO has undertaken several studies on this¹⁴, and with several partners (such as the World Bank, USDA, UNDP and IFPRI) has been responsible for producing a set of guidelines on good practice in the area of compensation for HPAI control¹⁵, which is very commendable. The RTE2 team was, however, concerned that not enough follow-up of this strategic engagement with individual countries had been carried out to try and match idealism with reality. The RTE2 team sees advantages of having an iterative “strategic-to-country, and back to strategic” approach to a cross-country analysis of what works and what does not, and considers that such a learning-from-experience approach could lead to the development of a harmonized set of principles and approaches on compensation based on sound experience and results in countries in which it is engaged.

Conclusions

- FAO has generally played a more strategic role in backstopping disease control interventions, with the exception of active and extensive field engagement of the PDSR programme in Indonesia.
- FAO’s programmes have generally been supporting strategic interventions at the national level. In certain endemic countries, there is arguably merit for greater FAO interventions at the sub-national level, to help governments pull together some of the broad principles of the integrated set of measures such as depopulation, movement

¹⁴ See for example:

<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/EXTAPREGTOPHEANUT/EXT EAPAVIFLU/0,,contentMDK:21205757~pagePK:64168445~piPK:64168309~theSitePK:2706883,00.html>

¹⁵ http://siteresources.worldbank.org/INTARD/Resources/HPAI_Compensation_Final.pdf

control, compensation and restocking, etc., particularly in areas with entrenched infection.

Recommendation for the “Disease control and eradication measures” pillar

1. **Sub-national support to HPAI responses in key endemic settings.** It is recommended that FAO discuss with government partners the potential to develop fully-staffed programmes at a sub-national level in endemic settings such as Egypt, Indonesia and Vietnam that aim to bring into play the range of surveillance, response and private enterprise partnership strategies advocated at national level. It is proposed that this take the form of pilot activities in high-risk areas in which inadequate progress is being made. Lessons from previous attempts to devolve the programme in these countries should be taken into account.
2. **Culling, compensation and restocking.** It is recommended that FAO seek to build on its broad compensation policy expertise and take it down to a country level, developing an iterative “strategic-to-country, and back to strategic” approach to a cross-country analysis of what works and what does not. This has the goal of developing a standard set of principles and approaches to the complex interface of culling, compensation and re-stocking based on sound experience and results in countries in which it is engaged.

e) Epidemiological data synthesis, analysis, presentation and use

Leadership and quantitative skills in epidemiology

All countries have identified the need for greater epidemiological capacity in discussions. This was also highlighted in a survey of FAO CTAs in Asia conducted by ECTAD-RAP (2008), and it emerged as the single greatest need at the Bangkok regional stakeholder workshop. Even in Bangladesh’s excellent operational matrix, epidemiology was not given the pillar status it arguably deserved.

The RTE2 team is of the opinion that there is inadequate attention given to quantitative epidemiology in all the country programmes by FAO, and this stretches from the field programmes, to the (sub-) regional ECTADs to FAO headquarters. This inadequacy is perhaps best illustrated by the absence of strong epidemiology leadership and mentorship in AGAH at FAO headquarters.

Effective epidemiology leadership was present in the government veterinary system in Nigeria, a regional veterinary epidemiologist has also been appointed to ECTAD-RAP to facilitate and drive a field epidemiology training programme for veterinarians in the region, a strong epidemiology capacity has emerged in FAO’s programme in Indonesia, and epidemiological expertise has been established in the FAO programme in Bangladesh, but beyond these examples much of the analytical epidemiological expertise has often been contributed by other organizations (such as the Massey University and Royal Veterinary

College groups in Vietnam, for example). That the expertise was there, but in other institutions, is not a problem. But in the Vietnam example an effective working partnership between FAO and the other centres of epidemiology expertise did not appear to have been established. An epidemiology unit has been established with FAO support in Egypt and Bangladesh, and in both cases there are enthusiastic teams of people staffing them. But these groups would almost certainly benefit substantially from senior expertise and mentorship to make their labours more useful, to make the products they produce more meaningful, and to engage them more in understanding the importance of, and the requirements for, data relevance and quality.

The RTE2 team is very supportive of the FETPV initiative being taken by ECTAD-RAP, initially in partnership with the Department of Livestock Development in Thailand. This is a very positive move, responding to the provision of funding support for capacity building, and encouraging the interface between common human and veterinary epidemiology approaches, particularly relevant to zoonotic diseases. However, the RTE2 team encourages this unit, and also the other sub-regional ECTADs in Nairobi, Bamako and indeed elsewhere, to seek various additional alternatives to epidemiology capacity building, particularly through building long-term partnerships with regional universities, and with key developed country institutions which have specialized in developing approaches to understanding livestock disease dynamics and control in developing countries, where multiple and diverse production systems complicate design and analysis procedures.

At a broader level, the deployment of TAD Info in several regions and countries has certainly provided veterinary services with an important tool for disease reporting and the analysis of epidemiological data. The benefits of TAD Info, however, are yet to be seen as very few countries (including Vietnam and Cambodia) that have received the product and the associated training over the past three years are yet able to make regular and effective use of it.

Beyond the general need for stronger engagement by FAO in boosting epidemiology capacity in the different countries visited, there is also a need for further consideration of the drivers of strong and effective national epidemiology systems. Key to this is an understanding of the incentives that drive and maintain quality data gathering and use, both at field and CVO levels.

The RTE2 team was informed that with the exception of Nigeria, in none of the countries visited was the data emanating from national epidemiology units being used effectively in strategy development and revision. Also, discussions with staff working at sub-national levels indicated that there was inadequate feedback of the synthesis emanating from data that they have submitted, which is likely to affect data submission incentives. This had been identified as a particularly important issue affecting the sustainability of the data gathering component in the PDSR system in Indonesia.

Underlying poultry population demography

Fundamental to sound epidemiological analysis is a good understanding of denominator data, which in the case of HPAI means an understanding of the structure, size and characteristics of the poultry populations. For purposes of understanding HPAI dynamics, this requires stratification into appropriate sub-populations. The onset of HPAI brought a realization around the world of the deficiencies in understanding of poultry population structures and sizes, quite apart from the lack of understanding of the growth and specialization that had occurred in many countries fuelled by the “livestock revolution”. The FAO devised the very valuable classification of the four sectors, 1, 2, 3 and 4, and this is used in some of the countries visited, but not all. Regardless of which classification system is used, quality data based on production system stratification is important because of the distinct sets of management factors associated with each, and the substantial differences in their socio-economic, marketing, biosecurity and other disease risk attributes.

All countries had statistics on their poultry populations, and under the leadership of the animal production service (AGAP), FAO has undertaken national reviews of poultry populations in several countries. At the national level, there is much variation in the quality of data on poultry populations, and in the stratification system adopted, most being inadequate for epidemiological and impact assessment analyses. While this is of course understandable, the RTE2 team questions whether FAO should be providing more strategic support to individual countries on evaluating the merits of the four poultry sector system, and its practical applicability, in terms of quantifying and separating systems which have different development and disease control intervention needs. Most important is to move towards practical, attainable and regularly updated data that meets sound epidemiological denominator needs for the long term.

Underlying value chain studies

FAO has conducted and sponsored a number of value chain studies, both at regional and national levels, in countries affected by HPAI. Most of these studies were initiated during 2007 “as a means to develop a better understanding of the trade flows, disease transmission mechanisms and possible entry points for intervention in various value chains”¹⁶.

The RTE2 team has reviewed some of these studies and discussed their use, particularly during their visits to Indonesia, Egypt and Bangladesh (where they have been undertaken in cross-border areas only). The RTE2 team is of the opinion that a sound analysis of the often diverse poultry enterprise value chains is a critical component in developing a sound understanding of HPAI epidemiology. Value chain studies are valuable in understanding the different players in the chain from production to consumption, the incentives they have for

¹⁶ A. McLeod et al. 2009. The use of poultry value chain mapping in developing HPAI control programmes.

engagement, the geographical scale of their operation, and in applying this knowledge to the development of critical control points for interventions, either in surveillance or control. Such studies also play a key role in understanding the impacts of HPAI, where a surprisingly wide spectrum of players involved and affected, other than just poultry producers. It must be said that development of good quality value chain understanding is a laborious process; and it can be argued that in some value chain studies undertaken the level of detail that is necessary to develop a useful tool in critical control point identification has not always been reached. In Nigeria, a detailed value chain study was undertaken under the auspices of the Pro-Poor Risk Reduction in Africa and Asia project, funded by the United Kingdom (Akinwumi et al., 2009¹⁷). The study concluded that disease transmission pathways are linked to economic incentives faced by chain actors, risks of disease transmission are strongly related to commercial practice, and consumer sovereignty is insufficient to influence governance and commercial practice in Nigeria. Finally, it concluded that chain actors face economic incentives to conceal information that is essential for effective HPAI control. The RTE2 team considers that this study is most valuable, both from the results obtained but also as a methodological model for other countries. It is uncertain if the results are being used effectively by the FAO programme in Nigeria. A number of countries from West Africa have also benefited from comprehensive value chain analysis of poultry sector organized by ECTAD Bamako, but there is still a need to make the link with HPAI dynamics and control.

Socio-economic impact

Socio-economic impact assessments have been undertaken by FAO in many of the countries visited, in general carried out by members of the socio-economics group at FAO headquarters. These have helped understand the range of impacts of HPAI, and quantify the losses experienced. Of particular value have been the livelihoods studies carried out by the multi-institutional team on the UK-sponsored studies in different African and Asian countries¹⁸. Other studies on cost, financing and market and trade dimensions of avian influenza have also been conducted, and several of these (such as those related to the cost of control strategies and compensation in Côte d'Ivoire, and impact of HPAI in Egypt, Indonesia, Vietnam and South East Asia at large) have been reviewed in detail by the RTE2 team. Similar to the value chain studies, it seems that there has been inadequate incorporation of the results of these studies, synthesised with the epidemiological data, into surveillance and intervention strategies.

Furthermore, there is an impression that the socio-economic studies, rather like the poultry production studies, sit in separate boxes and FAO has not yet capitalized adequately on the

¹⁷ Akinwumi, J., Okike, Iheanacho, Bett, B., Randolph, T., Rich, K.M. 2009. Analyses of the poultry value chain and its linkages and interactions with HPAI risk factors in Nigeria. Africa Indonesia Team Working Paper, in press.

¹⁸ www.hpai-research.net

potential for a much stronger interdisciplinary approach to HPAI preparedness and response that builds a broader and sounder base to interventions than the merely technical approaches. This was particularly noticeable at country level, where attention was primarily given to implementation of mostly uni-disciplinary projects, and where recent efforts at headquarters and at (sub-) regional level for stronger multi-disciplinarity (see Follow-up Report to the recommendations of the First RTE, rec. 5, 28 and 29) have not yet been translated effectively into substantive developments in the field programmes.

Outbreak investigation

Thorough and well structured outbreak investigations are an essential component of good field epidemiology. It is felt by the RTE2 team that this area is generally weak in all the countries visited, and it was acknowledged to be weak by the FAO teams and many partners in government systems. In some countries, outbreak investigations are not occurring at all; in some they are occurring but are merely collecting signalment data rather than probing possible infection sources and destinations, particularly if this means crossing district or provincial boundaries. Some courses have been run and standard operating procedures set up and tested, but even with such instruction, without adequate incentives to undertake structured outbreak investigations the sustainability is questionable.

The role of risk assessment

The RTE2 team found that in general there was a lack of use of risk assessment as a tool for targeting surveillance and intervention measures. While some targeting of active surveillance to areas of perceived higher risk was conducted, for example for ducks in Cambodia or for border areas in Bangladesh and Côte d'Ivoire, the evaluation team did not see evidence of structured risk management approaches to designing HPAI surveillance systems in the other countries visited.

Part of this is a result of underlying weak epidemiological surveillance, and as a result weak risk factor analyses. With the finite resources available to the endemic countries visited, the depth and breadth of both passive and active surveillance activities surveillance needed to provide effective early detection and response are not adequate. To improve the success rates a system to target resources to areas of highest risk is needed. Risk analysis techniques using available disease ecology, epidemiological, socio-economic, market value chain and spatial analysis data have the potential to target surveillance to high-risk areas and improve its quality and value, and also be more cost effective.

Conclusions

- Epidemiology capacity has been strengthened by varying degrees in FAO's country programmes, but sound epidemiology expertise with good analytical capacity remains very inadequate.

- The use of FETPV and AVET is a valuable initiative for capacity development; it is important that other initiatives are also explored.

Recommendations for the “Epidemiological data synthesis, analysis, presentation and use” pillar

1. **Enhancing epidemiology capacity.** It is recommended that FAO place greater emphasis on fundamental quantitative and qualitative epidemiology skills in the ECTAD HQ, regional and country programmes. The following areas are of particular importance:
 - a). The need for senior quantitative epidemiology expertise in FAO headquarters to advise and mentor on the development of epidemiology capacity in national, regional and global ECTAD programmes;
 - b). The appointment of senior epidemiologists in each of the (sub-) regional ECTADs to advise and mentor within the regions;
 - c). The fostering of stronger links and partnerships with national, regional and international institutions with epidemiological expertise; and
 - d). The consideration of a wider range of training opportunities for national epidemiologists, supplementing the FETPV and AVET programmes.
2. **Improving the understanding of poultry demography.** It is recommended that FAO build on its development of a 4-sector classification of poultry enterprises, using new data that has emerged from several countries, with a view to updating and harmonizing the classification and characterization of poultry systems in each of the countries.
3. **Putting value chain studies into greater practical use.** It is recommended that FAO place much stronger recognition at country level of the role of value chain analyses in improving the efficacy of surveillance and response mechanisms. It is also recommended that such analyses be conducted at higher levels of resolution by in-country teams, and results are well integrated with epidemiological analyses.
4. **Greater integration of the products of socio-economic analyses into surveillance and intervention strategies.** It is recommended that FAO seek to make much greater use of socio-economic impact assessments in strategy development. This will require much closer and more direct engagement of socio-economists, poultry production specialists and veterinary epidemiologists than is currently the case. Such integration should ultimately be reflected in integrated multidisciplinary programmes in the field.
5. **Putting greater focus on outbreak investigation.** It is recommended that FAO consider how outbreak investigations in affected countries can be made more effective and more sustainable, seeking incentives for field staff to undertake such investigations, and to engage more effectively in investigative tracing forward and backwards.

6. **Greater use of risk-based approaches.** It is recommended that FAO place much greater emphasis on the role of risk-based approaches to surveillance and response mechanisms, building on outputs from sound value chain and epidemiological analyses in the field. Products of risk assessment should play a much stronger role in national strategy development, in line with the FAO Global Strategy

f) **Disease prevention**

The disease prevention pillar is important in the follow through for endemic countries, as they seek to reduce the risk of new outbreaks, and it is the cornerstone of the non-infected countries, seeking to reduce the likelihood of HPAI introduction, and heighten the chance of rapid elimination. Below the RTE2 team deals with key elements of the disease prevention pillar (such as biosecurity, communication, vaccination and industry restructuring) in which FAO has engaged in the countries visited.

Biosecurity

FAO has been engaged in virtually all countries visited on biosecurity at the farm level, with many activities being designed following the publication of a paper on biosecurity for HPAI (see Follow-up Report to the recommendations of the First RTE, rec. 14). With a belief that sectors 1 and 2 have a level of understanding of, and compliance with, biosecurity, which may require updating or supplementing but not starting from scratch, FAO's programmes have increasingly focused on sector 3, with activities falling under various regional and national projects. The relatively new FAO headquarters biosecurity programme¹⁹ advocates developing an understanding of what smallholder producers perceive is important in biosecurity, what measures they consider are realistic and affordable, and seeks the development of an interface between the emerging shared actions and measures known to be efficacious. The group promotes an understanding of the attributes of the different possible measures and how these will affect the willingness and ability of producers with limited resources to apply them, and how they will compromise current production systems²⁰.

The RTE2 team noted that there is a narrowing gap between the understanding of what needs to be done in the area of biosecurity, and what is communicated to the various stakeholders, and lauds this move to understand feasibility and affordability. There are two concerns, however. The RTE2 team did not see any work to acquire empirical evidence on what any compromise set of biosecurity measures (i.e. the mixture between desirable and realistic/affordable) would be efficacious, either in reducing HPAI spread or that of other diseases constraining productivity. Furthermore, the RTE2 team noted a huge gap between

¹⁹ FAO, 2008. Biosecurity for Highly Pathogenic Avian Influenza: Issue and Options. FAO Animal Production and Health Paper 165, 89 pp.

²⁰ Guerne Bleich, E., Pagani, P., Honhold, N, 2009. Progress towards practical options for improving biosecurity of small scale poultry producers. World's Poultry Science Journal, 65, 211 – 216.

what is communicated to farmers and any behavioural change to respond to biosecurity messages. The team acknowledges that current behaviour is dependent on a multitude of factors, include longstanding cultural and social practices, and promoting change requires a deep understanding of these. The FAO pilot activities initiated in Egypt and Cambodia to develop “cost-effective and feasible biosecurity measures for resource limited circumstances” might provide some answers, but the team feels that their implementation with expected outcomes will probably be a lifetime job.

Communication and awareness raising

The ECTAD Communication Unit was formally established only in June 2007, with its TORs, work plan and budget approved around December 2007. FAO’s work in the communication domain is relatively recent and modest, but planned to tackle strategic issues.

At the field level, communication and awareness-raising activities have been a feature of almost every programme reviewed. Although the core work of the communications unit at ECTAD HQ is on strategic issues, it was reportedly involved in the backstopping of regional and national initiatives (see Follow-up Report to the recommendations of the First RTE, rec. 15), with the field programme largely being implemented by FAO local staff with specific inputs from the (sub-) regional ECTAD units (with the possible exception of the Nigeria project that is managed from Rome). Support from ECTAD Bamako, ECTAD Nairobi and ECTAD-RAP will be reduced in the near future since there are now no full time communication officers in these offices.

At the regional level, besides providing backstopping to national programmes (particularly ECTAD-RAP), networks (such as RESOCOM) and regional workshops have been set up to improve outbreak communication and media skills. The ECTAD Communication Unit has also been involved in the formation of an inter-agency South and South-East Asia risk communication network initiative, and in assessing both human and animal health communication capacities, through the INAP process conducted in nearly 30 countries in Africa. To this end, it has supported the development of Strategic Communication Frameworks for ECTAD-RAP and for the South Asia Cross border project, and to national communication strategic frameworks for Indonesia, Cambodia, Lao, Timor-Leste, Nepal, Bangladesh and Vietnam. Sub-regional ECTAD units in Africa have also developed their own web sites to raise visibility of their activities and to increase dissemination of technical information in their sub-regions. Regarding the latter, a media fellowship project funded by Canada has been implemented in Indonesia and Egypt to improve reporting on avian influenza news.

The RTE2 team considers that good communications skills are an essential component of all the regional ECTADs, meriting internationally recruited positions, and that qualified national staff should be in place in country teams. The RTE2 also considers that well planned

strategic frameworks for communication are essential, but not commonly found. The best example seen was that developed in Indonesia by FAO and the USAID-funded Community Based Avian Influenza Project (CBAIC), in which target audiences, methods to access them and expected impacts are clearly articulated.

At the country level FAO is engaged in various elements of awareness raising, relating to reducing the risk of disease spread between poultry populations, and reducing the risk of human infection. Dealing first with the latter, this component has principally been in the hands of other organizations (such as CHL in Egypt, CBAIC in Indonesia and AED in Asia), and at the international level UNICEF has been the leader in communications on HPAI awareness and human exposure risk reduction. There was some variation from country to country as to the level of engagement of FAO, ranging from strong involvement and good consultation to poor consultation, but overall there was a feeling by FAO staff that this was an area where the Organization needed to be more involved. FAO has often struggled to influence the technical content of messages emerging, with the result that certain emerging messages were deemed to be inappropriate. In addition, in some countries the NGO activities have also been funded by USAID, resulting in what might be seen by some as competitive initiatives.

Regarding the former, FAO staff were also inclined to focus more on these aspects, particularly in awareness raising activities in rural settings using the infrastructure and other partnerships developed through other FAO-led activities (for example, using government and private sector staff involved in active surveillance) as primary mechanisms to reach poultry producers and support behavioural change. The RTE2 team was impressed with the quality and innovative nature of the activities and the materials developed in Cambodia, Laos and Indonesia. In the Cambodia report, the second RTE2 team recognizes the great efforts by FAO in its communications programmes, citing that these have undoubtedly resulted in an increased awareness of HPAI, of how to reduce human risk of infection, and of how to reduce the risk of exposure to poultry through biosecurity; nevertheless, as reported in Knowledge, Attitudes and Practices (KAP) surveys, and from the RTE2 team observations, there appears to be an astonishingly wide gap between knowledge-belief of people and practice at all levels (vendors, middlemen, farmers, etc).

FAO has tried to remedy this situation with greater emphasis on biosecurity in the farm. At present biosecurity is seen to be paramount for reducing virus load in the growing smallholder commercial sectors in endemic countries such as Egypt, for example. It would be going too far to say that the efforts of FAO and others have so far been a complete failure in inducing behavioural change, but it does look as though more innovative and aggressive strategies will be required. First amongst these must be seeking appropriate incentives, and second must be the more effective engagement of the private poultry sectors and the various private veterinary enterprises more closely in the process. Some

very valuable proposals emerged from the Bangkok workshop, where the participants identified behavioural change along the poultry value chain as a priority for FAO. Participants called for innovative development of demand-led quality along the poultry value chains, supplemented by a “carrot and stick approach” to developing, understanding and exploiting incentives (through money, convenience and reputation) and regulatory requirements at different levels.

Risk of human disease

In some endemic countries (notably Egypt) the main concern expressed by the major donors was that outbreaks in poultry were not being detected (and contained) early enough to prevent human infection. An example often brought to the RTE2 team in Egypt was that human disease has been seen as a sentinel for disease in poultry. This observation raises several issues. It indicates that the surveillance in poultry populations by governments has been grossly inadequate, it suggests that the principle mode of transmission between poultry and humans has not been fully established, and it also suggests that any biosecurity and poultry handling messages are either not getting across, or are not resulting in the necessary behavioural changes. There has been a number of studies of the interface between poultry and human cases of HPAI (Hien et al., 2004; Dinh et al., 2006; Ly et al., 2007; Vong et al., 2006; Dudley, 2009; Minh et al., 2009²¹; Rabinowitz et al., 2009²², and a review by Van Kerkhove, 2009²³). While realizing that there has been an inadequate number of cases, coupled with inadequate data surrounding the circumstances of the different cases, to undertake powerful epidemiological analyses of the risk factors involved, if at all possible more should be gleaned from better case and outbreak investigation, traceback and trace forward, than is being done at present to prevent the relatively few cases of HPAI that are occurring in humans. The only area in which there has been behavioural change appears to be in families and communities in which fatalities have occurred. Surely this is an area that warrants a review of what has been achieved to date, and potentially for greater collaboration between FAO and WHO, and particularly for the regional ECTAD in Bangkok given the prevalence of human cases in Asia.

Vaccination

Vaccination is an important tool in the inventory of measures available to control HPAI in poultry, and to reduce risk of disease in humans. After initial conceptual resistance to use of vaccination to control HPAI in some quarters, the international community accepted that a properly managed vaccination programme could be used as a tool to assist in the control of

²¹ Minh, P., Morris, R.S., Schauer, B., Stevenson, M., Benschop, J., Nam, H., Jackson, R. 2009. Preventive Veterinary Medicine, 89, 16-24.

²² Rabinowitz, P., Perdue, M., Mumford, E. 2009. Contact variables for exposure to avian influenza H5N1 virus at the human animal interface. Zoonoses and Public Health,

²³ http://www.hpai-research.net/docs/Working_papers/WP10%20_2009.pdf

HPAI, and reduce the massive culling of poultry that was affecting the nutrition and livelihoods of small-scale and backyard poultry sectors. Of the countries included in this evaluation, it has been deployed in Côte d'Ivoire, Egypt, Indonesia and Vietnam. It is in Vietnam where it has been most extensively applied as a national strategy, and in general terms this has been considered to have been valuable. However, there have been major difficulties in terms of funding, logistics and understanding in achieving optimum results from vaccination programmes on a country wide scale in most countries using vaccination. The main problems have been:

- countries and producers putting too much emphasis on vaccination, without corresponding improvements in farm management, movement control and biosecurity;
- achieving an adequately high level of immunity throughout the year in poultry species with short generation times, especially with government programmes using mass vaccination 2 or 3 times per year;
- developing adequate vaccination protocols, cold chain issues and logistics relating to delivery of efficacious vaccines to birds; and
- developing a workable auditing system to assess effective vaccine delivery and the level of vaccine coverage of the population.

With the epidemiological data implicating grazing duck flocks in the persistence and transmission of H5N1 viruses, the need for improved vaccination protocols in ducks has also been identified as an area of research needed to reduce the risk of silent infection and shedding from duck flocks. Additional concerns have related to the level of protection provided by existing H5N1 vaccines as the virus undergoes genetic and antigenic change. Certain H5N1 viruses in China and Indonesia have evolved so that existing vaccines were not fully protective. Laboratories in Vietnam have shown that the current vaccines were still protective against all the strains currently isolated in the country, but the matching of vaccines and diagnostic PCR reagents with newly evolved H5N1 viruses will be an ongoing issue for H5N1 HPAI control by vaccination.

In some countries visited (Vietnam, Egypt, Indonesia and Bangladesh), FAO is involved in strategic discussions to modify approaches taken to vaccination. In Vietnam, strategic research has started to evaluate moving away from mass vaccination (a process which has already occurred in some provinces) to more targeted and better managed vaccination strategies appropriate to different poultry sub-sectors and perceived levels of risk. In Bangladesh, where vaccination was strongly opposed initially by government and the poultry industry, following the disease becoming endemic there has been increased interest in the strategic use of vaccination by both industry and government if the level of disease increases during the winter months in 2009-2010. In Indonesia, the OFFLU project has assisted Indonesia to develop vaccines efficacious against currently circulating field strains,

including the development of a master seed for a novel reverse genetic vaccine based on a recent Indonesia field isolate.

FAO is in the best position to provide technical advice to governments on HPAI vaccination in poultry, but it is also essential that FAO communicate and collaborate with other research groups and institutions working on these problems to ensure that they have the best consolidated advice on vaccination to provide. The RTE2 team was concerned that communication and advice from other groups working on HPAI vaccination in the various regions (such as PANVAC in Africa) were not being considered adequately.

Poultry population database/farm or unit registration

In three countries visited there were schemes underway to develop a farm/unit registration system (Bangladesh, Côte d'Ivoire and Egypt). The examples of Egypt and Bangladesh are quite contrasting. In Egypt, the criteria set out for successful registration and licensing were largely beyond the reach of the sector 4 poultry owners, and difficult even for those in sector 3 (including an 8 m long and 80 cm deep dip for cars, for example), with the result that an estimated 80 percent of producers are unlicensed, and the criteria has created a disincentive to the registration process. The FAO programme in Bangladesh is embarking on assembling an ambitious geo-referenced database of all poultry establishments in the country (Geospatial referencing of commercial poultry farms and live bird markets in Bangladesh, supported by SFERA funds), which if successful should prove extremely valuable. This activity has also been applied in Indonesia, and is seen as an innovation worthy of broader application. The key appears to be ensuring effective engagement of the private poultry sector actors through incentives.

Control of live bird markets and slaughter practices at markets

Live bird markets are a documented source of HPAI virus dispersal. They are also an integral part of poultry marketing in many countries of Africa and Asia, often for the overwhelming benefit of smaller producers and poorer consumers, but in some countries for a wider range of both. The countries visited displayed a variety of responses to the risks associated with live bird markets, ranging from virtually nothing (in markets visited in Cambodia and Nigeria), to organizing groups of sellers and modern cages for poultry (markets around Abidjan in Côte d'Ivoire), to early restructuring and construction of separate facilities for slaughter from open market areas (in a market visited in northern Nigeria and in pilot markets in Bangladesh), to a project to develop a model wholesale market (Ha Vi near Hanoi in Vietnam), to completely banning live markets from cities (with Ho Chi Minh City in Vietnam, and progressively in Jakarta, Indonesia), and to national bans on live bird markets by decree (in Egypt). The issue of live bird markets is a complex mix between human and poultry health and food safety, associated with HPAI and a broader group of infectious diseases and public health concerns, as well as livelihoods, customs and traditions, socio-

economic status and the role of poultry as a source of protein. It seems that this is therefore an area where FAO could perhaps play a more meaningful strategic advisory role, pulling these different issues together and setting out models which build on experience gained from the different countries in which FAO has been involved, and setting out guidelines, or minimal and optimal standards.

Industry restructuring

Several countries visited by the RTE2 team (particularly Indonesia, Egypt and Vietnam) have been contemplating the restructuring of their poultry industries in the past five years as an element of their disease control policies, linked to aspirations of improvements in food safety standards. FAO has developed some initial thoughts on this (see for example Thieme and Guerne, 2007²⁴), basically centred on the model proposed in Vietnam.

The evaluation of the PDSR programme in Indonesia found that not enough attention had been given by FAO to engaging with the private sector. Given the widespread mistrust prevalent between public and private actors, discussions on ways to implement this component (i.e. number IX) and other activities of the NSWP were to be brokered ideally by an external neutral partner such as FAO. FAO and Indonesia have learnt from this inadequacy, and the evaluation team understands that FAO is now taking the lead in facilitating the development of a National Poultry Quality Improvement Programme (NPQIP) with the poultry industry to provide a sustainable and effective framework for collaboration amongst the various poultry sectors and public sector agencies, focused on improving the industry as a whole. In Vietnam, there has been much discussion and many interpretations of proposals for the restructuring of the poultry industry, and the concepts among stakeholders have evolved over time. FAO has provided advice to the lead government entity, the Department of Livestock Production (DLP), and should continue to do so with a view of making sure that all types of producers are consulted and their needs and views are taken into account in the final proposal.

The RTE2 team recognizes that FAO launched a public private partnership programme (OSRO/INT/805/USA), but considers it is too early to properly assess this.

Conclusions

- FAO has placed considerable importance on the role of a set of prevention tools including biosecurity, vaccination, communication and awareness, among other tools.
- Messages on biosecurity are plentiful; behavioural changes in target audiences are scarce.

²⁴ O. Thieme, E. Guerne. April 2007. Poultry Sector Restructuring for Disease Control: Initial Thoughts

- While industry restructuring is identified by many as a requirement for future safe poultry products, there is a variety of interpretations of what it implies, and very few practical strategies on its wider adoption emerging.

Recommendations for the “Disease prevention” pillar

- 1. Moving biosecurity from theory to practice.** It is recommended that FAO take stock of the wide gaps between the quantity and in general terms the quality of messages that have emerged from FAO and other partners on biosecurity at the farm, the live bird market and the household levels, analyse the contributions to these gaps, and develop an updated and longer-term plan, ideally incorporating the generation of empirical evidence on options for the future reduction of infection risk in these three key settings.
- 2. Continued need for understanding of human disease risk reduction.** It is recommended that FAO, in collaboration with WHO and other partners, undertake a review of what has been achieved to date in discerning the risks of human infection in endemic countries, and make recommendations on the conclusions reached and the studies required to update current understanding
- 3. Continued need for understanding of the roles of vaccination.** It is recommended that FAO continue to update its strategic recommendations on vaccination against HPAI, taking into consideration how it might be added to the intervention options portfolio of countries currently choosing not to vaccinate, and how its effectiveness can be judged from experiences in countries where it has been used
- 4. Sustaining and enhancing communications capacities.** It is recommended that FAO enhance its partnership with other organizations working on communication activities in the field, particularly taking advantage of its recognized technical expertise, and, when and where appropriate, take a lead role in information, education and communication activities at farm level, particularly in settings where such activities can be complemented with disease surveillance and biosecurity work
- 5. From industry restructuring to safe integrated poultry production and marketing.** It is recommended that FAO take a strategic lead role in evaluating future poultry enterprise development options that build on the high demand for safe poultry products, on the need for greater biosecurity, marketing and processing innovations, on the exclusive roles that poultry play in livelihoods and food security, and on the need to reduce the global risks from influenzas.

5. Interface with Global and Regional Programmes

The RTE2 was tasked with reviewing the contribution of selected programmes managed from headquarters, including the Crisis Management Centre – Animal Health (CMC-AH), the

Global Early Warning and Response System for Major Animal Diseases including Zoonoses (GLEWS) and the Joint OIE/FAO network of expertise on animal influenza (OFFLU) to national programmes in the field. Contributions from other technical units at headquarters (such as the communication group and TAD Info), as well as the effectiveness of research and technical expertise on wildlife at country level, have been commented on earlier in the report.

The RTE2 team was also tasked with reviewing the contribution of regional programmes to national capacity building and information-sharing, and assessing the roles played by the (sub-) regional ECTAD units in the areas of their mandate.

a) Crisis Management Centre – Animal Health

The CMC-AH is the “rapid response platform” of FAO’s ECTAD, established in October 2006 to enhance FAO’s ability to help member countries prevent and cope with disease outbreaks. Since its inception, and up to June 2009, the CMC-AH has fielded 37 missions, out of which about half (19) have been on HPAI. Two countries visited by the RTE2 team benefited from CMC-AH missions: Nigeria and Bangladesh. Côte d’Ivoire received separate support from staff in CMC-AH.

While the CMC-AH was originally set-up for HPAI, its activity base and mandate have expanded, and this now constitutes the minority of rapid response activities. The team was informed that in 2009 the CMC-AH conducted 5 rapid response missions and deployed two follow-up missions to non-HPAI disease situations across nine countries. During the same period it provided just one response for HPAI and logistical support for another.

In Bangladesh, a CMC mission was fielded soon after the first reported outbreak. The mission’s main recommendation was to develop a consistent and comprehensive approach through the design of a Strategic Framework for HPAI Prevention and Control... to allow coordination of all control activities and actions of stakeholders and donors. This was followed up by FAO through the preparation of the avian influenza Operational Plan in June 2007. In Nigeria, the stakeholders met did not provide the team with feedback on the CMC mission conducted in February 2007. Interventions in Côte d’Ivoire were said to have been timely. As highlighted in the respective reports, CMC-AH activities in West Africa (in Ghana, Togo and Benin in 2007 and early 2008) were conducted in close association with the sub-regional ECTAD Bamako office, and a particularly close collaboration of FAO headquarters, regional and country teams and authorities was noted by the RTE2 team during the suspect case in Côte d’Ivoire.

b) Joint OIE/FAO network of expertise on animal influenza (OFFLU)

OFFLU is the joint OIE/FAO network of expertise on animal influenzas, established in 2005 to support international efforts to monitor and control infections of avian influenza in poultry and other bird species, and to share biological material and data to provide input to the

early development of human pandemic vaccines (i.e. interface with WHO). This joint OIE/FAO body supervises the maintenance of the OFFLU website containing detailed analytical information on genetic and antigenic characteristics of H5N1 and other relevant influenza viruses.

The RTE2 team was asked to review whether OFFLU data exchange and technical expertise have improved national capacity for laboratory diagnosis, vaccine efficacy and development. The team noted that in several countries OFFLU has been a major contributor to the provision of technical advice on biosafety guidelines, and to coordination activities for FAO and OIE AI/ND reference laboratories. OFFLU has also supported the building of country and regional AI laboratory and epidemiology networks in Africa and Asia, the coordination of training for these laboratories, the provision of AI laboratory proficiency testing systems in Africa and Asia, and supplying experts for multidisciplinary missions to member countries. The enhanced laboratory and epidemiology systems in place as a result of H5N1 were shown to be particularly useful for new animal influenza surveillance when the H1N1 2009 influenza pandemic commenced. OFFLU has also been active in the development of genetic analysis and antigenic profiling of H5N1 viruses in Nigeria, Indonesia and Egypt. In the latter two countries, this effort has been to enhance H5N1 AI vaccine strain selection. This is the process followed by a well resourced network of WHO influenza laboratories which results in new human vaccine strains every 6 months. There would be some concern, however, if this was being advocated routinely for poultry H5N1 vaccines. This is unlikely to be economically feasible for low-cost veterinary vaccine manufacture, and it may not be necessary for poultry vaccines given with oil-in-water adjuvants, which show greater cross-protectivity than human influenza vaccines.

c) Global Early Warning System for Major Animal Diseases (GLEWS)

GLEWS was originally established as a disease intelligence group within EMPRES. It has now grown and become a joint FAO/OIE/WHO initiative that aims to improve early warning and response capacity to animal disease threats of the three sister organizations. Information from various disease intelligence sources is assessed daily by GLEWS and other ECTAD staff and fed into effector arms of ECTAD and to the CVOs of relevant countries through partners in OIE. Mechanisms of information dissemination are the daily update report, ECTAD HPAI Situation Update and H5N1 HPAI Global Overview Reports produced by EMPRES/GLEWS. It has recently launched a website for easier dissemination of public products and reports.

The in-country FAO staff take an active role in reporting to GLEWS and generally have appreciated the data fed back from EMPRES/GLEWS. FAO might further explore the opportunity of strengthening and then involving the Rome-based GLEWS epidemiology staff in leading the improvement of country-level epidemiological data, analysis and use.

d) Regional programmes

As reported by the First RTE, the FAO regional programme at its initial stages (2004-07) consisted mainly of TCP projects aimed at engaging with countries and regional organizations through networking of relevant government veterinary services and laboratory representatives. These networks have largely continued to function, thanks to the mobilization of additional resources and the establishment of ECTAD units in Tunis, Bamako, Nairobi, Gaborone, Kathmandu and Bangkok.

The regional networks have been used by FAO (chiefly ECTAD Bamako) to conduct capacity building activities and promote exchange of information and regional collaboration. The RESOLAB network in West African is probably the most active seen by the RTE2 team, but as noted in the ECTAD Bamako report there is still an absence of buy-in and ownership from countries as the network still requires further FAO championing and promotion. The case of southern Africa is perhaps exemplary and a possible model for the others, as the ECTAD regional programme is implemented with and through the Southern African Development Community's (SADC) Livestock Unit.

After a relatively late start, ECTAD Nairobi and ECTAD-RAP are both moving firmly in the same direction in support of regional trade blocks, such as the East Africa Community and the Association of South East Asian Nations, respectively. ECTAD Tunis has also made progress in this aspect, being the only one with a Memorandum of Understanding with a regional body, the Maghreb Arab Union (UMA in French), which was signed in February 2008 to coordinate respective activities in the region, while discussions are ongoing to formalize FAO support to UMA's permanent veterinary commission.

As noted in the reports of the RTE2 team visits to ECTAD Bamako, ECTAD Nairobi and ECTAD-RAP, these units have played a very relevant role in the formulation, coordination and sometimes implementation of regional and national projects in countries under their responsibility. These units have also made some initial progress in advocating and mobilizing resources for diseases other than HPAI. This progress, however, is not yet firmly grounded. Activities are still heavily dependent on the availability of HPAI-related funds including those from SFERA. Interest from countries in a regional approach has not yet been translated into greater ownership and championing of the approach by regional bodies or countries themselves. There remain serious financial and institutional issues, particularly in Africa where the lack of funds for diseases other than HPAI and the delays in finalizing the agreements with African partners (such as OIE, AU-IBAR, sub-regional trade blocks and donors), have prevented the full operationalization of joint Regional Animal Health Centres.

The RTE2 team considers that ECTAD Rome and ECTAD at (sub-) regional levels also need to develop some criteria for the prioritization of their support; in doing so, attention should not only be given to the current size of the programmes or the disease situation, but also to

the potential needs for motivation and support especially when there are social, cultural and political environments that are not conducive to effective provision of assistance.

Conclusions

- The (sub-) regional ECTAD units play a valuable role in backstopping country programmes, in coordinating regional networks, and potentially in assisting with preparation of fund raising proposals.
- It will be important for their continued credibility and comparative advantage that the (sub-) regional ECTADs be staffed by the highest possible calibre of expertise.
- It will be important that the (sub-) regional ECTADs have well articulated visions, missions, strategic goals and budgeted programmes which are used to good effect in seeking sustainable funding for their existence.
- It is essential that the (sub-) regional ECTADs take a broad view of their disease mandate, building on the concepts of the Global Framework for the progressive control of transboundary animal diseases (GF-TADS), but also considering priority constraints to the countries within their regions.

Recommendations for the global and regional programmes

1. **FAO should develop a set of criteria for prioritization of global and regional support to countries:** the support should be aligned to country-level strategic programmes and work plans and go beyond individual project responsibilities; given the importance of women in poultry production, “greater impact on gender equity” must be one of the criteria to be included (see discussion below).
2. **Regional roles:** FAO should take note of the increasingly important roles of sub-regional and regional ECTAD units, and potentially multi-institutional RAHC, in supplementing the funding opportunities for these units, through multidisciplinary initiatives such as the OWOH initiative, while strengthening their technical and operational capacity.

6. Operational management

In reviewing the operational management of FAO national programmes, the RTE2 team has focused on the following areas: programming, financial resources, human resources, procurement, partnerships and gender aspects. Under a separate heading, the team also presents a summary assessment of the overall efficiency of programme management.

a) Programming

At the global level, FAO has developed a number of programming documents since the initial appearance of the disease; the most relevant have been the joint FAO/OIE Global

Strategy for the Prevention and Control of H5N1 Highly Pathogenic Avian Influenza, and the associated FAO Global Programme for the Prevention and Control of H5N1 Highly Pathogenic Avian Influenza (last revised in October and February 2008, respectively).

The RTE2 team has studied these documents, and finds them valuable living documents that have provided, and can continue to provide, overall guidance for global operations and fundraising (see section below); their regular revision is important. In view of the particular focus of the evaluation on country-level assistance, the RTE2 team is not in a position to provide a detailed assessment of the overall effectiveness of these global programming tools. It has, however, made use of some of the M&E elements (such as the list of country-level outputs and outcomes found in section four of the Global Strategy, and the outputs listed in the logical framework of the Global Programme) in their assessment.

The RTE2 notes that the programmatic approach developed by FAO for HPAI has in several ways been innovative for the Organization. More recently, and building on the HPAI experience, FAO has developed a Food Chain Crisis (FCC) Management Framework²⁵ which links prevention and early warning with response capacities within FAO for animal health, plant health and food safety issues.

At the regional level, the RTE2 finds that strategic programming has been high on the agenda of FAO. Regional Strategies for Africa and Asia were prepared in 2006 and assessed by the First RTE. The ECTAD unit in Bamako and ECTAD-RAP in Bangkok have both developed regional strategies and associated work plans that have largely guided the work of the Organization at the regional level. The RTE2 was informed that other ECTAD regional units have been asked to prepare regional strategies, and commends this move.

As previously discussed, country level work has tended to be more opportunistic²⁶, particularly in those countries where FAO had no strategy of its own. In some countries, FAO has tried to address this issue supporting the development of FAO National Medium-Term Priority Framework (NMTPF) and through the development of sectoral NMTPFs for Animal Health called National Medium-Term Priority Plan (AH-NMTPP).

ECTAD staff has actively contributed to the preparation of NMTPFs in countries such as Afghanistan, Burundi, Democratic Republic of Congo, Indonesia, Iran, Nigeria and Zambia. AH-NMTPPs have been prepared in countries where animal production is a priority, in line with national and regional strategic documents, co-owned by Government and FAO, defining priorities and proposing costed concept notes, supported by a strategy. AH-NMTPPs (2009-2011) for the Democratic Republic of Congo, for Burundi and for Rwanda were signed in January 2009. AH-NMTPPs for Benin, Côte d'Ivoire and Togo as well as for Bangladesh, Indonesia and Vietnam are reportedly under negotiation.

²⁵ Food Chain Crisis Management Framework (September 2009)

²⁶ The RTE2 noted that the quality of proposals developed at country level have improved over time, moving from a generic template to more detailed project proposals that in some cases included logical frameworks.

The RTE2 team found that the HPAI-NMTPF in Nigeria was instrumental in developing a more focused and jointly agreed approach for FAO support on HPAI. The RTE2 team was not able to establish the relevance and effectiveness of the NMTPFs and NMTPPs developed for other countries, but an ongoing strategic evaluation of FAO country programming including the NMTPF mechanism managed by OED will likely assess these programming tools in more detail.

b) Financial resources

In reviewing the operational management of FAO HPAI programme, it is important to realize that this is probably the largest livestock programme ever implemented by FAO, with over 160 projects and 33 donors and currently operational in practically the whole world. The allocation of HPAI funding by regions during the period 2004-2009 was as follows.

Table 2. FAO HPAI Programme Budget and contributions received as of October 2009

Region	Total Budget (in US\$)	Contribution received
Asia and the Pacific	152,695,069	112,478,354
Africa	48,571,610	41,770,272
Interregional Activities (including SFERA & CMC-AH)	47,905,301	44,641,125
Middle East and North Africa	20,910,502	14,200,614
Central Asia, Europe, Latin America	12,317,179	10,547,932
TOTAL	282,399,661	223,638,297

FAO success in mobilizing funds at the global level masks the constraints faced to fund more substantial responses in countries like Egypt or Bangladesh; it also masks that the nature of the funds available were largely of a short-term nature, and that the peak in annual contributions was reached between 2007 and 2008. External funding for the HPAI global programme is now expected to wind down in 2010, which will primarily affect regional and national programmes in unaffected countries that have not been able to attract longer-term and earmarked funding and expand their donor base.

The rapid expansion of the programme caught some FAO financial units at regional and country offices ill-prepared, with some field offices lacking the experience, manpower and capacity to monitor effectively the delivery of funds. This was the case in Indonesia and most other Asian countries. The intensive training and support provided to financial units at country level, coupled with the strengthening of the operations units in regional (such as Bamako and Bangkok) and country level ECTADs, have largely solved the capacity issues related to financial monitoring and reporting. In some countries, there are however still major financial reporting requirements as a result of the spectrum of donors and funding modalities involved. In the view of the RTE2 team, further streamlining and efficiency

savings could be realized if donors were to make more use of SFERA as a funding mechanism.

c) Human resources

An important element of FAO's field programmes is inevitably good in-country leadership. The RTE2 found that the current leadership in all countries visited was sound, providing the appropriate balance between technical knowledge, management skills and communications skills. The RTE2 team lauds the recent efforts made by FAO to recruit senior staff²⁷ for CTA positions from the broad region itself in a competitive manner. This approach has been actively exercised by the ECTAD-RAP manager in Bangkok, and although less proactively it was also noted in Africa and the Near East²⁸.

An issue that was noted in Bangladesh, Vietnam and Indonesia, and reported in several countries in Africa, was the absence of performance evaluation measures with a feedback loop, which could eventually lead to staff development, continuity or even promotion. Another aspect of human resources management that FAO tended to underestimate was related to the interface between international staff and a sometimes large number of national actors at various levels. The RTE2 team was informed that in a relatively high number of cases staff left their positions due to conflicts with stakeholders and due to the often limited duration of contracts being offered.

d) Procurement

The RTE2 team was informed of serious delays relating to the procurement of vehicles in Indonesia, but apart from this case, there were no other concerns in this area. The RTE2 team noted that FAO has applied lessons from other emergency interventions (such as the use of Letters of Agreements with governments for sub-contracting field work) and develop some innovative mechanisms such as the regional banks of laboratory reagents in southern and West Africa to facilitate restocking.

e) Efficiency of programme management

Efficiency is a function of the efficiency of FAO's central and regional activities (Rome and the regional ECTADs), and the interface between FAO and governments at the national level. In all countries visited there had been delays of some kind, some on relatively minor issues, some on major projects, some as a result of government inefficiencies, some as a result of FAO approval delays, and many a result of delays or inefficiencies on both sides. However, in virtually all cases, the efficiency of activities had progressively improved. A major contributor to the improvement in efficiency at country level has been the

²⁷ The six long-term technical consultants recruited for projects in the Asia region in 2009 have all come from the region itself.

²⁸ FAO national HPAI activities in Côte d'Ivoire, Ethiopia, Kenya and Uganda were all led by nationals of these countries. Programmes in Nigeria and Egypt are led by nationals from the Africa region.

appointment of operations staff in country programmes, in some cases complemented with the fielding of administrative and finance officers, allowing the CTAs to concentrate more fully on technical and strategic issues.

Given the intensive work schedule in all countries, there is arguably inadequate time spent on regular broader strategic thinking and planning to question the effectiveness of activities in place, to discuss efficiency and effectiveness, and to adjust programme activities accordingly. Although FAO headquarters has made some efforts to strengthen the links between veterinary technical, socio-economics, production and communication activities, there is still substantial room for improvement, and particularly at the country level where differences in understanding and uptake still exist.

f) Partnerships

FAO country programmes have developed many partnerships with and beyond the government stakeholders in each of the visited countries. These are important if FAO is to play a leadership role, and generally FAO programmes have done this well. In all countries there has been a progressive improvement in the engagement of partners. Related to issues of pandemic preparedness, however, the entry of H1N1 has altered the balance between FAO and WHO in several countries (such as Cambodia), and with all the other activities and responsibilities of FAO in country staff, there will be an inevitable tendency for FAO to delegate to WHO, or in the case of Vietnam to the overall UN coordination unit, but it must ensure that its engagement continues.

The RTE2 team found that partnerships between FAO and other research and development agencies were sometimes lacking. There were examples of very sound linkages; in the case of the partnership with CIRAD on the role of wildlife in West and central Africa, collaboration was very effective. In some cases, however, these were not as strong as they might be at the country level. Specific examples include the interface with the DFID-sponsored IFPRI led programme, particularly in Nigeria, with the Massey University and ACIAR projects in Vietnam. In other cases, such as with ILRI in Egypt and Indonesia, collaboration was more effective, but not without complications. The RTE2 team also considers that FAO would benefit from engagement with a wider range of research and development partners in pursuing sound evidence-based policies and strategies.

By far the largest single gap in partnerships is with the poultry private sectors. This was more obvious in countries with a progressively important industrial sector (Indonesia, Vietnam, Bangladesh and Egypt). The RTE2 team has recommended that FAO step up its support to government in the engagement of the various components of the poultry private sectors in general recommendation 5.

g) Gender aspects

The RTE2 team sees gender aspects in the response to HPAI at two different levels; one, at the level of targeting women poultry farmers and other players in the poultry value chains through training and other field activities, and second, at the level of staffing in FAO.

The links between household and smallholder commercial poultry production and gender are well known. Throughout the world women in rural areas tend to take care of the household, and with that comes the responsibility authority for small livestock species such as poultry, pigs, ducks, etc. The endemicity of HPAI in countries like Egypt, and the role women play in handling, marketing and slaughtering has disproportionately affected women (over 70 percent of human cases have been women). FAO has developed a concept paper on gender and socio-economic issues in avian influenza control, completed in March 2006, and conducted socio-economics studies that incorporated gender aspects (in India, Indonesia, Cambodia and Laos). FAO, together with the Ministry of Agriculture and Rural Development (MARD), has also conducted gender analysis in poultry production in Vietnam with a view to better targeting control measures. These studies and related research have provided greater insights, but with the exception of Cambodia and Indonesia they have apparently not led to discussions or changes to FAO advice in the field.

Regarding gender equity in staff, the RTE2 team was pleased to see a relatively high number of women working for FAO in the field (as CAHO in Egypt and PDSR officers in Indonesia) but also in positions of greater responsibility (such as CTAs and regional project co-ordinators). Nevertheless, there is still much progress to be made to reach job parity particularly in senior positions. In Bangladesh, the RTE2 team learned of the 20,000-strong all-women team of field workers assembled by BRAC to better reach women poultry producers, and recommended stronger engagement with BRAC.

The RTE2 team was informed of recent efforts at ECTAD-RAP to monitor the effectiveness of capacity building activities on women. This included receiving data on trainings conducted, disaggregated by the gender of beneficiaries. The mission was told that due to problems with the quality of the data, it has not been possible to undertake an analysis of this data. No other FAO initiative with a specific focus on gender aspects was apparently ongoing at the time of the RTE2.

Conclusions

- The programmatic approach developed by FAO for HPAI has been valuable to guide global and regional operations and fundraising, and has in several ways been innovative for the Organization. FAO is currently involved in several initiatives at the global level (such as the OWOH) and has recently developed new programmatic frameworks and tools (such as the FCC, NMTPF and NMTPP) which would merit further review.

- FAO success in mobilizing funds at the global level masks severe limitations to fund activities in some endemic countries. It also masks that funds were mostly of a short-term (emergency) nature and often earmarked for specific activities or countries. Partially as a result of this, there has been a slow pace of evolution from emergency to broader responses that capitalize on investments made to tackle other transboundary, emerging and endemic disease threats.
- The technical expertise, leadership and commitment of FAO country and regional staff are a major asset of the programme; management of human resources, from staff selection, mentorship and performance evaluation have, however, not always been adequate. Some of these issues are now being addressed at the corporate level as part of the ongoing reform of FAO, while others, more specific to emergency settings, are being reviewed following a management study of FAO's operational capacity in emergencies.
- Efficiency of programme management has in some cases been affected by delays and constraints on the part of FAO but also of governments; a major contributor to the improvement in FAO's efficiency has been the appointment of operations staff at the country level which was complemented with other administrative expertise when needed.
- The increased efficiency of programme management has yet to be translated into broader strategic thinking and planning of activities that effectively link the veterinary and non-veterinary components of the FAO HPAI programme; there is still substantial room for improvement, and particularly at the country level where differences in understanding and uptake still exist.
- FAO has built strong relationships with many partners including government, donors and regional and country-level institutions, but there have been some significant gaps, particularly in engaging with the poultry private sectors. FAO would also benefit from engagement with a wider range of research and development partners in pursuing sound evidence-based policies and strategies.
- There has generally been very limited engagement with the private poultry and animal health sectors which has hindered programme implementation and effectiveness.
- FAO has attempted to incorporate gender equity issues in the overall HPAI response, particularly in south East Asian countries. It has also lately tried to hire staff taking into account gender considerations. There is still much progress to be made in targeting field activities to the right recipient (gender-wise) and to reach a satisfactory level of job parity within FAO particularly in senior positions.

Recommendations for operational management

1. **Flexible funding mechanisms such as SFERA should be made more use of by donors.**
Donors should be encouraged to utilize the SFERA pool funding mechanism rather than setting up individual projects, and to accept greater use of such funds for preparatory and follow-up work at the country level. Building on the important role played by SFERA in the HPAI response, it is recommended that an **“animal health” SFERA programmatic window be opened** and contributions made by the donors. Such a window would also enable the CMC-AH to continue to provide timely responses to requests for assistance made by member countries, and for FAO in general to broaden the scope of the response and ensure the required follow-up activities.
2. **Improve management of human resources**, including greater use of pooled funding for human resources, procurement, etc. This type of funding should allow for consolidation, continuity, and more efficient and flexible use of resources. FAO should also consider mainstreaming its current policy in Asia of selecting staff, which takes into account not just technical but also geographical, managerial and cultural expertise as well as capacity building and gender considerations.
3. **Make greater use of FAO HPAI staff collective expertise**, enhancing internal communications and learning and promoting stronger engagement with, and feedback from, units other than AGAH or TCES as appropriate; achievement of this recommendation will also help in mainstreaming the HQ-led drive towards multidisciplinary particularly in regions/countries with lower availability of broader technical expertise.

7. Broader outcomes of FAO’s interventions

The RTE2 team has summarized in the previous sections its findings, conclusions and recommendations of FAO’s work on HPAI. Below the RTE2 team provides a general assessment of FAO’s work on HPAI using the FAO/OIE global strategy outcome targets as well as brief assessments of the broader outcomes of FAO’s interventions at country level in contributing to the four interrelated goals below:

- Prevention and control of HPAI;
- Broader disease surveillance;
- Pandemic preparedness; and
- Longer-term agricultural development, economic growth and poverty reduction.

a) Prevention and control of HPAI

The FAO/OIE Global Strategy lists 11 country-level outputs and outcomes of the global programme that should be achieved within 2 years of the response. Below is a table summarizing the RTE2 team rating (from 1 - not achieved, to 5 - fully achieved) based on the accompanying country and regional reports and the workshop proceedings.

Table 3. Summary table with ratings to FAO/OIE Global Strategy outcomes and outputs

Expected Output/Outcome	Rating
1) All countries with endemic/entrenched infection and recently infected will have developed and started implementation of appropriate longer-term plans for management of H5N1 HPAI, which will include strong communication components and will incorporate milestones and review points.	3
2) Recently infected countries will have eliminated infection, determined reasons for the initial incursion(s) and implemented appropriate corrective measures to prevent further outbreaks in poultry.	2
3) All countries at high risk of HPAI incursion (e.g. those having an infected neighbouring country) will have strong targeted surveillance programmes in place including in wild birds and will have enhanced capacity for early detection and emergency response. They will have revised and tested their emergency preparedness plans and incorporated review points for early assessment of the likelihood of success in eliminating infection using traditional control measures alone and consideration of use of vaccination.	3
4) All countries will be conducting regular risk-based surveillance for HPAI virus circulation and results and virus isolates will be shared with the international community. Systems will be in place at international, regional and country levels to allow updating of vaccine antigens in the event of emergence of significant antigenic variants, in particular in countries using vaccines.	2
5) Detailed, costed plans for strengthening of veterinary services based on OIE-PVS evaluations will be prepared and gap analysis carried out.	2
6) Poultry production and market chains will be analysed and high-risk practices will be identified in all countries. Social, economic and feasibility studies on proposed changes to overcome these problems are completed.	3
7) Epidemiological and socio-economic studies will have been carried out to provide information to support targeted, risk-based vaccination.	2
8) Research on wild birds and on other possible H5N1 hosts as well as on new vaccines will have continued particularly focusing on studies that improve the delivery system.	3

Expected Output/Outcome	Rating
9) Improved public-private partnerships and relationships will be evident between government and the poultry industry.	1
10) Regional and international collaboration on H5N1 HPAI control and prevention will be strengthened with greater transparency in reporting and exchange of information.	4
11) A new “One World-One Health” strategy will be in place to address the main emerging or re-emerging diseases at the human-animal interface. This strategy is implemented through more investment from the governments and international community, with the support for the international organizations in particular FAO, OIE and WHO.	3

Acknowledging some variation between the countries visited, the overall assessment of the RTE2 team is that FAO and its partners have been only partially successful in achieving some of the outcomes delineated in the Global Strategy for HPAI prevention and control. Evidence gathered by the RTE2 team suggests that FAO achievements in areas where global or regional initiatives and collaboration were involved (such as the strengthening of regional and international collaboration and transparency of reporting) can be rated with higher scores (4). Lower scores were assigned to achievements in areas that include integrated multidisciplinary studies (such as socio economy and wildlife research) and the use of such studies for improved (“risk based”) surveillance and control. The lowest score (1) was assigned to the single area that has received less attention from FAO and its partners, which is the limited interaction of FAO with the private sector in endemic countries such as Indonesia, Bangladesh and Egypt.

The RTE2 lauds the inclusion of outputs and outcomes in the September 2008 update of the Global Strategy document, and at the same time suggests that these need to be revisited regularly to ensure that they are being updated with new knowledge, and that they have the appropriate degree of specificity to be useful in monitoring achievements and progress.

b) The impact of HPAI programmes on broader disease surveillance at the country level

There is an argument that HPAI has taken the limelight to such an extreme that it has diverted resources from other priority animal health constraints. On further examination in this evaluation, while it is indeed true that HPAI has stolen the limelight, the issue of diverting resources is more complex. There were very few resources going to animal health initiatives in many parts of the developing world, and the funds for HPAI have changed that situation - and dramatically. This was a unique funding opportunity. However, full advantage of this opportunity to strengthen preparedness and response on a broader scale has not been taken full advantage of.

As documented in the individual country reports, the FAO programmes have built substantial capacity in office, field and laboratory settings for preparedness and response to HPAI. At the institutional level, this has included the preparation and planning of responses, planning and management of programmes, the development of funding proposals, and the implementation of project monitoring and evaluation. At the policy level, it has included issues such as legislation and communications, and support to strategy in areas such as compensation and biosecurity guidelines. At the personnel level, this has included training of veterinarians, technicians, paravets, and community animal health workers of various categories.

All these activities have occurred in an environment of increased funding to, and recognition of, veterinary services. Inevitably, these enhancements, in the form of more people, better trained people, better planning, better communication, better interface between institutions, will have a very positive effect on the generic capacity for broader disease surveillance in each of the countries visited. But importantly, all countries identified other priority disease concerns which have not gone away, or received any renewed attention, since the advent of HPAI.

Other priority livestock diseases identified during the country visits are available in the table below.

Table 4. Priority disease concerns in countries visited by the RTE2 team

Country	Poultry	Pigs	Ruminants
Nigeria	Newcastle disease, Gumboro disease	African swine fever, FMD	FMD, PPR
Côte d'Ivoire	Newcastle disease, Gumboro	African swine fever, FMD	FMD, PPR
Egypt	Newcastle disease, Gumboro disease	N/A	FMD, Ephemeral fever
Bangladesh	Newcastle disease, Gumboro disease	FMD	FMD, haemorrhagic septicaemia
Cambodia	Newcastle disease, Gumboro disease, duck plague	FMD, PRRS	FMD
Vietnam	Newcastle disease, Gumboro disease, duck plague	FMD, PRRS	FMD

Much of the capacity building undertaken in the field services should be relatively easily applicable to other poultry diseases, in particular in terms of surveillance mechanisms and biosecurity principles in the mixed farming systems. However, this will not necessarily be the case for the provision of control measures; Newcastle disease vaccination takes quite

particular mechanisms for delivery and for coordination with the vaccine manufacturers, and while Vietnam with its HPAI vaccination programme may be better placed than most, the lack of consideration of these two diseases together has been a missed opportunity in most countries. The direct applicability of HPAI laboratory capacity to other diseases is not given either. Clearly, general laboratory training, revamping of sample submission protocols and the provision of equipment should be widely applicable, but these capacities are not a panacea for all diseases. For the other diseases of pigs and ruminants, much will need to be done to expand the range of knowledge and understanding to the diagnosis of these, although many of the systems abilities (such as reporting channels etc.) are likely to be broadly applicable.

c) Pandemic preparedness

Investments and capacity development for HPAI have almost certainly had certain impacts on pandemic preparedness, but they are not easy to measure; and surprisingly indicators for them have not been established in most of the countries, despite pandemic preparedness being one of the drivers of support to HPAI. The RTE2 team used the arrival of H1N1 as a surrogate, and probed on how responses had differed to when H5N1 first arrived. In all the countries visited there had been a substantial enhancement of influenza pandemic preparedness planning involving poultry and human health, with multi-institutional committees already in place, and communications channels already established. In addition, there was improved disease surveillance knowledge and capacity that could be applied to other livestock species; enhanced laboratory diagnostic capacity for influenza diagnosis; improved reporting and communication systems; and improved awareness of risks and general availability of personal protective equipment especially for outbreak areas and those investigating the disease. But, as mentioned, much of this is anecdotal as key indicators have not been established.

d) The interface between HPAI programmes and longer-term agricultural development, economic growth and poverty reduction

Preparedness and responses to HPAI were clearly not specifically designed to have broader impacts on agricultural development, economic growth and poverty reduction per se; they were set up with much more specific objectives. Nevertheless, it seems logical to assume that an Organization such as FAO would consider how to ensure maximum relevance to its broader development targets, within the context of the more focused goals of HPAI containment. FAO has strongly and relatively successfully advocated against the extreme mass culling in some countries to protect nutrition and livelihoods of the small-scale and backyard poultry sector. However, it has been slower to advocate for funding partners to support development aspects that could have complemented the emergency response activities and had significant and sustainable capacity building impacts. Examples include enhancing investigation/surveillance, diagnostic and control activities for diseases affecting

livestock enterprises for the small-scale and backyard producers, or involvement of livestock production and socio-economic studies in efforts to improve industry structure and biosecurity. It appears that these issues are now becoming increasingly to the fore.

Conclusions

- The inclusion of short-, medium- and long-term outcomes and impacts in the strategy document is a valuable innovation. It appears that the countries visited are still struggling to achieve many of the short-term outcomes.
- The outcomes listed in the strategy document might benefit from greater specificity in order to monitor progress by countries more effectively.
- HPAI investments have had some impacts on broader disease surveillance and response capacities, and to pandemic preparedness, but clear indicators have not been developed for other priority diseases, and more thought needs to be given to broadening the relevance of HPAI investments.
- The RTE2 team was not tasked to review the role of global partnerships (including the GF-TADs and the OWOH initiatives) nor institutional issues including FAO's management and decentralized structure for HPAI (such as the ECTAD model or the FCC Management Framework); a comprehensive assessment of FAO's contribution to and lessons from these endeavours should be conducted through an independent evaluation that focuses on broader issues beyond HPAI.

Recommendations for broader outcomes of FAO's HPAI interventions

1. Conduct in two to three years' time a **comprehensive evaluation of FAO's contributions to reduced animal disease and associated human health risks** (Organizational Result B2)²⁹ that looks into HPAI and FAO responses to other animal diseases from a multidisciplinary and holistic point of view; this evaluation should ideally be carried out following a stock-taking exercise on the impact of FAO's support to the global response to the HPAI crisis, and take into account progress made in the consolidation of the ECTAD model and the implementation of the FCC management framework.

²⁹ <ftp://ftp.fao.org/docrep/fao/meeting/017/k5831e.pdf>