Food and Agriculture Organization
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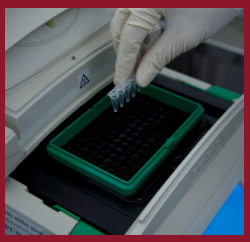
Legacy Document

Eight years of immediate technical assistance activities strengthening emergency preparedness for HPAI in Viet Nam



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Acronym list

AVET	Applied Veterinary Epidemiology Training
BSWG	Biosecurity Working Group
DAH	Department of Animal Health
DLP	Department of Livestock Production
ECTAD	Emergency Centre for Transboundary Animal Diseases
GDPM	General Department of Preventive Medicine
GETS	Gathering evidence for a Transitional Strategy
GoVN	Government of Viet Nam
HPAI	Highly Pathogenic Avian Influenza
LBM	Live Bird Market
MARD	Ministry of Agriculture and Rural Development
MOH	Ministry of Health
NAEC	National Agricultural Extension Centre
NCVD	National Centre for Veterinary Diagnostics
OIE	World Organisation for Animal Health
PAHI	Partnership on Avian and Human Pandemic Influenza
PVM	Post-vaccination monitoring
RAHO	Regional animal health office
SDAH	Provincial Sub-Departments of Animal Health
USCDC	United States Centers for Disease Control and Prevention
USDA	United States Department of Agriculture
UNJP	United Nations Joint programme
USAID	United States Agency of International Development
WHO	World Health Organization

Introduction

HPAI and the Agriculture Sector in Viet Nam

HPAI and the Agriculture Sector in Viet Nam

Introduction

The history of the battle to control HPAI in Viet Nam is relatively short but within the past 10 years there have been many insights developed, as well as some twists and turns in the road to the current level of success. As the concerted HPAI effort supported by FAO is coming to an end, albeit to be adapted into a broader One Health approach to animal health and zoonotic diseases, it was considered timely that a retrospective overview of the programme be produced to capture key elements and lessons that have arisen. A key adjunct for this retrospective is the FAO document 'Lessons from HPAI – a technical stocktaking of outputs, outcomes, best practices and lessons learned from the fight against highly pathogenic avian influenza in Asia 2005-2011'. Consistent with that stocktake, this retrospective on the HPAI control effort in Viet Nam does not attempt to be a comprehensive compilation of all the outputs and outcomes from the HPAI programme, but is rather a synopsis that captures the key experiences and challenges faced in Viet Nam in addressing this complex disease problem, concentrating on the USAID inputs but also with reference to other project areas as appropriate. This document examines the HPAI situation in Viet Nam at several points during the last 8 years through the prism of activities and outcomes in key areas such as coordination, surveillance, laboratory services, vaccination, biosecurity, socio-economics and communications and advocacy.

Background information

Country context

The current human population of Viet Nam has grown from about 82 million in 2004 to about 92 million in 2014, giving some indication of the recent growth trajectory. Most of the population is concentrated in the Red River Delta and the Mekong Delta, not surprisingly as this is where the most productive land for rice based agriculture lies. However there is also the impact of increasing urbanisation focused on the major population centres of Hanoi and Ho Chi Minh City. While approximately 70% of the population still lives in rural areas, 77% of population growth in the last 10 years has taken place in urban populations. This urbanisation separates many consumers from the source of production and rising incomes generated by a rapid liberalisation of the economy has increased dietary demand for animal protein. Cultural demands as well as infrastructure deficits mean that there are large live bird markets handling the poultry demands of these urban centres and so poultry populations tend to be most concentrated in the Mekong and Red River Delta areas.

A significant background issue was the significant transformation that had taken place in the poultry sector in Viet Nam in the period leading up to the recognition of H5N1 in poultry in Viet Nam, and also to the structure of the poultry production system. Both poultry and pig production were areas of the agriculture sector that had responded to the changes in government economic policy and the growth in gross domestic product in the years leading up to 2003 and the imbalances that came with rapid growth made both highly susceptible targets for epidemic infectious agents. By way of illustration the standing poultry population in Viet Nam increased from 133 million in 1993 to 254 million in 2003, with an annual growth of 9.1% in the three years prior to the epidemic. A further indication of the demand driven growth is that imports are about 10% of the local production. At the same time there was not a change in technical or operational capacity within the GoVN animal health services to deal with the challenges arising. Importantly about 8 million households were involved with poultry production

with about 50% of poultry held by producers with less than 50 birds and 95% of producers have less than 50 birds. These figures illustrate the constraints faced in attempting any interventions that involved individual producers as the sheer weight of individuals engaged in production and the issues related to service delivery to small holders created big challenges for HPAI control. The poultry population fell in the period 2003-2006 as a result of H5N1 HPAI and the measures introduced to control the disease. In 2004, the year that the poultry sector was worst hit, the poultry population decreased by 26% in the south and 19% in the north compared to 2003. (Figure 1,
Table 2-3) From 2007 onward poultry populations started to rise again and recovered completely to exceed pre- HPAI levels by 2009. The figures do not account for the informal trade specially with China for which there are no official estimates. But this demand also opens the potential for new viruses to enter the country.

Within the poultry sector another significant factor was that the growth in duck numbers

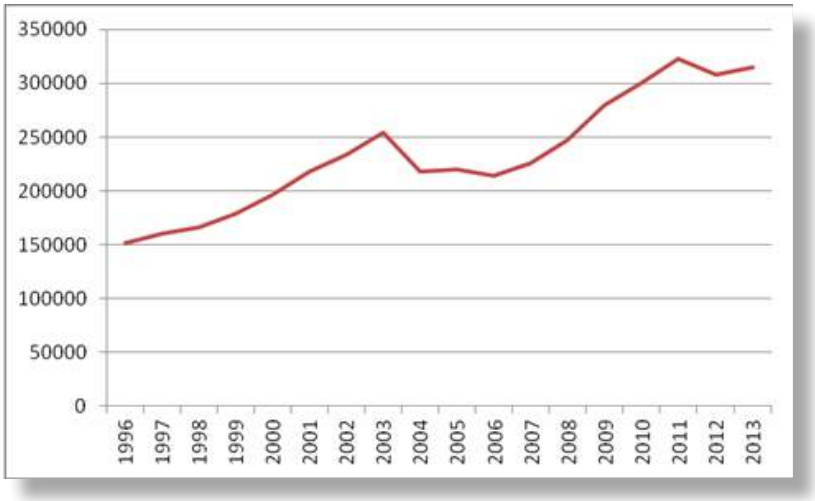

***Figure 1**: National poultry numbers 1996 – 2013*

Source: DLP (2013)

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
372.7	316.4	321.9	344.4	358.8	448.2	518.3	621.2	696.0	729.4

***Table 2:** Poultry meat produced in Viet Nam (thousands tons)*

Source: FAO stat and DLP (2013)

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1.1	35.5	5.4	37.3	156.2	222.6	N/A	N/A	76.5	74.2

***Table 3:** Poultry meat legally imported into Vietnam (thousands tons)*

wasproportionately greater than chickens and by 2003 there were about 60 million ducks present. Anecdotal evidence suggests that duck numbers were significantly reduced by 2006, although official statistics are not available. Since 2007 there has been an estimated increase of about 12.4% annually in the Mekong Delta to reach 67.5 million in 2012 and nationally the estimate was 84.7 million. This recovery indicates the resilience in the production system as well as the demand for product. It is also important to recognise that ostensibly all ducks are raised in free range systems and in the Mekong Delta especially large numbers of ducks are nomadic, being moved from place to place and province to province in synchrony with the paddy rice production cycle. Such free range systems have virtually no intrinsic biosecurity between flocks and are also open to contact with wild water bird species. Several studies have noted that free-grazing ducks play an important role in rice production by providing various eco-system services. In general changes to this and other production systems required to prevent avian influenza needed to be managed so as retain the benefits to farmers associated with the method of rearing. In the case of free-grazing ducks the benefits include availability of low cost feed in the form of fallen grain, pest and weed control by the grazing ducks and fertilization of soil from duck droppings. Two subpopulations of ducks graze rice paddies — large commercial flocks that move over long distances, even across provincial borders, to graze and those that are based in one location and graze local fields. The differences in the management systems for these subpopulations had to be considered when designing and implementing disease control programs. For example the contact rate with other poultry is probably higher for ducks that graze locally whereas those that travel long distances have the capacity to spread virus over a larger area if they get infected.

At the animal health and production policy level there was a gap in engagement with the private sector so that there was and is limited experience with the kind of public-private interaction and partnerships that are required to have the long term re-structuring of the poultry sector necessary to increase efficiency, reduce serious disease threats and to improve food safety. The limited fora and platforms for stakeholder dialogue are a constraint on effective policy development.

In summary with increases in urban populations driving demand, market systems had to proliferate and trade volumes needed to increase. At the same time many small commercial operations sprang up with little technical knowledge and virtually no attention paid to biosecurity. As a result very complicated marketing networks evolved that handled a huge number of live bird transactions daily (estimated to be about 1 million per day) and there was little development in regulatory oversight. The market system was characterised by numerous small operators, great mobility and unhygienic live bird markets that provided opportunities for healthy birds to become infected. In addition generally under-resourced animal health authorities had little engagement with the poultry production systems and producers had little interaction with animal health services. Within the public sector there was very little expertise in the poultry health and production and so when the disease was first recognised the virus was already well seeded into the population and an almost unfathomable problem presented itself. Without working knowledge of an industry it is very hard to mount a targeted and effective emergency response, a lesson learned by veterinary administrations on many occasions, even in the developed economies. To some extent this lack of interaction reflects the absence of strong producer associations to represent and advance the interests of the producers. While there is a growing private animal health service in Viet Nam and some technical capacity associated with feed milling and breeding operations, there has not been as strong connection of this group with public health and the proportion of poultry in the larger commercial operations is still relatively small.

Structure of animal health services

The principal animal health technical agency in Viet Nam is the Department of Animal Health (DAH) in the Ministry of Agriculture and Rural Development (MARD). At the central level the DAH has a number of technical units including epidemiology, quarantine, veterinary public health, drug management, planning, and the National Centre for Veterinary Diagnosis (NCVD). For the purpose of coordination and its administration the DAH had established 7 Regional Animal Health Offices (RAHOs) to facilitate its role in supporting and technically guiding provincial animal health services. There are between 8 and 10 provinces per DAH region and each RAHO has an associated epidemiology and laboratory unit. At the operational level, in the devolved system of government each of the provinces has a Department of Agriculture and Rural Development (DARD) under the local administration with a livestock section and the animal health activities are carried out by the Sub-Department of Animal Health (SDAH) under the DARD. Recently, in some provinces, the veterinary and livestock production services have been merged at province level and livestock officers are thus integrated in the SDAH. Central DAH does not have any direct management supervision over the SDAH. Each province is divided into a number of districts each with an administrative office that includes a District Agriculture Office within the District People's Committee. Each district also has a District Veterinary Station (DVS) reporting to the SDAH and to the district People's Committee. At the commune level, some Chief Commune Animal Health Worker (CAHW) who are a private service providers, receive a small remuneration from the government for public good tasks performed. In the rural jurisdictions the animal health staffs are often engaged in some level of private practice activity, and concerns are occasionally expressed that this can result in some conflict of interest in relation to regulatory disease control.

FAO in Viet Nam

The FAO representation was operated continuously since it was established in Viet Nam in 1978 and has implemented programmes with technical and/or policy components across many areas of the plant and animal agriculture, aquaculture, forestry and environment, and water management sectors. FAO also plays a key role in supporting the GoVN with policy matters related to food safety. Importantly FAO has been involved in many emergency responses in Viet Nam related to natural disasters such as flooding and typhoons. The HPAI epidemic can be considered a disaster in the animal agriculture sector.

FAO and HPAI in Viet Nam

From the beginning of the H5N1 highly pathogenic avian influenza (HPAI) crisis in Viet Nam in late 2003 FAO worked continuously with the Government, other international agencies and with donors to bring this zoonotic disease under control and to reduce its impact on animal and human health. At the early stages of the expanding epidemic the FAO and WHO representatives initiated regular meetings of various stakeholders to share information and coordinate efforts within the international community. At the same time the Government of Viet Nam (GoVN) instituted the National Steering Committee for Avian Influenza Control (NSCAI) in which the UN agencies (FAO, UNDP, UNICEF, and WHO) were observers within this critical coordination and policy forum. In general terms, until late 2005 most of the finance required for the control effort at the source in poultry was delivered by the GoVN, although with limited resources FAO provided vital technical support to assist with strategy development, in particular that related to the implementation of vaccination. Toward the end of 2005 the first Inter-Ministerial Conference on Avian and Pandemic Influenza (IMCAPI) was held in Beijing and from this substantial international funding was released, including to Viet Nam. The

sources of the most significant funding to FAO were the Asian Development Bank (for regional activities), the Japan Trust Fund (for regional and country activities) and the United States Agency for International Development (USAID) (for regional and country activities). In addition there was a global multi-donor fund managed by the World Bank (WB) and a nationally focused multi-donor fund managed in Viet Nam by the United Nations Development Programme (UNDP). This latter project, referred to as the United Nations Joint Programme (UNJP), channelled funds for agriculture sector activities to the Department of Animal Health (DAH) of the Ministry of Agriculture and Rural Development (MARD) as well as to FAO. The UNJP also provided significant funding to the human health sector. The funds that came to Viet Nam from the World Bank Trust Fund Facility supported the Viet Nam Avian and Human Influenza Control Project (VAHIP). While FAO did not have management responsibility for agriculture sector component of this project, FAO experts were engaged to provide technical advice to the project management. An important aspect of the response in Viet Nam was the development of the Integrated National Operational Program for Avian and Human Influenza (OPI) 2006-2010. This overarching program provided the framework for all donor supported activities in related to HPAI in Viet Nam. In this reflection on the collaboration between FAO and the GoVN in dealing with H5N1 HPAI most attention is given to the activity supported by USAID, as this was the longest and the largest donor support (approximately USD 21 million dollars over 9 years).

Technical issues and HPAI

To assist the reader to gain access to the information that follows it is necessary to reflect briefly on some key aspects of the natural history of avian influenza viruses and how much the avian disease landscape changed in Asia from 2003 onwards. Avian influenza (AI) viruses are a 'naturally' occurring microbial entity in the global waterbird ecosystem and generally circulate in many populations in different locations without any hint of associated pathogenicity and disease. However over time with the increase in populations of domesticated poultry, there have been occasional incursions of low pathogenic avian influenza (LPAI) viruses from wild water birds into these 'unnatural' accumulations of susceptible hosts and during progressive circulation in poultry the viruses have mutated to a highly pathogenic (HPAI) genotype, and caused significant mortality. While this sort of incursion was recognised in the poultry sector in developed countries, up to 1996 there had rarely been a report of HPAI in the less developed world. Why is open to speculation, but it was accepted that both the structure of the small holder sector and the relatively small size of the commercial sector in less developed countries did not lend itself to the establishment of an expanding epidemic of HPAI or for effective surveillance. One notable exception was the H7N3 incursion in Pakistan in 1995 where a HPAI virus gained access to the commercial poultry sector and quickly spread until control measures were implemented. The production environment in some countries meant that there were very porous interfaces between wild waterbird populations and poultry production species, and the most important entry point was most likely the expanding duck populations that were free grazing on rice paddy environments. Another factor that likely played some part in the spread of H5N1 was the international integration of the activities of some poultry companies with relatively unrestricted movement of personnel, equipment, vaccines and genetic stock. In the years just prior to HPAI H5N1 the poultry sector had experienced the wide international spread of highly pathogenic infectious bursal disease virus and low pathogenic avian influenza virus H9N2, and in both cases the connectivity in the poultry industry was a probable risk factor.

If there had been incursions of HPAI into the poultry sector in South East Asia prior to the H5N1 epidemic then these were not recognised and reported, and certainly did not become substantially established.

This would have been the case in Viet Nam, and in fact HPAI H5N1 was detected by research surveillance as early as 2001 without any reports of disease. The encounter with H5N1 was therefore something that went against the grain of what had been experienced by the animal health sector to that point. While the virus had been circulating and evolving in China since at least 1996, and had been giving some hints as to its potential, lack of information about the field situation resulted in a false sense of the threat and lack of preparedness globally. A further important development occurred at the global level as this virus became more entrenched in poultry - viruses that were HPAI genotype were isolated directly from wild birds, so that wild birds were capable of long distance spread of the virulent H5N1. Prior to this time with perhaps one or two exceptions, viruses obtained from wild birds were not HPAI genotype, but had potential to cause disease only when the necessary mutations occurred during virus cycling in susceptible poultry species. Furthermore it was very unusual for HPAI viruses to cause disease in domestic ducks, but at different times in the epidemic in Viet Nam mortalities were recorded in ducks. In addition the virus demonstrated another important and serious behaviour by causing mortality in humans. The situation in Viet Nam encapsulated much of what was peculiar to this new avian influenza virus and its atypical behaviour. And the experiences of the national animal health agency and international agencies in dealing with the problems posed in Viet Nam somewhat mirrored experiences in other countries were the virus became established in the poultry sector. There were many challenges that had not been faced before by many of the stakeholders and so there was a constant process of "learning by doing".

Early history of HPAI in Viet Nam

The first cases of HPAI were detected near Hanoi in the north of Viet Nam in December 2003 and because the virus had probably commenced spread in the population before it was recognised, the situation quickly developed into a rapidly expanding epidemic. Statistics indicate how widespread the disease came and therefore how severe this animal disease emergency was. Between December 2003 and March 2004 24 % of Viet Nam's communes were affected and 57 of the 64 provinces, and about 45 million poultry died or were culled –around 17% of the national poultry population. Since the peak of the disease in 2004 the numbers of outbreaks and the number of poultry dying or culled have been reduced significantly. A very obvious feature of the disease pattern in the early years was the peak in reported cases around the Tet New Year holiday. Prior to Tet poultry numbers build up in preparation for the holiday demand and then the level of animal movement and trading also increases. The end result is that this situation increases the opportunity for the virus to infect new and mobile hosts and so there is a peak in the incidence at this time. The first vaccination program in 2005 was introduced in the months prior to Tet with a view to reduce the number of susceptible poultry that would be entering market chains.

The regional USAID project was activated in October 2005 and in early 2006 the ECTAD office commenced operations in Hanoi. This document examines the activities carried out from early 2006 through to mid- 2014.

Conclusion

Over the course of this epidemic the Government of Viet Nam has shown steadfast commitment to resolving the near overwhelming problem it faced with H5N1 and its control. Much national energy and finance has been expended, international support has been unprecedented and a lot has been achieved since late 2003. While the disease situation is now considered under control and stable, there is still a firm realisation that eradication of the virus from the poultry sector is a long term goal that will only be achieved after a number of key contributing factors are changed and so it is necessary to maintain ongoing vigilance and dedication to the task of consolidating and sustaining the gains made.

It has been stated elsewhere that three broad factors combine to prevent elimination of H5N1 HPAI from endemic countries and regions. These are the nature of the poultry sector (discussed above), the quality of animal health and production services serving the poultry sector (mentioned above), and the extent and level of commitment at all levels to virus elimination. In relation to the last point commitment to get the epidemic under control was very high among most stakeholders, and this continued at central levels of government but probably waned at the local level and with producer and traders as the threat posed became more distant and control fatigue set in. There is also a factor related to the extent to which stakeholders see their role in the big picture and it would seem that the lack of industry associations means that there is not an environment of corporate self-regulation or responsibility that can derive from association vision and peer pressure. In general terms with all the players operating as individuals a lot of complexity is imposed on the regulatory role. Perhaps an example of the single-minded stakeholder approach is the persistent illegal flow of live poultry from China, generally a lower quality and high disease risk product but one that has a high profit margin in the live bird market system. Given the unfavourable hand dealt to the animal health service that was generally under-resourced, operationally ill-prepared for an emergency and somewhat weak on the technical side, the result after 8 years is a credit to the effort and the dedication applied to the task.


USAID
PLANNING MEETING AND BASIC ASSESSMENT TRAINING
HỘI THẢO LẬP KẾ HOẠCH VÀ TẬP HUẤN ĐÁNH GIÁ CƠ BẢN
OSRO/RAS/604/USA and OSRO/VIE/801/USA
Hà Nội, 1-7-2009

1

Coordination and Management

Biosecurity Working Group, 2013

The collaboration between the GoVN and FAO in responding to the HPAI crisis commenced in early 2004 although the substantial USAID financial support to the country channelled through FAO did not commence until late 2005. As Viet Nam is a member country of FAO, there was an established Representation and office in country with a well-established working relationship with the Ministry of Agriculture and Rural Development (MARD), including with the Minister as well as with the International Cooperation Department. With the establishment of the operational ECTAD unit in Hanoi, there has been a continuous HPAI dedicated collaboration between GoVN and FAO from early 2006 until the finalisation of project 604 in late 2014. During this time, there has been effective working co-ordination between FAO and the two MARD technical departments, namely the Department of Animal Health (DAH) and the Department of Livestock Production (DLP). A functional operations section within ECTAD VN meant that FAO was able to relatively effectively assist the project implementation and facilitate other support such as GoVN attendance at international meetings. While there were occasional changes in key technical personnel, there was a continuous senior animal health adviser with the ECTAD unit almost without break, and a similar situation was maintained for the operations section. This ensured a harmonised delivery of the various donor projects coordinated by FAO. This project structure has also been instrumental in assisting GoVN in coordinating the activities of partners to ensure a harmonised approach for HPAI control and development of monitoring and evaluation tools to assist in management of project implementation. As an international technical agency in the agriculture sector, FAO was called upon to assist other UN agencies in matters of HPAI control, as well as to provide technical advice and harmonisation with other USAID partners, and the project supported this role. The project also played a key role supporting the DAH with advice on disease control strategy and engaged with PAHI secretariat to facilitate the linking of this activity to the mainstream of the GoVN policy agenda. The UN Joint programme (UNJP) provided a significant level of support to the GoVN and in conjunction with this there were technical inputs in the communications programme facilitated by UNICEF, and in a Biosecurity Working Group convened by DLP and FAO. Over the duration of the HPAI assistance, FAO also closely liaised with WHO directly, as well as through the Communicable Diseases sub-group of the Health Joint Planning Group, encouraging a closer working relationship between MARD and the Ministry of Health. Collaboratively, FAO and WHO enabled four way linking between animal and public health

epidemiology and laboratory experts, joint outbreak responses, sharing of animal and public health disease information, implementing joint table top exercises, and joint communication statements. This multidisciplinary approach to zoonotic disease prevention, response and control contributed significantly to the further evolution of One Health in Viet Nam.

Introduction

When an emergency such as HPAI occurs, many international organizations with different mandates become involved and provide assistance. However, when the scope of the emergency is as narrow as that of an animal disease like H5N1 HPAI then there is potential for competition for access and implementation space. Possible outcomes are that the recipient government may struggle to absorb the amount of assistance being delivered, that limited human resources in the government are tied up by project activities or that there can be distortion of the local salary structures because of enhancements associated with projects. Importantly, when a national government is overburdened by assistance, there is a danger that duplication of effort can occur and valuable resources are wasted. In the case of Viet Nam, some of these outcomes were unlikely because of the strong central government system and the efforts that were made to first put plans in place that donors could support. However, because of the narrow technical focus of many of the inputs to the animal health sector, coordination was necessary to reduce duplication and ensure harmonisation.

As Viet Nam is a member country of FAO, there was an existing presence in the country along with a formal relationship with the Minister of Agriculture enabling FAO to work closely with government structures and mechanisms. In working with the DAH, FAO was able to provide technical advice and advocate to the National Steering Committee for Avian Influenza (NSCAI) chaired by the Minister of Agriculture. In addition, FAO had agreements in place with the World Bank, the Asian Development Bank, the World Organisation for Animal Health (OIE) and with other UN organisations such as the World Health Organisation (WHO) and the United Nations Children's Fund (UNICEF). These pre-existing agreements facilitated FAO capacity to undertake and coordinate with partners in projects both at the national, regional and global levels.

Importantly from the GoVN perspective, all of the inputs to the HPAI control programme in both the agriculture and public health sector were guided by the Viet Nam Integrated National Operational Programme for Avian and Human Influenza 2006-2010 (the OPI or the "Green Book"). FAO was part of the technical group that drafted the OPI and so this created a strong link to the GoVN programme. Another important instrument that was established by the GoVN was the Partnership for Avian and Human Influenza (PAHI). This coordination mechanism was signed by many donors and development partners including FAO, and was facilitated by the Partnership for Avian and Human Influenza (PAHI) Secretariat.

As FAO had a global mandate to control HPAI, there were a number of global alliances and agreements that ECTAD VN was guided by and it used these to guide its inputs and technical relationships. These included the FAO/OIE global framework for progressive control of transboundary animal diseases that was formalised in 2004 (GF-TADS,) and a part of this framework was the Global Early Warning System (GLEWS) for animal diseases that ECTAD VN linked to and provided disease updates. In mid-2004, FAO and OIE developed the Guiding Principles for Highly Pathogenic Avian Influenza Surveillance and Control in Asia and the FAO country teams used these as a basis for harmonisation. Later regional frameworks for HPAI control developed by ASEAN and by FAO RAP provided strategic guidance and were the basis of linkage and coordination to the wider region. While FAO was involved with some of the strategic thinking in Viet Nam in the early part of the epidemic, limited financial resources restricted the level of activity possible. However, major funds became available in early 2006 and at this point the ECTAD office was established and a more substantial role in the country commenced.

As noted in the background to this document, FAO has been a key collaborator in the concerted HPAI control effort in Viet Nam since the very beginning of the first outbreaks. In late 2003 and early 2004 when there was widespread concern about the exploding epidemic, WHO and FAO organised a core group of donors in order to coordinate the international response and provided regular updates to the international community about the disease situation in the country. From this point, FAO played a role through this project either as a primary coordinator or as an active participant in coordination activities overseen by other organisations. The role of forging, fostering, supporting and sustaining partnerships between the various players and stakeholders was regarded as one of the particular strengths that FAO brought to the control effort as a non-political, unbiased and "honest broker". As a result this project dealt with a range of partnerships including the national government and its various departments and administrations, international development donors, organisations and agencies, other UN organisations, international NGOs (INGOs), national and international technical groups and organisations, neighbouring government technical departments and within FAO itself.

Within the project context FAO coordinated the inputs of international technical experts to examine or respond to issues arising in the national control programme, and then developed the technical policy advice in collaboration with the national technical agencies for further consideration by the GoVN.

Coordination and management in the national context

The main GoVN partners FAO worked with were the DAH and the DLP. In addition, FAO was also an observer to the National Steering Committee for Avian Influenza (NSCAI) and had important regular interactions with the Partnership for Avian and Human influenza (PAHI), the coordination unit formed to facilitate the whole-of-government coordination required to control the disease. By participating in the PAHI workshops and annual plenary meetings there was opportunity to make inputs to policy discussions and monitor the delivery of the overall OPI inputs in the agriculture sector. FAO was tasked to regularly review the vaccination strategy and other aspects of the governments H5N1 HPAI control strategy and undertook these activities in collaboration with PAHI, which ensured the outcome were delivered to and considered by the NSCAI. Over the course of the HPAI programme in Viet Nam there were 4 reviews of the vaccination strategy including the DAH proposed suspension of the large scale government funded vaccination effort. On each occasion FAO produced a technical report for the DAH to consider and use for advocacy purposes. FAO also supported MARD with formulating and then issuing the Circular 53/2013/TT-BNNPTNT, dated 12 December 2013 covering reporting of diseases in terrestrial animals. The DAH considered this an important input to coordination of policy development.

The Viet Nam Avian and Human Influenza Control Project (VAHIP) supported by the World Bank was the largest participant in activities in the agriculture sector. While FAO did not have any management role in VAHIP, a full time technical adviser from FAO was part of the VAHIP technical team and this presence and the participation of this adviser in ECTAD technical discussions helped to ensure a level of harmonisation and coordination between the FAO facilitated activities and those of this large national managed and executed project.

The United Nations Joint Program (UNJP) was implemented by a number of government agencies including DAH and administered by the United Nations Development Programme (UNDP). The FAO ECTAD team was heavily involved in the project advisory group and also later provided technical oversight for funding that was earmarked for national execution when it became apparent this was required by UNDP management. This project was also heavily involved in the development of the behaviour change communications strategy that was executed by UNICEF under the UNJP umbrella,

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The National One Health Conference 2013

particularly to ensure that messages about disease and management were practical and had a proper technical basis.

Of particular significance was the role that project played to coordinate and facilitate the work of the Biosecurity Working Group (BSWG) that was led by DLP. The group met on a regular basis and FAO acted as the secretariat with preparation of the meeting agenda, preparation of reports, supporting national staff to attend and providing technical oversight of the activities of the BSWG. This group brought many issues related to production and biosecurity in the small holder sector to the table and developed policy positions for DLP to consider and advocate within MARD.

In Viet Nam there were a number of INGOs (Abt Associates and Academy for Education Development or AED) funded by USAID working to implement activities at the grass roots level. USAID undertook a level of coordination of their aid programme through a programme matrix, but increasingly looked to the project to provide guidance and coordination of the technical inputs into areas such as biosecurity, surveillance and communications messaging. The annual planning meeting of the USAID programme was a very important forum for all of the participating partners to engage in and the project was always well represented by both technical and operational staff from ECTAD.

Mentioned above, FAO had significant inputs to the key national strategy document referred to as the Green Book or OPI that was used by the project as a guide in seeking and executing donor assistance. When the OPI was reviewed in 2010, FAO was a stakeholder and provided a number of relevant recommendations that were taken up in the assessment, and subsequently influenced the formulation of the next strategic approach called the Integrated Plan for HPAI and Emerging Infectious Diseases (AIPED). This strategy called for a more holistic approach to animal disease issues and also invoked the One Health paradigm as a central pillar in the plan. In this way the project support for the ECTAD coordination role was a valuable contribution to the ongoing evolution of the GoVN response to H5N1 HPAI and other emerging diseases.

Coordination across International borders

The project played a key role in facilitating dialogue between the veterinary bureau from China and the DAH Viet Nam. The meetings that were organised and supported by the project relied on the input and coordination by the ECTAD teams from both China and Viet Nam. The meetings assisted to extend the concept of the market or value chains back to the source of the poultry in China as well as to the market destinations in Viet Nam. The project also facilitated the meetings and dialogue approach between the Department of Animal Health and Production (DAHP) in Cambodia and DAH Viet Nam to develop a harmonised approach to understanding the ecology of H5N1 in the Mekong Delta. These cross-border efforts featured the epizone approach based on virus clade distributions and agro-ecological characteristics that transcended international borders. More recently, the project has facilitated broader cross border collaboration including the public health sector, quarantine services, social scientists, and local producers and markets on both sides of the border.

Coordination within the UN agencies

FAO-WHO joint assessment mission on avian influenza preparedness

Coordination with the WHO was evident from the commencement of the HPAI epidemic in Viet Nam and has continued through the duration of the project. The two UN Agencies met on a regular basis to exchange information about the disease situation in the field and coordinate activities such as epidemiology training for national public health and animal health staff. Technical meetings were also held between the laboratory experts from both organisations to harmonise diagnostic techniques used to confirm the disease. When the large effort was being put into behaviour change communication, FAO was particularly involved to provide technical guidance and support to UNICEF, which did not have in-house technical capacity. The project also supported the PAHI One Health communication network and participated in the meetings and discussions conducted by UNDP to coordinate the implementation of the UNJP as well as leading the sub-group on Communicable Diseases within the Health Joint Planning Group.

Coordination with other international organisations and technical groups

Other international organisations involved with H5N1 HPAI in Viet Nam were OIE and the United States Department of Agriculture. Both were involved with the work undertaken to develop a new animal health law and FAO also collaborated in that process. In addition FAO and OIE were also involved under the Japan Trust Fund project in delivering joint epidemiology training in the field as well as providing some laboratory support. FAO assisted on a Government of Ireland project that provided support to vaccine cold chains. In the research area, FAO engaged with a project on virus circulation in ducks in the Mekong funded by New Zealand Aid, as well as with CIRAD France on HPAI surveillance. There was also collaboration with the Istituto Zooprofilattico Sperimentale (Padova) on a HPAI duck vaccination project. The US Centres for Disease Control also were involved in laboratory capacity development at different times and there was cooperation between the two agencies in this area. The project also had cooperation and collaboration activities with Wildlife Conservation Society (WCS), Royal Veterinary College London, the Zoological Park Organization in Thailand and The Institute for Development Studies at University of California, Berkeley.

Coordination within FAO

FAO as one of the key international technical agencies involved in the HPAI control effort had instigated a new internal mechanism in response to the crisis. This mechanism was a unique technical and operational partnership called the Emergency Centre for Transboundary Animal Diseases (ECTAD). In addition to establishing a national ECTAD unit in Viet Nam, a regional unit was formed at the Regional Office of Asia and the Pacific, in Bangkok to manage the efforts in the field at a regional level. This technical and operational modality enabled FAOs response to be properly coordinated from headquarters to the field. The Asian country ECTAD units participated regularly in regional ECTAD technical meetings and occasionally in global meetings and brought harmonised approaches to the respective countries. FAO also relied on back-stopping from technical units at headquarters including animal health, animal production, food safety, and the crisis management centre.

Annual Regional ECTAD meeting held in Siem Reap, 2014

Coordination in the future

As the FAO activities become less dominated by H5N1 HPAI and broaden to other health risks arising at the animal-human-ecosystem interface, co-ordination will be necessary across a wider range of project areas and stakeholders. For instance, rabies already requires collaboration with the public health sector and has expanded to include engagement with NGOs, ASEAN and the Ministry of Education. One Health coordination is also expanding to involve not only the Ministries of Health and Agriculture and Rural Development, but it will likely need to eventually engage the Ministry of Natural Resources, Ministry of Education, and others to be fully realized in-country. The threat of H7N9 in Viet Nam has revitalized the collaboration between WHO and FAO and this will continue as it is very likely this agent will enter the country and herald a new complexity in the management of avian influenza zoonoses.

Highlights of Coordination and Management

Viet Nam and China Bilateral Meeting on Collaboration to Address Transboundary Animal Diseases and Diseases of Public Health Concern, August 2013

The project work undertaken with DAH, DLP and in conjunction with PAHI to do a thorough review of the disease control and vaccination strategy was an important input to the coordination of the control effort from the perspective of the GoVN.
The project made a very important contribution to the revision and reformulation of the public awareness messages for the behaviour change communication project delivered by UNICEF.

While more subtle in the role, the project was also an important contributor to assisting USAID with the harmonisation of the programme of HPAI control delivered in Viet Nam, especially at the village level. This was a good example of the role that FAO could play in a technical facilitation mode without direct responsibility for project implementation.

Cross-border working relationships with China and Cambodia have significantly improved over the duration of this program. The ability to meet and discuss the disease situation on each side of the border and exchange ideas on how to harmonize monitoring and move towards safe movement of animals and animal products is a major accomplishment. Building this trust will also enable future integrated epizone approaches on both sides of the border.

Issues and Challenges of Coordination and Management

The wide range of HPAI prevention and control activities undertaken over the duration of this project required significant coordination with multiple partners and technical areas including, but not limited to DAH, DLP, the National Agricultural Extension Centre (NAEC), quarantine services, inspection, traceability, value-chains, etc. For a variety of reasons, this was challenging at times, in part due to the evolution of mandates, roles and responsibilities of the Departments themselves, decentralization, and the status of the disease situation.

While donors have directed other organizations to take the lead on risk communication related to HPAI, the project was still required to commit significant time and personnel to ensure that messages were accurate and science-based because the lead risk communication organisations do not have technical experts.

Progress on cross-border solutions is a slow and steady process because there is a need to have multiple meetings and to establish trust between the partners. Applying similar approaches to disease prevention and control on each side of the border can also be difficult due to differences in technical capacities, funding allocations, and government policies.

2 Surveillance

SUMMARY

Vietnam - China border in Lang Son Province

In the context of this project surveillance activities included support to strengthen outbreak detection, outbreak confirmation, outbreak response, outbreak reporting, information management, and virus tracking. During the initial H5N1 HPAI epidemic, the objective of surveillance was clear to all stakeholders - outbreaks needed to be detected and controlled quickly - as there was clear evidence of the threat of human disease and fatalities. To achieve this objective, farmers were strongly encouraged to promptly report disease incidents for the overall public good. In the case of H5N1 HPAI, farmer's concern about the personal danger to themselves or their families may have added motivation to report suspicions of disease. Sometimes reports came from third parties who were concerned about the likely presence of virus in their immediate environment. However, after time, the threat felt by the general population reduced, and although the global concern about the H5N1 pandemic potential remained, there was not ongoing translation to a continued local level concern. When the vaccination effort dramatically reduced the incidence of disease, it was likely that other coping mechanisms were adopted by producers to deal with occasional outbreak incidents. In addition, reporting a disease outbreak had implications for local jurisdictions such as restrictions on market activities or potential criticism from higher up the administrative tree, and so there was some reduction in the enthusiasm of local authorities to report. This led to DAH concerns about the efficacy of surveillance and requests to make the network more sensitive.

The role of the project was to support the government efforts to improve surveillance and suggest ways that it was possible to get information about disease outbreaks more reliably, efficiently and cost effectively. Activities undertaken to improve outbreak investigation, response and reporting all fell under the scope of surveillance for the purposes of the programme design. To this end DAH and FAO trialled a succession of approaches to disease surveillance in the context of a number of projects, and these approaches were supported by significant investments in training, software and hardware inputs for data management, and training and equipment to facilitate outbreak control. While the different approaches were assessed as technically valid, there were mitigating issues beyond the control of the DAH and FAO that reduced the efficacy of the models implemented and so the inputs did not significantly improve the outputs of the surveillance system.

Additionally considered in the surveillance element of the programme was the extensive work to monitor the genetic markers of H5N1 viruses obtained from both outbreaks and sampling at live bird markets. This work has made and continues to make an important contribution to understanding the role of different virus strains in the disease distribution, the spatial and temporal patterns of virus entry, as well as providing information to support vaccine

selection. In the final analysis, the disease is now endemic and so the objective of the surveillance is somewhat different, with a present focus on maintaining a watch on the disease situation and carefully monitoring the virus so as to have an early alert of any significant shift in its virulence or genetic constitution. It would appear that longitudinal sampling of live bird markets for avian influenza viruses has some value to the overall programme to monitor H5N1 HPAI viruses in Viet Nam, but it can be reduced in scope.

In the poultry sector in Viet Nam, the blend of traditional husbandry with other infectious poultry diseases along with extensive live bird marketing systems and a porous international border with China makes for a very challenging disease control environment. To meet the challenges, the project has supported an ambitious programme to provide basic epidemiological training to field veterinarians and that has brought positive outcomes to the quality of animal health services and infectious disease control efforts in general.

Looking to the future, the effectiveness of disease surveillance is very largely dependent on the value producers put on their livestock, on the quality of the veterinary services and on the trust relationship between producers and the veterinary services. Therefore, in Viet Nam, significant improvements in the poultry production and animal health service standards will need to develop if reliable disease surveillance is to become an intrinsic property of the sector. In addition, while the country is undergoing an economic transition, national and local authorities will need to pay more attention to the importance of poultry in the livelihoods of the rural populations, and also to the policy and technical environments required to prevent and control similar events should they occur.

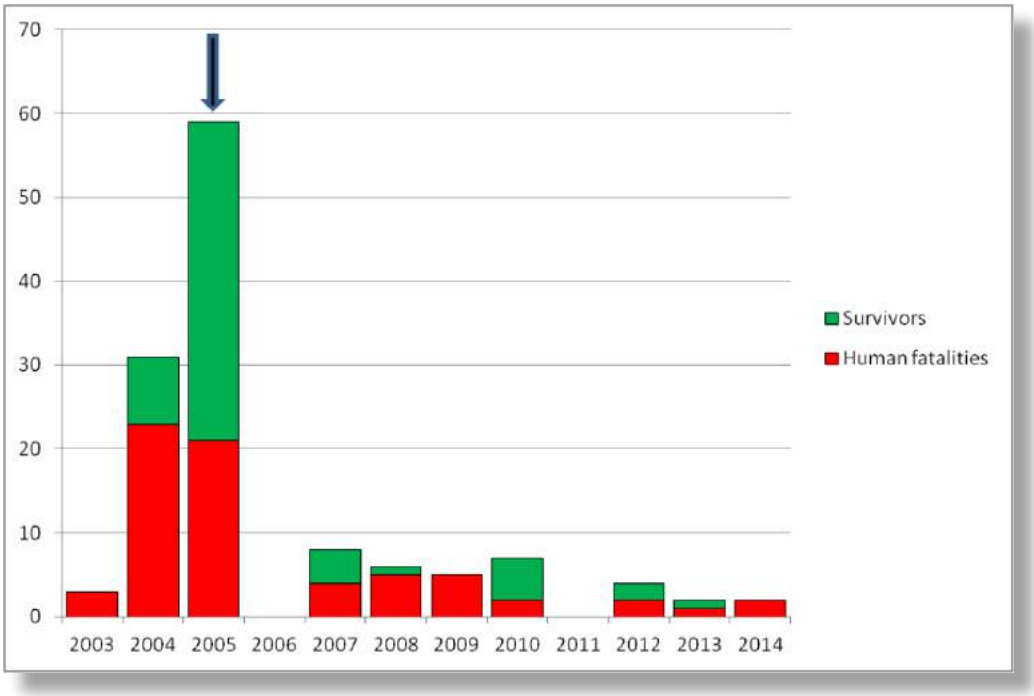

Figure 2.1: *Bar graph showing the number of human Influenza A H5N1 infections in Viet Nam by year. In early 2006, mass vaccination of poultry was commenced, resulting in a dramatic reduction of human H5N1 infections (The top blue arrow marks the start of the vaccination campaign) (Source: WHO)*

Introduction

Disease surveillance was and remains a key component of the overall H5N1 HPAI disease control activity in Viet Nam. The important aspects of surveillance with technical inputs from the project were outbreak detection, outbreak confirmation, outbreak response, information management, and virus tracking and characterisation. The GoVN objectives of surveillance were to detect and contain the disease in order to reduce its impact on poultry production, to gather information about the behaviour of the virus in the poultry population to better inform control policy and to provide timely information to the public health sector related to increased risk of human exposure to the virus. The serious disease situation that emerged in humans is illustrated in Figure 2.1, which also shows the reduction in human cases that accompanied the intensive efforts from late 2005 to immunise the poultry population. It is fundamental in a surveillance system that an adverse finding will trigger a planned response, and for this reason, the collaboration that took place to strengthen outbreak response is addressed in this section of the document. In broad terms, surveillance can be considered passive or active; passive surveillance is when the animal health system is reactive to disease intelligence that is received along a range of information channels while active surveillance is when animal health personnel actively seek disease or virus presence. The term "fit-for-purpose" is often used in relation to the objective of surveillance activity and its cost effectiveness, and this can be applied in the Viet Nam context.

In the first instance, a passive surveillance system is dependent on the willingness of the various stakeholders to cooperate with the disease control effort and report HPAI-like incidents to the local animal health service. Most HPAI disease intelligence in Viet Nam came from the passive surveillance system and in this sense it was fit-for-purpose and also cost effective. From the point of notification, the local response measures including movement of information along the disease reporting chain were the next indispensable steps. Early in the control program, the objective was to eradicate the disease and there was a high expectation to detect all outbreaks early through the passive surveillance system and to stamp them out. However with reduced alerting of events by farmers and less movement of information along the reporting chain, the system became less effective. When it became evident that eradication was not possible in the short or medium term, the objective of the control programme switched to maintaining a stable situation with low incidence of disease outbreaks and prevention of human infections. Currently when the surveillance system detects an outbreak, local control measures may still include culling but this is generally limited in scope, generally now to the affected premises.

Active surveillance to find existing disease is generally more expensive and the cost-efficiency depends very much on the prevalence of the disease and the method of detection. In Viet Nam, to activate large numbers of animal health personnel to search out disease for control purposes was a significant logistical and financial challenge, especially given the dynamics of the poultry marketing system where tracking movements of birds was and remains very difficult. Once the disease was regarded as endemic, a broad-scale active surveillance program was not considered to be cost-effective. In some instances however, an active surveillance programme can be quite targeted and serve a specific purpose such as to detect infection in a particular high risk group of birds e.g. imported spent hens or as was used extensively from late 2011 onwards, to detect viruses present in ducks in markets for the purpose of monitoring virus evolution. In this sense this active surveillance was "fit-for-purpose".

The distribution density of chickens and ducks in SE Asia and the temporal and spatial distribution of H5N1 outbreaks in poultry and cases in humans are shown in Figures 2.2 to 2.5. These figures illustrate that outbreaks were related to poultry density as were human cases, with the highest incidence in the Red and Mekong river deltas.

Disease outbreak investigation involved the submission of samples to the diagnostic laboratories to confirm the presence of virus. The initial

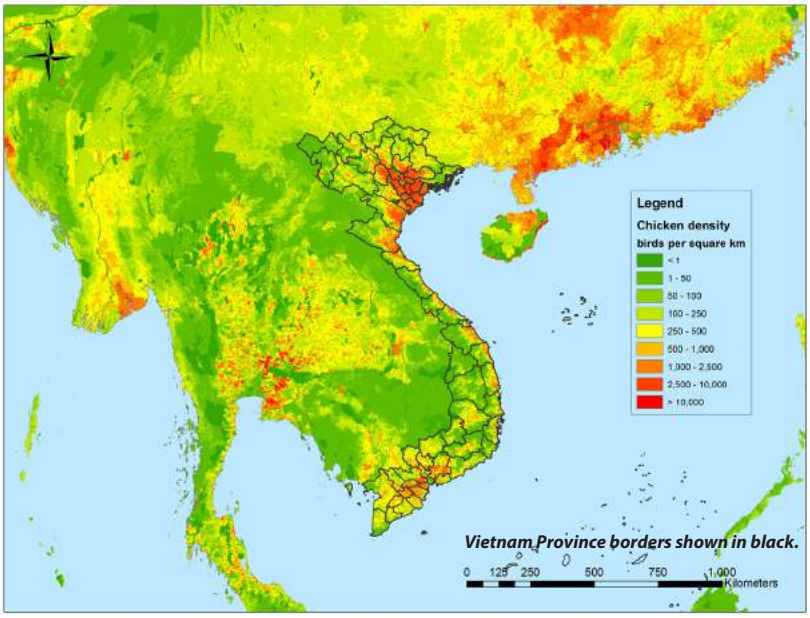

Figure 2.2: *Chicken density in South-East Asia*
Geo0Wiki, L. (2014). "Livestock distributions", Retrieved 8 November 2014 from http://www.livestock.geo-wiki.org/download/

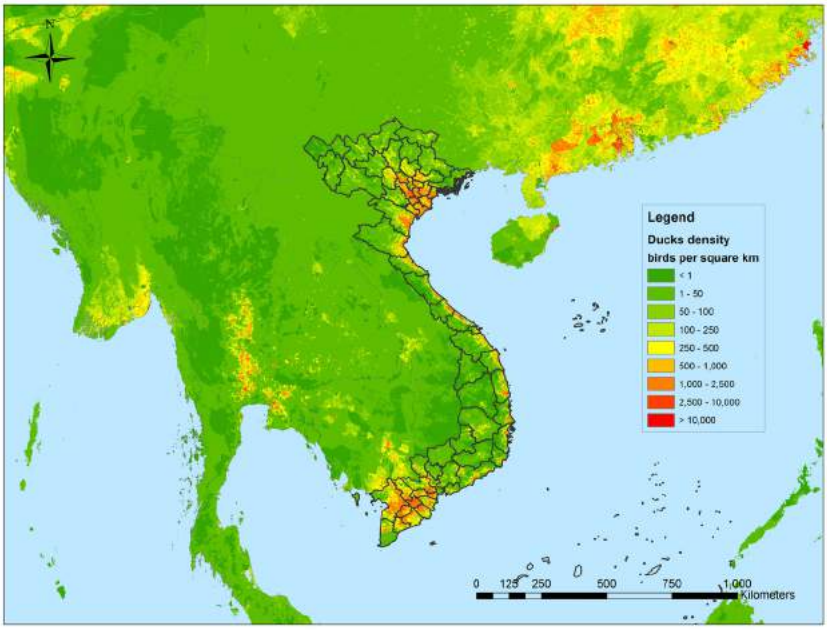

Figure 2.3: *Duck densities in South-East Asia.*
Geo0Wiki, L. (2014). "Livestock distributions", Retrieved 8 November 2014 from http://www.livestock.geo-wiki.org/download/

screening of the samples at the RAHO laboratories could confirm the presence of an influenza A H5N1 virus. Positive samples were then sent to the national leading diagnostic laboratory (National Centre for Veterinary Diagnostics (NCVD) in Hanoi) for further analysis, including genetic sequencing to determine the clade group[1]. Changes in gene sequences alerted the leading laboratory to check vaccine protection against the isolated field viruses or to make alterations to the sequence of the detection primers used in the laboratory tests.

One important contributor to the effectiveness of the surveillance system was the structure and governance of the animal health services. This has remained the same in Viet Nam since 2003, when the first H5N1 HPAI outbreak was detected. The central Department of Animal Health (DAH) is part of the Ministry of Agriculture and Rural Development (MARD), and acts as a technical bureau to provide policy advice, technical guidance, disease intelligence gathering and analysis, and also national level quarantine functions. DAH also has a network of 7 regional animal health offices (RAHOs), each with an associated veterinary diagnostic laboratory and an epidemiology unit that both play important roles in the surveillance system. Front line disease control operations are delivered by the technical groups associated with local administrations. One significant governance issue was that the central DAH has no direct line management authority over the Provincial Sub-Departments of Animal Health (SDAH) or the District Veterinary Offices and this disconnection has implications for the flow of information in both directions and also for uniformity of strategy delivery. The veterinary officers at the SDAH are employed by and answer to the provincial administration. A similar situation exists at the district level where there is a District Agriculture Office that supervises the district veterinary office. At commune level there may or may not be an animal health officer and the function might be carried out by a general agricultural technician. In the SDAH there are veterinary graduates filling the technical roles, but further down the tree the number of qualified veterinarians drops away, and at district and commune level, many animal health staff are technicians with limited scientific background especially in animal health and production. The range of qualifications and the management structure meant that there was not always a uniform or standardised delivery of operations and the local administrations had more or less influence over the technical aspects of the surveillance programme. The structural constraints on the surveillance system are mentioned further under specific headings.

Another important factor linked to the effectiveness of the surveillance system is the epidemiological capacity of the animal health services. At the start of the epidemic there was a significant capacity gap that had to be bridged to strengthen the technical quality of disease outbreak investigation and reporting, as well as information management. Addressing this gap was considered a priority by DAH and hence by the project.

1 H5N1 viruses are grouped into numerous virus "clades" based on the phylogenetic characterization and sequence homology of the hemagglutinin (HA) gene, source: WHO 2011, http://www.who.int/influenza/gisrs_laboratory/h5n1_nomenclature/en/

Disease Surveillance situation from 2004 to 2006

The national HPAI control strategy put in place by the GoVN since 2004 gave high priority to passive surveillance in high risk provinces with risk-based targeted surveillance and application of control measures to eliminate the focus of infection and prevent its spread. There was an expectation that within 4-6 years there would be a substantial reduction in the incidence of disease and within 7-10 years establishment of disease free compartments. In the first part of the epidemic FAO had supported the GoVN to reinforce training of animal health personnel at provincial and district levels and assisted public awareness campaigns to alert farmers to the need to report the presence of disease. This passive surveillance (referred to as community-based animal disease surveillance or CADS) which was piloted in some provinces, relied upon the strengthened capacity in disease recognition and reporting, disease outbreak investigation and sampling and in response and containment operations. There was also significant input to this surveillance system provided by adapting the FAO designed disease information management software program TADinfo to the Viet Nam situation (e.g. translation of interfaces into local language, inclusion of location name databases into the system) and establishing it in a web-based platform to link SDAH to central DAH.

At the beginning of 2006 some of the constraints in the surveillance system were beginning to become more evident as a result of two converging influences. There was a gradual lessening in the concern of poultry owners about the disease as the vaccination programme has commenced in late 2005, and 'HPAI fatigue' was emerging in various stakeholder groups. Small holders were not as concerned about the zoonotic threat of the disease, and they were less inclined to report because financial support for losses associated with control actions (e.g. culling of healthy poultry and market restrictions) was not working satisfactorily as an incentive to report. It was also recognised that H5N1 HPAI can smoulder in the scavenging chicken populations and not appear to be any different from other endemic diseases, especially Newcastle disease (ND) or pasteurellosis. So as vaccination resulted in a dramatic reduction of larger scale mortalities associated with small farms, this reduced reporting within the surveillance system and there was likely an underreporting of disease in the free-range scavenging chicken populations. The other factor that reduced reporting was that a confirmation of H5N1 HPAI meant that there was a 21-day restriction on the sale of poultry and poultry products from an infected area. As this resulted in further economic hardship, administrations increasingly implemented local control measures but did not report the suspicion of disease to DAH.

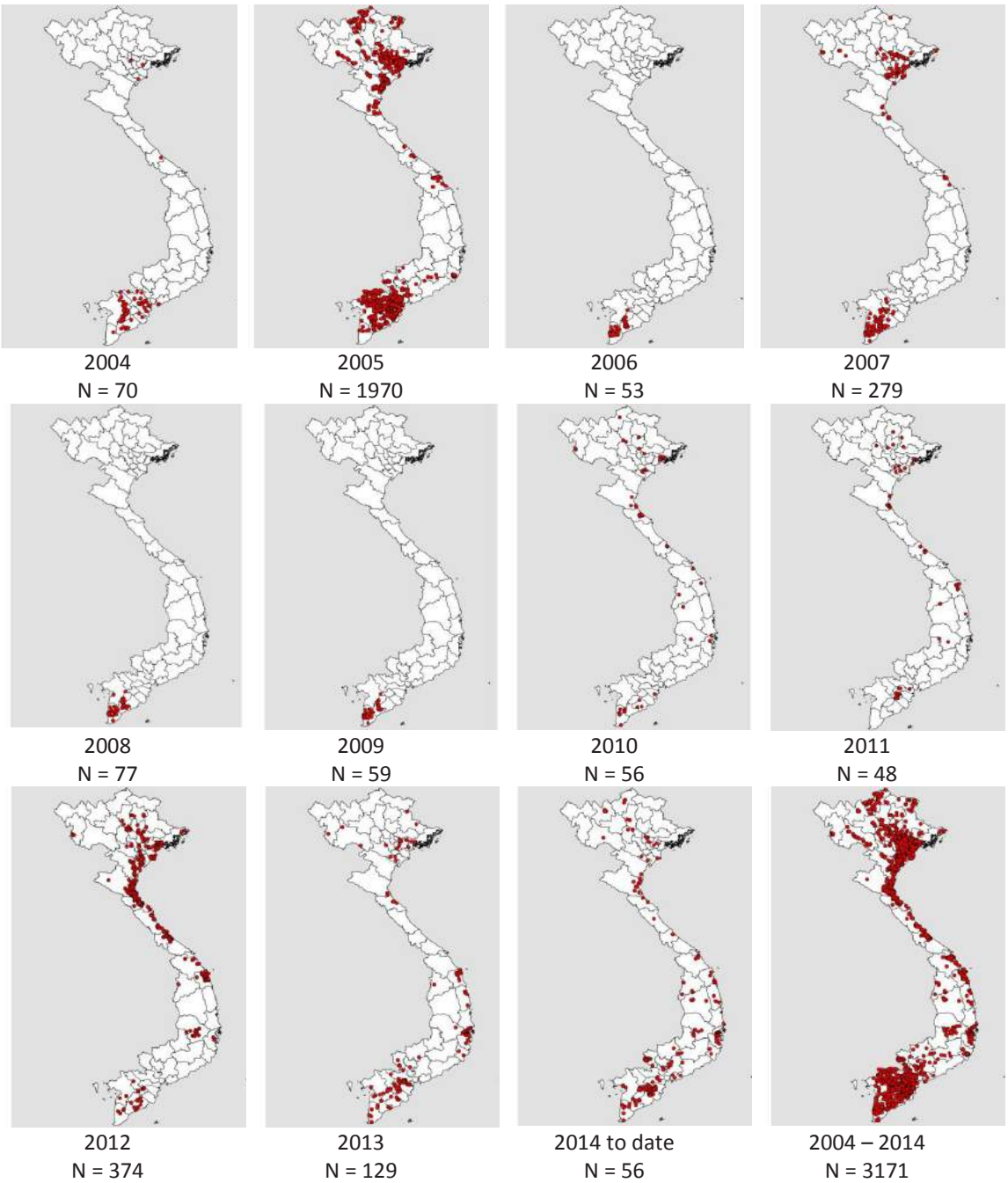

Figure 2.4: *Spatial distribution of Influenza A H5N1 outbreaks in poultry (chickens and ducks) in Viet Nam by year*

Disease Surveillance activities from 2006 to 2010

During this period, the project provided substantial support to GoVN to improve surveillance outcomes and several models were tested in the field. The aim of each model was to maximise the effectiveness of outbreak detection and reporting, and to strengthen the outbreak response, including the investigation and confirmatory diagnosis. The field activities were carried out by the local authorities in the pilot provinces under the technical direction of DAH. One model was supported for a period by the Japan Trust Fund (JTF) and the others principally by the USAID contributions. In conjunction with the field work in pilot provinces, project staff monitored the flow of information to reduce discrepancies among the different sources of data, continuously entered data into the project database, updated maps of spatial and temporal distribution of outbreaks and virus strains (clades), and provided information to global avian influenza platforms such as GLEWS (Global Early Warning System for HPAI) and EMPRES-i (an FAO information system to monitor emergency diseases).

In the JTF supported model, risk based surveillance was carried out by local animal health personnel in four provinces and districts. The model had elements of the participatory surveillance system that was in place in Indonesia, and particularly engaged with the steering committees on avian influenza control (SCAI) that were in place at provincial, district and commune levels. In the first instance, a needs assessment was carried out to understand the human resources and organisation of the animal health services and the disease control sections that were set up at each administrative level in the case of an outbreak. The experience of previous outbreaks was also examined to more fully understand constraints and the requirements of project activities in the provinces were planned with the local authorities and animal health services. The project officers subsequently implemented the actions necessary to strengthen the surveillance system according to the needs assessment, such as providing equipment and training workshops to standardise field control activities. In addition, the project officers were in the field to provide specific technical expertise and locally adapt biosecurity and disease surveillance measures. The activities in this model also incorporated and supported the function of a HPAI hot-line in the pilot provinces to notify suspicious incidents. The project also attempted

2003 - 2004
N = 34

2005
N = 59

2007 - 2014
N = 34

Legend

Figure 2.5: *Spatial distribution of Influenza A H5N1 outbreaks in humans in Viet Nam by periods (years).*

to standardise data collection at different parts of the surveillance process. The simplest report format was created to enable data collectors on the Hot-Line to distribute information to the relevant DVS. The outbreak investigation form was also created to enable DVS to assist with assessments of suspicion of HPAI cases, and to facilitate reporting back to SDAH. The third standardized form enabled field information to be sent to the laboratory with the samples and carcasses for investigation. Finally, the feedback form was sent monthly to the communes to facilitate reporting on the overall disease situation. A lot of attention was therefore paid to facilitating surveillance information flow.

This project model was only in place for a year but it made a significant impact, not so much in terms of increasing the number of outbreaks detected (outbreaks were at a low during period), but because of the strong sense of ownership felt by the participating administrations and animal health personnel in revising surveillance associated forms and implementing data collection. At the completion of the project there was some provincial interest to continue these activities using local resources, but this did not become institutionalised.

Another model for passive H5N1 HPAI surveillance increasing the linkage to the producers and strengthening outbreak investigation involved district and provincial animal health services and was supported by USAID. Financial support facilitated travel of District Veterinary Services and SDAH personnel to the field to investigate disease reports, and assisted the submission of samples to the diagnostic laboratory system. In addition the necessary adjunct training was provided on sampling, sample submission, and development of SOPs for outbreak investigation and response. In association with the passive surveillance system, two support activities were implemented to assess their utility in improving the number of outbreaks reported. The first was the establishment of a suspicious incident reporting hotline in project provinces that was maintained for 2 years. The second was that in late 2008 when community-based animal disease surveillance (CADS) workers in one province tested the utility of a short message service (SMS) system to report disease incidents. This SMS reporting trial did not get sufficient commitment and traction with the CADS workers in the communes where it was introduced, and it was not continued.

While FAO was engaged with the traditional DAH-SDAH-DVS surveillance model, Abt Associates (another USAID partner) was supporting village animal health workers in some districts to investigate and report suspicions of HPAI in village poultry. Late in 2009, the first information emerging from the GETS project[2] indicated that the commune or chief animal health workers (CAHWs), who were the last link in the officially recognised animal health system, were a very good source of information about the field situation. The project developed a new model that involved providing support specifically to the CAHWs in 5 project provinces. This model called community based surveillance (CBS) was linked to the Abt Associates programme where there was an overlap in the location of project activities. It was referred to as active surveillance as it involved either bi-monthly (in high risk season) or monthly visits by the CAHW to all the villages in the commune. This model was applied for 6 months and then further modified for 3 months to an event based surveillance system, where active surveillance was greatly

2 GETS = Gathering Evidence for a Transitional Strategy

intensified in communes contiguous with a confirmed outbreak of HPAI.

The active virus surveillance conducted in live bird markets is mentioned later but also arose from observations of the GETS project where it was found that virus detection was up to 10 times more likely in markets than sampling in the field. A pilot market survey was conducted in one of the project provinces and success in detecting viruses suggested that this might be a productive area of activity.

Disease response capacity building 2006 to 2010

In early 2004, DAH produced guidelines for disease control in the face of the expanding epidemic and there was little or no opportunity to provide training to the field operatives. During the early phases of FAO support, a large amount of personal protective equipment and disinfectant was delivered to Viet Nam and limited training was provided on its correct use. With support from a number of sources including FAO, DAH set out on a major training programme for all technical personnel involved in outbreak response, especially in the high risk areas. However there were some concerns that in spite of the very impressive number of people trained, some deficiencies appeared in the details of the SOPs. It was noted by international experts that the management of emergency animal disease situations in Viet Nam had a particular characteristic - animal health officials did not have any significant management control over the implementation of control measures because this remained the jurisdiction of the local administration. The animal health service was only able to provide technical advice. The ideal system for the outbreak response is to have a well-trained cadre of individuals who are able to supervise local activities and allocate tasks and responsibilities according to a standard manual. This is the so called Outbreak Response Centre approach,

but this does not work well in the Viet Nam context due to local government allocation of roles and responsibilities. Therefore the set of coordinated activities required for effective outbreak control were organised into job cards and in many high risk areas, technical training was provided to animal health services. However it was not possible to have this job card approach incorporated into the government regulatory guideline circulars governing the outbreak response.

In 2006 a training programme to strengthen disease outbreak investigation and response was implemented widely across Viet Nam, supported by a several different projects. However, the implementation of the training in every case was under the technical direction of the DAH and this ensured uniformity and compliance with the policy for disease control set out in a government decree. This training was well delivered and used a cascade approach where SDAH and appropriate DVS staff were trained as trainers. In the 604 project component of the training in 2007 some 368 participants from 211 districts in 22 provinces in the southern part of the country were put through the field course. The total effort brought improved uniformity to the responses that were implemented by local authorities. However the project became concerned that the management might be more robust and uniform if more detail was provided in the guidelines. In addition, it appeared that the outbreak investigation process was quite variable and not always followed up by a routine laboratory diagnosis. To overcome these constraints, the project supported the development of more detailed standard operating procedures (SOPs) to manage outbreaks and to undertake outbreak investigations. In particular there was more emphasis placed on trace-forward and trace-back actions in the investigation and as previously mentioned, sample collection and submission was stressed. The common feature of the outbreak response SOPs was that all specified roles in the response were set out in job cards. It became clear, however, that some of the roles in the control framework at district and especially commune level fell to non-technical members of the local HPAI Steering Committee requiring considerable training to ensure a more cohesive emergency response.

Disease Surveillance activities 2011-2014

In 2011 both the passive and active surveillance models mentioned above were reviewed by an international consultant with support from the DAH.

Review of the support for the passive surveillance system

The community based passive surveillance system had been supported in 5 project provinces for about 3 years. In general terms it appeared the model described above did not result in an increased sensitivity of the surveillance system, as the number of reports did not change significantly during this activity. It was evident that the constraints on the animal health service component of the process were not overcome by the financial support provided to facilitate the surveillance work of the service. One point of note in the review was that the animal health service was less concerned than in the recent past about the impact of the disease on poultry production, as experience now showed that local outbreaks often 'resolved' without any intervention. Despite the enhanced field capacity over the years, some serious outbreaks still require the support from national level as the diseases remain endemic in

Viet Nam. The factors inhibiting investigations were the significant unpaid work overheads, the requirement to have a continuous animal health service presence at the outbreak, hostility from traders when market activities were suspended and high level administrative criticism in the event of a disease report. If the zoonotic impact of H5N1 HPAI (or H7N9) increases, then attitudes and constraints entrenched in the animal health service and probably the local administrations must change. In regard to zoonotic threats, there were concerns expressed in the review about biosafety at laboratories and for SDAH staff handling materials submitted to provincial laboratories.

The economic and social constraints for farmers to report in the passive surveillance system were also identified by the review (this review dealt with mainly small commercial farmers and not scavenging chicken owners). A number of limitations with the financial support system also negatively affected the reporting incentives. In addition, an outbreak brings a lot of tension and inconvenience to a community, including the likelihood of some contiguous culling and due to social pressures, farmers may prefer not to report a suspicious event. The review also highlighted that the laboratories, an important link in the system, were not able to provide an adequate poultry disease diagnostic service but tended to be limited to a few tests. In other words, when a farmer had a disease problem that they were sufficiently concerned about and requested assistance, in many cases the diagnostic process was not able to provide a definitive answer. It would appear that in the long term, this constraint will need to be addressed, but the benefit of a better technical service may not be realised because of the disincentive arising from the fee structures that now apply for laboratory services in some places. It is not clear if there was a distortion in the fee structure because of the presence of international projects with financial resources to support the laboratory system.

This review also highlighted that there was a view strongly held at administrative levels that pre-emptive disinfection of the environment is a preventive measure for H5N1 HPAI, and failure to deliver this measure resulted in outbreaks. This view might be the result of the strong messaging from communications projects about hygiene in poultry-raising as a preventive measure for disease. The culture of criticism among farmers and animal health services when disease is discovered was also another constraint to disease reporting that emerged, but might be difficult to address. The review also recommended the use of the rapid antigen detection tests be considered as it was likely to benefit the provincial services and would not have a negative impact on the sensitivity of the current surveillance system. Rapid test would be an option for Viet Nam, however it would require further coordination between local and central government authorities to report results from rapid tests. It would appear that this issue needs to be further examined.

The findings pointed to substantial underreporting of H5N1 HPAI incidents and so the review questioned the cost effectiveness of the models. It was also recommended that further investment in the hotline system be suspended. It seemed that the injection of moderate material support for technical activities was not able to overcome other inhibitory factors in the system.

Review of the support for the active surveillance system

Following on from the review of passive surveillance, a similar exercise was conducted to assess the active surveillance models being implemented by the project. Many of the key findings about the constraints on reporting and investigation that were noted in the first review

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Commune Animal Health Worker training held in Ninh Binh Province

were noted again. As mentioned previously, the active surveillance model employed was similar to that used by the USAID partner Abt Associates, although with some slight variations. In the 604 project model that the Commune or Chief Animal Health Worker (CAHW)were provided with a monetary incentive to regularly visit villages and meet with key informants including Human Health Workers, Animal Health Workers and also operators of farm drug supply shops. The districts and communes chosen for the pilot were regarded as high risk according to specific selection criteria. While regarded by the review as an epidemiologically valid approach, it appeared that in 3 of the 5 pilot provinces the system did not work satisfactorily as there were no suspicious events detected in the project lifetime with over 1000 village visits. The reviewer suggested that this was not a credible result, especially given the reports of disease events from farmer interviews during the review process, and so the outcome reflected bias in the completion of the surveillance activities. However there were collateral benefits acknowledged by participants, such the improved role profile of the CAHW and strengthened links at community level with the human health services. In addition the activity increased the knowledge of the CAHW about the poultry population and its dynamics, as well as leading to detection and reporting of other disease incidents such as FMD and PRRS. It appeared that these benefits were directly dependent on external support and there was little demand in the system to continue this level of activity.

For a short period in 2011 in some of the high risk districts and communes the project supported an activity referred to as event based surveillance. The approach was when a HPAI outbreak occurred in a commune, active surveillance was intensively carried out in 50 contiguous communes for a month. This system was triggered twice during the study period but did not detect further outbreaks.

In the final analysis it was concluded that community based active surveillance and event based surveillance were not cost effective approaches, particularly because to the filtering

that took place further up the animal health communication tree from commune to district to province to central government level. However where the approach was embraced it was clear that it did facilitate the surveillance effort and the SDAH appreciated the support for sample testing to confirm or rule out H5N1 HPAI. Where it was not embraced, the review noted that there was a tendency to categorise an event as "not suspicious" when in fact a diagnostic investigation was the only reliable way to determine the cause.

Other observations on support for disease surveillance

At some point through the review process it was suggested by SDAH officers that farmers should be paid for diagnostic samples – this clearly indicated a lack of value placed on the investigation process by both parties. The project had noted that there was more of an emphasis on the regulatory role and not the service role from the animal health service and this created a negative relationship between farmers and the service. It was concluded that if poultry owners saw benefit requesting an investigation and not an impending penalty, then they would be more likely to engage. This added further emphasis to the need for diagnostic laboratories to provide broader scope of diagnostics and not be limited to a few prescribed test outcomes. Another theme that arose in interviews was that commune level authorities did not pay much attention to animal diseases, and this reinforced the view of many small holders that livestock losses are the norm and not a source of alarm.

As noted elsewhere in this document, during this period the programme started to invest more heavily in risk assessment and risk based approaches to disease control, especially with a view to initiate a zonal approach to HPAI control. It was decided to continue short-term support for passive surveillance in project provinces as a prelude to the market chain / risk based surveillance and the potential implementation of zonal control. However in late 2012, DAH adopted a new strategy for HPAI control that was not based on the 3 disease virus eco-zones identified by the project. After further analysis that indicated that the activities reinforced by the project did not have any significant impact on the reporting or control of HPAI, the external support for the passive surveillance activities was suspended, and disease outbreak reporting became totally dependent on the original source of signals – i.e. farmer engagement with the local animal health system. As discussed in greater detail later, active surveillance of live bird markets continued.

Another aspect of surveillance commenced in 2012 with the first meeting between the Department of Animal Health and Production in Cambodia, the Department of Animal Health in Viet Nam and the respective FAO ECTAD units from Cambodia and Viet Nam. The aim of this cross-border collaboration was to develop a greater understanding of the possible cycling of H5N1 HPAI within the shared Mekong Delta ecosystem and to strengthen disease control in the ecosystem. A number of additional meetings have been held and procedures have been developed to share information about virus isolates, animal movement dynamics especially ducks, and disease outbreaks. This so-called epi-zone approach to understanding virus epidemiology was an important cross-border development initiated by this project.

Disease response support 2011-2014

The emphasis in this period was to increase the dissemination of the outbreak SOPs and the outbreak investigation procedures. Again the focus of the activity was to build up capacity to support the implementation of a zonal disease control strategy. Animal health officials suggested that SOP training be extended to the local authorities as they were really in control of outbreak operations. However, the further embedding of the SOP approach with job cards in the overall disease control system has been constrained because the SOPs have not been included in the new regulations related to HPAI control. One concern frequently expressed was that the SOPs were too detailed and complex. Furthermore, the outbreak investigation protocol was regarded as overly complicated and difficult to obtain farmer agreement necessary at the conclusion of the investigation. This regulatory requirement was not anticipated when the technical drafting commenced.

Information Management

A disease information management system called TADinfo was developed by FAO and was deployed in Viet Nam prior to 2004. This was in use through a local network application in the Epidemiology Division of DAH. After the first HPAI outbreak, a new web-based version of TADInfo was introduced and the necessary equipment and training supplied to implement the system in all 64 provinces and enable linkage to the central server. This equipment and training extended to the use of hand-held GPS devices. There were some start-up issues as not all provincial SDAH had the basic computing skills required to enable fruitful use of the new system. However in 2006 the basic training and infrastructure necessary was in place. TADInfo was brought into official use in September of 2006 and was used to manage data on HPAI, foot and mouth disease (FMD), classical swine fever (CSF) and Newcastle disease. DAH requested the project to support the development of a vaccine inventory system to assist with large numbers of doses of HPAI vaccine that needed to be stored and distributed. In 2007 and 2008, refresher courses were conducted to increase the utility of the software for SDAH, especially to enable them to undertake local disease situation analysis. Included in the refresher training was a course dealing specifically with geographic information systems (GIS) and spatial analysis. In 2008 porcine respiratory and reproductive syndrome (PRRS) was added to the disease list when the new highly pathogenic form of the disease entered the country. During 2009 and 2010 further improvements were made to the software at FAO Headquarters in Rome and introduced into the Viet Nam along with updated national maps. To further streamline the operation in 2010 a national database manager was hired, a new server dedicated to TADInfo was purchased and additional firewall software installed on account of a hacker breach that had occurred earlier.

While the central Epidemiology Division was committed and TADInfo provided DAH with an organised system to manage national data, and it also supported SDAH to manage and analyse their own data, it seemed that the level of engagement of the SDAH was variable. In part, this was attributed to the requirement that disease reporting had to be carried out officially in paper format with an official seal stamp, resulting in a dual reporting system. The overhead at the local level to maintain this dual reporting system was considered a serious

drawback. While most of the infrastructure was supported from outside sources, there were still maintenance costs that had to be provided by DAH, including maintaining the training and skill base at the user end where there was frequent staff turnover. Increasingly the Epidemiology Division staff were entering data into TADInfo or alternatively storing it in customised spreadsheets to facilitate analysis. After considerable effort and technical support provided by DAH and FAO, it was decided in 2013 that the system was not able to meet the requirements and it was no longer maintained.

A replacement for the TADInfo system was sought and DAH and the project selected the Massey University Integrated Real-time Information System (IRIS) as it was well suited for the Vietnam situation and was partly developed by a Vietnamese national as part of his PhD fulfilment. Terms of Reference were developed and approved for international consultants to assist with the implementation, two national staffs were recruited and a computer server was purchased. Unfortunately, no further progress was made as the international consultants failed to come to Vietnam. In 2014, several attempts were made to get government approval of different systems. A USA developed 'smart phone' system was selected by DAH as the next option, but higher management approval could not be obtained. Late 2014, the project decided to hire an independent international consultant to assess the existing and previously used animal health database and information systems, to review their advantages and disadvantages as well as reasons why any systems have been discontinued. The assessment also included a needs assessment of relevant units of MARD, NCVD and RAHOs, sub-DAH and other decentralized stakeholders and assessed existing capacities and needs including facilities, equipment, internet access, human resources.

Training participants learning how to use the GPS device

Data Analyses and Disease Modeling

Since the beginning of the FAO involvement in the avian influenza programme, two projects have used modelling to assist with understanding the behaviour of H5N1 HPAI. One set of modelling in 2007 was able to demonstrate from outbreak data that the combination of local culling and vaccination reduced the spread of disease more than culling alone. This model also highlighted that in some flocks, there was not the expected protective vaccine effect meaning that further investigation was required to explain this outcome.

A second study was conducted as a response to influenza threats from China. The project commissioned a study to profile 18 live bird markets (LBMs) in northern Viet Nam. Input data included such variables as the number of traders and middlemen; the number and type of poultry traded; seasonality of poultry species traded; market opening hours and basic market infrastructure; quantity and practices applied to unsold poultry; and the source of the poultry presented at the market. This data was used by the contracted organisation (Royal Veterinary College) to carry out a Social Network Analysis showing market connections and probabilities of introduction and/or amplification of pathogens. The study confirmed the sampling strategy for H7N9 detection (or other influenza A viruses) in LBMs implemented by DAH was correct.

To bring some more focus on the application of modelling, the 5th international Workshop on Influenza Risk Assessment and Risk Modelling was held in Hanoi in 2013. In the workshop, presentations were made on different approaches to risk assessment and modelling. This included analysing HPAI H5N1 virus clade results and agro-ecological risk layers for the south-east and south Asia region. The workshop also resulted in DAH and FAO developing recommendations on how to apply these regional approaches to national level analyses that inform influenza A prevention and control management practices. Following this initial workshop, risk assessment and modelling were further pursued and included in the 2014 advanced AVET training course.

Participants of 5th international Workshop on Influenza Risk Assessment and Risk Modelling (2013)

Virus surveillance 2006-2010

Initial efforts to detect and characterize influenza A viruses was supported by international organizations such as the U.S. Centers for Disease Control (USCDC) in 2004, and USDA in 2005 by sending personnel to Viet Nam to enhance ongoing laboratory protocols and establish additional diagnostic techniques. Virus diagnosis capacity – principally using molecular based techniques but also virus isolation in embryonated eggs - was established at RAHO 6 in Ho Chi Minh City, the NCVD in Hanoi and at the National Institute for Veterinary Research, also in Hanoi. Viruses were sent from Viet Nam to international reference laboratories including USCDC to conduct initial virus genome and antigenic characterisation. As the epidemic progressed, virus genome information accumulated globally and Viet Nam contributed virus genome sequences information to this global effort.

The diagnostic laboratories played a very important role in the surveillance system by providing rapid and accurate diagnosis of H5N1 HPAI outbreaks. The progression of laboratory diagnostic capacity is addressed in a separate chapter, but it is noted here that a laboratory network was established with the NCVD at the centre. All samples with positive influenza A molecular test results were passed to NCVD for virus isolation and from the isolates obtained, viruses were selected for further molecular characterisation and inclusion in vaccine challenge tests. Over the years, the laboratory system accumulated an impressive library of field isolates that have been used to understand the evolution of the virus in Viet Nam. The temporal and spatial distribution of the clades was monitored with regular production of maps and reporting at local, national and international meetings.

Virus surveillance 2011-2014

In the early part of the programme most viruses studied were obtained from samples obtained from outbreaks with a small number of samples being collected from markets, and in one case, from spent hens apprehended after entering the country from China. As noted previously, evidence suggested that ducks in live bird markets were useful targets to detect and monitor H5N1 viruses, and this led to the LBM surveillance programme that commenced in 2011. The laboratory methods used to support surveillance are discussed under the section "Laboratory Diagnostic Services". As noted, genetic characterisation was initially carried out by collaborating international reference laboratories and there was a dependence on shipping virus isolates outside the country. By 2010 with the advent of gene rapid sequencing services, it was possible to obtain sequence information from nucleic acid samples sent by courier to a high throughput gene sequencing laboratory in South Korea. The number of influenza A viruses isolated and characterised is shown by year in Table 2.

As well as monitoring the influx of viruses into Viet Nam, the virus surveillance programme also established the geographic distribution of the different strains and clades. Mapping of the clade distribution made an important contribution to understanding the stability and evolution of the virus population at a national and regional level and led to the development of the virus ecozone/epizone approach. The spatial distribution of the viruses was one of the foundations of the FAO proposal for the epizonal approach to HPAI control. This approach to control clearly demarcated the virus eco-zones

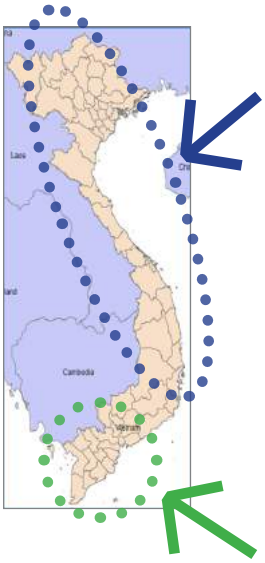
in the south from northern Viet Nam with the north being strongly influenced by introduction of new viruses and circulation among more chickens than ducks, while the Mekong Delta epizone was characterized predominately by virus circulation in free-grazing duck systems. This strong dichotomy and separation in clade distribution between the Mekong and Red River Deltas has been challenged several times with periodic introduction of new clades (2.3.4 and 2.3.2.1) but these clades had not been repeatedly isolated suggesting that they were not maintained within this epizone. Only recently (2013) did this epizone start to change with the appearance and establishment of clade 2.3.2.1 C in the Mekong Delta, co-circulating with clade 1 virus almost at the same level (25 isolates of clade 1, 28 isolates of clade 2.3.2.1.C). Clade 2.3.2.1.C virus continues to circulate in early 2014 and is becoming dominant over clade 1.1 (9 out of 11 isolates) which has undergone some evolution into two molecularly distinct lineages L5 and L6 based on the surveillance and outbreak data available. What remains somewhat of a mystery is the sudden increase of H5N1 human cases in Cambodia in 2013 (3 deaths out of 3 cases in 2012, 14 deaths out of 26 cases in 2013), while in Vietnam on the other side of the border, H5N1 human cases from exactly the same virus clade remained low or at the same level during 2012-13 (1 death out of 2 cases in 2012, 2 deaths out of 2 cases in 2013).

The annual distributions of clades from 2003 to 2014 is shown in both Table 2.1 and Figure 2.6 and the range of clades detected via the passive surveillance and LBM surveillance over the 3 month period from October 2012 to January 2013 is shown in figure 2.7.

In order to better address H5N1 HPAI control across the borders, it is necessary to continue to facilitate a closer collaboration among government counterparts to improve epizone activities including surveillance, joint sector (animal/human) outbreaks response and communication, improving the understanding and management of the cross-border animal movements. The project supported meetings between Vietnamese animal and human health sectors along the borders in both the Red River and Mekong Delta ecozones.

Additional LBM surveillance and laboratory data was analysed and in October 2014, the Journal of Avian Diseases published "Prevalence and distribution of Influenza A/H5N1 clade variants in Vietnam, 2011-2013". In summary, this virus surveillance system was effectively employed to detect the incursion of new clades of H5N1 HPAI from outside Viet Nam, to monitor the evolution of the clades once present, to confirm that mortality events in poultry were indeed caused by H5N1 HPAI, and to collect field viruses to monitor the efficacy of the vaccine being used.

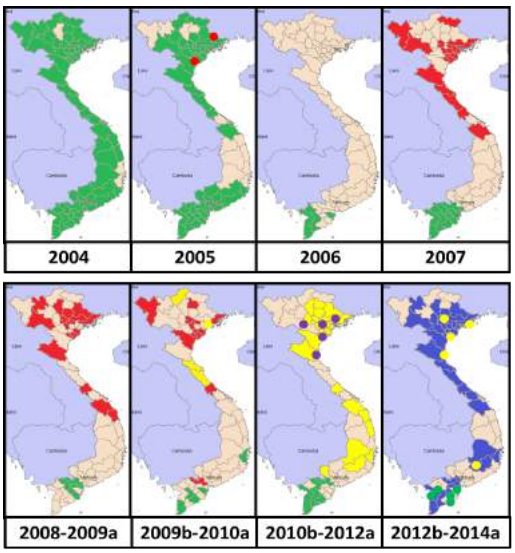
Changes in the H5N1 HA Clade in Viet Nam 2003 - 2014



HA Clade		No. of H5N1 virus detected in the north in year of											
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
0				3									
1		17	40	28								1	
5		2											
7							18					13	
2	2.3.2			9									
	2.3.4.(0-4)			10		103	53	29	18				
	2.3.4.6												
	2.3.2.1A							1	18	95	79		12
	2.3.2.1B									9	27	1	
	2.3.2.1C										189	33	50

HA Clade		No. of H5N1 virus detected in the south in year of											
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
0													
1			30	45	4	42	7	19	12	23	11	28	2
5													
7													
2	2.3.2												
	2.3.4							1					
	2.3.2.1A										4	1	
	2.3.2.1B												
	2.3.2.1C										11	25	9

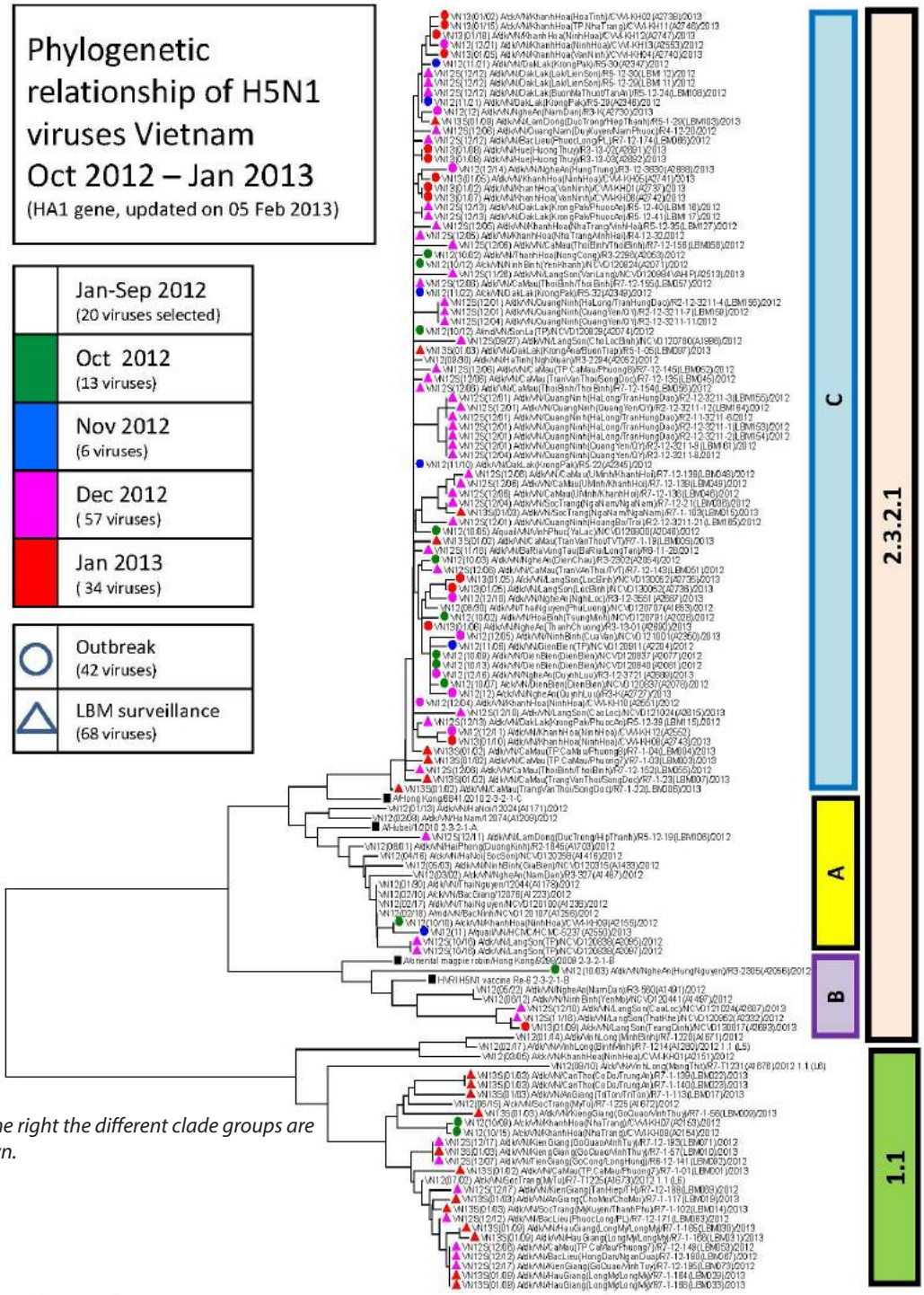
Table 2.1: *H5N1 HA Clade changes detected in Viet Nam from 2003 to 2014*



Year	Transition of H5 HA clade
2004	Incursion of clade 1 and quick spread throughout the country
2005	Dominance of clade 1 continued Incursion of clade 2.3.4 (sporadic)
2006	Absence of outbreaks in north Clade 1 kept circulating in south
2007	Spread of clade 2.3.4 in north Clade 1 kept circulating in south
2008	Same situation as 2007 continued
2009	Incursion of clade 2.3.2.1.a in north
2010	Spread of clade 2.3.2.1.a in north Incursion of clade 2.3.2.1.b in north
2011	Same situation as 2010 continued
2012	Incursion of clade 2.3.2.1.c and quick spread throughout the country
2013	Clade 2.3.2.1.a disappeared, while clade 1 and 2.3.2.1.c kept circulating
2014	Dominance of clade 2.3.2.1.c in north and south Sporadic cases of clade 1 in south

Clade	
1	
2.3.4	
2.3.2.1.A	
2.3.2.1.B	
2.3.2.1.C	

Figure 2.6: *Spatial distribution of H5N1 HA clades detected in Viet Nam from 2004 to2014*



On the right the different clade groups are shown.

Figure 2.7: *Phylogeny of the HA gene of Influenza A H5N1 isolated from HPAI outbreak investigations or collected through active surveillance in Vietnam from October 2012 to January 2013. The tree was constructed by neighbour-joining analysis using MEGA 5.3 with 1000 bootstrap replications.*

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The 14th AVET training course graduation ceremony in 2014

Capacity Building – Epidemiology

One of the first planned initiatives to build epidemiological skills involved linking veterinary graduates with the Viet Nam Field Epidemiology Training Program (FETP) managed by the Ministry of Health. A handful of veterinarians received epidemiological training through the European FETP short course programme in Spain, the regional Field Epidemiology Training Program for Veterinarians (FETPV) conducted in Thailand, and post-graduate courses at Massey University in New Zealand. In 2006, there was still a significant epidemiology capacity gap that had to be bridged to strengthen the technical quality of disease outbreak investigation and reporting, as well as information management.

The DAH and FAO recognised that one appropriate approach to remedy the situation was to develop a local epidemiology capacity building package and USAID agreed to support this initiative through the 604 project. Consequently, a plan to establish the Applied Veterinary Epidemiology Training (AVET) programme in association with the Veterinary Faculty at the Hanoi University of Agriculture was implemented. The curriculum was co-developed by DAH and FAO and involved classroom training in epidemiology theory, followed by planning and conducting an approved field study while carrying out normal professional duties, with a final classroom session for reporting results of the study. Since its inception in 2009 this programme has conducted 14 courses and graduated 190 veterinarians from the 4 month programme (10). To support AVET graduates, there has been a regular annual AVET Alumni meeting for exchange of ideas, discussing ongoing constraints, and to provide a platform for

presentations of relevance. The DAH has noted that this programme has resulted in a marked improvement in the quality of field reports and investigations. It has also resulted in increased work satisfaction for many veterinarians at district and provincial level. In the last 2 years, in response to demand, advanced AVET modules have commenced to provided training in areas such as quantitative and qualitative risk assessments, risk modelling, spatial epidemiology, and an introductory One Health course entitled Wildlife Investigation in Livestock Disease and Public Health (WILD). While the AVET program has been considered a resounding success, it has been noted that a significant number of the graduates move on to other professional roles or administration and therefore through attrition, benefits are partially lost due through professional advancement. The AVET course continues to be assessed annually for relevance and quality.

Future Directions

Although much has been achieved during the last years with animal disease surveillance, more is needed. The next project cycle will start in 2015 and focus on the early detection and prevention of emerging pandemic threats. This will require more intensive targeted surveillance in the animal populations, combined with surveillance at the human-wildlife-livestock-ecosystem interfaces embodying a One Health approach. So far surveillance has been conducted mainly for H5N1 HPAI and other relevant influenza A viruses in poultry. Future surveillance needs to: i) target poultry and other species such as swine and wildlife, ii) conduct targeted surveillance at LBMs, wildlife farms, and other areas where humans and animals come in close contact, for example at slaughterhouses and iii) further investigate H5N1 HPAI, other relevant influenza A viruses, progenitor viruses, and new pandemic threats in livestock and wildlife. Diagnostic protocols, capacity, and information management will also require further development to compliment the expanded surveillance focus.

In order to improve the effectiveness of active and passive surveillance, the implementation of an animal health database management system is urgently needed, including engagement by government laboratory and epidemiology counterparts at all levels. Although politically difficult, to progress significantly, 'smart phone' applications and other techniques will need to be used in the field to improve reporting at commune level by farmers (passive), animal health workers and veterinarians (active).

Over the last few years, donors, FAO and the DAH have discussed the hand-over to government and sustainability of the active surveillance program without any substantial conclusions. The ongoing challenge for the GoVN is to engage the provincial DARD in the national surveillance programme and to deliver benefits at multiple levels of the animal health network. FAO considers that independent of donors and international organisations, MARD, Provincial leaders, and the Ministry of Finance need to commit funding for DAH to sustain cost effective smart surveillance, delivering on clear objectives to improve the

knowledge of animal pathogen circulation. Initially this can be achieved with technical assistance from FAO and others, but in the long run, this needs to be ultimately managed and implemented by GoVN. Future surveillance should, as mentioned before, be implemented in synergy with MOH in a One Health context to better address transmission of pathogens between sectors. While pathogens remain the surveillance target, MARD and DAH also need to consider other issues that may be linked to or contribute to animal diseases or public health risks including production practices, biosecurity, hygiene , food safety and antibiotic use, residues and resistant bacteria.

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AVET and FETP(V) graduates attending the 3rd AVET Alumni meeting and 1st Epidemiology One Health Network Forum in 2013

Highlights of the support for disease surveillance

It is clear that the surveillance programme has increased the depth of understanding about the dynamics of HPAI H5N1 in Viet Nam. The outcomes of the FAO and DAH collaboration across a number of activities related to surveillance provided a good example of the benefits to be gained from continued technical and financial support. Both DAH and FAO worked hard over a number of years to find solutions to a problem that was a serious concern in relation to HPAI control i.e. how to find outbreaks quickly, how to respond effectively and how to gather field information to better inform the epidemiology knowledge base. While there was no simple or single solution, the information gathered on surveillance constraints provided good evidence for decision makers to make informed management decisions.

A significant effort was made on epidemiology capacity building in the field veterinary services with training on disease response and outbreak investigation. While the focus on HPAI brought improvements to this specific control effort, there are generic aspects to the capacity building that carry benefits to other areas of disease control. The AVET programme was a major output for the 604 project and trained 190 individuals in basic epidemiology, bridging an important gap in technical expertise

FAO and DAH counterparts were engaged in constant temporal and spatial monitoring of the

H5N1 virus and developing an understanding of the virus epidemiology in Viet Nam and regionally. It was helpful to DAH, MARD, the National Avian Influenza Steering committee and other stakeholders to have access to science-based professional presentations for informed decision making. It was also helpful to donors and other international stakeholders, as well as a global public good to have access to similar information.

The increased lab capacity to accommodate large volume throughput of samples from influenza A positive detections to genomic analysis as a routine part of the surveillance programme is an excellent accomplishment. This virus monitoring programme has also underpinned the effort to monitor vaccine efficacy in Viet Nam, and this is recognised as a powerful contributor to vaccination success (Figure 2.7 shows the phylogenetic analysis results over a defined period). Furthermore, sequencing and sharing information has contributed to the global public good associated with international pandemic preparedness.

The recent initiative to have collaboration with Cambodia on cross border surveillance in the Mekong Delta eco-zone is a significant step forward in developing a greater understanding of the dynamics of H5N1 HPAI in poultry in this shared environment.

The Cambodia-Vietnam cross-border meeting in Siem Riep, 2012

Issues and challenges of disease surveillance

While the model to enhance passive surveillance did not have a cost effective outcome, it is clear that the passive surveillance system is the best for the purpose of early detection of outbreaks provided there is transparency in reporting. As such, ways need to be found to enhance this. However as noted in the review of the passive surveillance models, there are many constraints that require concerted effort to overcome. The basis of passive surveillance is the belief that the producer has in the capacity of the animal health service to provide appropriate support. And so the animal health service must also continue to demonstrate a willingness to engage with their constituents, provide sound technical advice, and instil trust in the communities they serve. Efforts to improve surveillance by increasing interaction and interface between

producers and the animal health service had somewhat artificial outcomes. While it may have temporarily increased the contact and possibly improved early reporting, if opportunities for interactions were not provided, it seemed that the situation quickly reverted to the default whereby livestock owners tended to deal with their problems without communicating with official animal health or veterinary services.

The disconnections and decentralized mechanisms in place for national animal health management have also caused issues with information management and flow as well as with the outbreak investigation and response. It is virtually impossible to ensure that the myriad individual administrations around the country have the knowledge, training, and interest to be able to manage a local disease outbreak and share appropriate information with the central government counterparts. This will likely remain the norm for the foreseeable future as it is unlikely that new animal health legislation will overrule the authority of local administrations and so the potential for disparate approaches to disease investigation, control and information management will remain a major challenge.

Livestock producers world-wide will engage with animal health services in a time of concern if they perceive that the service has financial benefits to offer and if the engagement is not going to lead to an excessive penalty. It has been noted that in Viet Nam, usual engagement by the animal health services with producers was related to a negative issue (i.e. the regulatory problem) rather than a positive issue (i.e. how the animal health service might help). There were no poultry diseases specialists in DAH and DLP also had little expertise in important aspects of poultry production such as biosecurity and hatchery management. Capacity has significantly improved through efforts of the project but there is still a lack of specialisation and that requires additional capacity building. Both DAH and DLP also suffer from limited human and financial resources to implement activities. Additionally, it is necessary to continue to build trust between the veterinary services and the livestock producers and this requires stronger professional commitment and can be assisted by increasing requirements for proper professional performance. However, it is clear that these are long-term adjustments and ongoing engagement through the OIE PVS evaluations can contribute to this process but it must be driven by DAH at the national policy level.

The structural issues with the animal health service also appear to contribute to constraints in surveillance. There is concern that local authorities do not regard endemic disease control as a national but a local issue and so do not see the need to fully report their disease situation. Currently disease information flow is considered to be the mandate of the administration and so the technical line and function is not paramount in this situation. The policy issues that are likely to arise in implementing new national animal health laws in this situation are potentially very complex. To deal with the constraints it seems that a solution must be found to unhinge the technical disease reporting functions from the administrative functions at the local level, and build more technical accountability into a local to national functional disease control framework.

The initial outbreak response measures applied in Viet Nam were international guidelines designed for larger poultry enterprises with technical competency and capacity, and where disincentives to report are ameliorated by financial support mechanisms to offset the losses due to control measures such as culling. Fitting these measures to Viet Nam's small holder and backyard farming systems created significant disincentives for reporting. Some restrictions placed on provincial trade of an

important economic commodity also prevented transparent reporting and information sharing by local administrations. Therefore trying to implement a disease control programme dependent on passive surveillance was very difficult once the acute alarm phase had passed. Unfortunately all of the efforts to construct a viable and cost effective system were not able to circumvent the barriers that emerged. Once endemicity was accepted, the purpose of surveillance changed and for local stakeholders the disincentives for reporting predominated.

While the principle of a national execution mechanism for activities is important for capacity building and ownership of outcomes, the project did not have close enough engagement with the field activity to ensure uniform implementation of the methodology. An example of close engagement ensuring a good outcome was with the GETS project where the trial was treated as research and a degree of project involvement at field level was negotiated. In other cases, international engagement was limited and activities relied on modalities that at times, did not produce consistent or accurate information.

Conclusion

In the last 10 years, much effort was made by both DAH and FAO to strengthen the surveillance capacity of the animal health service. However, disease outbreak reporting ultimately is dependent on the financial concerns of the producers and willingness of local leaders to make information available. Constraints remain but despite this situation, great progress has been made with those aspects of the surveillance programme that DAH has some control over such as investigation of viruses found in outbreaks and from live bird markets. In the foreseeable future, this is the area where the most valuable information can be collected thus providing decision makers with excellent science-based materials for determining appropriate disease mitigation interventions. The following summarises the conclusions following the investments and investigations into strengthening surveillance

(i) Passive surveillance remains the cornerstone of H5N1 HPAI surveillance in Viet Nam

(ii) Passive surveillance detects incursions of new viruses relatively efficiently, although it is not known how long new viruses are circulating in the population before increased outbreak incidence results in signalment to the surveillance system.

(iii) Passive surveillance has a relatively low efficiency in reporting endemic disease outbreaks and many factors operate at the local level to reduce its effectiveness. Some factors are related to the structure and function of the animal health service, some to the structure of the poultry production and marketing systems, some to producer attitudes and some to the role of local authorities in disease control.

(iv) Active surveillance to detect disease outbreaks or circulating viruses is expensive, not sensitive and so relatively cost inefficient.

(v) Longitudinal active surveillance to find viruses in live bird markets is moderately sensitive, expensive and does not provide additional significant epidemiological information or improve H5N1 HPAI control over the current passive surveillance system.

(vi) Specifically targeted live bird market surveillance to monitor low pathogenic viruses or certain populations of poultry can provide useful epidemiological information.

(vii) The epidemiological approach to outbreak investigation and response is not deeply embedded in the animal health service and opportunities to gather key information and enhance understanding are currently being lost.

(viii) The pattern of distribution of viruses has changed with the establishment of a new clade in the Mekong Delta after about 8 years of endemic stability with clade 1.

(ix) Cross-border collaboration in investigating the virus ecozone in the Mekong Delta has proven productive in increasing epidemiological understanding of H5N1 HPAI.

3 Laboratory and Diagnostic Capacity

SUMMARY

The DAH has especially complimented FAO on the success in facilitating the strengthening of the HPAI diagnostic capacity of the animal health laboratory network and noted the very important contribution this has made to the effort to manage the HPAI problem in Viet Nam. An important ingredient of the process has been the continuous mentoring provided by the presence of an FAO laboratory expert working in close association with national colleagues since 2006. The inputs from FAO focused on provision of reagents and training, guiding vaccine efficacy testing, monitoring the performance of diagnostic tests, establishing linkages between laboratories and epidemiology groups, building genetic analysis capacity, and to a lesser extent with provision of equipment. There have also been inputs made to improve the general management of laboratories, and to expand the capacity for diagnosis of additional poultry and pig diseases.

FAO expertise and mentoring has also focused on monitoring the pathogenicity of H5N1 HPAI viruses isolated from field outbreaks and live bird market surveillance. In conjunction with virus studies the efficacy of the vaccines purchased by the GoVN for the control programme has also been monitored. This work was made possible by the establishment of a secure animal isolation facility at NCVD. Another focus has been to determine the HA gene clade of the viruses from the field and more recently, to investigate more deeply the lineage of all 8 genes to detect significant genetic changes such as gene reassortments. The geographic tracking of the clade distribution has contributed significantly to the understanding of the spatial epidemiology of H5N1 HPAI. The recent (2013-2014) genetic analysis of field viruses has elucidated evolutionary changes that appreciably increase understanding of the field situation and contribute to the global understanding of this set of viruses.

FAO Viet Nam has also worked through other projects to strengthen laboratory biosafety and biosecurity, and to mainstream quality assurance and proficiency testing across the national laboratory network. The active involvement with international reference laboratories, regional projects and global networks has meant keeping abreast with advances in technology as well as harmonisation of SOPS with international norms. At the local level, FAO forged links with laboratories in the human health sector to assure greater credibility for the animal health labs and outputs. Despite these successes, some weaknesses remain and DAH must maintain a strong commitment to sustaining the structure and functions of the laboratory network if it is to maintain and improve its present diagnostic expertise.

Introduction

In dealing with an animal disease emergency, one of the key platforms required is the capacity to undertake surveillance, of which a critical component is the capability to provide a rapid and reliable laboratory diagnosis. It is also important that the laboratory is a workplace where a zoonotic agent like H5N1 HPAI virus can be handled safely, and the activities do not pose any threat to the outside environment.

The standard diagnosis of HPAI typically relied on the detection of H5N1 virus in specimens collected from sick or dead poultry. The first method of detection was by isolation of the agent in embryonated chicken eggs and subsequent identification of the HA type by use of reference antiserum. This was a time consuming and also somewhat of a hazardous procedure as it required the manipulation of the infectious virus. As early as 2004, it became clear that this was not an option for routine work in the veterinary laboratories. The second diagnostic method was to use molecular techniques to detect the presence of virus genetic material in samples. Initially conventional reverse transcriptase polymerase chain reaction (RT-PCR) tests were used but by 2006 the use of real-time RT-PCR (qRT-PCR) was becoming commonplace because of the advantages it conferred to the diagnostic process.

During the early part of the epidemic in 2004, the capacity in Viet Nam to diagnose H5N1 HPAI in poultry was vested in three laboratories, namely the National Centre for Veterinary Diagnosis (NCVD) and the National Institute for Veterinary Research (NIVR) in Hanoi and the diagnostic laboratory at the Regional Animal Health Office (RAHO) number 6 in Ho Chi Minh City. A number of different international collaborations were instrumental in assisting the DAH to develop the early diagnostic capacity – USDA and US Centers for Disease Control (US CDC) collaborated with NCVD and the Australian Animal Health Laboratory (AAHL) with RAHO 6, while a Japanese International Cooperation Agency (JICA) project supported NIVR. Initially NIVR had the most capacity due to the research project support and a national PhD research virologist on staff. As a consequence, NIVR was acting as the national reference laboratory for a period of time. However most of the samples being submitted were coming in through the network of diagnostic laboratories associated with the 7 RAHOs. These laboratories were the frontline diagnostic facilities and it was necessary to embark on a programme to rapidly build their human, logistical and diagnostic capacities. Most veterinary laboratories lacked the equipment or training to safely work on diagnostic specimens, standardised quality assured diagnostic methods (SOPs) were not in place and there was no facility in DAH to safely undertake virus challenge work in poultry. In addition the established work flows and work space in the laboratories were likely to lead to sample cross-contamination, especially once PCR testing started. Over the first 2 years of diagnostic activities, the capacity in the system was built up but by 2006 many of the basic constraints to reliable diagnosis remained.

Capacity building in diagnostics was undertaken through on-site training at all 6 regional veterinary laboratories as well as at NCVD, NIVR and at the Institute of Veterinary Research and Development (IVRD) Nha Trang in 2005-2006, and as the NIVR in Hanoi was the lead technical institution, staff participated in a three-week hands-on laboratory and diagnostics training course in Australia, in November 2005. Apart from this project other training inputs were provided in 2004 in country and in the US by US CDC.

Laboratory and Diagnostic Capacity 2006-2010

By the end of 2005, four laboratories were carrying out H5N1 HPAI diagnosis by conventional RT-PCR (NCVD, NIVR, RAHO6 and RAHO7 (Can Tho)), but each laboratory was using different methods, depending on the source of training. In January 2006 FAO carried out a needs assessment of the laboratories to identify the critical requirements for equipment, training, bio-safety and workflows. There were large gaps in technical know-how and experience, and in understanding the requirements for laboratory management and workflow in order to handle the large numbers of samples anticipated, especially as vaccination had commenced and there was a large programme of post-vaccination monitoring that had to be serviced. At this point, the decision was made to base virus detection on the qRT-PCR as it was possible to suitably manage the required laboratory processes and methods within the scope of the facilities available. The basic equipment required such a biosafety cabinets and qRT-PCR machines were purchased with support of the USAID and World Bank projects. Then the process of training and establishing proper work practices in the laboratories commenced.

To this point, the veterinary laboratory system in Viet Nam did not have any experience in working as an integrated diagnostic network and it was necessary to build a laboratory network platform to facilitate training, harmonisation, monitoring and exchange of information. To facilitate the interaction between laboratories the FAO had requested DAH to officially recognise the formation of the animal health laboratory network (Laboratory Network). The first Laboratory Network meeting was held at RAHO6 in Ho Chi Minh City in March 2006 to formalise the network as an ongoing forum to make decisions on H5N1

No.	Year	Month	Place	Host Lab	Main subject
1	2006	3	HCMC	RAHO6	SOP for Influenza A H5 diagnosis
2	2006	10	Can Tho	RAHO7	Internal/external quality control
3	2007	5	Nha Trang	CVVI	Differential diagnosis of HPAI
4	2007	8	Nge An	RAHO3	SOP for PRRS diagnosis
5	2008	4	Ha Noi	NCVD/DAH	Lab biosafety and quality assurance
6	2008	10	Da Nang	RAHO4	Revision of SOP for H5N1 diagnosis
7	2009	10	Hai Phong	RAHO2	Avian influenza diagnosis and surveillance, Lab biosafety
8	2010	5	HCMC	RAHO6	Lab biosafety and quality assurance
9	2010	12	Ha Noi	NCVD/DAH	H5 vaccine efficacy
10	2011	12	Ha Noi	NCVD/DAH	Revision of SOP for H5N1 diagnosis
11	2012	9	HCMC	RAHO6	Lab biosafety and quality assurance
12	2013	10	Ha Noi	NCVD/DAH	H7N9: lab diagnosis and surveillance
13	2014	9	Ha Noi	NCVD/DAH	H5N6: lab diagnosis, vaccine efficacy, surveillance

***Table 3.1**: Laboratory and Epidemiology Network Meetings*

HPAI laboratory related issues, to establish the SOPs for H5N1 HPAI laboratory diagnosis and to prepare guidelines for field veterinarians on sample collection. The meeting was also used to introduce the concept of proficiency testing (PT), the first round of which was conducted in June 2006 to evaluate the reliability of H5N1 HPAI diagnosis across the network. The results of this PT round showed that the development of diagnostic capacity with qRT-PCR was proceeding very satisfactorily.

In 2006, an international consultant was recruited by the project and stationed at the NCVD to provide direct and continuous technical support to the laboratories and to coordinate as much as possible the donor support to this area. Across the project there was continuous support for reagents and laboratory consumables required to develop, validate and conduct diagnostic tests. Early in 2007 the expert visited all the laboratories for on-site training, troubleshooting, mentoring, and to advise on diagnostic algorithms as these varied between laboratories. Standard operating procedures (SOPs) for Newcastle disease and duck virus enteritis were included to extend the diagnostic strategy for outbreaks of fatal disease in ducks. In addition, a round of proficiency testing was carried out that demonstrated further inputs were required in some laboratories. It was clear later in 2007 that the internationally recommended primer and probe reagent set for the qRT-PCR was not working properly, and this was due to the introduction of a new strain (Clade 2.3.4). This quick recognition of the problem was the result of having an experienced scientist reviewing in consultation with national laboratory staff the results coming from the laboratories. NCVD tested the vaccine efficacy against the virus strain circulating at the time and re-assured DAH that the vaccine purchased was still protective. During 2007 FAO Viet Nam was also interacting with the Regional Laboratory Network established to harmonise laboratory methods across ASEAN and also with the global network OFFLU.

Two training workshop were held in 2007; the first to further reinforce diagnostic tests and biosafety and the second to focus on post-vaccination surveillance and sample collection. In addition, FAO assisted the laboratories in using new diagnostic skills and equipment to respond to the severe outbreak of highly pathogenic PRRS. To facilitate better management of the increased volume of laboratory data, the use of the LabNet software (an initiative of DAH to link laboratory reporting to the central Epidemiology section of DAH) was mandated by DAH for all laboratories. The project supported and provided further training on the use of LabNet and a national IT consultant was recruited to help further upgrade the software.

By 2008, significant infrastructure improvement, namely an upgrade of the animal isolation facility, was completed at NCVD to enable virus challenge work to be carried out more safely. During this year, vaccine testing work in young poultry and young ducks was supported and supervised to determine the optimal vaccination regimes to use on short-lived meat birds. In addition, results demonstrated that a fowl pox vectored vaccine did not provide protection to local chickens, in contrast to work carried out in specific pathogen free (SPF) chickens at an international laboratory. Clade 7 H5N1 HPAI virus was detected in smuggled poultry and further modifications were made to primer-probe sets to improve the sensitivity of the qRT-PCR. A new set of probes for Newcastle disease were also added as there was some reduced sensitivity in that test. The next round of proficiency testing showed that all participating laboratories were performing satisfactorily and following the installation of the new LabNet software, the laboratory staff and other DAH users were trained in its use. Meetings of the

DAH staff using breathing air hoods to follow biosafety guidelines

RAHO laboratory network continued as did FAO and key laboratory participation in the JTF regional network project that conducted its final meeting in Hanoi. To facilitate exchange of information and expertise, meetings were initiated between NCVD, FAO, the national public health laboratory and the WHO laboratory expert.

In 2009 the project supported the installation of a new LabNet server and a laboratory equipment survey commenced. Some minor adjustments were required to the qRT-PCR reagents to ensure sensitivity was being maintained for the full range of viruses and the initiative to upload H5N1 gene sequence information on Viet Nam viruses was started. In addition there was a further emphasis on the differential diagnosis of pig diseases using the qRT-PCR. Two rounds of proficiency testing showed that while qualitative results were 100%, not all the laboratories followed the protocols precisely and this was something that needed to be addressed. During the year, a number of biosafety training courses were organized by various donors, and two rounds of the LabNet meetings were held. A national laboratory network biosafety officer was appointed with a task to prepare the biosafety guidelines for DAH laboratories by mid-2010 and then guide the preparation of biosafety manual for each laboratory. To support the field programme, vaccine trials were carried out at NCVD to determine a regime to protect Muscovy ducks.

Vaccine efficacy testing and LabNet meetings continued in 2010, as did the continuous inputs to monitoring and mentoring the diagnostic programme. The LabNet report indicated that the average time from poultry sample submission to a positive HPAI diagnosis was 1.1 days and to confirm a negative result was 2.2 days demonstrating how much more efficiently the laboratory diagnostic system was operating. Interestingly, in 31% of submissions there was no accompanying epidemiological information. The new laboratory network software was now working properly after some earlier start-up problems and the manual for laboratory biosafety was completed and

submitted to DAH for ratification. At this point, FAO was strongly advocating that DAH adopt appropriate biosafety and biosecurity measures in the laboratories, particularly those handling pathogens having zoonotic potential.

In summary, by 2010 the laboratory capacity had been built to the point where diagnostic submissions were handled efficiently and reliably, there was a programme in place to improve biosafety and biosecurity in the laboratories, the management of information was standardised using a networked software package and vaccine efficacy testing was confirming that the vaccine from China (Re-1) was still efficacious against the dominant field strains.

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LabNet meeting, 2010

Laboratory and Diagnostic Capacity 2011-2014

Early in 2011 the laboratory system identified that a new H5N1 HPAI clade 2.3.2 had entered Viet Nam and became the dominant strain in the Northern provinces where it completely replaced the existing clade 2.3.4. Vaccine efficacy tests initially showed that the existing Re-1 and Re-5 vaccines were effective but then a variant of clade 2.3.2 entered that the two available vaccines were not effective. Commercial sequencing was still preferred for rapid classification of the HA gene clade type, and some sequencing was being conducted at RAHO 6 as they purchased a new NG sequencer. However, in 2012, commercial sequencing was extended to include more genes and eventually full genome sequencing to assess gene lineages was being arranged by NCVD. The results of this work are discussed under surveillance and demonstrated the important contribution this enhanced technical capacity has made to understanding virus epidemiology and evolution in Viet Nam.

The recent appearance of H7N9 avian influenza in China posed an immediate threat of virus incursion into Viet Nam. To prepare for an incursion it was necessary to establish diagnostic capability for the agent and appropriate H7 and

N9 primer and probe sets were evaluated and introduced to the laboratory network. In the first round of testing a large bank of specimens held at RAHO 2 in the northeast were tested for H7 and all found to be negative.

With additional support from the World Bank project, the RAHO laboratories commenced training for the implementation of the ISO 17025 standard for veterinary laboratory testing and by 2013 NCVD and 6 RAHOs (except RAHO5) labs had achieved certification, an important step in cementing the role of the national and regional laboratories for animal disease diagnostics in Viet Nam. During this period, FAO facilitated discussions within DAH on a strategic roadmap for the laboratory system in relation to functions, roles, and the financial sustainability of this important network.

The lab network meeting was expanded to a lab-epidemiology network meeting in 2010 as an extension of the laboratory network set up in 2006. These joint multiple discipline meetings brought in most of the institutions and organisations involved in HPAI and other zoonoses diagnosis or research in Viet Nam. This forum played a useful role in facilitating information exchange among the various stakeholders as well as developing coordinated joint recommendations.

Highlights of the Laboratory and Diagnostic Capacity building

On-site training of laboratory staff and repeated monitoring and mentoring in the home facility, as well as selection of techniques and equipment fit for the purpose of rapid diagnosis under conditions in Viet Nam has very significantly strengthened the diagnostic capacity of the network.

Molecular diagnostic capacity was built within the network of 8 DAH animal health laboratories and two MARD research laboratories to enable rapid confirmation of suspect outbreaks (within 2 days) and also large scale surveillance for H5N1 HPAI virus.

Capacity was built to enable management and testing of large numbers of samples submitted for post vaccination monitoring.

Capacity was built to monitor the genetic and antigenic changes in the H5N1 HPAI virus pool, and to interpret results in respect of epidemiology of the virus or implications for vaccine efficacy.

Two significant peer-reviewed articles published in international journals were based in large part on the outputs of the virus surveillance managed through the laboratories

Laboratory networking has contributed in the standardization of lab protocols, monitoring lab performance, trouble shooting, and motivation of staff through the increase in communication and collaboration among laboratories.

Issues and Challenges still facing the laboratory network

The paradigm of laboratory investigation has not been fully embraced and to date, lab efforts are limited to simply testing samples. Further efforts are needed to introduce and establish "conventional" microbiological techniques for confirmatory and differential diagnosis and research capacity.

More attention needs to be given to strengthening laboratory management in areas such as work flows, laboratory biosafety, quality assurance, and inventory systems to keep track of samples and reagent stocks.

Some attitudes that are not conducive to good laboratory services function and work practices are deeply entrenched and difficult to systemically change in a short time frame.

The laboratory data management reporting system requires further improvement, especially in linking test results to the epidemiology information.

There is a deficit in people with deep technical understanding of the diagnostic processes and a capacity to troubleshoot when test performance is not as expected. In the future, it is necessary to have more well qualified people retained in the system so they become leaders. This can be supported through a stronger career path in the laboratory system.

The government has a limited budget allocated to run the laboratories and to maintain a competent human resource base. In the overall government budget system, veterinary laboratories do not rank high in priority. Therefore it is necessary for the GoVN to develop a roadmap for development and maintenance of laboratory capacity and sustainable quality diagnostics.

The government veterinary laboratory system generally does not have good links with the livestock sector and the capacity to provide an in-depth diagnostic service is often lacking. The RAHOs will need to develop a quality service and a more holistic approach to disease investigation to generate the income that is needed in the future to maintain the laboratory system.

There could be further support to research labs that would enable development of diagnostic resources (primer and probe kits) and vaccines that will make Viet Nam less reliant on outsourcing these important diagnostic and management tools.

Ideally if there were more persons with post graduate technical training then applied research would help to sustain the high skill levels needed to be less reliant on outside inputs to maintain quality and reliability in diagnostic virology. It is also acknowledged that national standards, protocols and regulations are needed to harmonize biosecurity, biosafety, and diagnostic procedures at the central NCVD lab and associated RAHO labs throughout the country.

4

Vaccination

SUMMARY

Government commitment to financially support a vaccination programme according to a defined plan subject to regular review was an important feature of the HPAI control effort in Viet Nam. The project partnership between GoVN and FAO involved a close working relationship with continuous dialogue and access to expertise, and this underpinned the GoVN commitment to the programme. If the national authority was not as receptive or willing to fully engage with the international agency and vice versa, the outcome would likely not have been as favourable. Flexibility, data evaluation, research and adjustment were all important elements of the vaccination programme. The applied research project (GETS – see below) on a more targeted vaccination approach provided evidence that it was possible to reduce the amount of mass vaccination and this supported the GoVN decision to limit the amount of public expenditure on mass vaccination.

The GoVN has control over the importation and distribution of vaccine as well as the vaccine strains in use. This effectively prevented use of unsuitable vaccines or those of dubious quality. In addition, capacity was developed for the project to continuously monitor the virus strains in the field so that the GoVN and FAO were quickly and fully informed of any potential reduction in the efficacy of the vaccines being applied. The project developed a facility where vaccines could be safely tested and when new strains of H5N1 virus had entered the country it was possible to quickly assess vaccine efficacy and provide DAH with the information required. These two factors prevented some of the problems that have arisen elsewhere with vaccination programmes, where the same close collaboration and efficacy testing program have not been in place.

Post-vaccination monitoring (PVM) was an important aspect of the recommendations established by FAO and OIE to guide programmes of vaccination against H5N1 HPAI. The project assisted DAH to develop the PVM methodology and then linked the epidemiological aspects of surveillance and the laboratory capacity to undertake the serological testing required. In addition the project provided technical oversight to the analysis of the data.

As the disease situation moved from the epidemic to an endemic phase, it required extra

effort to maintain the enthusiasm of both the producers and the animal health workers in the field. Significant "vaccination fatigue" occurred by the end of 3 years of mass vaccination and so it was necessary to respond with flexibility and technically sound adjustments where possible. The combination of knowledge about the type and distribution of viruses, the efficacy of the vaccines and the results of applied research enabled a technically sound adjustment to the programme and limited the publically funded mass vaccination approach.

Introduction

The decision to vaccinate against H5N1 HPAI in Viet Nam was pivotal in gaining leverage over a serious epidemic that was, by 2005, resulting in an alarming number of human cases and fatalities. At this point, the mounting global concern of the perceived threat of an H5N1 human pandemic and the recent westwards expansion of the range of H5N1 were also significant aspects of the context at the time of the decision. Recognising these additional external dimensions of the issue, Viet Nam felt a great responsibility to curb the number of human cases as quickly as possible. It must be recognised that there were also considerable concerns both at home and abroad, about vaccination against influenza in poultry and strong views expressed internationally by public health authorities regarding the potential disadvantages of implementing such a measure. However, FAO was from the onset, a strong advocate for the Government of Viet Nam (GoVN) decision to vaccinate, and through donor support, provided the national authorities with continuous technical inputs as requested.

By mid-2005 it was apparent that the dangerous increase in the number of human cases was occurring in spite of strong application by the GoVN of traditional control methods based on "stamping out" – that is area wide culling of all poultry, affected or otherwise, in a control zone around an infected flock. As well as not preventing the increase in human cases, this policy was also inflicting considerable collateral damage on low income families whose poultry assets were an important part of subsistence livelihoods. It was evident that adjustments to the control strategy were required to combat the continuing spread of the agent and reduce the level of human exposures.

At this point it should be noted that vaccination was introduced as an additional measure, and not a replacement measure for the other measures being applied. It was also recognised that it was going to take some time to build the capacity required in other key areas of sanitary health to get a firm grip on the disease, and so an additional measure to stabilise the situation was urgently required. In this context, it was decided that vaccination would be applied as an additional control measure while technical areas such as surveillance, laboratory support, biosecurity and outbreak response were strengthened. In addition, modifications to risky production practices such as unregulated and unhygienic live bird markets and unsafe trading operations were necessary to reduce the overall risk of disease spread. However, the achievement of these structural adjustments was not expected in the short term. Against this background, vaccination against H5N1 HPAI commenced with early objectives to reduce the numbers of human cases that were occurring but also to tactically insure that a substantial proportion of the poultry population had a protective level of immunity during the lead up to the Tet New Year in 2006. Seasonally, this is when poultry production increases and more

trade-related movement poses a significant threat for human cases.

The vaccination response had started with two pilot provinces (Nam Dinh and Tien Giang) in mid- 2005 and in September 2005 the GoVN handed down decision No 2586/QD/BNN-TY regarding vaccination. The national roll-out for 46 provinces started in the 4th quarter of 2005, although the commencement of implementation was not uniform across the various provinces. During this time the GoVN and the UN System combined in a major effort to raise donor funds in country to provide additional support to the emergency response, and FAO was a significant partner in this process. Specifically the animal health support arising was directed to training, remuneration supplementation and equipment for field vaccination teams, to strengthen surveillance and to train field staff in emergency response activities. This input was very important to the early success of the campaign.

The history and technical aspects of the early vaccination programme are thoroughly reviewed in a case study titled "Vaccination of poultry in Vietnam against H5N1 highly pathogenic avian influenza[3]". For decision makers wanting further details this document provides useful information about the many issues that had to be considered before implementing the mass vaccination programme and why the programme inevitably took the shape that it did.

3 Vaccination of poultry in Vietnam against H5N1 highly pathogenic avian influenza – a case study by Dr. Les Sims and Dr. Do Huu Dung.

Situation in 2006

The importance of a clear vaccine policy objective cannot be over-emphasised and in this case, the vaccination programme had 2 major objectives; 1) to reduce the number of human cases occurring, and 2) to reduce the impact of the disease on the poultry population. The measures of success were uncomplicated and accessible - the number of human cases and fatalities were recorded by the Ministry of Health through a special surveillance programme, while the impact of the disease on the poultry population could be measured by the number of poultry deaths in outbreaks recorded by local authorities and in subsequent disease control operations. The centrally supported vaccination programme was implemented in 2-year phases involving twice yearly mass vaccination campaigns and regular technical reviews by DAH and FAO. Phase 1 commenced in 2005 and went to the end of 2006, phase 2 was implemented in 2007 and 2008 and phase 3 in 2009 and 2010. The fourth phase was planned but not implemented as the vaccination programme was discontinued at the end of 2010 because of issues with the effectiveness of the available vaccines against newly emergent strains of H5N1 HPAI influenza virus, as well as the information delivered by the GETS project (see below). An adjunct objective of implementation of vaccination was to bring some stability to the disease situation in the field so that the animal health authorities could concentrate some of their resources on capacity building and preventive measures to reduce the level of "firefighting" being undertaken. At this point activities had commenced to strengthen technical capacity in surveillance, laboratory diagnostics, biosecurity and outbreak response. Additionally, some modifications were being implemented in some markets and production units, so there was a strengthened baseline of control measures in place.

Proper management of vaccine storage is critical and the GoVN requested support to improve the cold chain for vaccine delivery and specifically to improve the storage facilities at the provincial distribution centres. FAO was able to facilitate a grant from the Government of Ireland to support this request, undertook an assessment of requirements and then facilitated the improvement or installation of 12 cold rooms with generators and 36 cool boxes for 12 targeted provinces including 5 provinces of Red River Delta region, 4 provinces of central and highland region and 3 provinces of Mekong Delta region.

Post-vaccination monitoring (PVM) was an also important aspect of the recommendations established by FAO and OIE to guide programmes of vaccination against H5N1 HPAI. The project assisted the DAH to develop the PVM methodology and then facilitated the donor support for what was a large undertaking that linked both the epidemiological aspects of surveillance and the laboratory capacity to undertake serological testing required. In addition, the project provided technical oversight to the analysis of the data. Prior to the decision to reduce mass vaccination, a review of the PVM programme concluded it was producing technically useful information but that some adjustments might deliver better insights into performance in the field programme.

The DAH requested project support to develop a vaccine inventory software application that could be used to monitor the use of vaccine and keep a track of reserves in the provincial distribution network. This software was developed by a local information technology company and came into regular use in 2010 by project provinces. Since the completion of the mass vaccination programme, it is still used by

some SDAHs to monitor the use of vaccine.

The details of the virus surveillance programme are outlined in the chapter on Surveillance. The linkage to the vaccination programme was provided by the inclusion of new field strains in routine or in some cases emergency vaccine challenge trials conducted by the DAH National Centre for Veterinary Diagnosis (NCVD) with technical assistance from FAO. With the completion of the virus challenge facility in 2007, vaccine trials were conducted regularly and safely. A total of 52 trials were conducted during 2007-2014 to monitor the pathogenicity of newly circulating field viruses and the antigenic matching of vaccine strains and those field viruses. Based on those results the vaccine strains to be used were updated, especially since 2011. Overall there have been 4 major changes/ incursions of field strains as follows: clade 1 to clade 2.3.4 in 2007 with no change in vaccines as Re-1 vaccine was effective against both; clade 2.3.4 to 2.3.2.1a and b in 2009-10 and vaccine Re-6 was introduced for 2.3.2.1b; clade 2.3.2.1c in 2012 but no change in vaccine as Re-6 was effective against this strain also, and; emergence of clade 2.3.4.6 (H5N6) in 2014 that may require reversal to Re-5 as Re-6 is not effective against 2.3.4.6. Since the suspension of the mass vaccination programme, some provinces have elected to continue targeted vaccination in what the local SDAH regard as high risk areas and so with project support DAH has continued to monitor the efficacy of the vaccines that are in use. Most recently, with the incursion of H5N6, DAH has recently undertaken another vaccine trial to determine whether the 3 H5N1 vaccines in use in Viet Nam provide cross-protection for the newly introduced strain of H5N6. Results indicate that two out of three provide some protection to chickens.

The GoVN had expressed an interest in developing vaccine manufacturing capacity as well as to ensure that the procedures used to rebottle purchased bulk vaccine complied with Good Manufacturing Practice (GMP) standards. The project facilitated an international expert on GMP to conduct audits of the two existing vaccine production facilities and to follow up with GMP training to improve the vaccine handling standards. In addition, the project supported a technical study mission from 4 officers from the National Centers for Quality Control of Veterinary Medicinal Products to visit the avian influenza vaccine production facility at the Harbin Veterinary Research Institute in China to get first-hand experience in some aspects of vaccine quality control. While there has been some effort by companies in-country to produce and distribute avian influenza vaccine, further investment into new vaccine technology could help Viet Nam move towards self-sufficient vaccine production in-country.

One part of the process to adjust policy and look to more targeted vaccination was the implementation of the "Gathering evidence for a Transitional Strategy" (GETS) project supported by USAID. This project conducted 2 years of applied research on an adjusted approach to vaccination, namely focusing on age-based vaccination of ducks and cessation of mass vaccination of chickens in a pilot zone. It found that it was possible to reduce H5N1 transmission through young meat ducks by targeted vaccination and to prevent the emergence of infection in the associated village chicken populations. The findings of the GETS project helped support the GoVN decision to discontinue mass vaccination. While some small vaccine trials and research studies have been conducted by different research groups since 2004, this was the first major applied research study that worked in the 4 target provinces with SDAH implementing the programme in the field. FAO heavily supported equipment requirements, surveillance, data analysis, communications and advocacy necessary for

implementation. In addition the 604 project provided complementary technical support to GETS to facilitate its operations.

The intensive vaccination effort by the GoVN also had important secondary outcomes. Both technical and administrative decision makers at ministerial, department and local levels developed better knowledge and understanding of the overall strategic use of vaccination, as well as its potential shortcomings. For example some jurisdictions have opted to move to local targeted vaccination rather than blanket vaccination, based on experience and understanding of local risk patterns. There is also now more willingness to see vaccination as a routine preventive measure, not one to be used only in the face of an emerging threat. In addition, there is a strong impression from the field that the vaccination programme brought many poultry producers closer to the animal health services and this means basic poultry production practices have been improved, as well as disease surveillance. As part of the learning process it has been clear that producers want the vaccination activity to be more aligned to their production cycles and needs, and this has been adopted by the animal health services in many places. There has been a move away from the fixed mass programme to a more flexible approach locally since the end of the centrally sponsored programme.

In summary, as the vaccination programme evolved and information became available, the project provided technical advice and support in a number of areas but importantly in the regular technical reviews that took place and culminated in a policy review with the appropriate officials of the Ministry of Agriculture and Rural Development (MARD). The strategy to monitor field strains and continuously test against vaccine strains meant that the GoVN was able to respond in a timely manner to emerging threats posed by variation in the field strains. Over the period of the project from 2006 there were 4 significant changes in field strains and subsequently 2 adaptations of the vaccine. In more recent times incursions of new virus strains did result in some short lived epidemic expansion but the combination of strengthened baseline activity plus rapid deployment of new vaccines meant that there has not been a resurgence of human cases such as occurred in 2005.

Collecting duck production data at a GETS training

Results of the vaccination programme 2006-2010

It is important to note that during this period, the vaccination programme was substantially funded and fully delivered by the government of Viet Nam. FAO provided technical support requested, including support for cold chain development and other ancillary equipment, especially early in the programme. However, to provide the overall picture some of the details of the vaccination outcomes are included here for the sake of completion. The success of this control programme can be seen with the sharp reduction in the numbers of human cases in 2006 and the fact that the number of poultry deaths also was significantly reduced. In part, the need for area wide culling in disease control was ameliorated by the confidence that local outbreaks would not expand rapidly through a population that had been vaccinated. Essentially, the two main vaccination objectives were successfully achieved.

The Realities of Implementing a National Vaccination Campaign

While the vaccination programme is recognised nationally and internationally as making an important contribution to the reduction in human and animal cases in Viet Nam, many challenges had to be overcome. While there was an initial pilot in two provinces to assess the implementation process, the plan moved quickly to a full operational action as the pressures to curtail disease in humans continued to grow. As this was an emergency, there was not time or resources available to collect ideal base line data before the application of the vaccine.

On the ground it is accepted that the initial round of vaccination did not work well, in part perhaps because one of the vaccine strains was selected to comply with the international guidelines to allow the application of a test to differentiate infected and vaccinated birds (DIVA approach) (i.e. an H5N2 vaccine), and in part because of inadequate equipment and financial support for vaccination teams. After the first round, the vaccine was changed to a genetically modified H5N1 vaccine strain from China, more closely matched to the field strain, and vaccine performance improved. After the first few rounds of vaccination there was a decline in the enthusiasm and compliance of small holder producers, and also of those who perceived that vaccination either induced production losses or cause interference with management as it was not synchronised with the production cycle. In addition the enthusiasm of the animal health services for maintaining the heavy load of activity also waned.

From an economic perspective, vaccination of young meat ducks and broiler chickens is not favoured by producers as there can be reactions in muscle to the oil based adjuvant. It was also noted that many of the producers with longer lived egg-laying ducks had a negative view of vaccination because of a temporary reduction in egg production. It is anticipated that vaccination will need to be a part of the normal disease control measures in the free range duck production systems for the foreseeable future, and so in the long term, the implementation of "production friendly" interventions to effectively reduce infection and virus cycling through duck populations is a key to maintaining sustainable control of H5N1 HPAI in Viet Nam.

Issues and Challenges of Vaccination

Possibly the key technical challenge for the future is to implement a more effective vaccination programme in ducks. Recent developments for live combined duck viral enteritis and avian influenza vaccines might lead to a major advance in this area, removing the need for multiple vaccines, providing longer immunity, combining influenza vaccine with one in the existing management programme for ducks, and removing the injection of oil adjuvant into the muscle of meat producing animals.

It is clear that H5N1 is endemic in both Viet Nam and China, and Viet Nam is dependent on the supply of relevant vaccines from China. So far there has not been a new strain of H5N1 detected in Viet Nam that has not been previously recognised in China. The incursion from time to time of new strains of virus from China means that field virus must be constantly assessed against vaccines and this will require ongoing technical and financial commitment from the GoVN. While incursion of new strains is a challenge for the overall control of the disease, it is important that Viet Nam has continued access to the new vaccines that are developed to deal with the emergent viruses that continue to appear to the north. However the supply of vaccines cannot be guaranteed, as that might be disrupted by political issues that might arise in the future.

Importantly it is now recognised that there is also the potential for a new strain of virus to emerge in the field in Viet Nam as it is already determined some field strains are the product of genetic re-assortment between different clades of H5N1. It might be necessary for Viet Nam to develop its own research capacity to quickly produce genetically engineered recombinant vaccines to manage the disease especially in ducks. Along these lines, MARD recently established a National Committee on Development of Animal Vaccines with the aim to supervising vaccine research and development activities in Viet Nam.

There are emerging constraints in maintaining vaccination as a preventive tool in high risk environments when the concern about the disease is considerably diminished in the mind of administrators and producers. When there a high level of awareness of the constant threat, a well-tuned surveillance system with response capacity and some resources to compensate producers affected by the disease and the control measures, it may be possible to remove vaccination from the disease control armamentarium. However this is not likely in the medium term.

5 Biosecurity

SUMMARY

The process of developing fit-for-purpose approaches to biosecurity in the small holder and medium scale production sectors has seen a steady evolution over the course of the HPAI programme. At the commencement of the epidemic, empirically-derived biosecurity measures and approaches were applied at the enterprise level in response to what was seen as a serious constraint on HPAI control. However since 2008 the project has worked with DLP along a pathway from a point where there was little technical experience on how to approach biosecurity in small holder and medium scale poultry production systems, to a point where there have been valuable inroads made into developing good management practices at the individual enterprise level as well as along value chains at the larger provincial or regional level. Where value chains cross international borders, attempts have been made to develop strategies to deal with the complexities of those situations and this will be a longer term pursuit through cross-border epizone approaches.

As this area of work progressed, it became clear that much of the effort to bring small and medium scale holders on board in applying the principles of biosecurity to their production systems was not rewarded by action on the part of poultry raisers. The reasons behind the lack of engagement were investigated and analysed. It became clear that it is necessary to find a broader approach than a single disease initiative, and to follow a paradigm that good health management means better production and greater profit. New approaches to biosecurity were developed to concentrate on areas of likely gains both at enterprise level and along market chains. In looking at the biosecurity at a regional level the application of risk analysis was especially rewarding in developing an understanding of the dynamics of H5N1 HPAI in value chains. To achieve broader transparency, integration and harmonisation of approaches, the project strongly supported DLP to establish and conduct the Biosecurity Working Group involving key stakeholders. In addition the development of risk based approaches to disease surveillance and management built significant capacity in the animal health services that has broadly addressed a range of disease problems. To broaden the entry to good management practices the project implemented biosecurity projects on two production fronts – small and medium scale hatcheries and parent flocks. Uptake of the good practices has been encouraging, although there is some tendency for owners to depend on project support for necessary equipment and reluctance to invest their own resources. The culmination of

steady and persistent project interaction with stakeholders at provincial level and consultation at central level has been the endorsement in 2013 of national technical guidelines by MARD covering biosecurity for hatcheries. Guidelines for parent flocks have been drafted and will be soon issued by the DLP based on the work of the project.

It is evident that many small and medium scale poultry meat and egg producers who are aware of the biosecurity messaging and who have received training where it has been offered do not convert knowledge to specified action. However it is not possible to say that these efforts to inform have not had some impact on their thinking about the threat of disease and risk mitigation that can be applied. Overall some of the changes in the epidemiology of the disease can be attributed to producers and other stakeholders becoming more astute in their management of HPAI. Subtle changes have resulted from intuitive adaptation and some will have been learned from external inputs. While the disease remains in a state of endemic equilibrium it remains important and necessary to continue to indirectly reinforce messages about human "biosecurity" – that is to maintain the barriers in hygiene between the animal and the owners at farms or households, and between animals and people working along the value chains.

Many fundamental constraints on strengthening barriers to disease spread along poultry production chains remain, and will not be removed as long as there is a substantial low-input low-output poultry production sector. Furthermore, poultry is expected to be a low priced food item for urban consumers, but at the same time, infrastructure, management, food safety and traceability improvements are necessary that require technical and financial commitment from government. Improvements to management, especially at the marketing and slaughtering end of the value chain requires the right policy environment and financial investments, so these costs are spread effectively and increase production efficiency. The management of the HPAI situation is in the hands of the GoVN and it is hoped that the capacity that has been built in understanding the macro and micro principles of risk analysis and risk mitigation can be translated into practical, area wide and enterprise level biosecurity strategies to reduce the introduction and spread of avian disease pathogens, especially H5N1 HPAI.

Introduction

A useful working definition of biosecurity in the context of H5N1 HPAI is that it is the sum of all the measures taken to build a barrier to the entry of the pathogen into a specific area or poultry production unit, or places where poultry are traded and slaughtered, and to prevent the escape of the pathogen once it has infected birds or contaminated a premises or environment. The latter part of the definition refers to bio-containment and the prevention of onward transmission of the disease. In Viet Nam there were (and continue to be) significant problems associated with the movement of H5N1 along market chains and in a number of projects major efforts were made to improve hygiene and sanitary practices at critical control points such as poultry collection points and live bird markets to prevent this onward transmission. Perhaps one of the conceptual difficulties that arose with communication about biosecurity was that the ideal was robust bio-exclusion, but the sets of measures building the barrier to pathogen entry or spread needed to be appreciated along a scale of risk mitigation that in the local context was rarely perfect. In addition early in the epidemic there was no hard evidence as to which measures brought the greatest returns in the small holder sector. An important realisation was that the entry points or targets for change in biosecurity knowledge and practices were inevitably linked to socio-economic issues influencing decision making by stakeholders in the poultry sector, whether these persons were at the production end or players along the market chain. In the first instance the international technical agencies did not appreciate the intrinsic business motivations that dominated the attitudes within the market chain.

Situation in 2006

It might be said that at the beginning of the epidemic biosecurity was almost a non-existent concept for the majority of poultry producers, and the bulk of poultry production in Viet Nam was carried out following practices that did not or could not readily have biosecurity principles applied to them. And at the same time within the animal health or animal production service there was very little appreciation of or experience with biosecurity. This situation created an instant focus for many international observers and there was a strong push to immediately strengthen biosecurity across the small holder producer sector. Information about the need to improve biosecurity and what actions were required became a prominent feature of the communications materials circulated by many participants engaged in public awareness for non-commercial small holders (so called backyard producers but essentially owners of free ranging, scavenging chickens). However many of these providers were to some extent taking messages 'off the shelf', and they did not have technical backstopping to evaluate the appropriateness of the messages in local contexts and what alternative measures might be applied to reduce the risk of introduction of the agent into free range poultry systems. In the beginning there was not a lot of insight in place into the characteristics of the farming society in Viet Nam that influenced attitudes to this disease and its control. It became evident that common messages about confining village scavenging poultry were counterproductive and viewed with scepticism by poultry owners who did not have financial resources to confine poultry or deal with the other issues that might arise, such as the need to supply feed or manage other diseases favoured by confining poultry. While there was this concentration on scavenging poultry the project became aware that more important sources of HPAI for the market chains were the small and medium scale commercial producers. These groups were also relatively resistant to change and to making the investments necessary to improve biosecurity, although many probably left the sector as HPAI proved to be too big a burden on profitability. There was also a similar lack of insight into the behaviour and motivations of the chain of participants between the 'farm gate' and the consumer.

Prior to implementing the project biosecurity measures, hatchery nests were not cleaned

In 2006 there was very little technical understanding of biosecurity in the national animal health and production services across most technical levels and little knowledge within these government services and international organisations including FAO of the complex networks of the poultry production systems in Viet Nam and the way in which these operated. In addition there was not a lot of information available about the fundamental operations of the small and medium scale commercial operators scattered through villages, or the rapidly growing duck production sub-sector. The degree of technical knowledge of these farmers was inadequate to deal with the problem that confronted them and most did not have an education standard that was conducive to readily picking up and grasping the large amount of conceptual information that was thrust upon them in a short period. As mentioned earlier they did not see the benefit of making changes if there were coping mechanisms to deal with the situation. While there was a significant extension service in the MARD, most emphasis was on agronomy and there was little experience with animal health and production extension, so there was not a developed education network for poultry farmers. Additionally the Department of Livestock Production (DLP) does not have a sub-department at provincial level or a district office as for animal health. As a result there was not a ready-made entry portal to contact farmers already dealing with government in a positive environment. It has also been recognised that the biosecurity guidelines issued by the relatively new DLP were probably not appropriate to the situation that was unfolding. In the Department of Animal Health (DAH) there was no poultry diseases expert or poultry pathologist, all this leading to a lack of engagement between veterinary services and the producers. The existing large scale commercial sector had technical skill in poultry management including endemic disease control, but there was very little technical connection between the private sector and the government animal health services. Undoubtedly private companies provided advice to their clients, and would have cautioned about the need to tighten biosecurity on commercial farms, but there was no linkage effectively established between the public and private sectors in respect of managing the HPAI problem.

It might be questioned whether the early part of the international inputs were not suitably adapted to the small and medium holder poultry production system as it existed in 2005-2006. It is possible that if the 'bar was set too high' it might have alienated many stakeholders. However there was a significant zoonotic threat and incomplete epidemiological understanding of the situation so it was considered urgent to press for significant change on the part of the small holder sector. There were difficult technical messages to get across and there was an emphasis on what was wrong with practices, rather than perhaps how poultry holders might be able to protect themselves and their families from the pathogen and save their investment. Indeed there seemed to be a problem with communicating the concept of risk to poultry producers and this point will be made again in the section on communications. In general this conceptual gap was connected with the lack of appreciation of 'germ theory' and the agent as a microorganism. Biosecurity was seen as a cost and no matter what the level of investment it appeared to be judged on the basis of perceived economic cost and the apparent likelihood of an outbreak, and not from the supposed public good outcome. In retrospect it could be seen if a producer had poor practices in most aspects of a poultry raising 'operation', it was unlikely that they would introduce a high standard practice in one aspect for little tangible benefit. The evolution of biosecurity being integrated into a good poultry management approach came out of appreciation of this aspect.

Participatory group activities during the biosecurity training course held in An Giang, 2009

Situation in 2006-2010

During the period 2006 to 2010, the GoVN-FAO avian influenza programme (AIP) projects were involved in gathering information from the field and then exploring technical interventions related to biosecurity issues identified. Some of the technical overview was supported by the 604 project but other inputs came from other parts of the AIP such as the UN Joint Programme (UNJP). Most of the village level biosecurity interventions were driven by international non-government organisations (INGOs), whereas an important consideration for the AIP was to find appropriate entry points given its procedure of working through the central government technical departments and their links with field level services. Assessments were conducted on a number of fronts at field level and an early one indicated that there were issues with the use of disinfectants in disease response activities. While outbreak response actions are not usually considered in the biosecurity portfolio, in fact proper disinfection is an important bio-containment action when virus is present. In addition there was a lot of inappropriate use of disinfectants in farming operations where many farmers used disinfectants inappropriately and wastefully, in some instances with potential environmental impacts. Importantly in the animal health services at the field level there was also very little technical understanding of their proper use and additionally there was a lack of appreciation of the need to clean away organic material before the application of disinfectants. To address this problem the project instituted a series of technical training courses for provincial and district veterinary staff in the provinces where it had particular responsibility for supporting local disease control efforts. Developing expertise in the animal health service in the proper use of disinfectants had potential for multiple flow-on effects, including the capacity to advise on their use in other disease and species situations.

A matter of particular concern for the GoVN and for FAO was safe disposal of carcasses accruing from disease and/or culling during outbreaks. The GoVN had commissioned

an environmental evaluation of burial sites used in the large epidemic and the Avian Influenza Program (AIP) followed up with the development of technical guidelines for future proper disposal of poultry carcasses in different environmental scenarios. As part of this work the AIP recommended the use of composting as an environmentally friendly alternative to burial in locations not suitable for this practice. However it was not possible to gain a policy agreement with the GoVN that composting was a technically sound, safe and practical alternative to burial. While this might be seen as a failure of investment of effort, the initial environmental guidelines for burial were accepted, and there was no way to anticipate the resistance of technical officials to the inclusion of composting as a sound alternative to burial. The AIP did not explore the matter further to develop a deeper understanding of this reluctance, other than to document the main reasons provided – the difficulty in policing the composting sites to ensure that these were not interfered with. The manuals for safe disposal and composting are still in place and the recommendations on burial disposal have been accepted into regulation.

In order to bring some structure to the inputs from different sources and to provide a platform for Department of Livestock Production (DLP) to engage with stakeholders, the AIP supported the establishment and functioning of the Biosecurity Working Group. This platform served the functions of raising technical issues for consideration, consolidating and harmonising information materials from different players, sharing experience and learning, and laying out reasoned programmes for development and implementation. Essentially it provided a mechanism to encourage transparency and coordination of the activities focused on biosecurity.

The AIP also engaged a number of consultants with international poultry sector experience to investigate biosecurity practices in the small and medium scale commercial sector. Several issues were highlighted but especially the poor standards that existed for many of the small and medium scale hatcheries and it was considered that a lift in standards was possible that would have immediate benefits in terms of day-old duckling health and development of the immune system. Another issue raised was that waste from duck farms was a significant pollutant of waterways and there were not adequate regulations to deal with this by-product. Using participatory and farmer-centred approaches the AIP then started to develop activities to address these concerns.

Other international consultancies were conducted using a standardised approach to assess biosecurity practices where training had been carried out by a number of different INGOs. The evidence gathered indicated at that point that most farmers who had received training were very aware of the information that had been imparted but were quite reluctant to make the changes prescribed because of costs, market pressures on profitability, and perceptions of risk as immediate threat. In addition evidence pointed to the lack of technical understanding of biosecurity principles and practices on the part of the animal health service personnel providing advice and guidance at district and commune level. It was also apparent a 'one-disease focus' was not engaging producers effectively and emphasis needed to be placed on the benefits of good management practices involving sanitary hygiene and reducing pathogen loads.

In response to the developing awareness the AIP started to look more toward the issue of the structure of the poultry sector and the marketing systems and to assist this developed a system to profile the poultry sector in particular project provinces. This aspect of the work also involved participatory engagement with the

management boards of some key markets and associated slaughterhouses to develop a deeper understanding of their operations and how risk of virus transmission might be reduced at these points in the market chain. One significant product of this process was the mapping of poultry farms, hatcheries and markets in a poultry production atlas produced for the participating provinces. While a static snapshot it was very useful in demonstrating to DARD the need to understand the poultry profile in order to manage the problems occurring in the sector.

Participants of Master Training Course on hatchery biosecurity and auditing in Can Tho Province, 2013

Situation 2010 to 2014

During this period there was more 604 project funding provided to support initiatives related to biosecurity and the activities were built on the foundation of the previous outputs from the avian influenza programme. By the end of this period of consolidation the project had progressively and strategically shifted emphasis from the application of biosecurity measures linked to small holder poultry production to activities targeted to building evidence for policy development in different parts of the sector as outlined above. Over these 4 years biosecurity guidelines for small to medium size hatcheries and small to medium size parent flocks were further developed and refined, and training was provided to provincial sub-department of animal health staff in auditing of hatcheries against the biosecurity standards. There are a number of model farms established to provide demonstrations and evidence and the guidelines for the operation of hatcheries and parent flock farms to meet the standards agreed have either been incorporated into official technical guidelines by MARD and DLP or are about to be. The project continued to be a driving force for the biosecurity working group and the outputs from the field activities were continuously reported and reviewed in this forum.

To further the risk analysis approach to biosecurity 3 major regional assessments were carried out in a consultative and participatory process. From these consultative workshops a clear picture was developed of the overall risk profile for introduction of H5N1 or other pathogens into the poultry populations. In the process training workshops were also held to introduce provincial SDAH staff to the principles and practical application of the qualitative risk analysis methods used, and so important capacity building was a by-product of this process. The final product of the consultation was an approach to national HPAI management based on risk assessment and understanding of the likely conduits of H5N1 introduction from within and from without the country. As part of this risk process the role of cross-border trade was identified as a significant biosecurity risk at the national level. Further activity will take place to deal with this matter in the context of cross-border value chain analysis and risk management.

The future and sustainability

There has been a major effort made by FAO to engage constructively with DLP within the program approach and to set out a reasoned and logical approach to an incremental strengthening of the technical capacity at the different levels of government in respect of good management practices including biosecurity. It now remains for the technical departments including the National Agriculture Extension Centre to sustain and build on this approach. In part this depends on the role that the different levels of government consider for the small and medium scale poultry sector. To sustain the gains made to date, more and consistent attention needs to be paid to biosecurity strategies for small and medium livestock production and to the management of risks associated with new and emerging pathogens in these sectors. The Biosecurity Working Group has played an important role to date and its functionality will need commitment from GoVN as well as most likely engagement with the private sector. In the course of the last 8 years this public-private linkage has not been strong in part since the two parties have tended to operate at 'arms-length', and probably because in the socio-economic context they are not a natural fit. As commented by a number of external reviewers, the fact that there is no independent organisation to represent and lobby for small and medium holder producers means that they find it hard to develop a concerted voice to press government at any level. It is necessary to get more poultry expertise in the public sector and for this to happen small and medium scale holder production needs to be integrated into the mainstream economy and so viewed and supported as a valuable national asset.

One international expert on biosecurity considered that effective vaccination was part of the biosecurity armamentarium as it prevented disease from becoming established in a contact population and so interrupted the flow of the pathogen. In the immediate term the number of outbreaks of HPAI can be managed by effective use of vaccine until such time as the shift of production to more secure production units takes place. The challenges faced by the ongoing need to vaccinate are considerable, but not impossible to deal with and new technology investment in the area of vaccines is an important part of the overall picture. At the same time more application of risk based approaches to surveillance and market chains will better detect and manage incursions

or explosions of the disease. As mentioned earlier, international support has built capacity in epidemiology and risk analysis and this capacity can be used by the GoVN to ensure the application of area-wide biosecurity approaches to disease management.

Success Stories

The key success stories in this area project work are characterised by steady engagement between FAO and the technical counterpart DLP, working from the analysis of the situation on the ground and building solutions that were practical and in line with farmer needs, somewhat different from the traditional 'top-down' modus of the government. This required a flexibility of approach and a lot of concerted effort on the part of the international staff but also from a dedicated band of national consultants. The success in collaboration with the provincial DARD that had been to that point not very engaged in the HPAI effort lead to significant progress with the biosecurity programme for hatcheries and duck parent flocks.

The success in developing fit-for-purpose biosecurity guidelines for hatcheries and parent flocks was the end result of much participatory consultation with the stakeholders. The subsequent uptake by MARD of these guidelines to become policy was considered by DLP to be a major project achievement. The Decision 1057/QD-BNNPNTNT dated May 10, 2013 was

Biosecurity Working Group Meeting focused on wildflife farming in Viet Nam, 2013

the official regulation on hatchery biosecurity minimum standards, and the draft technical guidelines are under development to regulate biosecurity conditions for poultry parent stock premises. These additions will be linked with the Decision 1057 in a broader approach covering the quality of poultry breeds.

This engagement and capacity building of the national team was a success story in itself. FAO was also able to engage some very experienced and capable international consultants to provide inputs into areas where FAO did not have inherent experience, especially with commercial poultry operations.

The development of the tool to evaluate the results of inputs to village level biosecurity and then the subsequent analysis and response was a key step in the step wise progression to a productive outcome. Such an analysis was important to advocate to donors about the directions that the programme needed to take.

The biosecurity working group (BSWG) was an important innovation and the partnership with DLP here was most productive. The BSWG also assisted engagement with other stakeholders and facilitated the access of the project to the biosecurity activities of INGOs in conducting the assessment and analysis of approaches. Through a total of 28 meetings the BSWG was also an important venue to disseminate useful information from many sources as well as project findings to a range of stakeholders.

The BSWG and the project demonstrated considerable flexibility in taking up the challenge of devising guidelines for farming of wildlife. This was certainly outside the usual realm of FAO technical expertise or usual interest but was seen as important in linking to the wildlife-human health interface. It also helped to develop linkages to other projects with interests in the wildlife-human interface such as USAID PREDICT and RESPOND projects.

While the poultry atlas and the hatchery maps were a static description of the demographics of the poultry sector province by province, it provided a sound illustration to the need for animal health and production people to understand the dynamics of the particular livestock sector to be addressed in planning or risk management activities.

The process of developing the regional risk analysis has also been mentioned under socio-economics as it built capacity to understand the structure of the sector and the associated risks and it provided a sound basis for a regional approach to control. The project regarded this as a valuable contribution to understanding the dynamics of H5N1 HPAI in the Viet Nam poultry sector.

The composting technique for disposal of culled birds was regarded by the project as a technical success and an important project output, especially as it had the potential to greatly reduce environmental impacts of culling and disposal.

The method of using open days to promote the hatchery and parent flock biosecurity/management was very practical and struck a chord with the audiences, most likely because simple interventions such as improving hygiene or nesting facilities has delivered up to a 5% improvement in hatchability and a 5% increase in non-cracked eggs respectively.

Implementing changes in a farming system was not easy but was accomplished by considerable effort to understand the decision making processes of farmers who have different social values that need to be addressed to achieve farm restructuring.

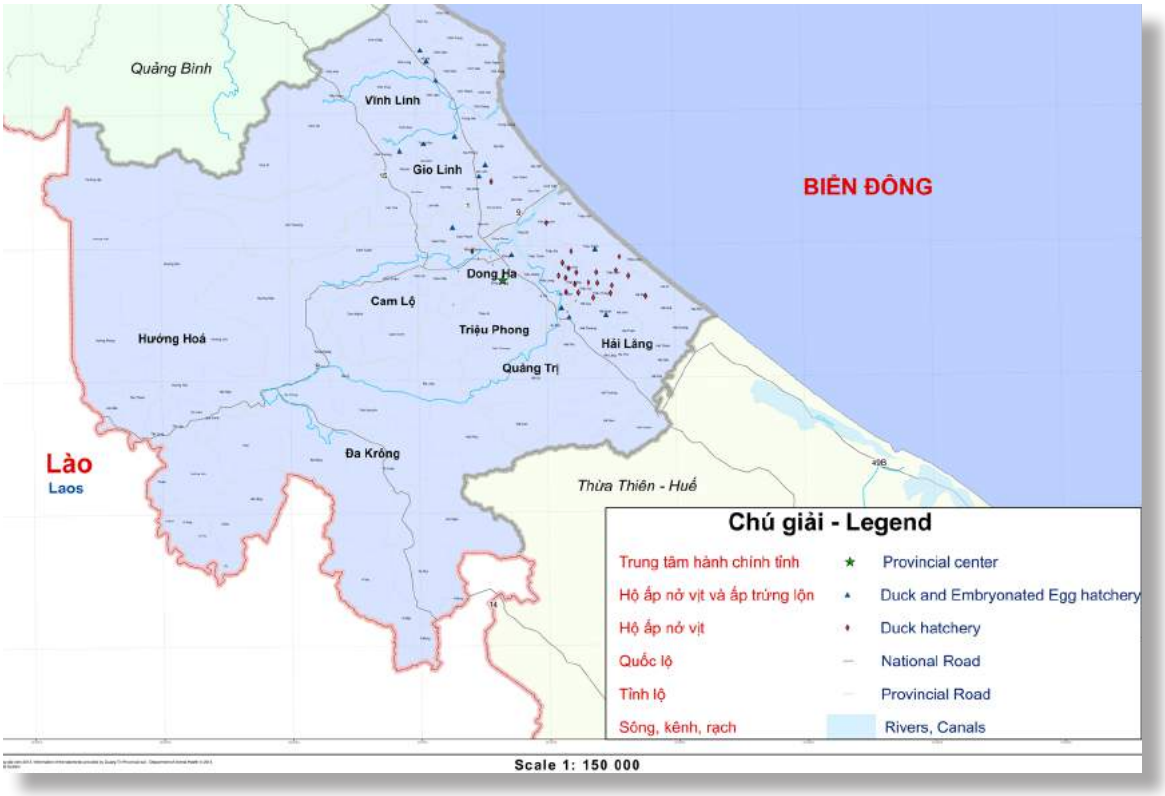

Figure 5.1: *Location of hatcheries in Quang Tri Province*

Constraints and Challenges Remaining

The biosecurity concept and its principles were introduced to Viet Nam late 2003 when the first outbreaks occurred and especially since the beginning of the project but the concept was not accepted well enough by relevant stakeholders. This was likely because there was a long tradition of low biosecurity poultry production and the generally farmers has no knowledge or understanding of the principles and a limited capacity to respond. There was probably also not enough importance placed on supporting or driving the implementation of biosecurity measures from the government side.

In the village environment it is difficult to maintain biosecurity because free range birds are part of the tradition and social norms, and their proximity to the small and medium operations. It is also difficult to maintain separation of farms due to the physical settings of the villages. These constraints remain.

The regional risk analyses were the basis for a proposal for overall approach to HPAI control in Viet Nam and in essence were the application of biosecurity measures on a regional scale. The underlying epidemiology probably remains valid unless there is a major switch in production dynamics but to some extent the momentum and value of the technical effort was considerably diminished. It might be considered this outcome was the result of a failure to advocate effectively due to lack of dedicated communications expertise.

A similar point can be made about the sound technical input to devising standards for composting poultry carcasses in HPAI outbreak situations. To some extent the biosecurity programme evolved by learning and it raises the question as to whether a better result might have been achieved if there was a study that looked at the cultural forces shaping decision making about disease and its management in different situations.

The programme did not engage significantly with the private sector – toward the end of 2012 some efforts were made to bring private sector into discussions about regional biosecurity approaches and to provide training in some technical aspects of biosecurity, but as mentioned there were not simple platforms for this engagement to take place. DAH, DLP and DARD officers did not have a history of working with the private sector and this was not an activity supervising administrators recognised as valuable. This situation continues.

It took some time for FAO and others to realise that the approaches to biosecurity being used were not penetrating the farmers system of judgement, and that it was difficult for this group to think about risk when the threat was not immediate. Also there needed to have been some considerable thought given to how to communicate about 'germ theory'. At the provincial level it is by no means clear the extent to which inputs on risk analysis and local poultry sector profiling will be continued beyond the life of the international engagement as clear champions of the methodologies had not emerged during the programme.

While it is possible to develop technically sound solutions to a problem, these are not always going to be automatically accepted by the counterpart organisation. However it is not possible to identify this outcome in advance.

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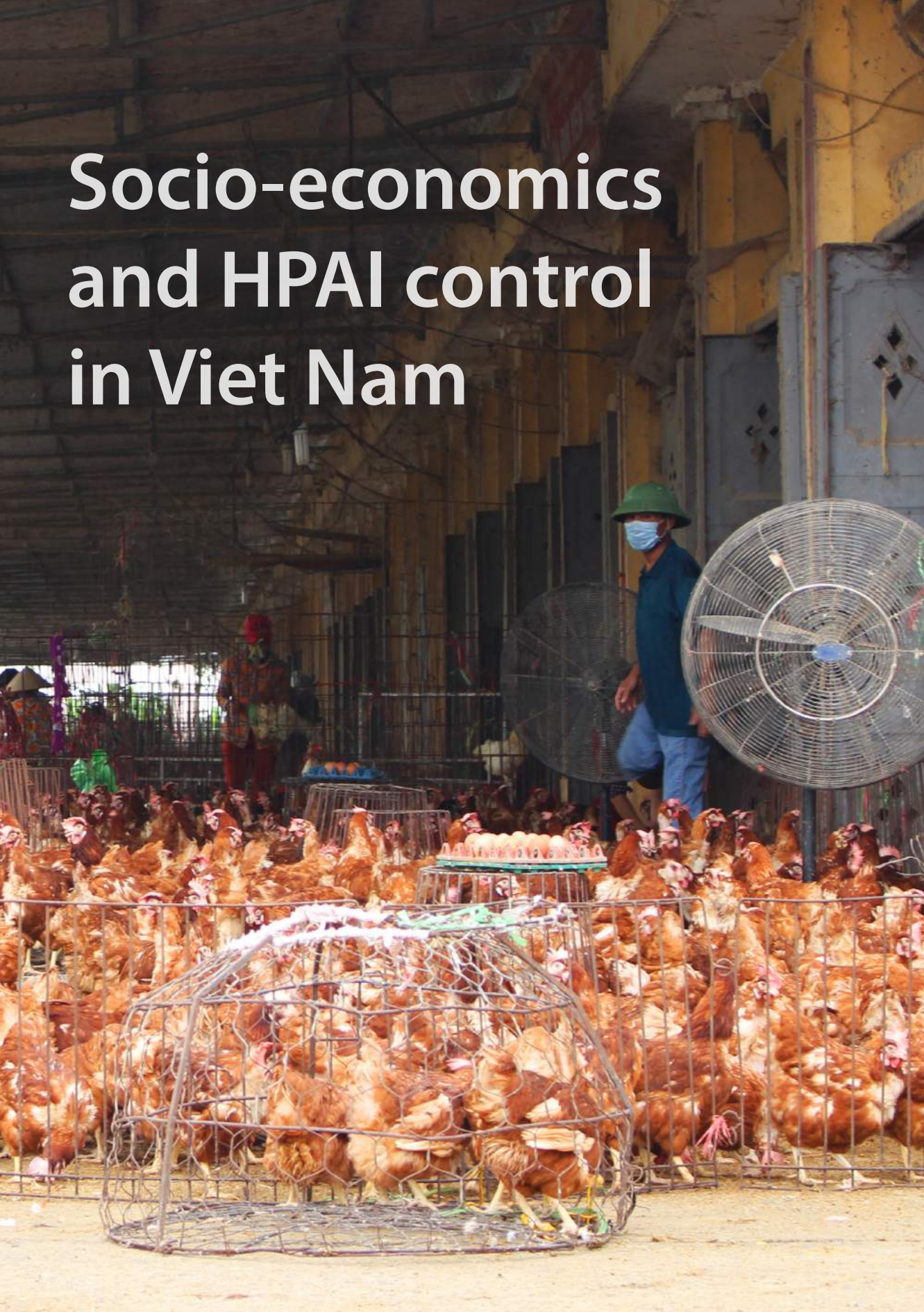
Socio-economics and HPAI control in Viet Nam



SUMMARY

Socio-economic analysis was used as a methodology to adapt the technical guidelines for HPAI control to the particular cultural and political circumstances in Viet Nam. The disease and disease control efforts had a significant impact on the livelihoods of stakeholders in the poultry sector and many were forced out and were not able to regain market share, either because of financial losses (e.g. small feed mill operators) or because of perceptions about product safety (small low technology commercial poultry producers). The initial area-wide culling around infected flocks resulted in very heavy losses and caused considerable stress on livelihoods. Early efforts with socio-economic analysis were focused on the application of financial support mechanisms as a reporting incentive[4], and then moved to developing for policy purposes greater understanding of the economics of surveillance and vaccination programmes. As an example, to further support developments in vaccination policy the operational research GETS project was undertaken over two years, providing sound evidence for the GoVN to reduce inputs to the mass vaccination approach. In addition much work was done to gather information about the structure and operations of both the commercial chicken and the different duck production systems.

The project also began to look more intensely at poultry market/value chains. In some instances the analysis included information about value adding activities, but was mainly concerned with roles, locations and linkages only. These analyses commenced in 2005 prior to this project[5] and continued until 2014 latterly with more emphasis being placed on risk analysis of the chains, volumes and contractual arrangements and on using the approach to improve the management of national as well as cross-border movement of poultry. Very complex socio-economic issues influence the outcome

4 FAO Report - Compensation and Related Financial Support Policy Strategy for Avian Influenza, Emergency Recovery and Rehabilitation of the Poultry Sector in Vietnam. Final report. Ana Riviere-Cinnamond. June 2005

5 FAO Report - The Impact of Avian Influenza on Poultry Sector Restructuring and its Socio-economic Effects, Poultry Sector Rehabilitation Project – Phase I. Agrifood Consulting International, April 2006

of attempts to increase the safety of poultry value chains, both in respect to dissemination of HPAI viruses in poultry and for the end consumers of product in respect to H5N1 and food borne pathogens. The experience with HPAI shows that rebuilding markets and slaughterhouses and other infrastructure is not enough – these changes need to be matched by risk mitigation actions and changed behaviours on the part of stakeholders, especially traders and transporters. It is clear that a level of political commitment linked to concern for consumer rights, as exemplified by the risk mitigation measure with the shift from live bird markets (LBMs) to slaughterhouse processing introduced in Ho Chi Minh City, must be in place for the structural, functional and enforcement changes required to reduce the risks of virus and food pathogen incursion and spread.

Introduction

Socio-economics in the context of HPAI in Viet Nam has been a multi-disciplinary approach to analysing, understanding and responding to social and economic impacts and drivers of the disease and the factors influencing the decisions of stakeholders about issues related directly or indirectly to its control. At the beginning of 2004 the Government in Viet Nam faced considerable pressure because of the global concern about the emerging pandemic threat of H5N1 HPAI, as well as domestic concerns about the rapid expansion of the disease in poultry and the appearance of fatal cases in the human population. In this context there was a need to urgently apply standard animal disease control measures to curtail the disease – these include culling at and around outbreaks to reduce the virus/host load, quarantine of affected areas for a prescribed period (21 days) and restrictions on marketing and trading in the control zone. In addition there were restrictions placed on inter-provincial movement of poultry when outbreaks were reported, which had a significant impact on market chains into population centres as well as on the producers supplying those chains. The socio-economic areas of concern included the broad scope of compensation mechanisms, gender related impacts of the disease and its control, understanding cost effectiveness of interventions, production norms for different segments of the poultry sector, value chains and implications for disease control, the legal framework for disease control and strategic approaches to poultry sector restructuring. In addition in the early part of the epidemic there was a sharp decrease in the market demand for chicken with the consequent collapse in market prices and this brought additional economic impact. There were also concerns about the impact of the disease and disease control measures on the livelihoods of the less advantaged in rural communities.

The national context of the poultry sector was referred to in the main introduction. There was not reliable information in the off-take from the poultry sector in 2003, and the volumes that were passing through markets. However this figure provides some illustration – the estimated 2014 requirement for Ho Chi Minh City for a population of about 8.4 million people is 308,000 birds per day. Eggs were also a highly traded commodity. Some of the poultry entering the market chains had origins in the low-input scavenging system, especially as these birds were favoured for their unique flavour. But many poultry also originated from the common business model of a family run operation with relatively low investment overheads that provided an opportunity to

convert the labour asset into a monetary asset. The onset of HPAI had a significant impact on these producers, and also on their creditors. It was evident that small feed producers supplying these operators suffered serious loss of business and many were put out of business. It was clear that understanding the socio-economics of the situation was pivotal to achieving any gains in the control effort.

Generally for the work under this component the project counterpart in studies involving surveillance or vaccination was the Department of Animal Health (DAH) and for those involving production systems, value chains and poultry sector restructuring it was the Department of Livestock Production (DLP).

Situation in 2006

It became evident during 2004 and again in 2005 that the disease control involving widespread culling of poultry was having a limited effect on the disease incidence, and negative effects on livelihoods and the supply chain. In part reduced effectiveness of control measures was due to the widespread distribution of the agent ahead of detection and response, but other matters of a social and economic nature were complicating the control landscape. One feature of the culling approach to disease control, especially where healthy birds at high risk might be confiscated from an outbreak area, is that producer cooperation necessary can be encouraged by timely and equitable compensation. However to establish and manage such compensation schemes is difficult in a small and medium scale system where there are many stakeholders and no official registration of production units, and additionally from a government perspective they are relatively expensive. In addition compensation schemes were partly administered from provincial budgets and so this resulted in variations in their implementation across jurisdictions. During 2004 at the global level FAO was exploring different fit-for-purpose compensation schemes as compliance incentives, and had made missions to the region including Viet Nam to examine and advise on existing compensation mechanisms. The issues identified in general terms were that compensation levels did not reflect market losses adequately and that the flow of funds was not timely enough to offset hardship arising from the loss of income. Gender studies showed that the impact of the disease and its control on household livelihoods was considerable, especially on the poor and women dependent on scavenging poultry for household income and nutritional supplementation. However the reality was that while it was possible to propose measures to increase equity, implementation was another matter. Additionally there was no direct international support to bolster compensation funds and the national scheme was funded entirely by the government. It is not the purpose of this chapter to document the cost of HPAI control to the GoVN but to recognise that from the outset the overall disease control programme was a considerable economic burden and the decision to commence vaccination was in part based on socio-economic considerations, as the hardship arising from the control measures was continuing and acceptable compensation was not possible.

It must also be acknowledged at this point that coping decisions made by various stakeholders were part of the background to the spread of the epidemic. Early in the epidemic a coping mechanism to salvage some investment if HPAI was suspected was to quickly sell birds. It has been noted that in 2004 particularly that traders were purchasing poultry cheaply from outbreak

areas because owners were panicked at this new disease with high mortality, and transporting them to unaffected areas where the poultry market was still strong. While market force differentials may not be as strong as when the disease was more rampant, the salvage by sale paradigm still most likely operates. Both activities effectively spread the virus and defeated disease control efforts. As the disease progressed in time, farmers and local authorities were less inclined to report disease events because of the widespread impact on the community and on interprovincial trade and so the struggling control effort was further diminished. These situations affecting disease control were significantly influenced by socio-economic considerations. It is also noted later that economic factors had a profound impact on the motivation of farmers to implement biosecurity measures both before and during the outbreak.

When major disease emergencies occur or disease programmes are initiated it is necessary for the implementing agency to have a clear picture of the structure, functions and organisation of a livestock industry including its marketing chains in order to employ successful interventions. This knowledge also facilitates communication and cooperation between disease control authorities and stakeholders. At the beginning of the HPAI control efforts there was limited documented evidence about these aspects of the poultry sector in Viet Nam and so in 2005 FAO sponsored studies of the main domestic poultry market/value chains. However there were still substantial knowledge gaps about other important aspects of market chains and production systems. While phylogenetic evidence showed that H5N1 viruses in Viet Nam share the same source as those in southern China and so likely move along trade routes, there was little detail of this trade in respect of eggs, day-old chicks and live birds. Similarly more information was required about cross-border trade with Lao PDR and Cambodia. Furthermore the duck production systems in both the Red River Delta and the Mekong Delta were not well described, although probably more was known about the latter.

To better understand the disease environment and the structural and functional aspects of the poultry sector, the project conducted some initial broad scoping investigation of market chains and production systems. It was quickly recognised there were a number of characteristics of the small holder production system that resulted in considerable weaknesses in the technical environment and these lead to inbuilt constraints to disease control. There were and still are few effective industry associations or cooperatives that support livestock producers and so can act on their behalf to collectively advocate with government. Because of the fragmentation of production there are large numbers of producers for the public sector to service and most don't have the resources to pay for quality technical advice or service. Consequently the private sector animal health services have not developed, except to support large producers, and often these services are linked to companies with other interests such as supplying feed and genetic stock. In this context smallholders do not have resources to invest in formulated rations, good housing or quality day-old stock. HPAI was therefore a significant burden to a somewhat fragile system. In a related context, there were also constraints with the regulatory environment. In some instances regulations were not readily enforceable or authorities were reluctant to enforce them because of perceptions of impracticality or hardship and unpopularity generated.

Concerning the socio-economic environment of many poultry producers, smallholder poultry production systems help to meet the livelihood requirements of the poor, especially grazing duck production for landless farmers.

It was evident later that there were a significant number of landless duck farmers on the Mekong Delta and systems of husbandry adopted, including movement of ducks across provinces following the rice harvest, are not conducive to implementing disease prevention and control measures. In addition the diversification of livestock seen in small holder systems is an insurance to reduce financial risks, along with the continuous turnover rather than all in – all out cycles that better prevent disease persistence. The project was therefore in the bridging role of advising and supporting strengthening disease control measures and at the same time increasing understanding of the relationships between livelihoods and disease control.

Developments 2006 to 2010

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Early in the programme it became evident that ducks were a significant reservoir of H5N1 and hence a source of virus for domestic chickens. And so there were some pressures to alter the fundamental operation of the duck production system but there was evidence that ducks contributed to the rice production ecosystem in the Mekong Delta through pest and weed control, depositing fertiliser and converting lost rice to meat. During the next 4 years the project set out to develop a greater understanding of the duck production systems and the structure of the poultry production and marketing systems in the project provinces. Two international workshops were conducted in 2007, one looking at the future of poultry farmers in Viet Nam after HPAI and the second on free-grazing duck production and feasible options to control HPAI in this system. A further study on the duck production systems (backyard, semi-scavenging nomadic laying ducks and commercial meat duck producers) and avian influenza was conducted in the Red River Delta to look at the dynamics of duck farming and to understand the practices adopted to reduce the impact of HPAI, with a view to provide some recommendations to improve production in the Delta.

To get better insight into the constraints on disease control and the economics of HPAI vaccination, the details of value chains at provincial level were examined. The economic analysis indicated that costs per bird vaccinated would affect the profitability of chicken and duck broiler and duck layer systems, but could be well absorbed by prevention of outbreak related losses in chicken layer systems. The

production economics and disease risk of different enterprises suggested that duck producers and small-scale broiler units are less likely to vaccinate their flock. However the role of ducks as the sub-clinical reservoir of virus would suggest that public funds should continue to be expended on vaccine delivery to this sector. A survey to determine the willingness of farmers to pay for HPAI vaccination was conducted in Viet Nam but was inconclusive. However, the study contributed to the policy brief on vaccination costs and cost-effectiveness prepared by FAO headquarters.

A project to specifically examine the possibility of altering the vaccination strategy (Gathering Evidence for a Transitional Strategy or GETS) was implemented in a limited number of provinces from 2009-2011. The GETS project was to test the hypothesis that limiting the publically funded vaccination programme to ducks would reduce the source of virus for chickens. While the trial demonstrated a 21% decrease in the cost of vaccination, the cost of surveillance increased 5 times. This project did help with the government decision to cease funding the mass publically funded vaccination programme. This trial also demonstrated the value of gathering good base line data before the intervention was introduced as many other ex-post evaluations attempted were constrained by lack of baseline data.

The early work on value chains indicated some national regional differences and in northern Viet Nam there were more poorly regulated market chains with very large volumes of live birds, some suspected of entering from China. In fact it was possible the market shocks and the market adjustments that forced many small local operators out of production post 2004-2005 might have created the space for this import activity to begin to flourish. In addition it was recognised that rebuilding the markets chains and in some instance adding infrastructure was not enough to improve the system – it also required a change in mind-set on the part of traders and other stakeholders, who it seemed did not concede there was a problem to be addressed.

As a result of regional concerns about cross-border activities two regional consultations were conducted to establish a coordination mechanism and then to develop the methodology. For Viet Nam two cross border sites had a provincial focus - Kien Giang for Cambodia and Quang Tri for Lao PDR -while there was a less province specific focus to the extensive China- Viet Nam border. To conduct these studies in the north the project collaborated with the Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD). Subsequently, IPSARD drafted a policy paper on cross-border movement of poultry and future project inputs to this area were revised based on those comments. Cross-border analysis for the Cambodia and Lao PDR value chains was carried out in collaboration with a regional project sponsored by the Asian Development Bank. A systems analysis approach was developed through consultations between the RUDEC/IPSARD and the project to generate information about the different characteristics of cross-border movement in the Mekong compared with the northern border movements. This information was taken into consideration during strategy formulation.

There was a significant effort made to describe the structure of the poultry sector as mentioned. The first major survey of the commercial poultry sector was conducted in 2008 in 4 provinces. This survey was comprehensive and looked at both socio-economic variables as well as biosecurity measures. Socio-economic data such as productivity, use of technical services, adoption of technical solutions, planning capacity, links to company operations, purchasing and marketing networks and mechanisms and

credit lines was gathered on chicken enterprises, duck enterprises and hatchery operations. This comprehensive information then led to a strategy to develop in the government service greater local capacity to investigate the structure and function of the poultry industry. Provincial DARD and central DLP staff were trained in the methodology for industry mapping, including the different commodities flowing and their unique market chains, profiling the sector in total and describing the value chain. The application of the methodology locally led to a much greater understanding of the operation of the poultry sector. This capacity building had the potential to then be a basis for policy development at local and national level. It should also be noted that the expansive profiles and value chain descriptions were then later used for risk analysis and HPAI control strategy development.

At a slightly different level the project supported investigation into the establishment of a market system that would link small operators to consumers with the incentive of having a safe product. Essentially it was a project to investigate traceability of poultry. In this work much was learned about the micro-operations of the market chains and the types of relationships between different players in the market chain. Within the market chains relationships are important and evident that trust, reliability, credit, conflict resolution, and contract enforcement are main components of these relationships. While some vendors indicated that the traceability system was agreeable to customers there was also a residual of mistrust in the acceptance of the safety of the product in the market conduit established. In general, consumers seem to have lack of faith in the government inspection stamp as a guarantee of product safety. In this sense the live bird market is a consumer driven mechanism to provide food safety.

Included in the socio-economics area of activity the project also was providing support to the GoVN with refining the animal health legislation and with the development of capacity in the DAH to meet its new responsibilities and mandate in food safety. While poultry producers were interested in improving productivity and general standards in the market system, the government lacked the technical capacity to meet the demand, there was not a robust national policy framework to encourage the improvements in the systems of production and marketing and the regulatory system was generally weak. In respect of policy one area where there was not full integration between GoVN and FAO concerned the plans for restructuring of the poultry sector. While FAO was supportive of the need to achieve improved production methods and greater biosecurity and continued to engage on the issue, there were reservations about a government supported drive to large scale industrial production with its many side issues to manage, including the impact on rural livelihoods. As it stood the private sector was adjusting to restructuring opportunities and it was felt that a better regulated supporting framework would be more appropriate to the needs of the country.

Situation 2010 - 2014

A substantial body of new information had been built using the socio-economic analysis approaches described earlier. The project was gradually moving toward the establishment of greater technical and strategic engagement of the government services with the poultry sector. In most instances the activity was more aligned to an understanding of the market chains with the various links back and forwards between the different stakeholders, and in a few instances the emphasis was on a value chain analysis to describe the volume and value of the various products as they passed from one operator to another. To achieve good understanding of how value chain operators interact, it is crucial to be able to understand trade flows and social networks, to identify where transmission risks are high and, simultaneously, to identify opportunities for intervention or adding value that will act as an incentive for the operators to engage.

One of the important outputs from the market chain mapping and poultry sector profiling was a major risk assessment process to produce risk maps for HPAI outbreaks and from these to develop zonal disease control strategies. These strategies were in a sense the culmination of the socio-economic analyses and were presented to the GoVN for consideration as the basis of the new Avian Influenza control strategy. While the zonal approach was not accepted as policy the underlying risk assessment process will be the technical foundation for the establishment of disease free zones being promoted by the GoVN.

In 2010 a pilot study was initiated under the project banner of supporting public private partnership (PPP) and institutional strengthening in the poultry production system. It was considered that a poultry price monitoring system was required to better understand the economic drivers in the market, to ensure that market and performance information is widely available, and to reduce the risk of market failure. This system was launched through collaboration with the Centre for Agriculture Policy/IPSARD of the Ministry of Agriculture and Rural Development on a pilot scale in three major cities of Vietnam. A website for dissemination of the information was launched by the Centre and the information about the study was projected through a national television programme in October, 2011. Although the outcome of the pilot was welcomed by both the private and the public sector representatives at the final workshop, the initiative faltered at the end of the financial support from the project and the website was not linked to the DLP website as destined. This was an example of a research initiative requested by GoVN where there was not full ownership by the agency responsible for final delivery and that was not sustainable with available government resources.

A comprehensive survey was carried out on the surveillance programme being facilitated by the USAID project. The assessment looked in detail at the activities carried out by project and compared their costs with those of concurrent surveillance activities in other projects. However there were limitations in determining the true cost effectiveness of the inputs to the surveillance programme, principally because of the lack of baseline data and the retrospective nature of the exercise. It was clear that for such an exercise it was necessary to have the sound baseline or control data and to incorporate forward the data collection in the project design. Nonetheless the report noted the cost to detect a HPAI outbreak will increase as the prevalence of disease is reduced by the disease control measures, so decreasing the cost effectiveness of surveillance. In the final analysis it was recognized that surveillance

is costly but some level is necessary to detect and respond to disease outbreaks. It was proposed that a theoretical model of the impact of surveillance at different input levels might have provided some additional insights but at significant expense, and an empirical fit-for-purpose adjustment to the system was the alternative strategy.

Regarding cross border trade the project facilitated a number of meetings between China and Viet Nam to develop a deeper understanding of the value chains especially on the supply side of the border. The value chain approach was used initially with the cross-border value chain in Viet Nam to understand where the most significant profits were generated. Evidence and analysis pointed to a lack of efficacy of quarantine stations at borders as the incentives to elude such measures were strong and the tactics and systems to bypass the checkpoints etc. were (and remain) well established. The increased understanding of the nature of cross-border value chains potentially allowed a focus on risk-based approaches to control the spread of disease along market chains, although analysis further indicated that to mitigate risk in this value chain in the absence of effective regulation, there has to be a benefit for the middle men and traders. A major concern was that the market demand for Chinese spent hens in Viet Nam appears strong, while there was not a significant consumer demand for the product amid concerns over product safety. In general it indicated that the supply side dominates the system rather than the demand side. This contradiction pointed to some manipulation or distortion in the market, and some work is ongoing to determine the dimensions and nature of the forces at work. The project has continued to develop an in-depth understanding of the market systems in the northern provinces with extensive mapping of markets and supply chains across 15 provinces (see figure 6.1). Through the application of the network analysis tool, the importance of some LBMs in the potential spread of pathogens was extensively confirmed due to the high connectivity with many other markets.

Future Activities

The World Bank Viet Nam Avian and Human Influenza Control Project (VAHIP) had undertaken a significant redevelopment of the Ha Vy live-bird market on the outskirts of Hanoi. While not an FAO project, FAO had some technical inputs to the subsequent program through a technical adviser position in the VAHIP project. It is not understood why the traders in the market were reluctant to fully cooperate with the various hygiene measures the VAHIP project tried to introduce. An in-depth study of the last parts of the market chain is required to determine the key issues that determine the trust in the system and whether in fact this can be built within the context of the local consumer habits. The policy environment related to poultry supply chains needs to use some leverage of consumer concerns for food safety to make improvements that will allow more acceptable interventions in a contingency situation. However it is clear that the city of Ho Chi Minh made the changes to the way that poultry are marketed and distributed for consumption and the supply system has coped. The project is working with the DARD in Ho Chi Minh City to set up a collaborative operational study to explore how a tracing system might be introduced into the commercial poultry sector especially to deal with the contingency for H7N9 incursion and other emerging

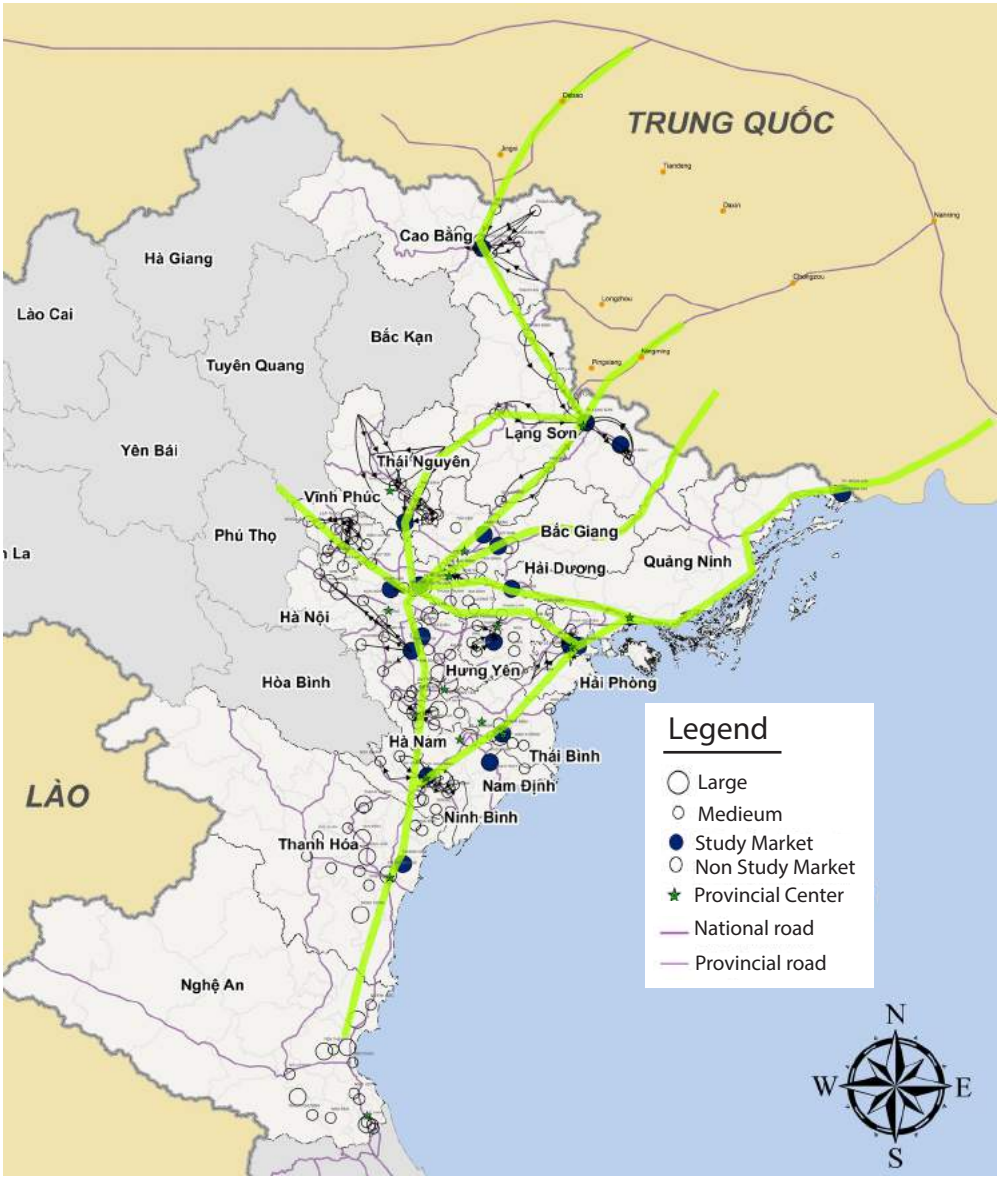


Figure 6.1: *Major roads connecting China and Viet Nam with locations of live bird markets in Northern Viet Nam*

zoonotic pathogens. But such a system will also support food safety standards in general. Field appraisal of a contingency plan to have markets closed for any significant period to control an introduction of H7N9 indicated that traders in peri-Hanoi markets were not supportive of the approach. The difference in outcome is to some extent attributable to a more commercial culture of the poultry sector in the southern part of the country but also to strong local administrative commitment in Ho Chi Minh City to undertaking necessary change.

Key achievements in application of socio-economic approaches to HPAI in Viet Nam

The incremental effort to engage the technical division under DARD and SDAH at provincial level to undertake poultry sector profiling, value chain description and risk analysis resulted in important long term capacity building, and created stronger links between animal production and health to manage the broad issues of good poultry management practices.

The GETS project was a successful approach to socio-economic analysis in Viet Nam, as it exemplified the value of an operational research project where baseline data could be gathered before the intervention was applied. The result of the research was therefore well accepted and incorporated into a change in the vaccination policy.

The application of value chain analysis of poultry networks within and across provincial boundaries has contributed to a marked strengthening of understanding of the sector overall, the risks associated with particular practices and the epidemiology of the disease. The value chain approach to the international cross-border movement of poultry from China to Viet Nam has created a rational framework to address the risk of disease transmission and a platform for development of effective policy.

The substantial effort to conduct in-depth surveys of farmers and their methods has made an important contribution to a greater understanding of the duck production systems in different places, the integration of the production across a wide area such as the Mekong Delta and the risks for HPAI spread associated with different practices.

Regional Socio-Economic Assessment Workshop for HPAI in Lao PDR, 2010

Shortcomings and challenges

In the early part of the response consultants commented that women were heavily involved in small holder chicken operations, but when it came to interactions with programme activities they were poorly represented, so in this sense operations were not well designed to reach women. This may have changed marginally but it more attention needs to be paid to the issue of gender.

While superficial examination might suggest interventions that could reduce disease risks associated with value chains, it is clear that the existing business relationships are very important to the functioning of networks and developing new relationships can be very complex. The approach of utilizing existing relationships and institutions is necessary but has to be balanced against the resistance to change and upgrade standards and practices in the current functioning system.

There has been a significant increase in the understanding of value chains and how to apply risk assessment to them, but there is still some lack of cohesion between the health and production technical departments that means full benefit from the considerable input is not achieved. The compartmentalisation of the technical approach is particularly detrimental to further development of effective strategies to deal with risks due to cross border movements of poultry.

More attention probably now has to be given to assessing the efficacy of risk reduction measures including their effects on the livelihoods of smallholder farmers and their families. Any national strategy for intervention in this sector needs to take careful account of how largely small free-range poultry producers, as well as small to medium commercial producers, can participate in supply chains serving urban areas while improving overall biosecurity standards. It is reasonable to expect that this emphasis also can apply to other livestock systems, especially as food safety becomes more mainstreamed in the market place in urban centres. Strong engagement between FAO and government on poultry sector related policy development has not been a feature of the relationship to date but there are signs this may be shifting as the overall sector collaboration is proving to be more productive

The institutional circumstance for supporting animal health legislation was complex with a number of international players with different fundamental approaches being involved. In Viet Nam there were consultants with legal backgrounds from the USA, French regulatory specialists associated with OIE and in the case of the project a consultant expert with a regulatory background from the EU and Great Britain.

7 Communication and Advocacy


Vi rút H5N1
80-120 nm
Hồng cầu

SUMMARY

At the beginning of the H5N1 HPAI epidemic in Viet Nam there was almost no expertise at FAO or DAH to provide guidance on the most effective manner to communicate the broad range of messages required to inform the public on the disease situation and the measures required to control the disease. On the other hand, DAH was aware from other disease control programmes of the need to have effective public awareness for effective implementation of measures, especially in an emergency situation. At the same time, FAO was in a similar position with little institutional experience in animal health communication but an acute awareness of the need to have a sound communications approach. It has been previously noted by FAO that communications was strongly promoted by other agencies as the most efficient avenue to address a wide range of disease control matters, but FAO was not directly involved in mass communication for social or behaviour change.

The first FAO engagement in communications came in 2005 and was limited to a technical video produced to facilitate training of vaccinators. While produced in Vietnamese, it was later adapted to English by FAO for use in Africa. At a larger UN coordination level, UNICEF was mandated with the role of leading H5N1 HPAI communications on behalf of the UN. There were some complexities that arose with this arrangement as UNICEF was not experienced in working in the environment where socio-economic issues related to animal production were part of the decision making framework for farmers. However, in the human health arena, UNICEF was much more at home with communication targets and methodologies.

An important point with the communications campaigns was that by early 2006, the Government of Viet Nam had produced the Integrated National Operational Program for Avian and Human Influenza (OPI) 2006-2010, known as the Green Book. The OPI mandated the Partnership for Avian and Human Influenza (PAHI) as the coordination mechanism for the national strategy. The OPI also noted that an Information, Education and Communication (IEC) working group had been established in 2005 to harmonise the efforts of implementing partners, and this IEC working group was to expand to include other implementing agencies and NGOs. The OPI, however, did not have a strong emphasis on public awareness and behaviour change activities for the agriculture sector. At the time of development and establishment of the OPI, it was noted that "there were many government, multilateral, bilateral

and non-government organisations developing and disseminating messages and materials". Therefore, it was recognised that coordination of communication messages and methods was critical and the communications approach should not be confusing or duplicative. The need for baseline research and concise technical messages was also emphasised.

Over time, and through the changes in the HPAI epidemic in Viet Nam, FAO, DAH and other partners contributed to a collective set of information that focused to a large extent on addressing at-risk stakeholders (poultry farmers, traders, and marketers) to prevent disease impacts and spread. Additional communication efforts focused on conveying appropriate information to the general public to prevent market shock and economic impacts to the poultry industry, especially at local level.

FAO has very successfully advocated and liaised with the provincial DARD, DLP and DAH to develop a market chain, risk assessment, and hatchery improvement program that not only resulted in substantially closer engagement between local government and farmers to implement better production practices, but outcomes of these efforts have also led to establishing national guidelines and standards.

Finally, through transparency and information sharing at national, regional and global conferences and meetings of surveillance results and disease prevention and control measures implemented in Viet Nam, the country has been recognized as a transparent global communication partner in efforts to fight H5N1 HPAI.

Communications and advocacy in 2006-2010

In Viet Nam, while the project had technical capacity in animal health there was no capacity to be heavily involved in the range of communications activities that were required on the animal health front and so the project assumed a role to provide advice to other organisations on technical messages when requested. However, the lack of dedicated capacity in the project left a gap in the programme and it was not until both an international and a national communications consultant were recruited that the deficit was reduced. This communications team was dedicated to developing and maintaining the information base about the HPAI situation so that enquiries to FAO about the disease situation, including from the international community, could be accurately and quickly handled. It was also necessary to have the capacity to respond similarly to enquiries from the media as well as to establish relations

Figure 7.1: Poster for avian influenza outbreak reporting to the free hotline, Japan Trust Fund project, 2007

Discussing connections between avian influenza outbreaks within Quang Nam Province, UNJP Project

that would ensure balanced, science-based reporting. With respect to national media, the project team assisted government counterparts with delivery of a multi-media communications project that involved a media fellowship initiative for successful applicants who were journalists from various disciplines – print media, photo-journalists, radio and television. Fellows reported on the livelihoods of farmers and other stakeholders affected by HPAI in Viet Nam. The principle of the fellowship was to develop an awareness of the value and importance of reflecting issues of communities most affected by HPAI so as to advocate on their behalf and at the same time rapidly providing relevant information to the general public. Another important output was a documentary film about the experience with HPAI in Viet Nam that was well accepted and featured at the IMCAPI meeting in Hanoi in 2010. It detailed the impact of HPAI on the livelihoods of poultry raisers, the measures employed to mitigate the problem, contributions from the international community, and the ongoing threats the country faced. In addition, the ECTAD and communications team developed a format for including up to date information about HPAI on the FAO Viet Nam Website.

In the early stages of the Japan Trust Fund (JTF) project, a field project manager was recruited to lead efforts to strengthen disease control in some pilot provinces in the north. Over the period of the JTF field activities, hotlines were established and a significant public awareness program was developed by the communications team to sensitise all levels of the control system to the field activities, including the use of hotline (see figure 7.1), and key messages about disease control. One important aspect of the JTF activity undertaken was the very strong advocacy element to engage with the non-technical side of the control system at the provincial, district and commune level. This project emphasised the role of strong linkages with the existing structures instituted by the government, namely

the steering committees for avian influenza (SCAI) and also the HPAI Control Section that was set up when an outbreak occurred. To further advocate this project approach, posters, calendars, maps and handbooks were produced and distributed. The technical information in the handbooks was complimented by a very useful compilation of regulations and decrees that the animal health services needed to be familiar with. Of interest was the survey work done to highlight the number of contacts that farmers had with feed shops and the role these might play in disseminating information about HPAI.

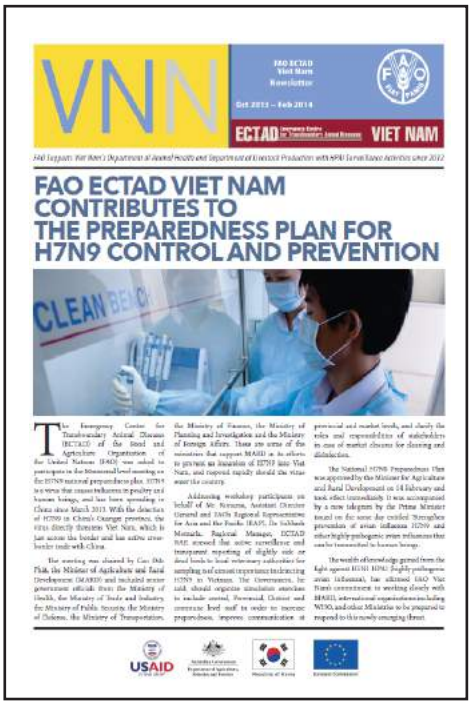
In January 2007, the communications officers made field visits to observe the larger UNICEF pre-Tet mass communications efforts. Following this experience, a field survey of the knowledge, attitudes and practices (KAP survey) of commune animal health workers and other front line disease control personnel was undertaken and the results were shared at an international workshop in Hanoi on Research to Policy. The overall conclusion was that commune animal health workers are in the position to be front line communicators about HPAI and control, but few are well prepared for this role. Being able to deliver clear and consistent messages to farmers was necessary for control but also to establish greater credibility for the commune animal health workers in their dealing with poultry owners. As a result of this KAP survey, the project communications team devised a strategic approach called ParaComm to focus communications and technical capacity on the front-line responders at the village level. While some effort went in to developing this strategy, it was not pursued because perceptions in the wider communications community were that it should be incorporated into other activities and funding for the key personnel was not sustainable.

When the JTF project was reviewed, it was noted that it had a significant impact at the national level. In essence, it reported that the Information, Education and Communication (IEC) group, supervised by a JTF funded officer, had played a key role in producing a well-coordinated IEC awareness program aimed at human and animal health professionals, stakeholders in HPAI control, all levels of the poultry farming community and the general public. During this time the IEC group had worked closely with DAH and DLP as well as PAHI and international partners such as UNICEF and WHO, USAID partners Academy for Education Development (AED), Abt Associates, Care International and other partners in developing the communications materials for the delivery of the OPI. In particular, the IEC team coordinated the project input into the preparation of the Strategic Framework on Communication for Avian and Human Influenza Control and Prevention 2008-2010. This preparation was coordinated by PAHI and culminated in an approach formalised by the GoVN in July 2008 to coordinate all public awareness and behaviour change communication related to avian and human influenza. There were many parties involved in the behaviour change communications area and PAHI convened a Behaviour Change Communication Working Group with participation of the project team. Of interest was the very large number of different messages that had been used in the program to that point and rationalisation review and reaffirmation of appropriate messages was required. The role of the IEC was important because otherwise the task of communication coordination and provision of technical input for animal health communication for activities carried out by partner organizations would have been carried by the technical advisers (veterinarians) who were already overloaded in their areas of expertise, and not specifically trained in communications. FAO argued that it was important to have a communication focal

point within the technical agency to coordinate communication messages and activities that are implemented by partner agencies. However, funding for the position was withdrawn in 2009.

In the period after 2009 to 2010, the position of the national communications assistant was maintained enabling information on HPAI status to be maintained on the FAO website. A substantial information and advocacy campaign was designed and implemented to support the activities of the GETS project in the 4 target provinces. This effort provided the necessary support to enable the success of this intensive field research project. The project technical team also continued to provide significant technical support to other USAID partners with field activities, but the level of broad-based FAO generated communication initiatives eventually fell away. A localised effort was made to increase public awareness pre-Tet in 2010 in 5 project provinces, especially to support the passive surveillance program.

As more work was done in the field with biosecurity and value chains, a considerable amount of advocacy was necessary to get the support of the provincial DARD that previously had little involvement with the HPAI effort or the poultry sector in general. In addition, some effort was made to advocate for engagement of the project with the larger players in the commercial poultry sector. In these ways, important disease prevention and control communication messages became more integrated in how the project regularly worked with the government at local level, rather than as a stand-alone communication effort, and this approach became a more acceptable modality of implementation.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FAO ECTAD Viet Nam Newsletter

Oct 2013 – Feb 2014

ECTAD VIET NAM

FAO ECTAD VIET NAM CONTRIBUTES TO THE PREPAREDNESS PLAN FOR H7N9 CONTROL AND PREVENTION

FAO ECTAD quarterly newsletter, February 2014

Communications and advocacy 2011-2014

The communications assistant and project technical officers continued to engage with the PAHI convened Behaviour Change Communication (BCC) working group and disease outbreak update reports continued to be translated and disseminated. Toward the middle of 2012, FAO supported DAH in developing a bulletin to communicate a consolidation of all animal health-related activities, projects and programmes implemented through DAH. This document, called the 2011 Animal Health Bulletin, was printed and distributed to RAHO and SDAH offices for wider dissemination. As part of the general effort to communicate to livestock producers, biosecurity film footage of high risk practices was gathered under the direction of a technical expert. This formed the basis of a visual training resource to highlight risk behaviour in a format that was designed

to engage and stimulate poultry producers. With respect to poultry production and risk management at local level, FAO advocated for greater DARD engagement and involvement in meetings and educative processes. At the same time there was a similar process undertaken with the development and then finalisation of the strategic approach to regional HPAI control. Monthly FAO ECTAD Viet Nam updates were written and distributed to partners and a quarterly E-Newsletter was initiated for an expanded group of stakeholders including One Health partners, as well as being made available on-line. These efforts continued to enable information sharing regarding valuable efforts being made by DAH, DLP and FAO in addressing HPAI disease prevention and control. The project has also continued interaction with the local media by providing comprehensive overviews of the HPAI situation, placing the situation into national, regional and global contexts.

At regional and global levels, information about the evolution of HPAI and innovative approaches to surveillance, response, value chain studies, and One Health to address HPAI was shared through multiple meetings. This ranged from participation and presentations at local meetings for example at Hanoi Agricultural University, to regional or cross-border meetings such as the Emerging Zoonoses meeting in Cambodia, and also included contributions to global meetings such as the PMAC One Health Conference "A World United Against Infectious Diseases - Cross-sectoral solutions" in Thailand (2013).

To facilitate national poultry biosecurity and hatchery improvement production communication, two films were developed in collaboration with government counterparts. Both films provided technical and advocacy information that not only supported increased local livelihood earnings, but also supported enhanced biosecurity and production practices that decrease the risk of disease and spread. ECTAD FAO has also supported handover of the films and information which is being utilized by the National Agriculture Extension Centre (MARD), DLP and DAH as well as being incorporated into biosecurity standards, government distributed guidelines, and will ultimately be included in a future national policy.

Highlights of communication and advocacy

FAO and government counterparts made significant contributions to provide important technical, advocacy, and public communication messages in support of larger UN and national coordinated communication mechanisms through UNICEF and PAHI.

The project has very successfully advocated and liaised with the provincial DARD, DLP and DAH to develop a market chain, risk assessment, and hatchery improvement program. The process has resulted in substantially closer engagement between local government and farmers to implement better production practices at enterprise level. Outcomes of these efforts have also led to establishing national guidelines and standards.

Viet Nam has been recognized as a transparent global partner by sharing at national, regional and international venues, information and presentations about HPAI in-country, and innovative approaches to prevent, respond and control to HPAI.

From the institutional perspective, DAH and the

communications team helped manage aspects of media attention and high volume demands at times when the pressure for information flow was extreme. Preparing bulletins, weekly updates and quarterly newsletters for the partners and other stakeholders in the international community was an important contribution.

Shortcomings of communication and advocacy

The disruption of funding for the communications team meant the loss of a lot of capital that had been built with the media and within ECTAD. It might also be speculated that some advocacy might have been more successful with the necessary expertise in the house, so as not to depend on the technical team or distract from their work.

To date, there is not a dedicated communications expert in DAH, DLP or Agriculture Extension Services and it would be valuable for MARD to have a trained communication expert to support advocacy within the government for additional funding support, at local and Provincial levels for greater transparency and implementation of control measures, for at-risk stakeholders to prevent further disease impacts and spread, and for the general public to prevent market shock and economic impacts related to disease events.

Conclusion

There was considerable value for the project and FAO to have in-house expertise in the area of communications and advocacy which supported many counterpart and partner agencies. FAO, DAH and DLP provided a significant amount of time assisting other partners with technical aspects of their communications programmes, and this process, as well as engagement in communications working groups was facilitated by the presence of communications specialists. While to some extent communications outputs speak for themselves, this is not the same with the advocacy processes that are somewhat less obvious, as the product is not directly linked to the organisation. It is perhaps a point to speculate as to whether advocacy would have been more successful with a specialist helping to guide the processes. In the final analysis because the project did not have hands-on involvement in mass communications the effort was somewhat obscured.

ECTAD Emergency Centre for Transboundary Animal Diseases

Viet Nam

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