

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

COUNTRY REPORT: VIET NAM

22-27 NOVEMBER 2009

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I. INTRODUCTION

Viet Nam was one of 7 countries selected for the second real time evaluation of FAO's contributions to the preparedness and control of HPAI, as part of a purposive evaluation of the country level assistance provided to countries by FAO through regional and national projects managed by the organisation. The evaluation team visiting Viet Nam comprised Professor Brian Perry, Dr. Trevor Ellis, Mr. Shashi Kapur and Mr. Robert Moore. They arrived on Saturday 21st November and left on Friday 27th November. Their terms of reference and approach to the evaluation are set out in their inception report. The evaluation criteria specified in the inception report were applied to assess the relevance, efficiency, effectiveness, sustainability and – to the extent possible – the impact - of FAO's HPAI work.

Viet Nam was visited by the first RTE. Their report commented: *"FAO was criticised as being late to start providing assistance to Viet Nam by both UNDP and WHO. UNDP reported that in the early stages of the HPAI epidemic, leadership from FAO was not good; there were too many staff changes and FAO was locked into its own procedures rather than adopting local procedures. There was also a lack of sharing of its research outcomes. This may in part reflect poor relations between the UN agencies, as in fact, on examination of the documentation, the initial response was in fact quite rapid. A review mission conducted in November 2004 detailed that official communication of the HPAI outbreak arrived on*

January 13th, 2004, and a week later an FAO Regional Office officer was in Viet Nam to prepare a TCP proposal. WHO reaction was faster, although WHO benefited from the experience gained from the SARS epidemic. The first TCP was operational on February 1st, 2004, only two weeks after the outbreak, for a total amount of US\$ 390,000. However in subsequent months, there was intensive back and forth friction between the FAO representative, the FAO Regional Office and FAO-HQ. Unfortunately, this led to uneasiness with the relation between FAO and the Government of Viet Nam. The situation changed significantly for the better with the appointment of a new FAO Country Representative”. “Following the arrival of significant amounts of funding in autumn 2005, all those met from government, donors and other agencies concurred that FAO had had a significant impact on Viet Nam's ability to bring the disease under control by 2006, mainly through provision of sound technical advice, capacity building, technical assistance for the vaccination programme, and assistance with contingency planning and strategy design. FAO assistance played an important role in the rapid decrease in response time and increased effectiveness of government services”.

The second RTE evaluation team considers that there remains a very cordial and constructive relationship between FAO and the Government of Viet Nam, which in many ways has improved and matured over time, while acknowledging that it is a relationship which needs to be worked on all the time by both sides to maintain its functionality and transparency. FAO's second Real Time evaluation is one of several monitoring and evaluation mechanisms set up in Viet Nam by different stakeholders. In the UN Joint Programme Project, the regular six-monthly and annual reports undertaken carry out significant monitoring and evaluation (see Figure 1 below).

Figure 1. Monitoring and evaluation schedules in 2008 and 2009 for different stakeholder in Viet Nam. From FAO, 2008¹

Monitoring and Evaluation Reporting Schedule									
Program	2008				2009				Reporting Schedule
DAH/DLP									A National Steering Committee was established in January 2004 as the national coordination mechanism and a national plan was approved in November 2005 (Decision No. 6719/VPCP-NN). DAH and DLP report progress to the committee on an on-going basis.
FAO									Project monitoring is a standard component of FAO project management. FAO has implemented a real-time evaluation program for its HPAI activities.
USAID (OSRO/RAS/604/USA)									Mid-term and final project reports.
Operational Plan (Green Book)									The results of relevant M&E activities in quarterly and annual progress reports. The fourth quarterly report of each year is an annual report. A comprehensive mid-term progress report will be prepared approximately half-way during the implementation period.
UN Joint Program									The development of the overall M&E framework for the JP was not completed in 2007 as planned. This has led to some challenges in monitoring and reporting which are expected to be addressed in 2008.
World Bank (VAHIP)									M&E reports form a standard part of the biannual project supervision reports, and are presented in standardized format. The fourth quarterly progress report of each year is an annual report, covering progress made during that year.

¹ eSys Development, Hanoi, 2008. Monitoring and evaluation framework for avian influenza control in Viet Nam. Report to FAO, 32 pp. OSRO/VIE/801/USA is not mentioned here, but it has mid-term and final project reports as for the OSRO/RAS/604/USA reporting schedule.

II. POULTRY SECTOR AND HPAI EVOLUTION IN VIET NAM

Characteristics of the Poultry Sector

The poultry sector of Viet Nam has been extensively reviewed by Desvaux et al (2008²). Poultry production plays an important role in the economy by contributing 19% of the households' incomes in rural areas, ranked second after pig production (DLP, 2006³). In 2006, the poultry population was estimated at around 214,565,000 (now probably around 250 million). Chickens account for 73% of total poultry population and waterfowl for 27% (DLP, 2006). There are estimated to be around 70 million ducks. The total poultry meat production (live weight) was estimated to be 321.89 thousand tons and the number of eggs produced was 3.9 billions (GSO, 2007⁴). The annual output value from poultry production was estimated at 3 619.3 billion Dong at constant 1994 prices accounted for around 13% of the total livestock output value in 2006 (GSO, 2007).

In 2006, the average poultry density of Viet Nam was around 650 birds/km² (450 / sq km for chickens and 180 for ducks). The Red River Delta, Mekong River Delta and North East regions are the agro ecological regions with the highest population of poultry in the country. Due to the HPAI epidemic, in 2004 the poultry population decreased by 26% in the South and 19% in the North compared to 2003. Before the HPAI outbreak (2000-2003), the global growth rate in poultry production was 9.1%, becoming negative for the period 2003-2006.

In total around 8 million households keep poultry from which:

- 65% of households keep chickens in small numbers⁵ (less than 200 heads/year)
- 25% of households keep waterfowl, mainly ducks;
- <15% are small scale commercial chicken farms with flock sizes ranging from 200 to 500;
- 0.1% are integrated industrial farms with flock sizes ranging from 2 000 to 30 000⁶.

There tradition of considering all flocks under the size of 200 chickens as basically the same sector has led to a number of difficulties in the early period of HPAI control, given that this includes both back yard and small scale commercial; this difficulty is only recently being addressed through better reporting of poultry data.

The poultry production in Viet Nam is mainly in the hands of small holders. However, medium to large scale poultry production is progressively increasing. According to an inter-ministerial circular issued in 2000 (69/2000/TTLT/BNN-TCTK), a poultry farm is defined as a farm with more than 2000 heads and an annual income of more than 40 millions VND⁷. The Department of Livestock (DLP, 2006) report 2,837 poultry farms meeting this definition in 2006 (this accounted for 17% of the total livestock farms in Viet Nam). Out of those 2, 837

² Desvaux, S., Ton, V., Thang, P., Hoa, P. 2008. A general review and description of poultry production in Viet Nam. Agricultural Publishing House, Hanoi, Viet Nam, 38 pp.

³ DLP - Department of Livestock Production. (2006). Report on commercial and industrial livestock farm development in the period 2000 - 2005 and orientation of development in the period, 2006 - 2010. Ministry of Agriculture and Rural Development, Hanoi.

⁴ GSO, General Statistics Office, 2007. Statistical yearbook of Viet Nam 2006. Statistic publishing house. Hanoi, Viet Nam.

⁵ Note that this consolidated grouping includes households with backyard scavenging chickens (mean of about 8-10 and a range of approx 1-30 birds) and households with some containment of chickens, and hence different risk factors for HPAI

⁶ These farms are often integrated with foreign feedstuff companies such as: the CP group, Japfa, Cargill, Proconco, etc. (DLP, 2006).

⁷ USD 1 = VND 19,000 (Nov. 2009)

poultry farms, there are 68.8% chicken broiler farms, 23.5% duck broiler farms and 7.7% breeder farms.

The commercial poultry production sector is fairly well developed in the Red River Delta, the Mekong River Delta and the Southeast regions, where it accounts for 68% of total number of (commercial) poultry farms in the whole country and is still limited in Northeast (2.7%), Northwest (1.5%) and High Land (Tay Nguyen) (4.5%). There are 219 breeding farms registered in Viet Nam, most of them with a flock size of 2,000 to 11,000 heads; only 5.5% have a flock size over 11,000 heads. The breeder farms are mainly concentrated in the Red River Delta and Southeast regions.

Chicken broiler farms with flock sizes of 2,000- 11,000 are common (93.5% of commercial flocks), chicken farms with sizes of 11,000-15, 000 account for about 3.4%, and there are 3.1% chicken farms with over 15,000 heads. Duck broiler farms with sizes of 2,000 to 5,000 are prominent (97.8%). There are about 2% farms with flocks ranging from 5,000 to 11,000 heads and 0.2% of duck farms having over 15,000 head.

HPAI status and evolution

Viet Nam was one of five countries in Southeast Asia affected in the first wave of the H5N1 HPAI epidemic in late 2003 and initially was one of the worst affected countries. There have been 112 human cases of H5N1 with 57 deaths (an overall case fatality of about 50%).

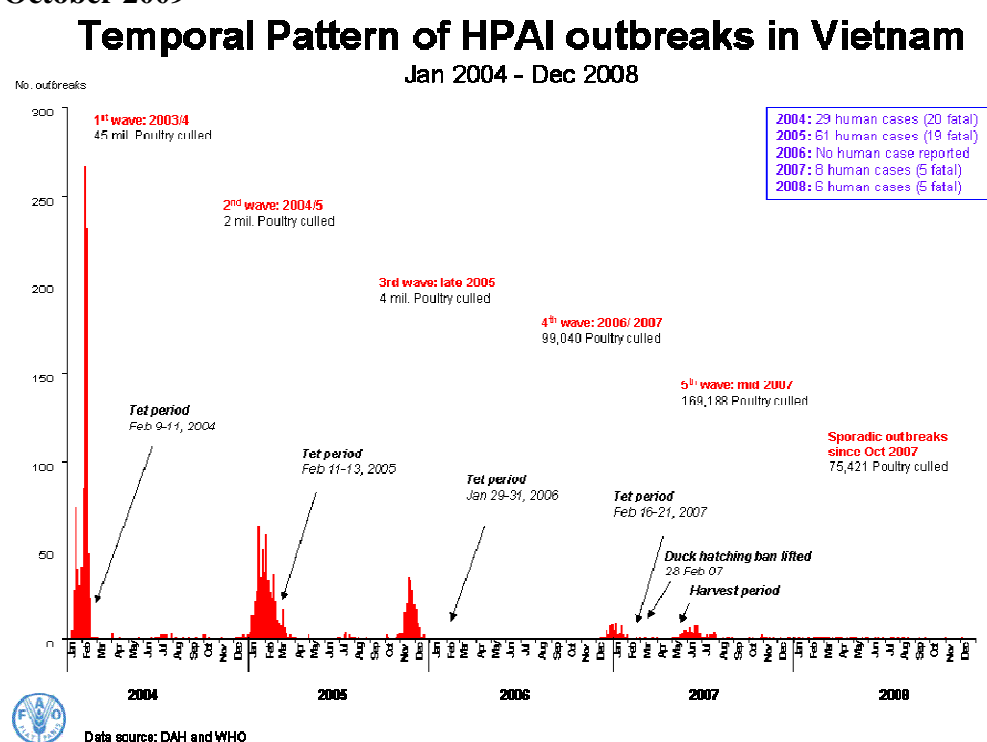
Between December 2003 and March 2004, preceding the Tet festival, 24 percent of Viet Nam's communes and 60 percent of towns were affected, in 57 out of Viet Nam's 64 provinces; 45 million poultry were culled and 27 human cases (of which 16 were fatal) occurred. At the peak of the epidemic in early 2004 around 17 percent of Viet Nam's poultry population died or were culled. Scattered outbreaks and a small number of human cases continued through November 2004. A second wave of outbreaks occurred between December 2004 and March 2005, again just prior to the Tet festival. This affected 670 communes, resulting in 2 million poultry being culled and 64 human cases (21 fatal). Scattered outbreaks and a small number of human cases were detected through the middle of the year. A third wave occurred between October and December 2005 in which disease was reported in 276 communes and resulting in 4 million poultry being culled and 2 human cases. Studies on the spatial and temporal patterns of the disease indicated that crop-livestock livestock farming systems involving domestic water birds and rice production in river delta areas are important for the maintenance and spread of infection (Pfeiffer et al., 2007⁸).

Mass vaccination of poultry was commenced in December 2005 and this remains an official national policy. However, it is understood that it is no longer being applied vigorously throughout the country in all eligible classes of poultry. After including mass vaccination with other control measures in late 2005, there appeared to be a measurable improvement for approximately 12 months with no H5N1 outbreaks in poultry or human cases detected, until late in 2006 when a fourth wave of HPAI occurred (from December 2006 to January 2007). However, this may well have reflected the seasonal variation in HPAI incidence. The fourth wave mainly affected 12 provinces in the South. A fifth wave of disease occurred from May to September 2007, affecting 22 provinces that were mostly in the North. Although there were minor epidemic peaks in February and March of 2008 and 2009, there were also sporadic outbreaks reported in 27 provinces in Viet Nam in 2008 (Ben Tre, Ca Mau, Can Tho, Dong Thap, Ha Nam, Hanoi, Ha Tinh, Hai Duong, Kien Giang, Lao Cai, Long An, Nam Dinh, Ninh

⁸ Pfeiffer, D., Minh, P., Martin, V., Epprecht, M., Otte, M. 2007. An analysis of the spatial and temporal patterns of highly pathogenic avian influenza occurrence in Viet Nam using national surveillance data

Binh, Nghe An, Phu Tho, Quang Binh, Quang Nam, Quang Ninh, Quang Ngai, Quang Tri, Son La, Soc Trang, Thai Nguyen, Tien Giang, Tra Vinh, Tuyen Quang and Vinh Long). There has been a progressive decrease in the number of outbreaks officially reported each year. From October 2007 to October 2009 there were a higher proportion of outbreaks occurring throughout the year, rather than just in the winter months, than had been the case in previous years (Minh et al., 2009⁹). Temporal and spatial analysis of HPAI dynamics suggests that infection is being maintained in the north and south of the country, and there is substantial variability in the dynamics within the country (Walker et al., 2009¹⁰). From 2007 to 2009 there were 18 human cases (14 fatal). The temporal distribution of reported H5N1 HPAI outbreaks and the poultry losses for the first five outbreak waves is shown in figure 2a&b, and the location of outbreaks in communes and the affected provinces in 2009 until the end of October is shown in Figure 3.

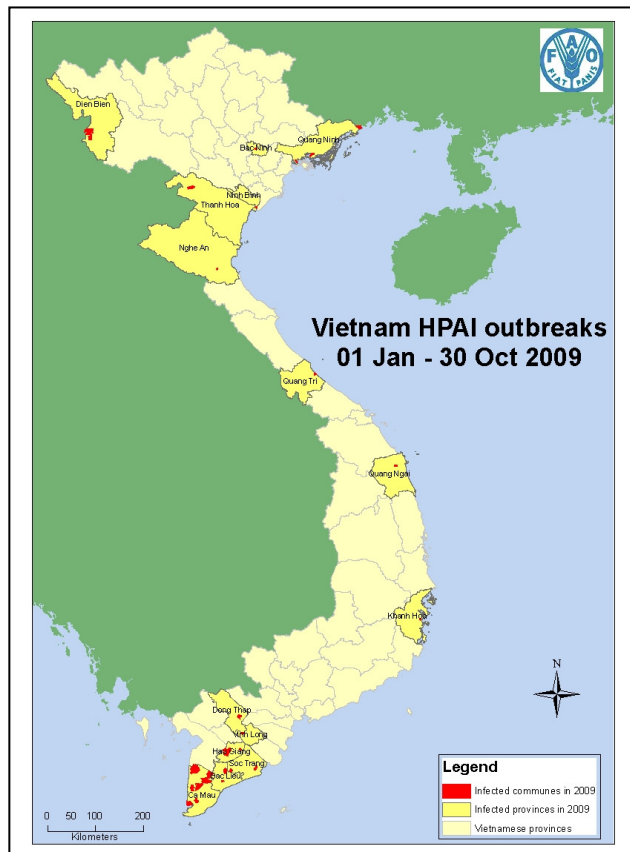
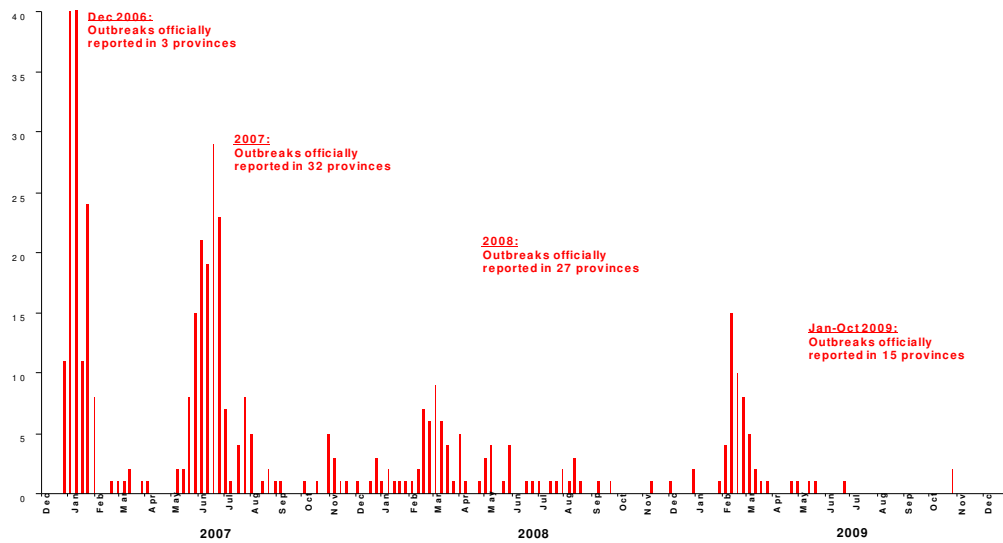
Figure 2a &b. Temporal pattern of HPAI outbreaks in Viet Nam, January 2004 – October 2009



⁹ Minh, P., Morris, R.S., Schauer, B., Stevenson, M., Benschop, J., Nam, H., Jackson, R. 2009. Preventive Veterinary Medicine, 89, 16-24.

¹⁰ Walker, P., Cauchemez, S., Metras, R., Dung, D., Pfeiffer, D., Ghani, A. 2009. Modelling the temporal and spatial dynamics of the spread of H5N1 in Viet Nam. HPAI Research brief No. 19, www.hpai-research.net

Temporal Pattern of HPAI outbreaks December 2006- October 2009



The initial H5N1 HPAI outbreaks in Viet Nam, Thailand, Laos and Cambodia were caused by Z genotype H5N1 viruses with clade 1 HA gene lineage. Phylogenetically these viruses are closely linked to viruses isolated in Yunnan Province, China in 2002 and 2003. There has been sporadic detection of H5N1 viruses from other clades (clades 3 in 2001, 5 in 2003, 0 in 2005, 8 in 2005 and 2.3.2 in 2005 to 2007) from surveillance samples. In 2007 and 2008 there was an incursion of clade 2.3.4 H5N1 viruses, closely related to those in southern China, and these caused a number of HPAI outbreaks in the north of Viet Nam and later some outbreaks in the south.

Virology studies have also demonstrated some re-assortment between clade 1 and clade 2.3.4 viruses in Viet Nam. In 2008 an incursion of clade 7 virus was detected in surveillance samples from the north of Viet Nam.

The HPAI outbreaks in Viet Nam have generally been associated with very high mortality in chickens and ducks for both the clade 1 and clade 2.3.4 viruses. However, virulence studies have shown a marked age related variation in virulence of these viruses in ducks, showing high mortality in ducks under 12 weeks, and very low mortality (but still with high levels of virus shedding) in ducks over 20 weeks of age. This may become further complicated with the clade 7 viruses which have been shown in laboratory studies to cause HPAI in chickens, but with a more protracted disease course, and in ducks do not cause death and result in minimal virus shedding.

The increase in outbreaks which occurred after 2006 was possibly associated with the lifting of the ban on duck breeding in 2007, with a consequent increase in susceptible, unvaccinated young ducks. However, the possibility of a loss in vaccine efficacy against evolving strains of H5N1 was also considered; this resulted in the initiation of vaccination efficacy studies. These have shown that the existing killed adjuvanted vaccine (Chinese H5N1 Re-1 vaccine) is still giving adequate protection against the 2007-2008 clade 1, clade 2.3.4 and clade 7 H5N1 viruses in chickens and ducks. FAO supported studies to evaluate the efficacy of a fowlpox recombinant vaccine (Trovac) used in day-old broiler chickens reportedly indicate that this vaccine is not effective for field use in broiler chickens in Viet Nam. The persistence of H5N1 HPAI outbreaks since 2006, despite the mass vaccination programme, raised concerns regarding the spatial and temporal consistency of vaccination coverage, as well as the dependency on vaccination without improvements in bio-security and movement control. The evaluation team was informed that part of the rationale for using vaccination was to allow for time to be made for improvements in biosecurity and movement control, but there is still a very large population of poultry (especially ducks) for which only minor improvements in bio-security can be made.

The H1N1 virus has been spreading in Viet Nam, and as of 10 December, Viet Nam's Ministry of Health has received reports of 11,040 laboratory confirmed cases, including 47 deaths¹¹. A recent model of H1N1 spread in the country suggested that a widespread epidemic would likely occur, and also warned that a large epidemic in a country with intense human-animal interaction and continued co-circulation of other seasonal and avian viruses would provide opportunities for H1N1 to acquire new genes (Boni et al., 2009¹²).

III. NATIONAL HPAI RESPONSE FRAMEWORK

In 2004 Viet Nam did not have a Preparedness Plan for HPAI. The initial contingency plan in late 2005 (Emergency Disease Contingency Plan for Control of Highly Pathogenic Avian Influenza in Viet Nam - Decision No. 3400 QD/BNN-TY) was approved by the Ministry of Agriculture and Rural Development (MARD) and constituted the basis for the National Veterinary Services to develop their own strategy to control HPAI.

¹¹ http://www.wpro.who.int/Viet_Nam/sites/dcc/h1n1/

¹² Boni, M., Manh, B., Thai, P., Farrar, J., Hien, T., Hien, N., Kinh, N., Horby, P. 2009. BMC Medicine, 7, 43: available at <http://www.biomedcentral.com/1741-7015/7/43>

A high-level National Steering Committee for Avian Influenza (NSCAI) was established by the Prime Minister in 2004 to supervise Viet Nam's overall response. The National Steering Committee developed three main documents outlining Viet Nam's medium- to long-term strategy and pandemic response plan:

- The Viet Nam Integrated National Plan for Avian Influenza Control and Human Pandemic Influenza Prevention and Response 2006-2008 (completed in January 2006) outlining the overall direction and estimated costing for this three-year period;
- A more detailed Viet Nam Integrated National Work Programme for Avian and Human Influenza 2006-2010 (OPI or Green Book - developed in May 2006) as a basis for coordinated national efforts and international support;
- Viet Nam has also prepared a National Preparedness Plan in Response to Avian Influenza Epidemic H5N1 and Human Influenza Pandemic, based on WHO's six stages of global pandemic alert.

The OPI (known as the Green Book) includes a range of activities relating to influenza pandemic preparedness for the human health and livestock sectors, as well as plans for supporting the restructuring of the poultry sector. These are in line with the “commercialisation” (or industrialisation) strategy proposed by the Department of Livestock Production (DLP) of MARD, but also are intended to preserve poultry farmers’ livelihoods and minimize environmental impacts. The policy measures adopted by MARD have incorporated relevant aspects of the FAO/OIE/WHO Global Strategy and propose medium to long-term aggressive control measures for Viet Nam through the deployment of conventional methods of culling, bio-security and movement control, combined with strategic vaccination of domestic poultry and ducks. Other measures include raising public awareness, strengthening diagnostic capacity, enhancing research capability, establishing compensation policies, and carrying-out epidemiological surveys to understand the route of transmission as well as the role of wild birds. The process and preparation of the Green Book had strong involvement of central ministries in close collaboration with the WHO, FAO, UNDP, UNICEF and the World Bank. The Green Book is currently under review to develop an updated document for the period 2011-2015.

The overall goal of the Plan is to progressively control and eradicate HPAI from poultry in Viet Nam. The specific short- to medium-term objectives are to:

- (a) strengthen veterinary services to control HPAI and other potential zoonotic disease threats;
- (b) control HPAI using a cost-effective phased approach that addresses each sector;
- (c) plan poultry sector restructuring so that it enables better control of HPAI while minimizing loss of livelihood and environmental pollution

As mentioned, a longer term objective is to restructure its poultry industry by improving bio-security and food safety along the market chain from producer to consumer, while protecting the livelihoods of poor farmers and safeguarding the environment. Initially the strategy adopted was to implement generic measures in markets that have worked well elsewhere, without knowing the precise risks to target. However long term success will require a major increase in the understanding of the market value chains and the epidemiology of H5N1 infection in all sectors of the poultry industries and live poultry markets, as well as strategic use of vaccination and development and adoption of effective but practical biosecurity procedures for small commercial farms and markets. This will likely require a risk management approach with coordinated planning and implementation from DAH/DLP/MARD plus, importantly, representatives of small and large scale poultry industries and NGO’s; FAO has started contributing to this through multi-sector

representation in the 'Biosecurity Working Group', with development of training modules on risk assessment and management, and has the potential to play a further role in facilitating the process. FAO can also contribute indirectly through the FAO-CTA input to VAHIP by baseline industry surveys in target provinces and by workshops and training of SDAH staff. Some changes to markets are already in place but the key issue is having incentives to implement measures (or disincentives if not implemented). However, other than for the incentive of likely production gains, many farmers will not invest in appropriate biosecurity measures and for certain farm types, such as grazing ducks, it is unlikely that the production system can be made biosecure without fundamental changes to the system itself.

Coordination mechanisms for HPAI control were set up at the central, provincial and district levels. Central coordination was provided by the NSCAI with strong government leadership to ensure that the efforts of donors and international NGOs are consistent with national priorities. The four activity areas involved are: (a) strengthening national coordination; (b) enhancing coordination at the provincial level; (c) strengthening overseas development assistance (ODA) coordination through the establishment of a government-donor Partnership for AHI Control (PAHI); and (d) establishing thematic working groups for public awareness and behaviour change, monitoring and evaluation, and capacity building. Steering Committees for Avian Influenza have also been established under the Peoples' Committees at the provincial (and in some cases district) levels.

The DAH is the lead technical agency for implementation of the national avian influenza operational preparedness and response programme in poultry, with responsibilities which include rapid response in outbreak areas, with focused culling of infected birds and the deployment of mass H5N1 vaccination. Response activities include: rapid response to reports of suspect cases; the formation of emergency response teams to investigate, collect and submit samples to laboratories; confirmation of laboratory diagnosis; notification of relevant agencies; declaration of outbreaks through the Minister; liaison and communications activities; the establishment of infected, control and surveillance zones; initiation of appropriate movement restrictions; coordination of poultry depopulation and disposal; outbreak and epidemiological investigations into the source and spread of infection; and close liaison with MoH to determine the public health risk. At the provincial level the SDAH takes a lead role in local liaison and coordination to implement control measures including vaccination, assisting with field investigations, culling teams, carcass disposal, movement control and managing public awareness at village, district and provincial level.

There is a compensation scheme, but the value given is considerably less than market value, does not compensate for losses before production returns, and the payments are reportedly often delayed, which in the past at least resulted in some people selling off sick birds or destroying birds and not reporting disease. The compensation paid by the GoV was at a rate of 70% of market value but was capped at 23,000 VND; some provinces top up this amount.

The mass vaccination programme commenced in December 2005 and has been conducted twice yearly (March-April and October-November). While many poultry were culled as a result of a stamping out policy, the measure was seen as highly destructive to the industry and livelihoods. There was also considerable public health pressure for vaccination. In 2005 the number of human cases was on the increase.

The programme did incorporate a system of post vaccine monitoring (PVM) and surveillance, as per FAO/OIE recommendations. The system monitors the effectiveness of vaccines in field

use (including vaccine variability, cold chain efficacy, vaccination protocol and techniques), but does not routinely attempt to measure the overall level of protection induced in the population as a whole, or the individual poultry sub-sectors. Some monitoring of birds one to two months after the first and second rounds of mass vaccination showed 67% and 60% of birds had H5 HI antibody titres respectively (Taylor and Sims, 2007¹³). Some regular random serological monitoring of population antibody levels would be a necessary component for evaluation of the overall effectiveness of the mass vaccination programme. FAO has been advocating such an approach.

Viet Nam is now considering a more strategic vaccination programme. The mass vaccination is expensive, and there has been a “burn-out” of personnel after four years of the twice yearly vaccination schedule. There is also substantial variation in vaccination coverage between provinces and production systems; in some provinces the strategic switch has reportedly already occurred, with national policy out of phase with provincial pragmatism. The evaluation team was informed that the recommendation to vaccinate widely in late 2005 was taken because the existing control measures (mass culling without clear information on the extent of infection) had failed to prevent human disease at village level, and because it was recognised that improvements in biosecurity, hygiene and movement controls were likely to take a prolonged period of time. The recommendations made were based on the FAO Guidelines on control of HPAI in Asia which stated that vaccination was one of the control measures that could be implemented in concert with other control measures available.

An FAO international consultancy on Avian Influenza Vaccination Strategy – Future Directions (Taylor and Sims 2007) in Viet Nam reviewed the results of the vaccination programme to date, highlighted the need to change the approach and made recommendations to the vaccination programme and post-vaccination monitoring and surveillance in Viet Nam from late 2007 onwards. Vaccination was likely to be required for an extended period and it was important that it was effectively targeted to areas of risk so that it was sustainable in terms of manpower and resources.

It has been recognised that the level of biosecurity and movement controls in poultry farms and live bird markets was a problem in Viet Nam and that changes would take time to implement and be adopted by the industry. Considerable communication efforts have been undertaken with farmers, animal health workers and live bird markets relating to improvement of biosecurity and industry practices. International consultancies through FAO and the World Bank have investigated and made recommendations on enhancement of biosecurity in small-scale farms and live bird markets, suggesting the need for structural changes in some sectors of the poultry industry (Thieme and Guerne-Bleich 2007¹⁴). At the current time there has been limited improvement or adoption of biosecurity practices, especially in sectors 3 and 4 of the poultry industry.

Case detection depends on a mixture of passive surveillance from farmers or AHW at the commune level, active clinical surveillance at the commune level supported by a network of commune Animal Health Workers (cAHWs¹⁵) who are partially funded by the Government of Viet Nam for surveillance activity (but also undertake private animal health work). This

¹³ Taylor, N., Sims, L. 2007. AI vaccination strategy: future directions. Unpublished FAO report

¹⁴ <http://www.fao.org/docs/eims/upload/239034/ai291e.pdf>

¹⁵ Denoted intentionally as cAHWs (*Commune* Animal Health Workers), to differentiate them from the volunteer *Community* Animal Health Workers (CAHW) prevalent in Laos, Cambodia and various African countries, for example.

surveillance is supplemented by active virological surveillance in markets and slaughterhouses/points, but only in some provinces (16 out of 63) and in some field research projects. Suspected outbreaks are reported to district or provincial veterinary offices or centrally via a hotline system. Investigation teams visit and take samples for laboratory testing. A considerable amount of disease awareness, biosecurity and personal safety training has been given at the AHW district and commune level and a series of SOPs and Job Cards for outbreak investigation, sample submission, outbreak response, reporting activities, etc. have been developed cooperatively between DAH and FAO for these activities. FAO is apparently not privy to all the outbreak information being gathered. However, the underlying concerns include whether the incentives, including the amount and timeliness of compensation payments are sufficient to encourage farmers, or even animal health workers to report suspect cases and also whether they have sufficient knowledge or ability to consider low level poultry mortality as suspect HPAI cases. Additionally, the virological surveillance data suggests that clinical cases currently represent a small proportion of the total burden of infection.

The laboratory diagnostic capacity for HPAI in Viet Nam has been greatly enhanced and has been well supported by FAO and partners (including USAID, World Bank and other donors). This support has contributed to improved facilities with good biosecurity and biosafety practices, equipment, training support and introduction of standardised SOP, PCR equipment and PCR and HI test reagents in the national laboratory (NCVD), 6 RAHO laboratories and 2 NIVR laboratories with a wide geographic spread throughout Viet Nam. Viral testing is conducted initially by real-time RT-PCR using primers for M, H5 and N1 genes; the central and regional laboratories also conduct serological monitoring for post-vaccinal antibody responses by HI testing. A proficiency testing system for H5N1 PCR and HI testing is conducted by NCVD; NCVD and RAHO 6 in HCM City participate in the proficiency testing conducted by the international AI reference laboratory (AAHL, Geelong). Performance in this testing appears to have been mostly sound, but some concerns have been expressed that laboratory diagnostic reagents (e.g., real-time PCR primers) are reportedly not uniform between the RAHO 6 & 7 and the rest of the laboratories. NCVD and RAHO 6 have the facilities, protocols and capacity to conduct virus isolation for H5N1 and receive samples from other regional laboratories to grow viruses for further virus characterization. Selected viruses are regularly sent to international reference laboratories (CDC, AAHL and HKU before 2008, since then viruses have been sent from NCVD to CDC and AAHL) for genetic and antigenic characterization and phylogenetic analysis. NCVD also has a support role to the regional laboratories and has established a laboratory network to look at proficiency testing and for information sharing. Apart from the HPAI testing, which is largely supported by donor money, funds are limited for other livestock disease surveillance testing and this needs to be considered for sustainable laboratory capacity development.

The weaknesses of the veterinary services in Viet Nam have been documented previously, including through an initial evaluation under the first World Bank project (an activity managed by FAO¹⁶); this was followed by the OIE's PVS report. Weakness in epidemiology was identified as a major concern from these evaluations. There is an Epidemiology Division within DAH and Epidemiology Units within the Provincial and S-DAH structure regionally. This Division receives and consolidates information from the regions and is responsible for updating national livestock surveillance data on the DAH website daily and preparing monthly and 6-monthly reports on disease activity. The epidemiology groups in DAH and

¹⁶ Report by Dr Bill Geering, WB-FAO

provinces have mainly focused on data collection from investigations and surveillance, but there has been less focus on further analysis and synthesis of data for policy and planning. Training in field epidemiology for disease investigation and surveillance is being developed through AVET programme, modelled largely on FETPV type training, and this will support epidemiology capacity building for broader disease surveillance. Other overseas post-graduate training in epidemiology is also underway. However, the overall concern at the national and international level at this time is that the disease control programme is working with an insufficient understanding of the overall epidemiological situation of HPAI in Viet Nam and it has meant that control and preventive measures had to be implemented based on imperfect information.

The Department of Livestock Production (DLP) within MARD has played a limited role in the HPAI response in the earlier years. This has meant a lack of adequate interface with Vietnamese expertise in poultry production and marketing at the central level, and although some value chain studies have been carried out by FAO, several gaps in knowledge and understanding of critical control points for HPAI surveillance and control remains.

With a focus on how to interpret and move forward with restructuring the poultry sector in a way that supports the growth in demand for poultry products, the need for more formalised systems of marketing, but at the same time protects the livelihood considerations of small scale producers, it is clearly important for the DLP to play a greater role in HPAI control. They currently have limited central capacity, and do not exist as an entity in the provinces. The World Bank's VAHIP project has a substantial commitment to training and equipping DLP for this role. Policies to continue and/or increase the involvement and reach of DLP will require ongoing advocacy from FAO and this has been promoted in the FAO submission for the Green Book revision.

HPAI in Vietnam have resulted in substantial morbidity and mortality caused in poultry populations, and major expenditures in control measures applied by private and public sectors (Burgos et al., 2008¹⁷). From December 2003 to March 2008 a total of 59.3 million poultry died or were culled. Including culling and disinfection costs, it is estimated that the total economic costs of the first wave of HPAI outbreaks reached US\$200 million. After the first HPAI outbreaks poultry prices plummeted and alternative meats experienced price fluctuations with periods of consumer anxiety followed by cycles of high demand and supply shortage.

Poultry continues to be marketed predominantly through traditional live bird markets but some increase in marketing of processed poultry products has occurred in large urban areas such as HCM City where there is strong provincial government and SDAH. Viet Nam's accession to the WTO opened trade opportunities which have led to a very considerable surge of importation of frozen poultry products from highly developed and competitive poultry industries such as USA and Brazil. This appears to have contributed to a decline of the chicken meat sub-sector, but duck production and chicken egg markets remain buoyant and are thought to be expanding modestly. Despite the development and extension of a considerable amount of technical materials targeted at commercial poultry farmers, the overall trends in adoption of improved bio-security and good poultry production practices are very low. Also the nascent commercial poultry sector lacks effective institutions to represent them, such as strong producer associations and marketing structures.

¹⁷ Burgos, S., Hinrichs, J., Otte, J., Pfeiffer, D., Roland-Holst, D. 2008. Poultry, HPAI and livelihoods in Viet Nam – A review. Mekong Team Working Paper No. 2, 50 pp.

There has been much discussion and many interpretations of proposals for the restructuring of the poultry industry, and the concepts among stakeholders, including the DLP and other branches of Government, have evolved over time. Initially it was taken by many to mean a centrally-planned system with drastic elimination of sector 3 and 4 poultry, and the development at the Province and commune level of very discrete and well planned commercial poultry enterprises. While there are still emerging plans for future safe poultry production, marketing and processing in Viet Nam, the vocabulary has changed to “encouraging people to scale up production capacity”, and “encourage households to practice appropriate hygiene and biosecurity”. Nevertheless the mission was informed about a new draft submission from the large scale poultry industry sector to MARD for funding of a progressive restructuring in the southern part of the country using the compartment concept for broilers, layers and hatcheries, creating integrated feed supply resources, and eventually associated processing plants. However, no indication of willingness to commit substantial public or private funds for this was indicated to the RTE team. FAO (through the country ECTAD team and with inputs from the Animal Production Service in Rome¹⁸) and the World Bank¹⁹ (through the Livestock Competitiveness and Food Safety project) have and will continue to support this process.

IV. DONOR, PRIVATE SECTOR AND TECHNICAL ASSISTANCE SUPPORT

NSCAI has been entrusted with the responsibility for government-donor coordination and has met on a regular basis with the International Community. Donor coordination meetings are organized with the assistance of the UN Resident Coordinator and Country Team, the World Bank and other donors. In particular, the DAH, with help of the International Cooperation Department (ICD) in MARD, has played a central role in government-donor coordination in the past few years (especially regarding the Joint Government-UN Program to Fight Avian Influenza, which receives funds from seven bilateral donors).

In November 2006 the Partnership on Avian and Human Pandemic Influenza (PAHI) was established by the Government of Viet Nam together with representatives of UN agencies, bilateral and multilateral donors, non-governmental organizations and research agencies. The main purpose of PAHI is “to facilitate implementation of the Green Book or OPI” by enhancing dialogue and monitoring resources and activities. In spite of the presence of these co-ordination mechanisms, various bilateral relationships continue among donors, international NGOs, and different ministries and departments, as well as the Peoples’ Committees at different levels. This engagement is not fully coordinated as yet, although information flows have improved recently, with increasing information available through the websites of PAHI²⁰, WHO and FAO, and the DAH and MOH.

At least 27 bilateral and multilateral donors have committed funds to the fight against avian influenza in Viet Nam, with USAID and the World Bank being the largest of these. About 13

¹⁸ FAO has provided funding support to DLP to hold national consultations to review draft questionnaires on poultry production structures and to develop a poultry training package to be used in field work of the poultry restructuring activities as part of the UN Joint Programme for HPAI prevention and control (OSRO/VIE/701/UNJ). For further information see Thieme O. 11 November 2008. Livestock Development Officer Back-to-office report on Country Visit Viet Nam 4 – 15 October 2008.

¹⁹ A World Bank project is supporting Viet Nam’s Livestock Competitiveness and Food Safety (LIFSAP) with the objective of improving the competitiveness of household-based livestock producers by addressing production, food safety and environment risks in livestock product supply chains in selected provinces.

²⁰ <http://www.avianinfluenza.org.vn/>

International NGOs and 11 UN Agencies are also supporting Viet Nam. The VUFO-NGO Resource Centre maintains a matrix of INGO responses to avian influenza, online resources, and an email discussion list on avian influenza programmes in Viet Nam.

USAID

Starting in 2005, USAID provided funds in support of Viet Nam's fight against HPAI, then threatening to reach epidemic proportions. USAID has contributed approximately US\$ 27 million since 2005 (\$10.5 million in FY 2008), of which about 50% of USAID funding contributes to programs managed by FAO and WHO. The program supports prevention, containment and preparedness measures as well as communication activities and capacity strengthening for the Government of Viet Nam's MOH and MARD. USAID, together with FAO and WHO, has helped Viet Nam develop and revise the national plans to control and limit the risk of H5N1 outbreaks, strengthen monitoring of the HPAI virus in bird populations, and enhance pandemic preparedness and planning for HPAI. USAID is working with the business community to increase the resources, expertise and financing to fight the spread of bird flu. In addition to funding technical assistance, USAID provided over 24,700 sets of personal protective equipment and 100 decontamination kits for rapid deployment valued appropriately at US\$ 230,000.

World Bank

The World Bank has provided assistance to the Government of Viet Nam from the earliest stage of the outbreak. At the request of the government, a World Bank/FAO Cooperative Program (FAO-CP) team was fielded in Viet Nam from March 3 to 26, 2004 to assist in reviewing the National Action Plan for the Control and Eradication of Avian Influenza, and subsequently to prepare the US\$ 5 million Avian Influenza Emergency Recovery Project (AIERP). This joint effort led to the WB project, the first operational supported by the Bank to address the threat of HPAI; the approach developed has substantively informed all subsequent activities underway world-wide. This project had a major biosecurity component, including the upgrading of biosecurity on state breeding farms, which was prepared with contributions from an FAO international consultant²¹.

The AIERP, which was implemented by MARD and received technical assistance from FAO, closed in June 2007. A follow-up project, Viet Nam Avian and Human Influenza Control and Preparedness Project (VAHIP) was designed and is being implemented by MARD and MOH, with the aim of assisting Viet Nam to move from an emergency response mode to medium- to long-term integrated disease control and prevention programs for both poultry industry and human populations. The follow-up project has a total cost of US\$ 38 million, comprising three components:

- (A) - HPAI Control and Eradication in the Agricultural Sector;
- (B) - Influenza Prevention and Pandemic Preparedness in the Health Sector; and
- (C) - Integration and OPI Coordination, Results Monitoring and Evaluation (M&E), and Project Management.

The project is co-financed by the World Bank (US\$20 million via the IDA Credit), the European Commission (US\$ 10 million via the Avian and Human Influenza Facility - AHIF), the Japanese Government (US \$5 million via the PHRD) and the Government of Viet Nam (US\$ 3 million of counterpart funds). This project receive high level technical assistance from

²¹ Report of Dr Larry Allen, FAO-WB

FAO by providing the CTA to this project, and staff employed by FAO (through the Investment Center) have played a critical role in the drafting of VAHIP, designed to cover a number of areas that were not being covered by other projects.

Project implementation had fallen behind the initial schedule but the CTA has reportedly played a crucial role in pushing to get activities off the ground, in working to improve the quality of disease surveillance, in conducting vaccine trials and in supporting DAH in epidemiological analysis. Implementation has improved recently with the appointment of a consultant on laboratory quality assurance, provision of FAO staff for spatial planning for poultry sector restructuring, along with a consultancy on biosecurity; agreeing to contracts for construction of Ha Vi market; and speeding up procurement activities for the project generally. Some progress was made in decentralization from the central to provincial level and from the Provincial People's Committee (PPC) to Department of Agriculture and Rural Development (DARD) and Department of Health (DOH) for approving procurement activities, and this has contributed to some streamlining of the government's procurement procedures. The baseline surveys and development of the project M&E framework for both the animal and human health components were completed. Meetings between the two Project Co-ordination Units (one in MARD and the other in MOH) with the local World Bank team were held twice yearly, and this resulted in more timely identification and addressing of issues affecting implementation, although some institutional constraints remain. The present level of disbursement of the project however remains low (at around 38%), but with recent improvements in implementation the project is expected to be on-budget by completion in December 2010.

Private Sector

There is a steadily growing private poultry sector in Viet Nam, catering principally for the expanding domestic market, although there is an export market for some duck products, notably duck eggs. Feedback from the Poultry Association of Viet Nam indicated their belief that the vaccination programme has gone a long way in helping to bring the disease under control and they expressed concern that the withdrawal of vaccination could lead to outbreaks in poultry and consequently a threat to human health. The Association believes, as do those Sector 2 & 3 farmers interviewed by the evaluation team, that a vaccination programme should continue and the farmers will be willing to pay for it.

V. ROLE AND ACTIVITIES OF FAO

FAO has been supporting the Government of Viet Nam in its efforts to combat HPAI continuously, since very shortly after the initial confirmed outbreaks in December 2003. As in many other countries affected by HPAI, the immediate response to the crisis was funded through FAO's TCP, as this is generally the quickest way to initiate action at country level. Subsequent support to Viet Nam on HPAI has been funded primarily by USAID and Japan, but FAO is also a partner in the UN Joint Programme on Avian Influenza and has provided the CTA to the World Bank-funded VAHIP project. Ireland also funded a project through FAO aimed at establishment of an effective cold chain for vaccines in selected provinces. The list of FAO-implemented projects in Vietnam can be found in table 1.

The initial responses to HPAI in Viet Nam were conditioned by the large number of outbreaks and relatively high number of human cases in 2004 and 2005. Since 2006, FAO's responses have been guided by the Integrated National Operational Programme for Avian and Human Influenza 2006-2010 (the "Green Book"), which FAO helped to develop. The vision

statement for the Programme is that by the end of 2010, Viet Nam no longer represents a risk for development of human pandemic influenza from the H5N1 virus. In response to the preparation of the Green Book, FAO produced its own Country Strategy and Work Plan for 2007-2010 to outline its expected contribution to the National Programme. The FAO Country Strategy, first produced in May 2007, was updated in November 2009. As part of the ongoing revision of the Green Book FAO, in close consultation with the GoV, has provided 11 major recommendations for the next phase of the national programme.

FAO's work on HPAI in Viet Nam has been focused in broad terms on providing support and advice to government in five areas: disease surveillance, communication, biosecurity, laboratory diagnosis and applied research. There has been limited funding until now for biosecurity (more has been allocated for post-vaccinal monitoring and cold chain) and little for communication; there has been considerable funding for outbreak response, vaccination strategy development and monitoring, cold chain, training and capacity building and support of SDAH and DVS staff and some AHWs. Operational projects are generally focused on selected Provinces for each intervention, with the choice of Provinces being made by the central Government. A detailed assessment of the main FAO Avian Influenza Projects in Viet Nam can be found in annex 3.

Table 1: FAO-implemented projects in Viet Nam as of October 2009

Project	EOD	NTE	Total Approved Project Budget	Total Expenditures under the project	Budget Allocated for Viet Nam through FBA	Expenditures and Commitments under FBA for Viet Nam
<i>National - (UTF /VIE/034/VIE)</i>	12/12/2007	11/12/2010	800,000	433,912	35,000	17,546
<i>National - (OSRO/VIE/701/UNJ)</i>	01/01/2007	31/12/2010	1,968,203	1,692,660	511,820	394,367
<i>National - (OSRO/VIE/501/UNJ)</i>	01/11/2005	31/07/2006	2,017,062	1,909,898	181,000	169,645
<i>National - (TCP/VIE/3003)</i>	04/02/2004	31/01/2006	359,039	359,039	170,347	170,347
<i>National - (OSRO/VIE/601/IRE)</i>	01/08/2006	31/05/2007	321,042	316,167	82,540	82,297
<i>National – (OSRO/VIE/801/USA)</i>	01/10/2008	30/03/2011	4,000,000	728,180	365,000	129,603
<i>National - (OSRO/GLO/504/MUL Baby 08)</i>	31/12/2005	31/12/2009	500,000	391,105	9,500	7,105
Total National Projects:			9,965,346	5,830,961	1,355,207	970,910
<i>Regional - (TCP/RAS/3004) – B01</i>	01/02/2004	31/01/2006	43,876	43,876	23,234	23,234
<i>Regional - (OSRO/RAS/604/USA)-B06</i>	01/08/2006	30/09/2010	8,400,000	5,657,946	2,711,200	1,988,155
<i>Regional - (OSRO/RAS/505/USA)</i>	01/09/2005	31/03/2007	6,000,000	5,959,835	537,958	506,178
<i>Regional - (OSRO/RAS/401/JP) – B04</i>	01/03/2004	30/11/2005	196,324	211,417	196,324	196,514
<i>Regional - (OSRO/RAS/602/JPN)</i>	01/04/2006	31/12/2009	11,400,052	11,004,407	753,850	753,874
Total Regional Projects:			26,040,252	22,877,481	4,222,566	3,467,955
<u>Grand Total:</u>			<u>36,005,598</u>	<u>28,708,442</u>	<u>5,577,773</u>	<u>4,438,865</u>

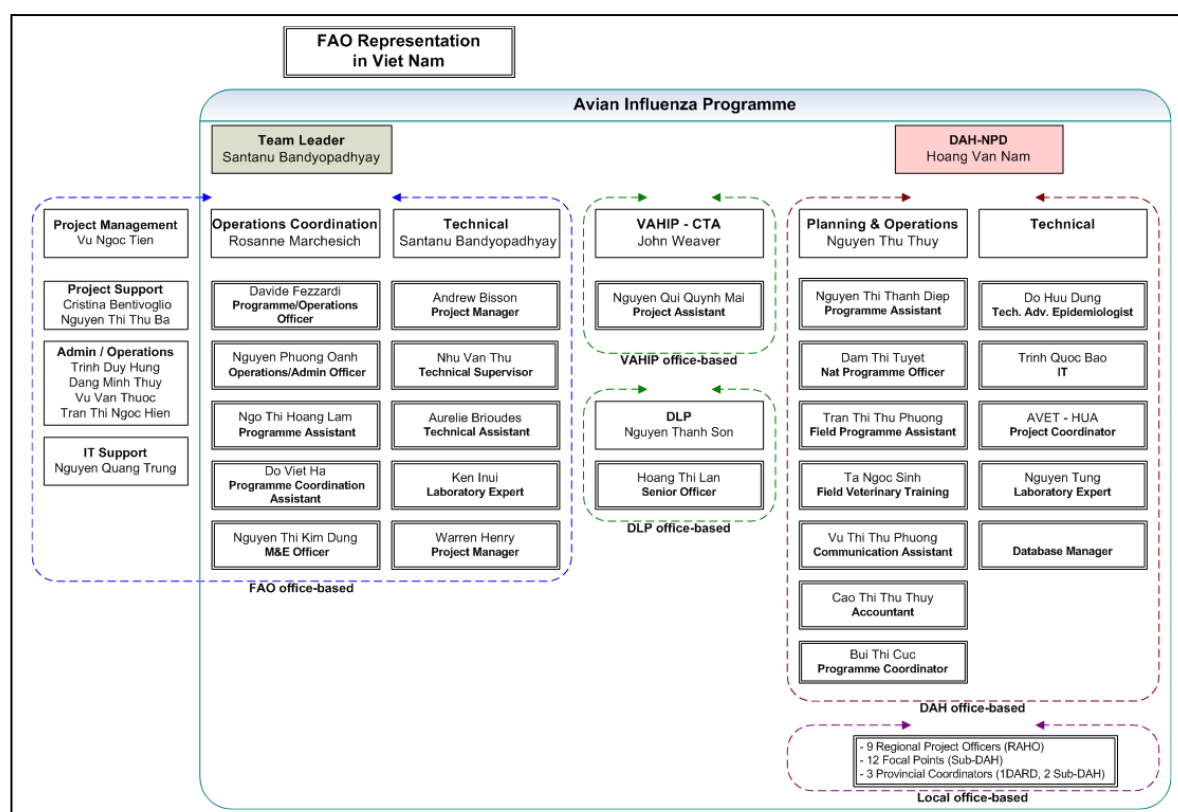
The FAO Country Team

FAO has wisely adopted a programme approach with the various projects it has implemented in Viet Nam, particularly the USAID-funded and UN Joint Programme (JP) projects, which have very similar objectives and are complementary in many ways.

FAO's activities in the country are largely implemented through an Avian Influenza Programme team, comprised of technical and operational staff, including international staff as the Team Leader, three CTAs/Project Managers, a laboratory expert, a technical assistant for surveillance activities supported by the French Government and two international Operations staff. A post of epidemiologist under the GETS project is under recruitment at the moment. VAHIP is trying to recruit an additional epidemiologist, although this is yet to be approved by GoV. National staff also serve on the Country Team, but with their commitments to DAH activities, their direct project related activities appear to be less than in other countries. GETS has three national staff that have minimal commitments to DAH activities. The involvement of national staff with these projects however does have a spin-off in general capacity building within DAH.

The FAO HPAI programme in Viet Nam has also benefitted from support by several short- and medium term consultancies mainly organized through ECTAD-RAP and FAO Rome. These consultancies²² have provided expert advice in several areas including strategy and policy development, vaccination, biosecurity, composting and disinfecting, etc.

The organigram of the FAO Avian Influenza Programme in Vietnam can be found below.



²² Experts involved include Tony Forman, David Hadrill, Nick Taylor, Les Sims, Astrid Tripodi, Peter van Beek, Larry Allen, Andrew Almond, Yoni Segal, Laurie Gleeson (former ECTAD-RAP regional manager), etc.

FAO's role as an implementer of projects and programmes in Viet Nam was appreciated by the Government as well as other donors. There did not appear to be any unusual shortcomings in implementation, although procurement delays relating to some vehicles and lack of information at field level about project budget status of UNJP projects were mentioned.

FAO's project international staff is housed within the FAO Representation in Hanoi, with the exception of the VAHIP project CTA who is located some 10 km away with the MARD Coordination Unit and the senior laboratory expert who sits in the NCVD Laboratory adjacent to DAH. Most of the national staff is based at NCVD or DAH. The project teams meet at DAH at least 2- 3 times per week or more, informally. The FAO Team Leader or the Operations coordinator arranges formal meetings with senior staff in MARD (including DAH and DLP) at mutually convenient times on a regular basis. DAH or FAO offices do not have sufficient office space to permit co-location. With increasing engagement with DLP, it is fortuitous that the FAO office is strategically located between DAH and DLP.

Thematic areas covered by the FAO programme

The various currently running FAO projects can be summarized into the following main thematic areas:

Policy level support; disease surveillance in the field; responses in the field (rapid response interventions and risk reduction through biosecurity; risk analysis and disease control planning at the Provincial level; risk reduction through biosecurity in live/wet markets; laboratory capacity development and networking; vaccine studies to support vaccine use in the field; post vaccination monitoring; the GETS project (gathering evidence for a transitional strategy); and poultry industry restructuring. These are undertaken by the set of projects indicated above. Below are some comments on some of these thematic areas.

In terms of policy advice, FAO is an important, but not sole, adviser to the Government of Viet Nam's National Steering Committee for Avian Influenza Control and Prevention and to the DAH. FAO has played a large role in contributing to the OPI. FAO's influence will be able to be measured by seeing how many of the 11 recommendations made will be incorporated into the revised Green Book. In response to requests for support FAO has been a major contributor to DAH in the development of operational policy. There was considerable support and influence throughout the period from 2005 to 2008. Moreover the measures used in Viet Nam, and their assessment, have reportedly contributed valuable information towards the development of the global strategy that was formulated at the technical meeting in FAO Rome in 2007. This global strategy was then fed back to Viet Nam and other countries. The strong influence by FAO probably relates to multiple factors, including the need for the Government to get a quick handle on what was at the time a new and very serious zoonotic disease with which it had no previous experience. More recently, FAO's influence may have been affected by the turnover in the CTA position between February and August 2009 and this was an issue with FAO's interlocutors in the Government and donor community.

For the other set of thematic areas, FAO's field work has taken place in what seems to the outside observer to be a curious patchwork of different provincial locations (see figure 6 on the next page). FAO does not have a say in which province is selected for a given project, these are apparently decided by the Government team on the basis of three factors, perceived risk of HPAI, provincial needs for assistance, and the presence of collaboration and they should also be distinct from the 11 VAHIP Provinces. While a variety of avian influenza

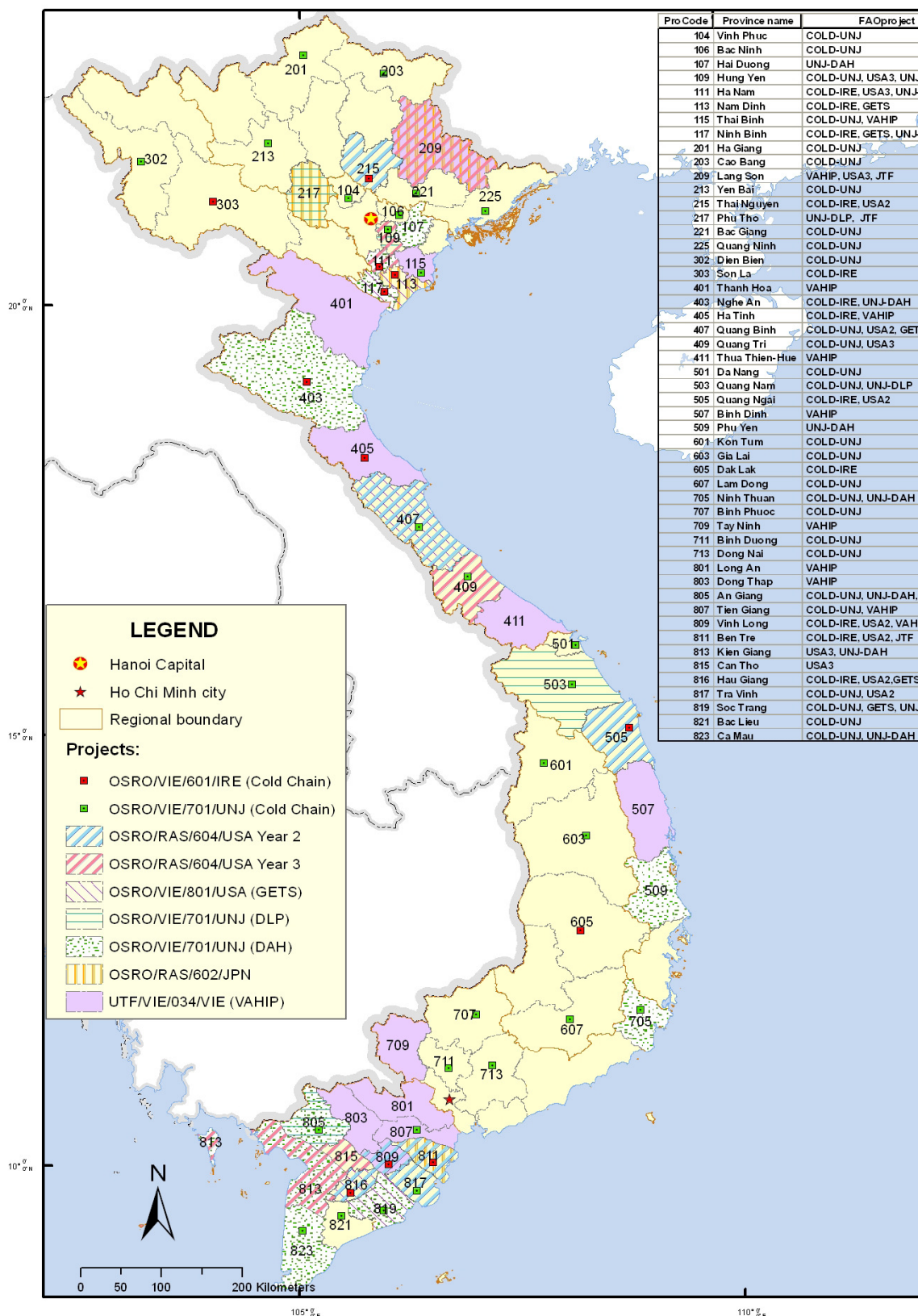
projects have been conducted in many provinces, which may have different production systems and risk profiles, the evaluation team was concerned that the work might have had greater impact if FAO would have been involved in the selection of locations from a scientific planning point of view.

In terms of *disease surveillance in the field*, given the previous patchwork of activities, a major contribution has been to develop the standard operating procedures, now in place in all provinces and the more recent revision and structuring of SOPs with appropriate Job Cards that are being tested in pilot provinces before adoption nation-wide. The passive surveillance, which has been in place for a few years, is steadily being improved, but the trace-back and follow-up is weak, despite the training in disease investigation and SOPs now in place. Implementation of the programme is clearly the role of the veterinary services, but the slow pace of improvement is something that needs continued input from FAO. Unfortunately apart from the payment of least one cAHW per commune to provide this type of service, the publicity/public awareness material in project provinces about hot line numbers, and the need for reports to help protect public health, there is an absence of effective incentives to farmers to support passive surveillance. This has been identified as an issue for investigation in the VAHIP project; there was considerable input into discussions on compensation by consultants involved in Viet Nam during a HQ e-conference on the issue; and there was an initial compensation review conducted by FAO during AIERP.

An active surveillance project is underway with a USAID identified partner (the Massachusetts based Abt Associates Inc.²³, operating in 5 pilot provinces). However, there is apparently inadequate communication and sharing of data by Abt. The high costs and sustainability of this active surveillance programme are also questionable.

²³ <http://www.abtassociates.com/Page.cfm?PageID=12605&CSB=1&OWID=2109769227>

FAO Avian Influenza Control Programme DISTRIBUTION OF FIELD ACTIVITIES (BY PROJECT) 2006-2009



Risk reduction through improved bio-security was recognised by FAO as a major target for control of HPAI in Viet Nam, and although vaccination was the dominant control tool used since late 2005, efforts have been made into concurrently improving biosecurity in farms and markets by FAO/DAH through international consultancies (on upgrading biosecurity in government grandparent farms and improving hatchery hygiene), communications and publications (training courses for cAHW, and farmers, market staff; distribution of VSF smallholder biosecurity handbook), consultancies to consider structural change as a means to improve biosecurity especially in small-scale commercial poultry industries, and including elements related to enhancement of farm biosecurity, enhancements of markets and slaughterhouses in selected provinces in the WB funded VAHIP.

Some training of SDAH, market and slaughterhouse staff, guidelines for market and slaughterhouse improvements, plans prepared for upgrading market and slaughterhouse facilities have already been implemented through the VAHIP programme. FAO supports a bio-security working group, a training module targeting district veterinary staff, value chain studies, a poultry atlas and other studies assessing bio-security standards. Despite all these efforts by FAO and other partners in awareness training and development of biosecurity enhancements, the evaluation team's observations were that uptake of biosecurity improvements was generally very limited and further implementation would require a stronger commitment from DAH, DLP and closer engagement with the poultry industry.

The components of risk analysis and disease control planning at the Provincial level, including risk reduction through biosecurity in live/wet markets, has been an on-going theme since 2005, but progress in this area has been slow. This is currently being followed up using external technical assistance in running courses *in situ* on risk analysis (one such course was being conducted in the north of the country at the time of the evaluation team visit). The protocols for post vaccination monitoring have been somewhat of a sensitive subject, with the level of coverage being a sensitive issue with Government. In addition, there is a difficulty for central Government in effectively controlling how vaccination is carried out in the different Provinces. In 28 out of 63 provinces, forty flocks are selected among those flocks known to have been vaccinated, which, while it should provide an estimate of seroconversion in vaccinated flocks, does not provide effective information on population immunity across the board. Even gaining access to the listings of vaccinated flocks is difficult for FAO. Recommendations for a more randomised study have been made by FAO to DAH (see for example Taylor and Sims 2007). For the VAHIP pilot provinces a more randomized sampling frame is being applied. For the other provinces FAO is in the process of developing a modified PVM sampling protocol.

The idea of the GETS project was very much driven by USAID, and has had a relatively long incubation in terms of project design. It is being piloted in 5 Provinces (two high risk in the north, two high risk in the south, and one apparently low risk in the central region). The aim is to target the higher risk duck populations, and also transfer certain responsibilities to private enterprise for vaccination. One concern in the pilot provinces is whether there will be an increased public health risk from reduced vaccination. The project will engage a new epidemiologist, and will incorporate socioeconomic impact assessments with technical support from FAO Rome. The protocols for the five Provinces are shown below.

GETS PROGRAM	Nam Dinh V2	Ninh Binh V2	Quang Binh V0	Hau Giang V2	Soc Trang V2
No GoV Vaccination in these production units, but vaccine available for private purchase	All Chickens (except one parent flock)	All Chickens (except commercial layer chickens)	All poultry in 4 districts (Bo Trach, Quang Trach, Minh Hoa, Tuyen Hoa)	All Commercial Chickens	All Chickens
Targeted Vaccination (meat ducks & replacement ducks) (GETS intervention)	Monthly vaccination -newcomers into duck flocks	Monthly vaccination -newcomers into duck flocks	Monthly vaccination -newcomers into duck flocks (Le Thuy, Quang Ninh, Dong Hoi)	Monthly vaccination - newcomers into duck flocks	Monthly vaccination -newcomers into duck flocks
Maintain twice yearly GoV Vaccination program as per GoV Directives	All ducks & One parent chicken flock	All ducks & Commercial layer chickens	All poultry in 3 districts (Le Thuy, Quang Ninh, Dong Hoi)	All ducks & Free ranging chickens <200	All ducks

The VAHIP project will be operational in 11 Provinces and involves 6 RAHOs, 2 laboratories of the National Institute of Virus Research, NCVD and 6 provincial laboratories.

The staffing has been reduced substantially from the original concept (from 26 to 5 international and from 36 to about 20 national staff) and has taken very long to become operational. There will be two additional consultants in 2010 on spatial risk and planning and biosecurity guidelines for larger commercial poultry systems. The delays have caused intense frustration on all sides (FAO, WB and DAH), the provinces targeted are all scattered, and it has been questioned whether greater value would have come from them being clustered.

The evaluation felt that the country team was highly engaged in its work and dedicated. However, there was understandably a heavy emphasis on carrying out operational tasks that were related to the emergency response mode. Work load and ongoing outbreaks have limited consideration of long-term sustainable activities, but there is an increasing engagement with DLP on investigation of sustainable structural changes in the poultry industries. Part of the problem has been that, until very recently, the reporting burden to FAO HQ in particular was deemed to be excessive to accountability requirements. This is expected to lessen in the future. The sum of factors, i.e. the strong role of Government generally, the fact that HPAI is now a more mature problem, high recent staff turnover and focus on operations, is that FAO may be less influential currently in the national policy debate than it is in other countries visited by the evaluation team. Given the remaining unresolved issues in Viet Nam regarding HPAI and animal disease control more generally, there is scope for further enhancing the policy advisory role for FAO in the country. To support this role FAO commissioned a consultancy to prepare a submission for the Mid-Term Review of the Integrated National Operational Program for Avian and Human Influenza (OPI), which was submitted by the consultant in October 2009²⁴. This submission has also drafted a comprehensive list of possible milestones that could be used for M&E in the revision of the Green Book.

²⁴ Sims, L. 2009. Submission for the Mid-Term Review of the Integrated National Operational Program for Avian and Human Influenza (OPI), FAO, 28 pp.

It has not just been the FAO in-country team that has provided support to Viet Nam. There has been substantial input from short to medium term FAO consultants and different groups in FAO, Rome, notably from the socioeconomic group, the animal production group, and the Pro-Poor Livestock Policy Group. In addition, some very valuable strategic contributions have been made by the members of the DFID-supported Pro-Poor HPAI Risk Reduction Project, which has involved several partners including the Royal Veterinary College, UK, and others.

The relationship between FAO and Private Sector is very limited, almost non-existent. This is clearly in part because the private sector itself is very poorly developed and organised in Viet Nam; there is no effective private sector association, so FAO is reduced to meeting the companies on an ad hoc basis. Even the Poultry Association of Viet Nam is managed by ex-academics, not private sector poultry people. There is no real estimation of the role and size of the private sector. However, a beginning is perhaps being made by contact with CP as representing large commercial farms and hopefully this will pave the way for other commercial entrepreneurs to come forward and eventually strengthen the private sector.

This lack of interface with a functional private sector in a country advocating poultry sector restructuring is of concern, and can be a major constraint to FAO's future effectiveness; the private sector has an important long term role in poultry development and needs to be engaged by all, including FAO.

Recognizing these limitations the FAO staff working on projects OSRO/RAS/604/USA, OSRO/VIE/701/UNJ and VAHIP projects have recommended processes that could progressively contribute to improved HPAI control, through more coordinated action between provinces as well as neighbouring countries through regional ECTAD activity; innovative approaches using focus groups of farmers and market chain intermediaries to try to understand barriers to adoption of biosecurity and good poultry production practices, exploring incentives which might improve uptake; and using surveillance data, epidemiological intelligence/analysis and understanding of market value chains to give an integrated risk management approach at provincial and central levels. These and other aspects have been considered in formulating the submission from FAO for the Mid-Term Review of the Integrated National Operational Program for Avian and Human Influenza (OPI).

VI. SYNTHESIS AND DISCUSSIONS OF FAO's CONTRIBUTIONS AND ROLES

Relevance and Appropriateness of FAO's Strategy and Programme at country level:

- Adequacy of FAO's support vis-à-vis the national agenda and priorities, national development needs and challenges and decision-making processes;

FAO has been engaged with the Government of Viet Nam now for five years, and although there have been regular staff changes on both sides, the period has been characterised by a progressively maturing relationship, very much led by DAH. As a result, FAO has, on the whole, successfully interpreted GoV aspirations and ideals, and contributed to these a set of broad strategic technical contributions that have resulted in balanced and effective programmes. The integral link with the Green Book/OPI, and FAO's contributions to this (along with other independent contributors) have helped to cement this partnership.

- Extent to which FAO's field work is in line with the Organization's priorities (as described in programming documents such as the National Medium Term Priority

Frameworks, the FAO's Programme of Work and Budget, the FAO/OIE Global Strategy and the FAO Global Programme for the Prevention and Control of HPAI);

FAO's field programme is generally in line with the Organisation's priorities. Viet Nam is one of the few countries in which vaccination is a strategy in active use, a tool very much advocated by FAO in the early stages of the SE Asian outbreaks. It has played a strong role, and with the apparent reduction in human cases in the months after vaccination was started, perhaps the country was lulled into a false sense of security, and the need for a package of measures to be followed vigorously, beyond just vaccination, in which biosecurity was critical, received less institutional support. As Viet Nam moves to a reduced and more strategic use of vaccination, and concerns are expressed about changing risks of human disease, there is a need to reinforce the need for a package of surveillance and response measures. Beyond this, the programme has focused on the enhancement of capacity of veterinary services to conduct outbreak investigations, tracing and surveillance; trained cAHW in active clinical surveillance and biosecurity procedures; enhanced laboratory diagnostic capacity for rapid virus detection and reporting and other aspects of HPAI control as recommended in global strategies and programmes. The FAO experiences from the Viet Nam programme have reportedly helped to shape the latest iteration of the FAO/OIE global strategy and provided inputs to the technical meeting held in July 2007 at FAO HQ²⁵.

- Extent to which the various FAO activities at country level are underpinned by a strategy and form a coherent programme, with consistent approaches and common goals;

The activities conducted by FAO in Viet Nam are mostly underpinned by the OPI (*Green Book*) which outlines the activities to achieve the objectives of the Integrated National Plan for Avian Influenza Control and Human Pandemic Influenza Preparedness and Response (*Red Book*). One purpose of the OPI is to provide a framework for coordination and collaboration between the GoV and international partners in the fight against HPAI. In this regard, FAO has supported OPI implementation in full cooperation with the Government. The activities in Viet Nam are also consistent with and based on the recommendations from the technical meeting held in Rome.

- Coherence and integration of regional projects into country programmes/activities;

Close linkages were apparent between ECTAD regional activities and the country-level work in Viet Nam. Of particular note are the cross border studies in the area bordering China, and those in the Mekong delta region.

- Appropriateness of FAO interventions in terms of:
 - Approach: comprehensiveness;
 - Duration: short term inputs versus long-term technical assistance; and,
 - Focus: HPAI versus other Transboundary Animal Diseases

While funding dictates that the major effort in Viet Nam is focused on emergency responses to HPAI, it is clear that the disease is endemic and will not be controlled in the short term. In spite of the constraints of short term funding, a comprehensive improvement has occurred in surveillance, laboratory diagnostic and disease response capacity at central and provincial level. This capacity can be further developed if support and funding continues, and if it will

²⁵ <http://www.fao.org/avianflu/en/conferences/june2007/index.html>

be able to be demonstrably directed towards the control of other TADs and emerging infectious diseases (EIDs). The funding strategies now need to be directed to long term technical assistance for disease detection and control (HPAI and other EIDs) to build on existing gains. The GoV still ranks HPAI as its highest animal disease priority, and appears reluctant to slacken the strict focus it maintains on this, rather than exploiting the capacities to also address the control of FMD, PRRS and other national priorities.

Efficiency

- Timeliness of FAO's response to requests for assistance on HPAI prevention and control

The timeliness of provision of advice and support during the period from 2005 to 2008 was considered to be good. There have recently been several timeliness issues affecting the Viet Nam programme, and the reasons for them have been complicated and multi-institutional. The most serious relates to an extended delay in the work of the World Bank's VAHIP project, which is managed by the PCU of MARD, and FAO only provides the CTA who is not the Project Manager. Some frustration was also expressed by DAH on loss of continuity and momentum as a result of the need to appoint short term acting Team Leaders filling the extended gap between the departure of the previous Team Leader (February 2009) and the relatively recent arrival (August 2009) of his replacement.

- Adequacy of FAO's response, including human/financial resources, operational, administrative, monitoring and reporting arrangements

The office of the FAOR provides strong administrative support and guidance to the programme.

The location of the team in the FAO office provides them with appropriate support services. There is arguably a case for the team to be co-located with DAH and the laboratory facilities, but there are space constraints to this option.

The relatively recent (April 2009) appointment of an operations coordinator, previously in Rome, is considered a very constructive move. In consultation with the technical team, this person will also be developing a longer term strategic framework for ECTAD in Viet Nam, emphasising the need to broaden responsibility to other priority diseases. In addition, the operations coordinator attends interface meetings with the FAOR, potentially offering a channel of communication between emergency and development issues.

- Timeliness and adequacy of technical and operational support from FAO Headquarters (HQ) and decentralized offices (including ECTAD units and RAHCs) to country level activities, including:
 - quantity and quality of co-ordination and support from HQ, decentralized offices and Regional ECTAD/RAHCs (in terms of backstopping/supervision missions);
 - quantity and quality of country level work undertaken by the ECTAD national units and, where relevant, the FAO Representations

There has been substantial technical support from FAO Rome and from the ECTAD Bangkok over the years, in a variety of different fields. Viet Nam has been considered a priority country by FAO; it has been the main recipient of technical backstopping missions from ECTAD Bangkok for wildlife surveillance, strategy development, laboratory capacity building, some field epidemiology training, etc. FAO HQ has also fielded numerous missions

particularly in the programmatic/operational/administrative side, but also on strategy and policy development, vaccination, socio-economic impacts, industry restructuring and biosecurity issues.

- To the extent possible, determine whether the approach, duration and focus of FAO interventions at regional and country level have been cost-effective

The evaluation team has identified several areas where FAO inputs might have been very cost-effective, and others where it would very likely have been less. Empirically, it appears that FAO contributions including enhanced policy and strategic planning (chiefly through the national ECTAD Team Leader and the consultancy inputs), improvements of laboratory networks, improvements in HPAI disease detection and surveillance, and communication for awareness of transmission risk and personal protection were cost-effective interventions. FAO has conducted studies that show that targeting interventions (such as vaccinating only the commercial sector) will result in major savings (of about US\$ 16 m per year) provided that the changes being advocated do not increase the risk of human cases or overall control of the poultry disease in Viet Nam. A negative element noted by the team was the wide dispersion of activities over the country, with project sites not necessarily being chosen based on cost-effectiveness considerations.

In neither case however the evaluation team was able to provide definitive examples of cost-effectiveness. The issue faced by the evaluation team in Viet Nam and elsewhere was how to measure cost effectiveness for the whole FAO programme when valuation and attribution of effects is so difficult to do. The project reporting in terms of outcomes and impacts and the relationship of benefits-to-costs for project activities was not sufficient to actually allow the evaluation team to calculate if activities were cost-effective. This requires further attention to project documents and the monitoring of activities to enable assessment of outcomes, impacts and cost-effectiveness.

Effectiveness of individual country programmes

- Achievements in terms of outputs and outcomes, including:
 - development of effective national policies, preparedness measures, communication and public awareness campaigns, surveillance systems, laboratory capacities and contingency plans to deal with the disease;
 - new or strengthened institutional frameworks, organizational structures and processes, as well as knowledge, skills and competences acquired resulting in improvements in the performance of public and private veterinary services; and,
 - enhanced preparedness and response capacities of the poultry sector to deal with the risk of HPAI outbreaks, and of other animal diseases

There is a high level of respect from DAH/MARD and donors for FAO's emergency response support and coordination in the emergency phase from 2004 -2008. FAO has a good working relationship with DAH, and advice from FAO is usually heeded, although it apparently was not for some major issues, such as a compensation policy, in which FAO advocated a 100% scheme.

DAH/MARD are generally appreciative of the more recent response, but the major donors (WB and USAID) are concerned with slowness of the approval processes with the USAID and VAHIP projects. There is also a perceived lack of clarity on which approaches should be advocated for future responses to HPAI in Viet Nam. This may be related to the difficulties

associated with aspects of the current response of the GoV. First, sustainability of vaccination is an issue, which is draining financial and staff resources. Secondly, other measures being advocated, (i.e, risk-analysis, biosecurity, poultry sector restructuring, etc.) are difficult to implement in the short-term and will not produce instant results.

FAO has made substantial contributions to HPAI preparedness and responses in Viet Nam, including contributions to policy development, institutional strengthening and capacity development. The evaluation team qualifies this by saying that a) the FAO programmes have been generally supportive and strategic, with the DAH, principally in the front line implementing activities of disease control, and b) given the continued limited understanding of the epidemiology of the disease, it is difficult to directly attribute a cause effect relationship between actions taken and the current apparent reduction in HPAI incidence.

The number of outbreaks in the winter peak periods has fallen dramatically in the period 2006-2009, when compared with 2004 and 2005. Comprehensive vaccination commenced in December 2005. Despite the HPAI control programme since 2005, the proportion of outbreaks outside the peak winter period has apparently increased substantially, and the reason for this, if a real phenomenon, is not understood. This change in pattern, if it is indeed that, given the various confounding factors such as possible improved surveillance sensitivity, needs further investigation, based on better outbreak investigation, better understanding of the industry structure, as well as market value chain and associated epidemiological studies. Obtaining accurate information on this disease and on virus dynamics is difficult and will require an effective set of veterinary capacities and resources to undertake these investigations. Comprehensive training has been provided for cAHWs, and for District and Provincial Veterinary staff in outbreak investigation and this has been reinforced by preparation and distribution of SOPs and Job Cards to be used in the field. Sixteen SOPs and Job Cards have been developed collaboratively for outbreak investigation, sample submission, outbreak response, reporting activities, among other procedures.

The level of provincial system autonomy has made it difficult to get consistency across the 63 provinces and this probably also affects cross-province coordination in aspects such as outbreak investigation and reporting. Further advocacy from FAO for funding and support at the provincial, district and commune level to maintain a sustainable disease investigation and surveillance system will be needed.

From the relatively low skills level at present continued training and support for SDAH and DVS staff will be needed for some time to underpin a sustainable disease investigation and surveillance capability in Viet Nam.

There has been a comprehensive system of disease awareness, personal protection and biosecurity training, extended down to the grass roots level and including Provincial SDAH, DVS staff and cAHWs. The absolute number of cAHWs trained and the provision of funding for cAHWs for HPAI activities should act as incentive to improve passive and active clinical surveillance. However increased awareness has not resulted in significant behavioural changes, as manifest by outbreaks going unreported, a problem not just confined to Viet Nam. The whole question of incentives to report is extremely complex, and is one aspect that will be investigated in VAHIP.

Training for other AHW and Agriculture Extension Workers, and the development of incentives (such as more effective compensation) are probably necessary for other AHW and

farmers to report to cAHW or through the hotlines, if the sensitivity of the passive surveillance is to be improved.

Data on poultry populations, as well as on morbidity and mortality, is collected from communes and passed on to district, Province and central DAH on a monthly basis. Provinces and district offices have appreciated support from FAO and other donors in the form of computers and fax machines to facilitate data recording and reporting, but the main contribution has been building the capacity of human resources at both the provincial and central level for this process. However, good denominator data on poultry populations is an essential component of sound epidemiology and intervention programmes, and improvements in this presents an area for ongoing FAO support to DLP, which should form part of a seamless interface with DAH. Poultry census data from the General Statistics Office (GSO) is available but its accuracy, especially for sectors 3 and 4, may not be very sound. Using GSO data FAO has published a comprehensive atlas of poultry production in all the pilot provinces under UNJP, and two USAID projects covering a total of 13 provinces.

The effectiveness and efficiency of outbreak investigation, the completeness of investigation reporting, and the quality of data analysis and synthesis are difficult to assess because FAO is only given limited access to this data, but this clearly need to be kept under constant review. Outbreak investigations have been recognised as one of the weakest parts of the HPAI control system, and until this area is improved it will act as a block to understanding of and progressive control and elimination of the disease²⁶. The effectiveness of the TADinfo network across all provinces, and the ability to use its mapping and analysis functions, appears to be highly variable.

Training in field epidemiology for disease investigation and surveillance is supported through the Applied Veterinary Epidemiology Training (AVET) programme (modelled on FETPV type training). Nominal epidemiology units are set up in DAH and Regional offices. This activity potentially provides the basis for capacity building for a broader disease base than just HPAI. Furthermore, epidemiology groups in DAH have mainly focused on data collection from investigations and surveillance, but have undertaken limited analysis and synthesis of data collected.

The level of epidemiology expertise and experience in DAH and SDAH in the provinces will make it difficult to get effective mentoring for the A-Vet (FETPV) trainees in the short term. The Oxford University Clinical Research Unit in HCM City indicated its interest in assisting with mentoring for epidemiology training. FAO clearly needs to take a much more pro-active and aggressive approach to considering how epidemiology capacity can be enhanced in the country.

The comprehensive vaccination programme did incorporate post vaccination monitoring, as per FAO/OIE recommendations. The system was implemented by DAH and it monitors the effectiveness of the vaccine in field use (including vaccine variability, cold chain, vaccination protocol and techniques). But monitoring is selective (good farms which are tested at the optimal time). A system of post vaccination monitoring looking at the overall level of antibody (as a surrogate for population immunity) in all sectors of the poultry population is needed to guide planning decisions on vaccination policy (e.g. the level of antibody cover

²⁶ See consultancy reports from Les Sims (with Taylor in 2007 and in October 2009).

across provinces, in ducks, layer flocks etc.). This has been introduced in VAHIP provinces and has had moderate uptake with better quality information available from some provinces.

An expanded network of paid cAHWs now conducts active clinical surveillance in communes as part of their duties, which should enhance case investigation in chicken flocks. However active clinical surveillance in duck flocks is problematic, due to the low sensitivity of clinical assessment in ducks. Targeted virological surveillance in ducks will be necessary and is underway in the GETS project. Innovative approaches based on findings from FAO/DAH surveillance projects, but which also evaluate data from other projects (such as those of NZAID and ACIAR), should be considered to improve sensitivity of the active H5N1 infection surveillance in ducks.

The competency and skills of the veterinary services need to be further reinforced, particularly at the local level, and particularly in conducting outbreak investigations that include comprehensive tracing to ascertain source of infection and potential spread of infection to other districts and provinces but this is difficult to assess because FAO is only given limited access to this data. One critical factor is the lack of legislation regarding veterinary services and control of supply of drugs and vaccines to livestock. FAO has provided support for legislation review but this will require legislative changes that are likely to take some time.

From data on the level of vaccination coverage and variation between provinces it appears that the national vaccination programme is not being consistently applied in all provinces. Informal information indicates that coverage in small chicken flocks is reduced and there is, or is proposed to be, more effort on vaccination of ducks with better vaccination protocols for ducks, especially grazing ducks. The USAID funded FAO/DAH GETS Project is one project that might provide background evidence to support a transition from a very expensive mass vaccination programme to a more targeted vaccination approach. The project also has a component on assessing cost-effectiveness and impacts of these approaches, and will have close links with MARD in the monitoring and evaluation process. The project has a complex design and a lot of effort has gone into selection of target provinces. They are pilot provinces, and there is some risk that the virus dynamics in poultry systems of the trial provinces may differ from other provinces, and these variations may present different challenge pressure on vaccinated flocks.

There are other ongoing research studies undertaken collaboratively by NCVD, RAHO and NIVR laboratories with other partners (eg NZAID and AUSAID projects) looking at duck vaccination and its role in HPAI control in Viet Nam. It will be important that FAO/DAH also consider information from all these projects when going through the process of modifying the vaccine campaign in Viet Nam.

The laboratory diagnostic capacity for HPAI has been greatly enhanced and has been well supported by FAO and partners. This has been in terms of improved facilities with good biosecurity and biosafety practices, equipment, training support and introduction of standardised SOPs, PCR equipment and PCR reagents in the national laboratory (NCVD), in 6 RAHO laboratories and 2 NIVR laboratories. The table below provides a wide geographic spread throughout Viet Nam.

Activities	Outputs	Implementation in 200X				
		6	7	8	9	10
Lab designing and supply essential equipment	Improvement of lab facility and work flow with installment of essential equipment	x	x			
Laboratory techniques	Introduction of real-time PCR for H5N1 diagnosis	x				
	Preparation and revision of SOP for H5N1 diagnosis	x	x	x	x	x
	Preparation and revision of SOP for differential diagnosis		x		x	x
	On-site trainings for total of 44 staff at all 9 animal health laboratories with continuous follow-ups	x	x	x	x	x
Quality control	Introduction of internal quality control	x				
	Proficiency test (4 th round completed with good results)	x	x	x	x	x
Biosafety	Installation of Biosafety cabinet class II installed	x				
	Preparation of Biosafety guideline and manual		x		x	x



Networking of the various central and regional laboratories appears sound and there is an ongoing process of inter-laboratory proficiency testing nationally (NCVD organised) and from international panels for NCVD and RAHO 6 (organised by AAHL in Australia). There is regular submission of viruses to international influenza reference laboratories for virus characterization. Regular laboratory assessment is carried out of the efficacy of current vaccine strains against recent H5N1 viruses, including molecular epidemiology studies. A new activity supported via the VAHIP project is implementing a quality management system in all DAH labs and associated provincial labs.

The next challenge is to broaden the role of veterinary laboratories into true diagnostic laboratories, not just laboratories testing for HPAI, to build on the capacity developed from the H5N1 epidemic. This includes funding for testing, training and development for other significant livestock and zoonotic diseases and enhancing disciplines other than just virology (eg. bacteriology, pathology, parasitology). Two laboratories (NCVD and RAHO6) have BSL3 equivalent facilities and are approved for HPAI virus isolation. The cost of running and maintenance of such facilities is high. Capacity building would be enhanced by not building further BSL3 capacity and using funds saved in general diagnostic capacity building.

Advocacy by FAO for internal GoV funding to support ongoing laboratory capacity for disease diagnosis rather than just HPAI is recommended.

The NCVD, RAHO and NIVR laboratories are involved with various field research studies relating to H5N1, H1N1 in Viet Nam with other partners (eg NZAID and AUSAID projects with RAHO 7; Oxford University Clinical Research Unit with RAHO 6). It was not clear how effectively information was shared from these projects with other members of the laboratory network or with FAO but it is important that information is shared to build up and strengthen the laboratory network. .

Project work relating to “industry restructuring” needs strong involvement of DLP, with support from FAO, but there is limited funding available in the HPAI project budgets. The involvement of DLP has been late in starting but has recently been boosted by the awarding of the WB funded LIFSAP project with the objective of improving the competitiveness of household-based livestock producers by addressing production, food safety and environment risks in livestock product supply chains in selected provinces. FAO facilitated collaboration and cooperation between DAH and DLP on the development of the poultry (and soon pig) production atlas. FAO has also facilitated collaboration between DAH and DLP in matters relating to biosecurity, through the Biosecurity Working Group, and the introduction of market value chains approaches to both departments. These collaborations should all have sustainable benefits for poultry production in the country.

Several acting CTAs, and other international technical staff movements, as well as the heavy administrative workload, has meant that there is reduced “thinking-time” for strategic project planning and analysis by senior technical staff. However, the team was informed that considerable strategic project planning support has been provided by short term consultants over the past 5 years. Some of these consultants have developed a good working relationship with DAH and other parts of FAO, which will be very valuable for the incumbent CTA when tabling strategic and policy issues for discussion.

- Extent to which improvements in these areas have contributed to increasing national capacities to prevent and control future outbreaks of HPAI and of other transboundary and zoonotic animal diseases

Clearly there have been some spillovers to the capacity to detect and respond to other diseases, but given the apparent GoV reluctance to divert attention from HPAI, and the specificity of much of the funding to HPAI, it must be emphasised that this capacity is probably quite weak.

Effectiveness of global/regional programmes at country level, in particular the extent to which the:

- GLEWS information, analysis and technical expertise have improved disease response and understanding of HPAI epidemiology

Reports are regularly made to GLEWS and the regional and international data reported via GLEWS is scrutinised by the Technical Unit on a regular basis and considered valuable.

- OFFLU scientific data exchange and technical expertise have improved national capacity for laboratory diagnostic, vaccine efficacy and development

Selected viruses are regularly sent to international reference laboratories (CDC, AAHL and HKU before 2008, since then viruses have been sent from NCVD to CDC and AAHL) for genetic and antigenic characterization and phylogenetic analysis.

- Regional networks have contributed to national capacity building and information-sharing

The NCVD and other Vietnamese laboratories are members of, and have participated in, the Southeast Asia Regional HPAI Surveillance and Laboratory Network, and they will be involved in the coordinated laboratory proficiency testing programmes.

Sustainability and Impacts

- The *likely* effect of FAO's work on the institutional, organizational and human capacity of affected and at-risk countries beyond HPAI

There are undoubtedly areas of impact of FAO's contributions that will be sustained over time, providing that effective follow-up institutional support from GoV, and appropriate levels of funding, are made available. It is difficult to evaluate to what extent the work done so far has contributed to a reduction in the prevalence and circulation of the virus, but it seems highly likely that it has contributed.

- Sustainability of the strengthening taking place in public and private veterinary services

There is an apparent trajectory of veterinary services in the right direction, and the FAO programme is undoubtedly contributing to the steady improvements. However the broad needs for inputs to serve this goal extend way beyond the scope of HPAI preparedness and response mechanisms contained within FAO's projects, and so the sustainability of any strengthening taking place is fragile unless other supportive measures are taken. The need for on going support for strengthening the capacity of the DAH in the field is particularly crucial.

- Extent to which disease surveillance and control interventions have likely contributed to reducing HPAI prevalence

Due to the lack of a full understanding of the dynamics of HPAI in Viet Nam, and only a relatively superficial understanding of the risk factors, while the investment in surveillance and control measures have almost certainly benefited the country, it is impossible for the evaluation team to specify how, and to what extent, they have influenced the apparent reduced prevalence of HPAI. It is recognised that considerable efforts were and are being made in current FAO projects via supply chain analysis activities and case studies on the meat trader system as well as monitoring the movements of mobile duck flocks to identify these linkages.

- Likely macro-economic, livelihoods and food security impact of FAO's strategy and response to HPAI

Given that HPAI is endemic in Viet Nam, and that Viet Nam has many other unaddressed constraints to its poultry enterprises at both industry and smallholder levels, FAO is arguably not reaping the macro-economic and livelihood returns that it could by taking a broader, more encompassing and development-orientated approach to livestock production and health, which incorporate the specific disease emergency elements of donor interest as specific components. The evaluation team also considers that FAO has a role to engage with the industry restructuring programme at a higher level, given the important role of sectors 3 and 4 to the livelihoods of so many rural Vietnamese people, and the potential drastic impacts that sudden restrictions on their capacity to have poultry in their inventory of livelihoods strategies might have.

Partnerships

- The clarity of FAO's role, based on its comparative advantages and capacities, as well as the degree of complementarity, co-ordination and collaboration with regional and national partners

Generally FAO has a clear role as the lead UN institution engaged in HPAI preparedness and response issues. It has collaborated with several local partners, chiefly DAH and DLP from the GoV. The FAO HPAI activities have so far not been part of the One UN programme of work. In 2010 efforts will be made to incorporate the regional strategy into the PCG 11 of the One UN, and finalise an Animal Health National Medium Term Priority Plan (AH-NMTPP) for Viet Nam in consultation with Government authorities.

- FAO's contribution to the preparation of partners' HPAI regional and national strategies

FAO's contributions to partners' strategies is arguably less now in Viet Nam than in other countries visited by the evaluation team, possibly because there are so many actors engaged in supporting Viet Nam's preparedness and responses, and because of the complexities of the divested responsibilities of the provinces.

In conclusion, the evaluation team have summarized the strengths and weaknesses of the FAO avian influenza programme in Viet Nam as follows:

Strengths	Weaknesses
High level of respect from DAH/MARD and donors for FAO's emergency response support and coordination in the emergency phase from 2004 -2008	DAH/MARD generally appreciative of the response but some key stakeholders are concerned with slowness of the processes with the USAID and the World Bank's VAHIP projects (although the latter is not managed by the FAO CTA).
The number of outbreaks in the winter peak periods has fallen dramatically in 2006-2009 compared with 2004 and 2005. Comprehensive vaccination commenced in December 2005.	Despite the vaccination program since 2005 the proportion of outbreaks outside the peak winter period has increased substantially and the reason for this is not really understood. Needs good outbreak investigation , industry structure, market value chain and epidemiology studies to unravel. Repeated requests by FAO to be involved with outbreak investigations have not been successful.
There is a comprehensive national plan for avian and human influenza called the Viet Nam Integrated National Operational Programme for Avian and Human Influenza 2006-2010 (OPI also referred to as the Green Book). This has been complemented with FAO's Country Strategy and Work Plan for 2007-2010 to describe FAO's continuing collaboration with GoV and other implementing partners in meeting objectives outlined in OPI. FAO will be a partner in the review and preparation of the revision of the OPI to	Good relation with DAH and advice from FAO is usually heeded but was initially not heeded for the major issue of compensation policy (although they did increase compensation after the FAO review) A system weakness is present in the lack of registration for veterinarians and limited control of drug and vaccine supply to livestock industries. FAO supported legislation review and draft legislation has been prepared. However, legislative change in any field is slow in Viet Nam, with an approximate 2 year lead time.

cover the period after 2011-2015 and has provided 11 major recommendations for this review.	
Comprehensive training for cAHW and District and Provincial Veterinary staff in disease outbreak investigations was provided and was reinforced by distribution of and collaboratively developed SOPs and Job Cards for outbreak investigation, sample submission, outbreak response, reporting activities, etc.	<p>The level of provincial system autonomy has made it difficult to get consistency across the 63 provinces and this probably affects consistency of these activities and cross-province coordination in aspects like outbreak investigation and reporting. Further advocacy for funding and support at the provincial, district and commune level from FAO may be needed.</p> <p>Continued training and support for DVO staff will be needed to underpin a sustainable disease investigation and surveillance capability in Viet Nam.</p>
<p>There has been a comprehensive system of disease awareness, personal protection and biosecurity training extended down to the grass roots level and including District Veterinary staff and cAHW in this.</p> <p>The absolute number of cAHW trained and provision of funding for cAHW for HPAI activities should act as incentive to improve passive and active clinical surveillance.</p>	<p>Awareness has not had major impact on behavioural change when outbreaks are not reported, but this is complicated by other disincentives. This challenge has been faced by all UN agencies in Viet Nam. FAO has provided technical support to UNICEF, Abt and AED for behaviour change/awareness related findings during field mission.</p> <p>Training for other AHW and Agriculture Extension Workers and incentives like more effective compensation are probably necessary for other AHW and farmers to report to cAHW or via hotlines and improve the sensitivity of the passive surveillance.</p>
<p>Comprehensive collection of data on poultry population, morbidity and mortality from commune to district to Province to DAH is undertaken on a monthly basis.</p> <p>Provinces and district offices have appreciated support in the form of computers and fax machines from FAO and donors to facilitate data recording and reporting.</p>	<p>Effectiveness and efficiency of outbreak investigation, completeness of investigation reporting, then data analysis and synthesis needs to be kept under review.</p> <p>The effectiveness of the TADinfo network across all provinces and ability to use mapping and analysis functions appears very variable.</p>
Support training in field epidemiology for disease investigation and surveillance is supported through AVET programme modelled on FETPV type training. (Nominal epidemiology units are set up in	<p>Epidemiology groups in DAH have mainly focused on data collection from investigations and surveillance but limited analysis and synthesis is conducted.</p> <p>The level of epidemiology expertise and</p>

DAH and Regional offices). This activity supports capacity building for a broader base than HPAI.	experience will make it difficult to get effective mentoring for the A-Vet (FETPV) trainees in the short term. (Oxford University Clinical Research Unit in HCM City indicated interest to assist with mentoring for epidemiology training). FAO needs to take an ongoing role in enhancing epidemiology training.
<p>The comprehensive vaccination programme did incorporate post vaccinal monitoring as per FAO/OIE recommendations. The system used monitors effectiveness of the vaccine in field use (including vaccine variability, cold chain, vaccination protocol and techniques).</p> <p>Marked improvement in cold chain for vaccine delivery to District level and commune level in the GETS project.</p>	But monitoring is selective (good farms tested at optimal time), A system of post vaccination monitoring looking at the overall level of antibody in all sectors of the poultry population is needed to guide planning decisions on vaccination policy (e.g. level of antibody cover across provinces, in ducks, layer flocks etc.)
Increased network of paid cAHW now conduct active clinical surveillance in communes as part of their duties which should enhance case investigation in chicken flocks.	Active clinical surveillance in duck flocks is problematic due to low sensitivity and for further improvement of detection and control targeted virological surveillance in ducks will be necessary. Innovative approaches based on findings from FAO/DAH surveillance projects but also examining data from other projects (like NZAID and ACIAR) should be considered to improve sensitivity of the active H5N1 infection surveillance in ducks.
<p>The FAO/DAH GETS Project is a positive approach to move from a very expensive mass vaccination program to a more targeted vaccination approach as a step towards long-term removal of vaccination</p> <p>It also has a solid focus on assessing cost-effectiveness and impacts of these approaches and will have close links with MARD in the monitoring and evaluation.</p>	The risk may be that the virus circulation in poultry systems in the trial provinces may have different dynamics and interactions than other regions that alter the challenge pressure on vaccinated flocks. This was recognized in the design of the GETS project and it is why the provinces were chosen specifically to represent different regions such as red river delta, Mekong delta and central region But it will still needs to be considered in moving to the next stage of withdrawal of vaccination.
The laboratory diagnostic capacity for HPAI has been greatly enhanced and has been well supported by FAO and partners in terms of improved facilities with good biosecurity and biosafety practices, equipment, training support and	The next challenge is to broaden the role of veterinary laboratories as true diagnostic labs not just testing laboratories for HPAI to build on the capacity developed from the H5N1 epidemic. This includes funding for testing, training and development for other

<p>introduction of standardised SOP, PCR equipment and PCR reagents in the national laboratory (NCVD), 6 RAHO laboratories and 2 NIVR laboratories with a wide geographic spread throughout Viet Nam.</p> <p>Networking of the various central and regional laboratories is sound and there is an ongoing process of inter-laboratory proficiency testing nationally (NCVD organised) and from international panels for NCVD and RAHO#6 (AAHL organised)</p> <p>Regular submission of viruses to international influenza reference laboratories for virus characterization</p> <p>Regular laboratory assessment of efficacy of current vaccine strains against recent H5N1 viruses and molecular epidemiology studies are conducted.</p>	<p>significant livestock and zoonotic diseases and enhancing disciplines other than just virology (eg. bacteriology, pathology, parasitology).</p> <p>Two labs (NCVD and RAHO#6) have BSL3 equivalent facilities and are approved for HPAI virus isolation. Cost of running and maintenance of such facilities is high. Capacity building would be enhanced by not building further BSL3 capacity and using funds saved in general diagnostic capacity building.</p> <p>Advocacy by FAO for internal GoV funding to support ongoing laboratory capacity for disease diagnosis rather than just HPAI is recommended.</p> <p>There should be more sharing of information within the network and FAO on H5N1, H1N1 research studies undertaken collaboratively by NCVD, RAHO and NIVR laboratories with other partners (eg NZAID and AUSAID projects with RAHO #7; Oxford Univ. Clinical Research Unit with RAHO #6) to build up and strengthen the network.</p>
	<p>Project work relating to “industry restructuring” needs strong input from DLP but limited funding was available in the FAO project budgets. Involvement of DLP has been late in starting but FAO has recently facilitated collaboration and cooperation between DAH and DLP on matters relating to poultry demographics, biosecurity and market value chain approaches. These links have been recommended in the submission to the Green Book, and are part of the LIFSAP and VAHIP projects.</p>
	<p>Several changes of Team Leader and increased workload on other international technical staff plus increased administrative workload has meant reduced “thinking-time” for strategic project planning and analysis by senior technical staff. Strategic thinking has been an on- going activity for a range of consultants brought in to assist the CTA previously.</p>

Based on the above, the evaluation team recommends nine priority actions to FAO. Some of these recommendations complement and/or supplement advice that has been provided previously by FAO to MARD or DAH (and that has not as yet been acted upon), or has also been recommended in the current FAO submission for the review of the Green Book. Pilot studies relating to evaluation of some of the recommendations have been commenced as part of the VAHIP activities.

1. Continue to support and advocate for DAH to improve the consistency and quality of outbreak investigations at district and provincial levels with more effort in tracing to identify source and spread of outbreaks between district and more cross- province investigation and reporting. In this regard, FAO should advocate at senior country level with counterparts in the GoV that FAO ECTAD staff are permitted to be involved in the M&E of the quality and capacity of disease outbreak investigations.
2. Support the capacity development of epidemiology units to analyse and synthesise surveillance data so that it contributes in a transparent manner to planning of further surveillance activities, and provide advice on management and control of HPAI based on risk analysis.
3. Consider means to increase the understanding of market value chains within the country and cross-border to identifying risks and critical control points that can be targets for practical and sustainable improvements in biosecurity.
4. Explore innovative approaches, including those promoted under VAHIP, to improve the levels of adoption of biosecurity and good poultry management practices by proactive engagement with the various representatives of the poultry industry private sector.
5. Advocate the development of a system of post vaccination monitoring that determines the overall level of immunity in all sectors of the poultry population, not just in “model farms”, as a more robust guide to planning decisions on future vaccination policy.
6. Support the interface between DAH and DLP on developing quality poultry demography data, and greater understanding of the diverse market value chains in the country. It should also advocate and support involvement of DLP with DAH in considering industry restructuring that also considers the needs of commercial and smallholder producers dependent on poultry enterprises for their livelihoods.
7. Consider improving the sensitivity of the active H5N1 infection surveillance in ducks by innovative approaches based on findings from FAO/DAH surveillance projects and also other projects (like those funded by NZAID and ACIAR)
8. Consider improving the sensitivity of the passive surveillance system by continued awareness training for other AHW and Agriculture Extension Workers (AEW) and examine incentives for AHW/AEW and farmers to report to cAHW or via hotlines.
9. Advocate to GoV to support and fund ongoing laboratory capacity for broader disease diagnosis for TADs, emerging zoonotic diseases and differential diagnosis of other endemic diseases, rather than just HPAI.

Annex 1. List of People Met

FAO

Mr. Andrew Speedy, FAO R,
Dr. Santanu.K. Bandyopadhyay, Team Leader, AI Programme,
Mr. Andrew Bisson, Deputy Team Leader & Technical Advisor,
Dr. John Weaver, International Chief Technical Advisor,
Dr. Warren Henry, International Veterinary Consultant,
Dr. Ken Inui, Laboratory Expert,
Dr. Aurelie Brioudes, AI Technical Assistant (Epidemiology).

Government

Mr. Diep Kinh Tan, Vice Minister, Ministry of Agriculture & Rural Development,
Dr. Hoang Van Nam, Deputy Director General, Deptt. Of Animal Health,
Dr. Nguyen Thu Thuy, Chief of Planning Division, Deptt. Of Animal Health,
Dr. Mai Van Hiep, Deputy Director General, DAH, Southern Provinces,

Dr. Hoang Kim Giao, Director, Deptt. Of Livestock Production,
Dr. Trang Trong Trung, Officer, DLP,
Ms. Lan, Head of Poultry Production,
Ms. Nguyen Thi Tuyet Hoa, ICD Deputy Director General,
Mr. Nguyen Huu Hung, Project Officer, Pandemic Preparedness, Ministry of Health.

Dr. Hieu, Director AH Nam Dinh Province,
Dr. Hien, Sub Head, AH Nam

Dr. Lee Tan Huu, Director AH, Ben Tre Province,
Dr. Nguyen Van Be, Vice Director, Ben Tre Province,
Dr. Phan Trung Nghia, Head of Epidemiology,,
Dr. Ms. Le Ngoc Thuan, Project Coordinator,
Mr. Phan Hoang Tien, Vice Chairman, Lung Hoa Commune.

International Agencies & NGO's

Mr. Jonathan Ross, Director, Office of Health, USAID,
Dr. Kim Thuy Oanh, Public Health Specialist, USAID,

Mr. David Payne, PAHI (Partnership for Avian & Human Influenza),
Mr. Bui Van Truong, Technical Director, Abt Associates Inc.

Associations

Dr. Tran Cong Xuan, Chairman Viet Nam Poultry Association,
Dr. Nguyen Thien, Vice Chairman Viet Nam Poultry Association,
Dr. Pham Sy Lang,
Ms. Phan Thi Thuy.

Private Sector

Mr. Ky Tran, Sector 2 farmer 10,000 layer birds in cages, Vu-Ban District, Nam Dinh.
One Sector 3 duck and one chicken farm at Ben Trey' several sector 4 holders.

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Annex 3: Assessment of FAO Avian Influenza Projects in Viet Nam

TCP/VIE/3003 “Emergency assistance for the control of avian influenza”

The primary objectives of this project was to support efforts aiming at an immediate control of avian influenza outbreaks in all poultry species so as to stop the transmission of the disease from poultry to humans. After the first wave of outbreaks the focus of the activities shifted towards more technical assistance (studies, and training) for the mid term recovery and for the prevention of further outbreaks. A budget revision was made and the specific objectives of the assistance became: improved epidemiology capacity of key veterinary staff, improved information flow and reporting system, pilot surveillances for large farms, and the development of a contingency plan for HPAI.

The project was implemented by DAH from February 2004 to end of January 2006. To smoothly implement the project, seven international and seven national consultants were hired to assist in carrying out the HPAI control activities. The collaboration between FAO and other main stakeholders as MARD, other UN agencies as the WHO and other institutions as the WB was reportedly good. Two main collaborations were signed and implemented during the project duration with the World Bank-funded AIERP project and with the Joint UN-Government Programme (OSRO/VIE/501/UNJ).

In accordance with the project objectives and strategy, the following outputs were achieved in the first phase (February 2004 to August 2004):

- Production of awareness material (booklets and leaflets) in collaboration with WHO
- Improvement of the national HPAI surveillance strategy.
- Improvement of the national AI reporting system.
- In depth assessment of laboratory equipment needs.
- Technical assistance to the epidemiology division of DAH.

In the second phase after the budget revision (September 2004 to January 2006), the following outputs were achieved:

- Pilot surveillance study for commercial farms conducted.
- Biosecurity in poultry farms evaluated.
- Emergency contingency plan developed.
- TAD Info introduced to Viet Nam.

Epidemiology training was carried out for a total of 95 participants in three locations: Hanoi (17- 21 May and 23-27 May 2005), Danang (30 May – 3 June 2005) and Ho Chi Minh City (6-10 June 2005). Training contents included outbreak control and investigation, principles of surveillance, data collection and data management inclusive one field visit for practical exercises. Four workshops for contingency plans have been held in 4 provinces (Bac Ninh, Ha Tay, Long An and Tien Giang). During the visit (31 May to 10 June 2005) of two Chinese vaccine experts workshops to introduce the HPAI vaccine and results of vaccination in China were carried out in Ho Chi Minh City (40 participants from the SDAHs and RVCs) and Hanoi (41 participants). The Chinese mission also visited two provinces (Tien Giang and Ha Tay) to assess the field situation in Viet Nam. This mission was said to be instrumental to the Government’s decision to step into a mass vaccination campaign that followed few days after.

The project terminal report contains a number of recommendations that were followed up in successive projects. Also, a few lessons learnt were identified which were reportedly incorporated in the FAO HPAI Country Strategy 2007-2010.

Japanese-funded projects: OSRO/RAS/401/JPN “The Japan/FAO Joint Emergency Programme for the Control of Avian Influenza in Cambodia, Indonesia, Laos and Viet Nam” and OSRO/RAS/602/JPN “Strengthening the Control and Prevention of HPAI and enhancing public awareness”

Japan moved very quickly after the initial outbreaks to support HPAI-related control activities in Southeast Asia, and Viet Nam was a major beneficiary. The first project (401) supported a series of strategic field studies and investigations, including:

- Field training in reporting and disease investigation;
- Pilot study on serological surveillance;
- Analysis of spatial and temporal epidemic patterns of HPAI;
- Biosecurity surveillance for village produced poultry;
- Evaluation of laboratory procedures and standards;
- Training of VRL staff;
- Evaluation of veterinary services;
- Biosecurity evaluation for poultry farms; and,
- Study for the establishment of a national strategy for the rehabilitation of farmers.

The project was implemented through a Technical Support Unit, coordinating all HPAI activities in the country (including FAO’s TCP/VIE/3003 and the World Bank’s AIEVC project) in collaboration with DAH. The project employed 6 short-term international consultants. A series of training courses on field reporting and disease investigation were held in April-May 2005 and two staff from the virus reference laboratory were sent to the FAO/OIE reference laboratory in Geelong, Australia for hands-on training in virus manipulation in November 2005.

Project activities were delayed until information and detailed technical justifications were provided regarding the budget revision and allocation of funds. However, the no-cost extension granted by the Donor enabled all activities to be satisfactorily completed. The activities initiated through this project continue with funding provided by Japan and USAID.

The second project (602) was designed to strengthen the capacity of field veterinary services on strategic surveillance and proper implementation of related policies such as stamping out and vaccination, as well as to enhance public awareness. As both FAO and OIE were benefiting from Japanese Trust Fund support, the project was to be implemented in close cooperation with that organization. It focused on provincial and district veterinary services as well as enhancing village animal health workers’ and general public awareness about safe handling of backyard poultry. It included provision of technical support, training, procurement and distribution of inputs, laboratory networking with other agencies and strengthening field coordination.

Activities were included in the following areas:

- Preventing Incursion of Disease: These activities were specifically aimed at quarantine and movement control. Training was provided, protective equipment (PPE) and disinfectants were supplied; in addition operational support was provided to the quarantine stations in three northern provinces;
- Emergency Preparedness & Response: An international consultant advised on emergency preparedness. Workshops were arranged to provide information on AI preparedness and response to Avian Influenza Steering Committees at province and district levels of the four pilot provinces (Ben Tre, Phu Tho, Vinh Long, Nam Dinh);
- Endemic Disease Control: Training was provided to veterinary staff, paravets and farmerse. This included disease outbreak investigations, active surveillance, bio-security, IT, and

Training-of-trainers (ToT). The field surveillance model – ‘CADS’ (Community Active Disease Surveillance) – was developed and piloted. The project also supported operational costs for investigation of suspect outbreaks that were reported to veterinary authorities. A bio-security pilot study was conducted in Nam Dinh province, farmers received training and equipment. Bi-annual national mass AI vaccination campaigns were ongoing throughout the project cycle, and both pre-vaccination & post-vaccination surveillance components were supported. The project assisted with OIE’s training on “HPAI Surveillance for Field Veterinarians and Paraprofessionals”;

- **Applied Research:** The Royal Veterinary College London undertook several ‘rapid rural appraisals’ (RRA) to review the patterns of farm gate trade; an expert conducted a mission to review the progress of Influenza A/H5N1 vaccine production for poultry in Viet Nam;
- **Socio-economic Aspects of Disease Control and Production Systems:** A pilot system of electronic tagging was designed by Royal Veterinary College London in collaboration with local consultants. However this could not be completed;
- **Public Awareness and Communications:** A communications consultant provided regular coordination with HPAI stakeholders, communication materials were produced and updates on latest AI outbreaks were disseminated. The national toll-free Hotlines at DAH and in 4 pilot provinces were supported;
- **Strategy Development, National Coordination and Programme Management:** Technical and operations staff posts were supported, at both the FAO Representation and in DAH. Two delegates from the MARD were supported to participate in the ASEM Workshop on Avian Influenza Control;
- **Policy and Legislation:** A manual on HPAI prevention and control was drafted and distributed nationwide.

The project was a key part of FAO’s early contribution to HPAI control in Viet Nam, with its effects probably most evident in the 4 pilot provinces. Communication and information exchange with OIE were said to be inadequate although the evaluation could not reliably determine why. Originally, the project was to have focused on 10 pilot provinces, but the level of inputs was insufficient which led to a decision with the Government to focus on four pilot provinces only.

USAID-funded projects: OSRO/RAS/505/USA “Immediate assistance for strengthening community-based early warning and early reaction to avian influenza outbreaks in Cambodia, Indonesia, Lao PDR, PR China and Viet Nam”; OSRO/RAS/604/USA “Immediate Technical Assistance to Strengthen Emergency Preparedness for Highly Pathogenic Avian Influenza (HPAI)” and OSRO/VIE/801/USA “Gathering Evidence for a Transitional Strategy for HPAI H5N1 Vaccination in Viet Nam (GETS project)”

These projects represent the largest donor contribution to FAO’s HPAI programme in Viet Nam. The first project focused on building capacity for community-based disease surveillance to support the disease control programmes. Training activities for provincial and district staff were undertaken in order to recognize and report the disease in a timely manner, carry out disease outbreak investigation, collect specimens and disease history information, submit specimens to laboratories, and undertake measures necessary to prevent the disease from spreading. Public awareness and training activities were implemented to ensure that poultry premises were adequately disinfected and culling operations were conducted in an environmentally safe manner.

A major issue during implementation was the coordination between the large number of stakeholders and international agencies working on HPAI. The situation eventually improved and the improved

cooperation within the national HPAI framework has continued in the follow up phase (OSRO/RAS/604/USA). The project carried out the following activities:

- TADinfo software was adapted and is now set up as a web-based reporting system for Viet Nam;
- A training video for vaccinators was produced in Viet Nameese with English subtitles which was also adapted for use in other countries, including in Africa;
- In order to test the efficacy of the use of heterogonous vaccine on day-old ducks in field conditions in Viet Nam, a field trial was carried out using a novel timing for vaccination versus current two rounds injections to provide adequate immunity against H5N1;
- FAO supported the Government of Viet Nam in its AI vaccination strategy and continuous risk assessment. Further technical assistance for analysis of the data from vaccination and post-vaccination surveillance was also provided;
- Socio-economic technical backstopping provided from FAO HQ on gender and rural livelihoods was provided into an ongoing market chains evaluation study.

The second project (604) is still under implementation. The project continues to support much of the FAO Avian Influenza Programme in Viet Nam, including staff positions. As with other projects, many activities are focused on pilot provinces, which included Thai Nguyen, Quang Binh, Quang Ngai, Vinh Long, Ben Tre, Hau Giang, Tra Vinh in the period March-August 2009, and Hung Yen, Ha Nam, Quang Tri, Kien Giang and Can Tho from Sept. 2009-Sept. 2010.

To date, the project has supported a wide variety of activities related to animal surveillance and response, and policy support to Government. Disease surveillance, investigation and reporting activities were supported by providing equipment and training for improved communication of information from the field and database development for transmission, collation and analysis of disease information from field and laboratory sources. The project reviewed the national vaccination strategy and concluded that surveillance data reconfirmed that the vaccination policy has met meaningful targets and supported effective control of HPAI. However, virus surveillance demonstrated that the AI virus is circulating widely throughout the national flock. The review made recommendations that have been incorporated into the national plan for 2009-2010.

HPAI vaccination and outbreak response has been strengthened by training vaccinators, assisting in plans for national vaccine production, developing policy on users paying for vaccination and in assisting with the development of Standard Operating Procedures (SOPs), to improve the rigour of field activities. The project has conducted a number of studies, including on vaccine efficacy, an epidemiological model for H5 N1 transmission dynamics, cross-border trade and cold chain appraisal.

Government staff (diagnosticians, heads of laboratory, virologists, epidemiologists and researchers have enhanced capacity from various training activities and meetings during the implementation of the project. The upgraded database systems, IT and communications equipment and other laboratory consumables and technical assistance provided by the project have significantly contributed to a more efficient laboratories and enhanced capabilities of provincial and district offices. The supply of PPE to the users in high-risk areas has decreased the exposure to possible threat to human health. The capacity created can be correlated to an enhanced capacity of the Government to combat the threat of AI as well as other animal diseases.

HPAI control in Viet Nam still remains a daunting process. Capacity development requirements remain high at all levels, especially at provincial, district and sub-district levels. Planning of capacity building activities was compromised by the time limitations of USAID's annual cycles of funding support. HPAI prevention and control has global and national objectives that are difficult to promote to farming communities so that there is continual disappointment in community compliance with disease control initiatives, even when they are well communicated. The late signing of project document caused delays

in many activities and the timely placement of required technical consultancies for field activities became a challenge. USAID's forbearance in allowing funding to be carried over between budget cycles has alleviated some of the problems in maintaining continuity of support and permitting its support to be integrated into a country programme.

Technical training of animal health personnel, communication for improved public awareness, improved laboratory diagnostic capacity and enhanced support tools including disease reporting systems and information management, have all contributed to a much improved HPAI situation and disease control capability. However, the current situation is still of concern, as viruses continue to circulate, poultry outbreaks are sporadic but widespread, and occasional human infections are still identified.

Operating in five pilot provinces (Nam Dinh, Ninh Binh, Quang Binh, Soc Trang and Hau Giang), the two-year GETS project (OSRO/VIE/801/USA) began operations in April 2009. The USD 4 million project is intended to provide field data on several alternative targeted vaccination strategies in both high- and low-risk provinces to enable MARD to make informed choices about a targeted vaccination strategy for HPAI. If successful, such targeted vaccination strategies would lead to establishment of disease-free zones, followed by complete removal of vaccination and eventually, eradication of HPAI. Project field activities include cost-effectiveness analysis, determination of risk factors for outbreaks, policy analysis and sociological studies in each pilot province. Initial intervention strategies have been developed for each pilot province. As the project is at its early stages, assessments of its effects and impact cannot be made yet. However, there are questions as to whether information needed for establishment of the initial baseline data is actually available, and this could very much complicate the development of the envisaged vaccination strategies.

The UN Joint Programme: OSRO/VIE/501/UNJ and OSRO/VIE/701/UNJ “Strengthening the Management of Public Health Emergencies in Viet Nam – with focus on Control of Diseases with Epidemic Potential including Highly Pathogenic Avian Influenza”

The UN Joint Programme has been implemented in two phases: an initial emergency response programme (501), and a subsequent 4-year programme of capacity building support (701). The 501 project included logistical support to the first vaccination campaign (cool boxes, refrigerators, automatic syringes) in 47 provinces, support to post-vaccination surveillance, and support to research on different vaccination protocols in ducks.

The 701 project has been managed to be largely complimentary with the Viet Nam component of the 604/USA project. It is part of an overall UN programme with a total budget of USD 16.2 million. The programme is funded by Finland, Australia, Canada, Luxembourg, New Zealand and Switzerland via UNDP as Administrative Agent for pooled funds, with parallel funding being provided by Japan via UNICEF, and by UNDP.

The Agriculture Component is being implemented by MARD's Department of Animal Health (DAH) and Department of Livestock Production (DLP) with technical and other support from FAO. Key activities include:

- review of the National Strategy for the prevention of highly pathogenic avian influenza (HPAI) in the agriculture sector,
- joint review of the Veterinary Ordinance by MARD DAH and FAO as a basis for developing a draft Veterinary Law, and development of draft standard operating procedures (SOPs) for rapid disease outbreak response and disposal of animal carcasses,

- provision of training and refresher courses to selected high risk provinces and border control stations on rapid response to outbreaks, vaccination cold chain system, international border control, customs, market management and border enforcement,
- provision of training and allowances to district and commune animal health workers in 10 high risk provinces for improved outbreak report and investigation,
- provision of facilities and equipment for improved reporting and outbreak investigation in 10 provinces, for the vaccination cold chain system in 27 provinces, for provincial and international quarantine border controls, and for the AI Risk Assessment Technical Working Group,
- review of the animal production and marketing regulations, and creation of a legislation database,
- enhanced mapping capacity and development of a poultry production atlas, and,
- establishment of the Biosecurity Working Group led by MARD DLP, as well as a range of field assessments and surveys conducted jointly by DLP and FAO on biosecurity practices in different types of farms as well as hatcheries.

The Joint Programme is a significant initiative bringing together key national departments and UN agencies in support of the national HPAI control strategy (Green Book), with harmonised funding from a number of bilateral donors. However, there have been considerable inefficiencies in the programme administrative structure, largely the result of the complex funding and implementing arrangements set-up, which were underestimated by the stakeholders at the time of project design. The Programme is viewed by some members of the Government and some FAO staff as a bureaucratic, with cumbersome and inefficient managerial and operational arrangements that have not been sufficiently challenged by the donors and organizations involved. A consequence of these operational issues has been the relatively slow delivery achieved and delays in project implementation.

UTF/VIE/034/VIE “Viet Nam Avian and Human Influenza Control and Preparedness Project” (VAHIP)

The World Bank –funded VAHIP project (USD 38 million, including USD 20 million IDA grant and co-funding from EC, Japan and the Government of Viet Nam) includes three components: HPAI Control and Eradication in the Agricultural Sector; Influenza Prevention and Pandemic Preparedness in the Health Sector and Integration, Coordination and Project Management. The Agricultural component, which constitutes slightly under half of the total project (USD 17.2 million), is implemented in 11 Provinces (Lang Son, Ha Tay, Thai Binh, Thanh Hoa, Ha Tinh, Thua Thien-Hue, Binh Dinh, Tay Ninh, Long An, Tien Giang, and Dong Thap). The project includes sub-components for the following areas:

1. strengthening veterinary services (needs and capacity assessment for labs undertaking HPAI testing, portable BSL-3 unit for RAHO No. 6 in Ho Chi Minh City, capacity building for animal disease reporting by CAHW in 90 districts);
2. enhanced disease control (rehabilitation of Ha Vi live poultry market near Hanoi, development of SOPs for movement between farms and slaughterhouses, pilot disease monitoring for large poultry farms, vaccination-related activities and improvement of quarantine in Long San Province on the border with China);
3. surveillance and epidemiological investigations;
4. preparing for poultry sector re-structuring (plans, development of biosecure farm models, upgrading biosecurity in selected small farms); and
5. emergency outbreak containment plans, including disinfectants, disinfection equipment, protective clothing, training, emergency contingency funds, simulation exercises, telephone hotline charges, vaccination consumables and equipment, vaccine pools, contract services to support emergency workers and vaccinators, technical assistance, and compensation funds.

FAO has recruited the Chief Technical Adviser for the project, who works from the office of the Project Management Unit.

The project has been slow in its implementation. Although implementation began in August 2007, the CTA was not on board until March 2008. Delivery has been slow; by July 2009 implementation was only 12% but most recently has ratcheted up to 38%, largely by some “big ticket” spending.

A mid-term review of the project resulted in a recommendation that FAO should implement two additional consultancies under the project: one on spatial risk and planning as part of poultry sector restructuring efforts and the other on bio-security guidelines for larger producers. This will bring the total FAO component of the project to USD 1.05 million.

OSRO/VIE/601/IRE “Emergency assistance for control of highly pathogenic avian influenza in Viet Nam”

This project, implemented from Aug. 2006-May 2007. The project provided cold rooms, generators and cool boxes for vaccine storage and transport in 12 Provinces and included technical assistance (national consultants) in procurement. The Provinces assisted were Nam Dinh, Ha Nam, Ninh Binh, Thai Nguyen and Son La in the north (Red River Delta), Nghe An, Ha Tinh, Dak Lak, Quang Ngai in central Viet Nam, and Ben Tre, Hau Giang and Vinh Long in the south (Mekong River Delta). In addition to the Irish assistance, and as noted above, the cold chain for vaccine storage was strengthened in 27 other Provinces through the UN Joint Programme.