

Country reports

- Topic-1: Implications for AI surveillance of wild birds in HPAI control and prevention in Asia
- Topic-2: Implications for market surveillance in HPAI control and prevention in Asia

*The 5th OIE Regional Expert Group Meeting for Implementation of the
Programme on Surveillance of Wild and Domestic Birds
along Migratory Flyways*

*OIE/Japan Trust Fund (JTF) Project for Strengthening HPAI Control
in Asia
(Tokyo, Japan, 13-14 December 2012)*

(Key Facts as the background information)

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

- In 2005, over 6,000 wild birds died over a period of 2 months at Qinghai Lake in China, and number of report on dead wild birds due to H5N1 HPAI virus has increased. Subsequently H5N1 HPAI outbreaks in wild birds have been reported in more than 75 wild bird species from 38 countries in Asia, Europe, Africa and the Middle East.
- The isolation of H5N1 HPAI viruses in dead wild birds implied a potential role of those bird populations in the spread of the disease.
- Since early 2011, a number of countries in Asia have experienced introductions of new virus clade 2.3.2.1, and wild birds were implicated in most cases which included Bangladesh/India/Nepal/Myanmar (2010-2011), RO Korea/Japan (2010-2011) and Bhutan (2012).
- It is clear that migratory birds may act as temporary reservoirs for H5N1 HPAI virus and may be responsible for primary introduction of the virus in a previously free area.
- The unprecedented HPAI situation in Asia resulted in spillover of the virus to naïve populations of wild birds. However, the role of wild birds in the spread and transmission of HPAI viruses has been debated, but not yet clearly elucidated.
- Furthermore, it is not clear whether or not H5N1 HPAI viruses are maintained in wild bird populations for a certain period of time.
- On the other hand, it is suggested that wild birds may not play a role in transmitting H5N1 HPAI virus in the lower Mekong delta region (Southern Vietnam and Cambodia), since virus clade 1.1 has been persistent and maintained only in the area since 2003-04.
- At the same time, virus clade 2.1 continues circulating since the first outbreak in Indonesia in 2003 and has been remained circulating only in Indonesia since then. This fact also suggests that wild bird transmission of H5N1 HPAI viruses from Indonesia back to mainland Asia does not occur.
- Thus, the role/involvement of wild birds in the introduction/transmission of H5N1 HPAI viruses may be different from country to country and is dependent on various factors (environmental, spatial, temporal, etc.) in each country or region.

(Key facts and background information)

(Topic-2) Implications for poultry market surveillance on avian influenza in HPAI control and prevention in Asia

- Live poultry markets (LPMs) are ubiquitous in most of developing countries in Asia. LPMs are essential for marketing poultry and a preferred place for local people to buy freshly killed poultry for consumption. Thus, LPMs are usually sited close proximity to residential areas in a city or village or community.
- In LPMs, people can choose poultry they want to purchase and can have them slaughtered, defeathered, eviscerated, cut up and put in plastic bags to bring back home. Sometimes, people take live poultry back home.
- Different species of poultry (native ducks/chickens, Muscovy, etc.), which can satisfy the local taste, are collected and gathered from multiple producers (mainly small scale farmers) by middle men/retailers and marketed live to people in LPMs. Birds are kept in cages, baskets or tied up for sale there.
- Poultry that are not sold are returned to the supplier (producers/middle men) or kept at storage houses/points over to the next day and brought back to the market.
- The LPM practice differs from country to country, and these differences can affect the role of LPMs in amplifying and disseminating avian influenza viruses including H5N1 HPAI virus.
- Previous findings and studies confirm/suggest that;
 - LPMs can serve as a source of infection for farms and maintain, amplify and disseminate the viruses and may allow viruses to persist there for long period of time.
 - Retail LPMs are a dead-end for the poultry that are slaughtered there, but they are not a dead-end for the virus. LPMs possibly help maintain infection in poultry flocks and provide a potential site for intervening to control virus transmission.
 - The virus spread/transmission from LPMs to farms may easily occur through movement of humans (e.g., consumers, buyers, middle men/retailers), live poultry/poultry meat and materials/equipment (e.g., cages, trucks) between LPMs and farms.
- The presence of H5N1 HPAI virus in poultry in the market system seems to be subclinical, because poultry are kept in LPMs for a short period of time, and ducks usually does not show clinical sign when they get infected with the virus.
- These circumstances may help H5N1 HPAI virus continue circulating in LPMs, which may allows the maintenance and circulation of the virus in ecosystem across Asia.

(As of 12 Dec) List of country report

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1	Bangladesh	0
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(Q & A sheets for Topic-1)

Your name: Dr. Narapati Dahal

Your country: Bhutan

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/transmission/spread of H5N1 HPAI viruses in your country?

Bhutan lies on the Central Asian Flyway of the migratory birds. More than 40 species of birds including water fowls are known to migrate to Bhutan from various places. Black necked cranes, one of the endangered species of bird migrates from north to Bhutan every winter.

The climatic conditions for poultry rearing and commercial farming are conducive in southern part of Bhutan. This is where maximum concentration of poultry population is found in Bhutan. Bhutan also shares a long border with India in the south. Most of the past outbreaks in Bhutan had been reported from areas bordering India.

Given the above facts, the National Influenza Pandemic Preparedness Plan mandates active surveillance in these areas. This includes the roosting places for migratory wild birds in Bhutan.

Although there are no incidences implicating outbreaks of Avian Influenza H5N1 to wild birds except for one instance where sparrow and a pigeon tested positive at the outbreak location, Bhutan considers the risk for Avian Influenza spread from wild birds relatively significant.

Bhutan currently is collaborating study of Avian Influenza in domestic poultry, wild and migratory birds and swine population with Centre of Excellence for Influenza Research and Surveillance, Memphis in USA. The collaboration is comparatively new and has so far analyzed less than a 1000 samples. Therefore, we expect that this study could guide us in appraising implication of Avian Influenza of wild birds in HPAI control and prevention in Bhutan.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
- If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?

Avian Influenza Surveillance in wild birds is carried out by the Department of Livestock in collaboration with Wildlife Conservation Division of the Department of Forests and Park Services. The Royal Society for Protection of Nature, a non-governmental organization is also involved especially in surveillance of Black Necked Cranes.

Apart from the above, the National Centre for Animal Health (apex body for all animal health matters) collaborates with Centre of Excellence for Influenza Research and Surveillance, Memphis in USA in “Ecology of Influenza Viruses”. This collaboration undertakes surveillance of Influenza not only in birds but also in swine population in the country.

The collaboration is comparatively new, and we have shipped less than a 1000 samples so far. All the samples from wild bird surveillance had been negative to Avian Influenza H5N1; however, the national laboratory in Bhutan does not have capacity to screen these samples for other subtypes. Therefore, we expect to be guided by the results of the collaborative surveillance program.

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.

The National influenza Preparedness Plan clearly outlines the importance of wild bird surveillance for control and prevention of Avian Influenza in poultry. It defines the roles and responsibilities of all the agencies involved in the surveillance of wild birds along with the protocol and standards. Therefore, wild bird surveillance for control and prevention of Avian Influenza in poultry is very much part of the national plan.

The National Plan also specifies intensively active surveillance in poultry population in the vicinity of wild and migratory birds. The Veterinary Vigilance Teams of the Department of Livestock is active throughout the year in these areas.

(Q & A sheets for Topic-2)

Your name: **Dr. Narapati Dahal**

Your country: **Bhutan**

(Topic-2) Implications for poultry market surveillance on avian influenza in HPAI control and prevention in Asia

(Question 1 for Topic-2)

- How do you see the role of live poultry market in maintaining, spreading and transmitting H5N1 HPAI viruses in your country?

Bhutan does not have live poultry market basically due to the fact that majority of the population is Buddhist and are against killing. Few live poultry markets that existed in bordering towns were officially banned. Although Bhutan Agriculture and Food Regulatory Authority apply strict measures and regulations for import of poultry and poultry products, fraction of the population in the bordering towns along the Indo-Bhutan border can access to live poultry markets across the border. Some of the past outbreaks had been implicated to illegal smuggling of poultry and poultry products in the country. Therefore, the current concern for Avian Influenza surveillance for Bhutan is along the Indo-Bhutan border.

(Question 2 for Topic-2)

- Does your country (by veterinary authorities, public health authorities, donor agencies, etc.) conduct poultry market surveillance in your country?
- If so, please briefly outline: 1) the main objective, 2) results of the market surveillance, and 3) interpretation of the results of the surveillance

The Veterinary Vigilance Team of the Department of Livestock in collaboration with the Border Vigilance Team of Bhutan Agriculture and Food Regulatory Authority (BAFRA) is mandated to carry out the surveillance. Additionally, BAFRA is responsible for import regulations and surveillance of commercial poultry farms in the country.

(Question 3 for Topic-2)

- How does your country incorporate poultry market surveillance into the HPAI control and/or prevention to improve the HPAI situation in your country?
- What actions are to be undertaken to control/prevent HPAI based on the information obtained from market surveillance?

Although live poultry markets in bordering towns were officially banned, the National Influenza Pandemic Preparedness Plan incorporates surveillance of poultry in the live poultry market incase these markets are opened again.

(Cambodia: Topic-1)

Your name: Dr Bun Chan

Your country: Cambodia

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/transmission/spread of H5N1 HPAI viruses in your country?

So far, Cambodia do not have own fund or donor to support for conducting surveillance for avian influenza of wild birds. In 2009, the Wildlife Conservation Society (WCS) had small fund and cooperated with NaVRI to conduct surveillance for avian influenza on wild birds (sparrow species), but we did not find H5H1 HPAI virus on sparrow. We cannot detect H5N1 HPAI virus may be due to the samples collection were small and conducted only sparrow species. However, two H5N1 HPAI outbreaks on wild birds at Takmao Wildlife Rescue Centre on February 2004 and on July 2011. Thus, in order to know about wild birds as transmitter of H5N1 HPAI virus or not in Cambodia, should be conduct large surveillances on many wild bird species and much samples collection. Nevertheless, Cambodia has strict regulation to ban imported live poultry and wild birds from neighboring countries to control and prevention of HPAI spreading as well as other poultry diseases.

In collaborating with Wildlife Protection Office in since August 2008, National Veterinary Research Institute tested 1,543 samples for the avian influenza H5N1 virus which included 746 cloacal and 792 tracheal swabs and 5 organ samples, that were obtained from 797 wild birds of 42 different species that were captured as part of the surveillance and monitoring program in Cambodia. Each of the 1,543 samples tested negatively for the highly pathogenic avian influenza H5N1 virus.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
 - If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?
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As I mentioned in the question.1, there are only WCS and Wildlife Protection Office were cooperated with NaVRI to conduct surveillance for avian influenza on wild birds and we did not find any H5N1 virus in wild birds. I think that wild bird's surveillance is an important research for seeking the transmission mechanisms of HPAI so that Cambodia needs fund support from an international organizations to perform surveillance. Currently, we do not have fund to conduct any more surveillance on wild birds.

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.
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Even though, in Cambodia don't have enough results in proving that wild birds are transmitter of HPAI but wild bird surveillance is already incorporated into national strategy for controlling and prevention of HPAI.

(Cambodia: Topic-2)

Your name: Dr Bun Chan

Your country: Cambodia

(Topic-2) Implications for poultry market surveillance on avian influenza in HPAI control and prevention in Asia

(Question 1 for Topic-2)

- How do you see the role of live poultry market in maintaining, spreading and transmitting H5N1 HPAI viruses in your country?

Live bird market is a multi-collective places for sale or buy bird species that bring from different provinces in Cambodia. So, the risk spreading and transmission of H5N1 HPAI virus from birds to birds, and birds to human can easily possible in infection, especially from birds to human.

(Question 2 for Topic-2)

- Does your country (by veterinary authorities, public health authorities, donor agencies, etc.) conduct poultry market surveillance in your country?
 - If so, please briefly outline: 1) the main objective, 2) results of the market surveillance, and 3) interpretation of the results of the surveillance
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In order to early detect the outbreaks of HPAI and to prevent the spreads of HPAI, Cambodia was started establishing of the country's disease surveillance system both passive and active surveillance to control and prevent HPAI, however, active surveillance needs more budget so that government seeks various donors for supporting these activities, especially FAO. There are two types of active surveillances have been performed include live bird market surveillance and sentinel duck flock surveillance. The objective of this surveillance is to find H5N1 virus circulation and prevent spreading and transmission of AI from birds to birds and from birds to humans.

The Live bird market surveillance was conducted since **2006** in one municipality and targeted provinces. One market in each province of pilot project was selected, except two markets in Phnom Penh.

For live bird market surveillance, all of 4,800 cloacal swabs and 4,800 tracheal swabs are negative of avian influenza virus by egg-inoculation test; screening RT-PCR and 308 of 4,702 (6.55%) serum samples are antibody positive of avian influenza by Haemagglutination and Haemagglutination Inhibition Test.

For sentinel duck flock surveillance, all of 4,260 cloacal swabs and 4,260 tracheal swabs are negative of avian influenza virus by egg-inoculation test; 128 of 4,260 (3.0%) serum samples are antibody positive of avian influenza by Haemagglutination and Haemagglutination Inhibition Test.

(Question 3 for Topic-2)

- How does your country incorporate poultry market surveillance into the HPAI control and/or prevention to improve the HPAI situation in your country?
 - What actions are to be undertaken to control/prevent HPAI based on the information obtained from market surveillance?
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Based on HPAI surveillance, Cambodia government already has the National Strategy Plan for controlling and preventing the spreads of HPAI in Cambodia. Currently, World Bank Project also supports this activity within Department of Animal Health and Production and this project will end in June 2013.

(PR China: Topic-1)

Your name: Dr Liling Liu, Dr Yongping Jiang

Your country: China

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/transmission/spread of H5N1 HPAI viruses in your country?

It is no doubt that wild birds play important roles in the introduction and spread of the H5N1 HPAI around the world. In 2005, the wild birds carried the clade 2.2 H5N1 HPAI into China and caused the H5N1 outbreak in wild birds in Qinghai Lake, and the virus was then spread to chickens in Northern China and other countries through wild bird migration. The clade 2.3.2 viruses had been detected in wild birds outside China before 2009, and they were detected in the wild birds in the wetlands of Qinghai Lake, Qinghai Province in 2009. The virus was then spread to the domestic ducks in China that were raised in open field. These facts demonstrated that wild birds are playing important roles in the spread of H5N1 influenza viruses.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
 - If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?
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In China, we actively performed the surveillance of influenza virus in wild birds, and we have isolated different subtypes of avian influenza viruses from wild birds, the manuscript about these data is under preparation.

Active wild bird surveillance provides important information for the disease control in domestic poultry in China. For example, when we detected the clade 2.2 virus and clade 2.3.2 virus in wild birds in China, we started to prepare the vaccine seed viruses targeting these strains. If the virus spread to domestic poultry in several provinces, and if the currently used vaccine can not provide 100% protection, we will update the vaccine.

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.
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If we detected a new virus in wild birds, we will pay high attention to monitor whether the virus was transmitted to domestic poultry or not, and we also need to evaluate if our currently used vaccine can provide enough protection to the virus. If the vaccine can not provide enough protection, we will have new vaccine seed virus prepared.

(PR China: Topic-2)

Your name: Dr Liling Liu, Dr Yongping Jiang

Your country: China

(Topic-2) Implications for poultry market surveillance on avian influenza in HPAI control and prevention in Asia

(Question 1 for Topic-2)

- How do you see the role of live poultry market in maintaining, spreading and transmitting H5N1 HPAI viruses in your country?

Live poultry markets are important in maintaining, spreading and transmitting H5N1 HPAI viruses in our country, and also important places where humans get infected by H5N1 avian influenza viruses.

(Question 2 for Topic-2)

- Does your country (by veterinary authorities, public health authorities, donor agencies, etc.) conduct poultry market surveillance in your country?
- If so, please briefly outline: 1) the main objective, 2) results of the market surveillance, and 3) interpretation of the results of the surveillance

In China, we actively performed the influenza virus surveillance in live poultry markets, and we have isolated different subtypes of avian influenza viruses from the birds in the markets, the manuscript about these data is under preparation.

Active live poultry markets surveillance provides important information for the disease control in domestic poultry in China. For example, when we detected the clade 2.3.2.1 virus in live poultry markets in China in 2010, we started to prepare the vaccine seed viruses targeting to the strain, and we recently updated the old H5N1 vaccine (clade 2.3.4 virus based) with the new clade 2.3.2.1 virus based virus for the H5N1 control in China.

(Question 3 for Topic-2)

- How does your country incorporate poultry market surveillance into the HPAI control and/or prevention to improve the HPAI situation in your country?
- What actions are to be undertaken to control/prevent HPAI based on the information obtained from market surveillance?

As we described above, the live poultry market surveillance provides direct and important information for the disease control in China.

(Hong Kong SAR: Topic-1)

Your name: Dr TSE Pui-ying, May

Your country: Hong Kong SAR

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/ transmission/spread of H5N1 HPAI viruses in your country?

We believe there are possibilities of wild birds (both migratory and resident birds) in the introduction/ transmission/spread of H5N1 HPAI viruses in Hong Kong. In order to monitor the occurrence of HPAI infection in domestic and wild birds, we conduct various active and passive surveillance programs. Surveillance programs include local chicken farms, poultry markets, pet bird shops, as well as wetland area, recreational parks and dead wild bird collected. Based on the surveillance results, 61 H5N1 infected wild birds have been found in Hong Kong in the past 6 years.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
 - If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?
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Yes. In Hong Kong, the government conducts avian influenza surveillance of wild bird. Surveillance programs include testing of wild bird droppings from wetland area as well as testing of sick or dead wild birds collected from government collection service.

In average there are around 14, 000 samples (including tracheal and cloacal swabs, tissue and faecal swabs from wild bird collection and Wetland Park and other parks) screened and tested for AI per year from 2007 to 2012 (up to October 31st).

In 2007, only 21 wild birds were confirmed to be infected with H5 HPAI viruses.
In 2008, only 7 wild birds were confirmed to be infected with H5 HPAI viruses.
In 2009, only 6 wild birds were confirmed to be infected with H5 HPAI viruses.
In 2010, only 1 wild bird was confirmed to be infected with H5 HPAI viruses.
In 2011, only 5 wild birds were confirmed to be infected with H5 HPAI viruses.
In 2012 (up to October 31st), only 21 wild birds were confirmed to be infected with H5 HPAI viruses.

Should there be any suspected or confirmed case of H5N1 found in the wild bird surveillance, we will implement different control measures against HPAI depending on the location found and the case nature such as disinfection and closure of the Mai Po Reserve etc.

Information on the surveillance data from these wild birds helps us understand the subtype and genetic characteristics currently circulating in the wild bird population. This information could help us to improve our diagnostic tests. In addition, through challenge study, we could advice our local poultry farmers which vaccine to be used for better protection against the common circulating H5N1 virus.

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.
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If there is a confirmed HPAI infected wild bird, we will upgrade the corresponding response level to alert response level. There will be increased surveillance and testing of wild birds, enhancing local poultry farmers' awareness on farm hygiene, biosecurity measures and close monitoring of herd health, increased surveillance and monitoring on local poultry farms, plus closure of Wetland Park and Mai Po Nature Reserve and other walk-in aviaries if 3 dead wild birds are found within 3-km radius of the parks, premises or facilities in a consecutive of 10 days.

(Hong Kong SAR: Topic-2)

Your name: Dr TSE Pui-ying, May

Your country: Hong Kong SAR

(Topic-2) Implications for poultry market surveillance on avian influenza in HPAI control and prevention in Asia

(Question 1 for Topic-2)

- How do you see the role of live poultry market in maintaining, spreading and transmitting H5N1 HPAI viruses in your country?
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We believe live poultry markets play a role in maintaining, spreading and transmitting H5N1 HPAI viruses in Hong Kong. In order to monitor the occurrence of HPAI infection in live poultry markets, we conduct various active and passive surveillance programs. Surveillance programs include daily check for dead poultry, testing of dead poultry and random faecal or cage or floor swabs.

In order to minimize the risk of infection in the live poultry markets, we have improvement measures in the design and management of the markets including reducing the number and density of stalls and cages, banning of overnight live chicken in retail markets and enhancement of biosecurity measures etc.

(Question 2 for Topic-2)

- Does your country (by veterinary authorities, public health authorities, donor agencies, etc.) conduct poultry market surveillance in your country?
 - If so, please briefly outline: 1) the main objective, 2) results of the market surveillance, and 3) interpretation of the results of the surveillance
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Yes. In Hong Kong, the government conducts poultry market surveillance to monitor the occurrence of HPAI infection in live poultry markets. Surveillance programs include daily check for dead birds, testing of dead poultry and random faecal or cage or floor swabs.

In average there are around 3, 800 samples (including environmental swabs, tracheal and cloacal swabs etc) screened and tested for AI per year from 2007 to 2012 (up to October 31st).

In 2007, none was confirmed positive of H5 HPAI viruses.

In 2008, only 4 cases were confirmed positive of H5 HPAI viruses.

In 2009, none was confirmed positive of H5 HPAI viruses.

In 2010, none was confirmed positive of H5 HPAI viruses.

In 2011, only 1 case was confirmed positive of H5 HPAI viruses.

In 2012 (up to October 31st), none was confirmed positive of H5 HPAI viruses.

Should there be H5N1 found in the poultry market surveillance, we may implement different control and measures, such as depopulation of the birds, closure of the markets for certain number of days etc

(Question 3 for Topic-2)

- How does your country incorporate poultry market surveillance into the HPAI control and/or prevention to improve the HPAI situation in your country?
 - What actions are to be undertaken to control/prevent HPAI based on the information obtained from market surveillance?
-

If there is a positive H5 AI environmental swab found in wholesale or retail poultry markets, we will upgrade the corresponding response level to alert response level. There will be depopulation, intensive cleaning and close down of the market for 21 days with the stop of live poultry supply. There will be sample tracing back to the farm origin, intensive testing of farm if it is from local farm origin. We will enhance local poultry farmers' awareness on farm hygiene, biosecurity measures and close monitoring of herd health.

If there is a confirmed H5N1 poultry found in wholesale or retail markets, we will upgrade the corresponding response level to serious response level. There will be depopulation, intensive cleaning and close down of the market for 21 days with the stop of live poultry supply. There will be depopulation of the infected local farm and quarantine and surveillance of neighbouring farms falling within 3km radius. We will enhance local poultry farmers' awareness on farm hygiene, biosecurity measures and close monitoring of herd health. And should there be any signs of an outbreak in local farms, there will be total depopulation in all local poultry farms and poultry markets.

(Indonesia: Topic-1)

Name : Dr Soedarmono

Country : Indonesia

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/transmission/spread of H5N1 HPAI viruses in your country?

We understand that Indonesia is located in wild bird migration pathway in Southeast Asia and the birds can fly from China in the north to Australia in the South. We have list of migratory birds species which potentially able to mingle with the resident birds and local poultry both commercial and backyard birds. From the experience, we consider wild birds both migratory and resident, have potential role in H5N1 HPAI though until now their role seems not clear and significant.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
- If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?

In our record, there were two surveillance activities were conducted in Indonesia.

First was conducted by US-NAMRU 2 and National Institute of Research and Development of the Ministry of Health during 2006 – 2007 and second conducted by Wildlife Conservation Society (WCS) worked together with the Ministry of Agriculture and Forestry during 2007 – 2009 in several sites in Sumatera, Java and Kalimantan.

We also have the National Guideline for Wildbirds Surveillance based on consensus of several ministries, ornithology groups, research institutions in Indonesia developed through collaboration of the National Committee of Avian Influenza and USDA.

The results from surveillance activity showed that moderate serologic evidence of H5N1 infection in captive birds, sampled in five sites in Java and only occasional infection in resident and migratory birds. These data imply that the role of migratory birds transmission of H5N1 in Indonesia is limited.

As Indonesia geographically consisted of many islands, we still consider that AI surveillance in wild birds is important tool in H5N1 HPAI control and prevention. it is still important to have wild bird surveillance in several locations sample from the birds whether there is new infection or reintroduction of H5N1 virus. This activity will help the local livestock office in the area as early warning tool or prediction for potential new outbreak for preparedness in the field despite of their routine prevention and control for H5N1 HPAI.

From previous experience, we know some location along major migratory pathways in Sumatera and Java which can be used for wild bird surveillance sentinel sites. We also have some personnel who has been trained from the previous projects and can be regularly deployed to those sites supported by laboratory capacity where samples can be submitted. We would welcome if there is interest for foreign institutions to work together on this surveillance activity.

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.

As the last activity in wild bird surveillance was in 2009, we don't have any updated data at this moment. The previous data was disseminated to the local livestock office in area where surveillance sites are located as additional background data for them to plan the H5N1 HPAI control in the area. Ministry of Agriculture also work closely with the Ministry of Forestry on this subject as the sentinel sites most often are located within national parks or forest area under supervision of the Ministry of Forestry.

(Indonesia: Topic-2)

Name : Dr Soedarmono

Country : Indonesia

(Topic-2) Implications for poultry market surveillance on avian influenza in HPAI control and prevention in Asia

(Question 1 for Topic-2)

- How do you see the role of live poultry market in maintaining, spreading and transmitting H5N1 HPAI viruses in your country?

In Indonesia there are approximately 10,000 Live Poultry Markets (LPMs) spread all over the country and potentially has significantly roles in maintaining, spreading and transmitting H5N1 HPAI viruses as the biosecurity and movement control measures are not conducted in those premises.

The study which has been conducted by FAO shows that due to the separation between farm and live bird market, as well as the accumulation of virus contamination into downstream urban markets with limited contact with poultry farms, live bird markets do not appear to be the primary means of spread of the H5N1 virus to poultry, however live bird markets may be a primary means of spreading virus to human populations. There is no apparent relationship between endemic areas and locations with highly contaminated markets.

(Question 2 for Topic-2)

- Does your country (by veterinary authorities, public health authorities, donor agencies, etc.) conduct poultry market surveillance in your country?
 - If so, please briefly outline: 1) the main objective, 2) results of the market surveillance, and 3) interpretation of the results of the surveillance
-

Ministry of Agriculture (MoA) and FAO work jointly in conducting LPMs surveillance study which was started in 2009. The main objective is to understand the influenza A virus prevalence in the LPMs located in Greater Jakarta area, and determine prevalence H5 contaminated LPMs over time. Started in March 2009, 261 LPMs included in the study. Environmental swabs from 5 sites pooled into one VTM sample. PCR testing for both matrix and H5.

Overall LPMs surveillance results :

From 5,862 environmental samples collected :

47.2% influenza A virus positive.

26.2% H5 subtype positive results.

The data showed a progressively decreasing prevalence in both matrix and H5 positive samples each year :

2009 : 68.2% matrix-positive and 40.1% H5-positive

2010 ; 50.3% matrix-positive and 28.8% H5-positive

2011 : 35.6% matrix-positive and 18.9% H5-positive

Seasonal pattern increasingly evident in 2010 and 2011

Surveillance of prevalence in collector yard and traditional markets in Great Jakarta. Decleaning trend of prevalence in commercial poultry farm since 2009 – 2012.

(Question 3 for Topic-2)

- How does your country incorporate poultry market surveillance into the HPAI control and/or prevention to improve the HPAI situation in your country?
 - What actions are to be undertaken to control/prevent HPAI based on the information obtained from market surveillance?
-

Poultry market surveillance is one important key element in our control and prevention effort to improve HPAI situation in Indonesia.

The surveillance in some market is becoming parameter on prevalence of HPAI circulated in particular area and become early warning for local livestock office when the data shows increasing in positive result. Another action is to urge the local livestock office to conduct cleaning and disinfection in those particular market.

(India:Topic-1)

Your name: Dr. A.S. Nanda

Your country: India

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/ transmission/spread of H5N1 HPAI viruses in your country?
-
- India is a large tropical country with diverse Flora and insect population. This along with distinct seasons and variable types of geographical locations attract migratory birds.
 - There is a large diversity of resident wild birds which are vulnerable to Avian Influenza. A large number of local/ resident birds feed on dead poultry and other birds and hence could be potential carrier of the virus.
 - India falls under 3 international migratory pathways.
 - Sometimes the wild birds break in to the routine biosecurity in poultry establishments and might help in spread of disease. Because of these reasons, India is under tremendous threat of Avian Influenza ingress through the wild birds.
 - During 2011-12 some dead crows (*Corvus macrorhyncos*) were tested positive for H5N1 at several places in India. The populations of crows are spread over a vast area and they involve several states. Although no correlation could be established with AI in crows and that in poultry, it is felt that the crows might have spread the virus to far flung areas.
 - The Clade of AI virus 2.3.2.1 in wild birds and in the recent outbreaks of domestic poultry is one and the same which shows the possibility of wild birds transmitting infection to domestic birds and vice versa.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
 - If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?
-

- Routine and targeted surveillance for wild birds is in place in India. The Central Government of India (DADF) oversees the related developments. The passive surveillance is undertaken by the resident inhabitants/farmers, the Forest Officers / Rangers / Field Veterinarians and Special Surveillance Cells in routine as well as on random basis.
- For AI surveillance in wild birds in India, all states submit their annual surveillance plan by October every year.
- The director (Animal Husbandry) or equivalent proposes and implement surveillance plans together with the wild life wing of Forest department.
- Dead wild birds, droppings under the area of surveillance, serum, tracheal and cloacal swabs from randomly selected birds are sent to the OIE referral, High Security Animal Disease Laboratory (HSADL), Bhopal for diagnosis.
- Separate guidelines for targeted serology is being issued by the Department of Animal Husbandry, Dairying and Fisheries.
- Active surveillance is also done to confirm Avian Influenza in morbid or acutely sick birds suspected fro AI.

Results of AI Surveillance in India:

- Around 11,000 samples collected over the last three years from different wet lands/forest areas have been tested and found negative.
- Morbid samples from dead crows collected from the Indian states of (a) Jharkhand, (b) Bihar, (c) Uttar Pradesh, (d) Maharashtra and (e) Orissa tested positive for Avian Influenza (H5N1) in 2011-12.
- A large number of pigeons died in Meghalaya state during the year 2011, but were found negative for AI.
- Some Migratory birds found dead around Kaziranga Wild Sanctuary have been tested negative (December 2012).

- The recent mortality in cranes and Herring Hawks in Gujarat is under investigation (December 2012).
- The Clade of AI virus in wild birds was 2.3.2.1

Role /Purpose of Surveillance

- To identify extent of mortality in wild life and its causes,
- To identify birds died due to AI or carrying Avian Influenza virus,
- To study mutations on Avian Influenza virus, if any.
- To understand ingress, route and sources of the AI virus.
- The above information will be useful to develop disease forecasting and preventive strategy.
- Wild birds surveillance definitely helps to assess the possibility of transmission of AI among domesticated species.
 - Surveillance programmes in wild birds definitely help to better understand the epidemiology of AI in the country.
 - This will help to identify the virus mutations as well as changes in the Clade of AI virus circulating in the wild birds/ migrating birds as well as in the domesticated poultry.
 - This will help in forecasting the risk of transmission of disease as well as in formulating policies and methods to prevent spread of infection. So also suitable measures can be devised to control and contain the AI infection at the earliest possible time.

Avian Influenza in wild birds vis-a-vis poultry

- The Clade of AI virus 2.3.2.1 in wild birds and in the recent outbreaks of domestic poultry is one and the same which shows the possibility of wild birds transmitting infection to domestic birds and vice versa.
- Although there have been no co-relation established in the occurrence of Avian Influenza in poultry with that of wild life, it is, however, felt that the wild life contributes to spread of the disease.

(Question 3 on Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.
-
- Surveillance of wild birds (active and passive) is already a part of India's Action Plan to contain Avian Influenza.
 - The following information however needs to be generated with further studies:-
 - (1) Travel schedules and styles of resident birds,
 - (2) Their feeding habits
 - (3) Disposal of poultry end-products at wet markets and elsewhere,
 - (4) Proper awareness and education campaign,
 - (5) Better coordination with the Wild Life Rangers, general public and Veterinary Cells,
 - (6) Strengthening of an independent epidemiological Cell which would coordinate activities of all concerned within the country and within the South East Asian region.
 - (7) More active participation of FAO and OIE as facilitators.

(India:Topic-2)

Your name: Dr. A.S. Nanda

Your country: India

(Topic-2) Implications for poultry market surveillance on avian influenza in HPAI control and prevention in Asia

(Question 1 for Topic-2)

- How do you see the role of live poultry market in maintaining, spreading and transmitting H5N1 HPAI viruses in your country?
-
- The wet /bird markets in India are a potential threat of Avian Influenza spread which also exposes the human population of this zoonotic disease.
 - In India approximately 95 per cent of meat supply is through live poultry markets. Birds are mainly slaughtered/ auctioned/ sold live here.
 - The National Institute of Virology, Pune monitored AI viruses in selected live poultry markets of the country. Few samples were found positive for H5N1.
 - Since live /wet poultry markets pose a potential threat for the spread of infection, advisories are issued from time to time to improve the hygiene and biosecurity practices in order to avoid the transmission of AI.

(Question 2 for Topic-2)

- Does your country (by veterinary authorities, public health authorities, donor agencies, etc.) conduct poultry market surveillance in your country?
 - If so, please briefly outline: 1) the main objective, 2) results of the market surveillance, and 3) interpretation of the results of the surveillance
-

- This is a part of the National Action plan for containment of Avian Influenza but is not followed extensively. However, random studies are being conducted by the following units:-
 - i) Project Directorate on Animal Disease Monitoring & Surveillance (PD-ADMAS),
 - ii) National Institute of Virology (NIV),
 - iii) FAO Team on Avian Influenza in India.
- The main objective of such surveillance is to identify the prevalence of Avian Influenza positive birds being slaughtered and to track back their source.
- Monitor prevalence of AI virus and its clade – keep a watch on AI virus mutations, if any.
- Immediate information on AI outbreaks, if any, and to make the public aware of this situation and to advise them on bio-security.

Results of the market surveillance

In one of the study carried out by NIV in Jharkhand tested a few ducks sero positive for H5N1.

Interpretation

The results point out at the possibility of non clinical AI positive / carrier birds in the system being marketed. These could be a potential source for further spread of the disease and warrants further investigation and immediate control.

Methods of Surveillance:

- Carried out periodically in the selected live poultry markets, mortality or the rumors those of, Vigil by the state Animal Husbandry department, and by conducting awareness campaigns.
- Chicken, duck, turkeys, goose, etc. in the live bird markets, slaughter points are the target species.
- Serum, cloacal swab, tracheal swab, feces, dead birds and morbid materials are the sample category.

Result

Few reports of Non-NAI and a few samples were found to be positive for H5N1 NAI.

(Question 3 for Topic-2)

- How does your country incorporate poultry market surveillance into the HPAI control and/or prevention to improve the HPAI situation in your country?
 - What actions are to be undertaken to control/prevent HPAI based on the information obtained from market surveillance?
-
- The surveillance of live poultry markets has been incorporated in the revised action plan on the Preparedness, Control and Containment of Avian Influenza by the Department of Animal Husbandry, Dairying and Fisheries in June, 2012.
 - Advisories are issued to the state Animal Husbandry department to keep extreme vigil in the live poultry markets and to improve the biosecurity and hygiene in markets.
 - In cases of occurrence of AI in a particular location immediate instructions are given to immediately close down such markets until the sanitization and post operative surveillance plan of the area is complete
 - Further efforts are needed on the followings:
 - i) To register all wet markets,
 - ii) Unorganized illegal slaughter and selling places to be discouraged / banned,
 - iii) Complete hygiene and bio security in the markets to be ensured,
 - iv) Regular Avian Influenza surveillance to be made a routine,
 - v) Efforts to track back the source of positive birds,
 - vi) To undertake targeted surveillance in the identified source / farms / areas.

(Japan: Topic-1)

Your name: Dr Noriyoshi Ojima

Your country: JAPAN

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/transmission/spread of H5N1 HPAI viruses in your country?

(1) Introduction of the virus into Japan

There is a strong possibility that the outbreaks of HPAI occurring in Japan from 2010 to 2011 were caused by the viruses delivered by wild birds including migratory birds because:

- ① HPAI viruses were isolated from feces of wild ducks in Hokkaido (the northern part of Japan) in the beginning of the winter migratory season from the north to Japan;
- ② The first poultry case of HPAI was occurred in a farm facing on a lake where a lot of migratory birds had come flying; and
- ③ A lot of cases of wild birds infected with the virus including migratory birds were found.

We think there is a strong possibility that migratory birds coming flying from neighboring countries where HPAI continues occurring will carry the virus into Japan in the future.

(2) Transmission/spread within Japan

It was considered that most cases in 2010 and 2011 were caused not by the viruses transmitted from other affected farms but by the viruses delivered directly from the environment to the farms. It was considered that there might be a route of infection through wild birds and wild animals because small wild birds actually were found in some affected poultry houses and tears of bird-proof nets and cracks of poultry houses were also confirmed by on-the-spot inspections. (It was assumed that some falcons had been infected with the virus through predation of infected wild birds.)

(3) Response

Given the fact that there is always a possibility that the virus will enter Japan, therefore, we are making efforts to establish a more feasible control system in close coordination with owners and managers of poultry and administrative organs (the central government, prefectural governments and municipal governments) and related organizations.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
 - If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?
-

In Japan, Wildlife Authority collects samples of feces of wild ducks coming flying in early winter (from October to April, in principle) and dead wild birds (year-round), and monitors the presence of influenza virus in them so that we could early detect HPAI infection of wild birds and well understand HPAI situation in wild bird populations.

Wildlife Authority establishes the surveillance levels and changes target and scope of the monitoring of abnormal wild birds and the survey of the virus, corresponding to the situation of HPAI: while there is no outbreak of HPAI in Japan, level-1 surveillance is adopted; if an outbreak of HPAI is confirmed in poultry or wild bird populations, level-2 surveillance is undertaken; and when several outbreaks are confirmed at different places within 45 days, level-3 surveillance is conducted. In addition, when infected cases are confirmed in the country, intensive monitoring zones for wild birds are established within 10 km around the outbreaks.

Results of the surveillance are shared with Animal Health Authority, and made use of for prediction of HPAI outbreaks and spread in poultry, and mitigation of the risk and minimization of the damage through the measures according to Guidelines for Prevention and Control of Avian Influenza.

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.
-

If HPAI infections were confirmed in wild birds and others than poultry in Japan, according to Guidelines for Prevention and Control of Avian Influenza we would take the following measures:

- ① Disinfection and block and control of the traffic of the places where the birds (including dead birds) were captured or where the birds were kept (with the exception of where the measures are not considered necessary from the perspective of poultry protection, for example in mountains or densely build-up areas.); and
- ② Prompt on-the-spot inspections of farms (which keep no less than 100 birds) located within 3 km around the outbreaks (inspections for abnormal symptoms such as increase of mortality and decrease of egg production rate).

In addition, genetic homology between viruses isolated in Japan and in foreign countries is analyzed by Hokkaido University, Tottori University or National Institute of Animal Health, which is made use of for estimation of the route of infection into Japan.

(Laos: Topic-1)

Your name: Dr. Watthana Theppagna and Dr. Phouvong Phommachanh

Your country: Lao PDR

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1 on Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/transmission/spread of H5N1 HPAI viruses in your country?
-
- Wild birds, especially waterfowl, are considered to be the natural reservoirs for all 144 subtypes. These subtypes are adapted to survive in these wild species and usually cause little or no disease. However, gradual genetic mutation can occur and a particular subtype can become adapted to infect other species of wild birds and domestic birds. Although this slight genetic change in the virus allows it to infect new species. The virus can also change if a host is simultaneously infected with another type A influenza virus. In such situations, mixing of the genetic material from the two virus strains can occur, resulting in the formation of a new strain. The combination of gradual drifts and rapid shifts results in the production of a strain that now causes morbidity and mortality in susceptible hosts. If the morbidity and mortality is significant, the virus is classified as a highly pathogenic avian influenza (HPAI) virus.
 - Although the spread of H5N1 in Asia has been primarily due to movement of domestic birds, the movement of this virus into wild birds raised the possibility that these species may also spread the virus and increasing the potential for migrating species to introduce the virus into new regions of the world.
 - Even there is no evidence that wild bird plays an important role in introducing/spreading the virus in Lao PDR but to better control the disease the surveillance of the virus in both migratory and resident birds need to be implemented to make sure the control measures undertaken in the past were effective enough.

(Question 2 on Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
 - If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?
-

➤ *There has been no surveillance in wild bird undertaken in Lao PDR yet*

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.
-

As mentioned above that there has been no surveillance in wild bird yet so far in Lao PDR but it is obviously that to better control the spreading of the disease it is critical to obtain the information and data about wild bird and use it to reduce the risk of introduction of the virus into domestic birds by improving biosecurity of the farm and zoning.

(Laos: Topic-2)

Your name: Dr. Watthana Theppagna and Dr. Phouvong Phommachanh

Your country: Lao PDR

(Topic-2) Implications for poultry market surveillance on avian influenza in HPAI control and prevention in Asia

(Question 1 on Topic-2)

- How do you see the role of live poultry market in maintaining, spreading and transmitting H5N1 HPAI viruses in your country?

➤ *Even there has been no more outbreak of H5N1 in Lao PDR since the middle of 2010 but according to the result of the active surveillance implemented in collaboration with FAO and Saint Jude Children Research Hospital we found that there was H5N1 virus detected from some live bird markets. This is to confirm that the market is the source where the viruses could be maintained and spread.*

(Question 2 for Topic-2)

- Does your country (by veterinary authorities, public health authorities, donor agencies, etc.) conduct poultry market surveillance in your country?
- If so, please briefly outline: 1) the main objective, 2) results of the market surveillance, and 3) interpretation of the results of the surveillance

Yes, National Animal Health Center, Department of Livestock and Fisheries, Ministry of Agriculture and Forestry in collaboration with Food and Agriculture Organization and Saint Jude Children Research Hospital conducted the poultry market surveillance.

- 1.) The aim of the surveillance is to improve the understanding of HPAI infection and risk along the market chains. Through the surveillance activities, an enhanced understanding of virus epidemiology, geographic distribution, and market-level risk factors will enable Lao PDR to define high risk-areas and identify the specific risk factors for targeting control activities. Ultimately, this will increase Lao PDR's capacity to prevent, detect and eliminate HPAI in timely manner, thereby minimizing production losses and jeopardy to human safety.*
- 2.) 10 isolates were detected and they were divided into three groups: two groups of clade 2.3.4 and one group of clade 2.3.2*
- 3.) The surveillance result shown that there were multiple introduction of H5N1 viruses into Lao PDR during 2009-2010: Clade 2.3.4 Group 1 is persist since Feb 2009, Clade 2.3.4 Group 2 only detected in March 2010 and Clade 2.3.2.1 Group 3 persist since March 2010*

(Question 3 on Topic-2)

- How does your country incorporate poultry market surveillance into the HPAI control and/or prevention to improve the HPAI situation in your country?
 - What actions are to be undertaken to control/prevent HPAI based on the information obtained from market surveillance?
-

Yes, we do incorporate the poultry surveillance into HPAI control and prevention in our country and the following control measures have been undertaken:

- Public awareness campaign : Sanitation and Hygiene
- Improve the biosecurity of the live bird market
- Zoning of Live bird and poultry product at the market
- Establishment of Safety market at the province
- Active surveillance for Live bird market
- Produce IEC material

(Mongolia: Topic-1)

Your name: Dr Myagmarsukh Yondon

Your country: Mongolia

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/transmission/spread of H5N1 HPAI viruses in your country?

(Answer)

- In my country there is no development of poultry farm, there are few poultry with little amount of poultry, no case has been reported in HPAI and LPAI in poultry.
- In the case of wild birds, wild birds when in spring comes flying far away from the countries reported HPAI / countries of South and Southeast Asia /, they will contact with sick wild and poultry birds and transport the virus to Mongolia. When wild birds arriving in Mongolia, only make contact with wild birds. They can't be contact with poultry, poultry farms that are far from lakes and rivers, these poultry farms are concentrated in the center and near of cities.

(Question 2)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
 - If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?
-

(Answer)

- Yes, our country conduct the surveillance of avian influenza in wild birds twice a year in some provinces /that has a lot of lakes and rivers/ of East, Central and West part of country. Responsible authorities or organizations of surveillance are SCVL, Institute of Veterinary Medicine and Institute of Biology.
 - The main role of controlling in wild birds surveillance is our country is active surveillance of wild birds of East, Central and West part of country. As I mentioned before the poultry farms in my country that localized far from lakes and rivers, these poultry farms are concentrated in the center and near of cities. This is one of the reasons that the wild birds can't access with poultry.
 - No, because we never reported HPAI.
-

(Question 3)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.
-
- Our country conduct the surveillance of avian influenza in wild birds twice a year in some provinces /that has a lot of lakes and rivers/ of East, Central and West part of country, and taken data information's and collecting. And the running the samples by RT-PCT, qRT-PCR. In case of poultry we keeping the samples from poultry farms.

(Mongolia (SCVL): Topic-1)

Your name: **Batchuluun.D**

Your country: **Mongolia**

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/ transmission/spread of H5N1 HPAI viruses in your country?

Mongolia was free from Avian Influenza until 2005, when the first case was detected, and found to belong to the same clade (2.2) as the virus isolated from wild birds at Qinghai Lake in China in 2005.

Further H5N1 occurrence was reported in 2005, 2006, 2009 and 2010 among wild birds such as Whooper swan (*Cygnus cygnus*), Common goldeneye (*Bucephala clangula*), Ruddy shelduck (*Tadorna ferruginea*), Bar-headed goose (*Anser indicus*).

Mongolia is located in a cold region with 4 seasons. According to ornithological studies, about 487 species of wild birds have been recorded in Mongolia.

Establishing regular active and passive surveillance of wild birds to detect bird diseases and causes of sudden death can lead to a strengthening of early warning systems, reduce the risk of infection and improve rapid response measures.

Mongolia is located at the intersection of main flyways between Asia and Europe and the 4 main migratory flyways cross the country.

Migration flyways are considered to be an essential factor in studying virus circulation in nature and detecting virus subtypes and virus origin. Although migration routes are an important risk factor in disease transmission, the risk to poultry farms is almost negligible due to the small size of the domestic poultry sector.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
 - If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?
-

The research objective was to determine clearly the species and number of migratory birds arriving at larger lakes, rivers and project areas by season and geographical location, collect migration-related data to establish a database, collect samples for LPAI and HPAI testing, and provide ornithological information useful in developing preventive measures and a management rationale to combat the spread of HPAI.

Activities of the study

1. Conduct observational studies at priority lakes and rivers on the flyways where large numbers of migratory birds gather and determine bird locations
2. Collect fresh feces or tissue samples from dead birds in order to investigate viruses, particularly from AI-sensitive birds such as swans, geese, ducks and herring gulls.
3. Test samples to detection viruses and determine subtypes
4. Collect data, aggregate and analyze

Study design and methodology

Surveillance: Surveillance was conducted at about 70 lakes in the central, western and eastern regions of Mongolia in spring (May) and autumn (September) when migratory birds arrive and depart. Observation using binoculars was used to identify bird species, estimate numbers, and locate AI-suspected and dead birds.

Sampling : Fresh feces were collected following identification of the bird species. Samples were stored in sample tubes (1.5 ml) and labelled. During the observations, sick or suspected cases were investigated and a tissue sample was collected. Samples were stored in nitrogen in central and eastern surveillance areas and at -4°C in the west, then delivered to the laboratory, where the samples were stored at 70°C.

RNA isolation. The 5 samples were pooled and RNA isolated by RNA extraction kit.

RT-PCR.

Virus isolation. The eggs are incubated at 35 for 3-5 days. The allantoic fluid of any eggs containing dead or dying embryos as they arise and all eggs at the end of the incubation period are tested for the presence of haemagglutinating activity.

Study result

Surveillance was conducted at the following lakes:

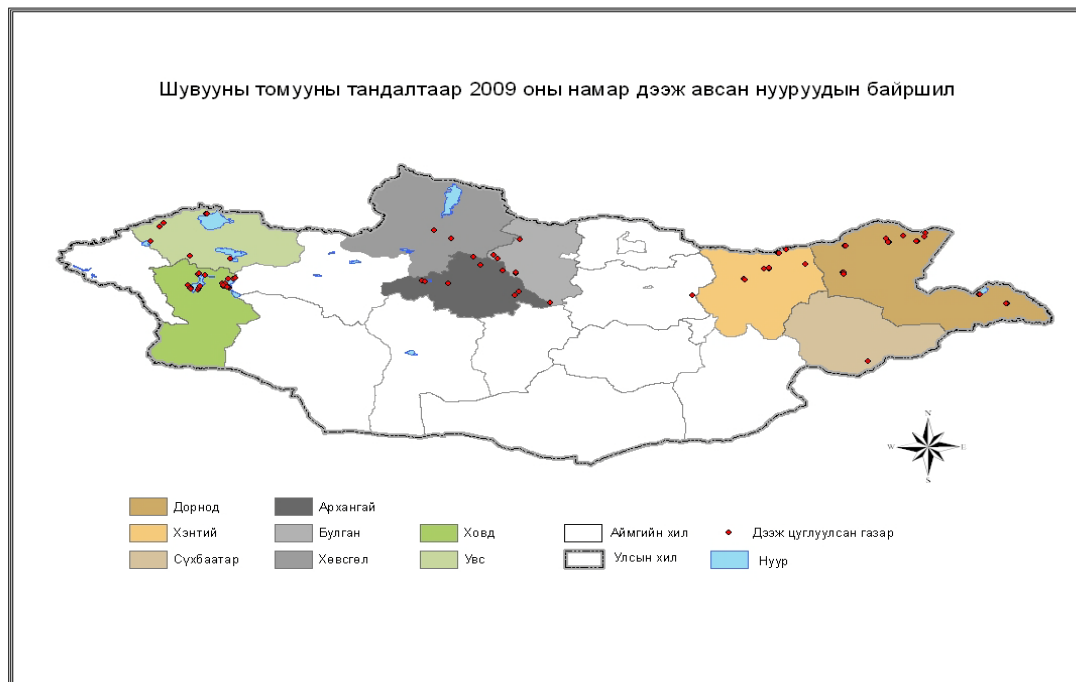


Figure. Lakes covered by the surveillance

Sampling: After identifying the bird species, fresh fecal samples were collected. The samples were taken by a swab and inserted into a solution in a 1.5 ml tube for transport.

Table. Result of RT-PCR and Virus isolation

№	Bird species	Sample	RT-PCR	Virus isolation
1	Greylag Goose/ <i>Anser anser</i> /	393	5 (1.3%)	3 (0.8%)
2	Bar-headed goose/ <i>Anser indicus</i> /	459	2 (0.4%)	2 (0.4%)
3	Swan goose/ <i>Anser cygnoides</i> /	730	5 (0.7%)	3 (0.4%)
3	Whooper swan/ <i>Cygnus cygnus</i> /	1305	4 (0.3%)	2 (0.2%)
4	Ruddy shelduck / <i>Tadorna ferruginea</i> /	452	20 (4.4%)	3 (0.7%)
5	Mallard / <i>Anas platyrhynchos</i> /	351	6 (1.7%)	4 (1.14%)
6	Gadwall / <i>Anas strepera</i> /	320	1 (0.3%)	1 (0.31%)
7	Pintail / <i>Anas acuta</i> /	83	15 18.1%)	1 (1.20%)
8	Red-headed pochard/ <i>Netta rufina</i> /	108	10 (9.3%)	1 (0.9%)
9	Herring gull/ <i>Larus argentatus</i> /	277	16 (5.8%)	8 (2.9%)
TOTAL		6044	84(1.39%)	28 (0.48%)

LP AI- H3N8, H4N6, H6N4, H10N6 subtypes were isolated from fresh feces of Herring gull, /*Larus argentatus*/, Ruddy shelduck / *Tadorna ferruginea*/, Gadwall /*Anas strepera*/, Mallard /*Anas platyrhynchos*/, Whooper swan /*Cygnus cygnus*/, Bar-headed goose /*Anser indicus*/, Pintail /*Anas acuta*/, Greylag goose /*Anser anser*/, Red-crested pochard /*Netta rufina*/ and HPAI- H5N1 was isolated from tissue sample of Whooper swan /*Cygnus cygnus*/ . In total 28 samples were positive (0.48 % of the total samples).

In Mongolia has been implementing of avian influenza surveillance by donor agencies, research institute and international agencies. Particularly, OIE, Hokkaido University, WCS and other...

(Mongolia (SCVL): Topic-2)

(Topic-2) Implications for poultry market surveillance on avian influenza in HPAI control and prevention in Asia

(Question 1 for Topic-2)

- How do you see the role of live poultry market in maintaining, spreading and transmitting H5N1 HPAI viruses in your country?
-

The domestic poultry sector in Mongolia is small. The biggest commercial poultry farm, with a capacity of 300 000 layers, production of 4.5 million eggs and 70 tonnes of meat was established in 1963 near Ulaanbaatar. In the last decade, interest in keeping poultry increased significantly. In the first half of 2007, there were 148 farmers, keeping about 579,400 chickens. There are non-breeding poultry rearers, who import day-old chicks, feed and hatching eggs from other countries which increases the risk of introducing avian influenza across the border.

Poultry surveillance was conducted from 2009 to 2011 with 2 rounds a year. This study proved an absence of LPAI and HPAI among poultry that leads to optimizing of control measures of avian influenza such as enhanced preparedness, modifying the avian influenza control strategy and improving veterinary quarantine planning measures. Also, the study has shown that there is very low risk of Avian influenza infection that would be derived from movement of poultry products for human consumption.

Avian influenza vaccination has been applied to all poultry populations since 2005-2006 due to the occurrence of HPAI among wild birds. However, in recent years, vaccination has stopped because LPAI and HPAI have not been detected in poultry farms. Therefore, the control strategy shifted to improving bio-security at the farm level instead of vaccination in order to keep farms free from diseases.

Poultry farm bio-security measures have been defined as a complex of measures that focus on restricting visitors, avoiding contact with wild birds through window or feed attraction, equipment, veterinary drug and bird changes between farms. Therefore, the strategy will focus on poultry farmer education in cooperation with the government implementation and regulating agencies and professional associations.

(Question 2 for Topic-2)

- Does your country (by veterinary authorities, public health authorities, donor agencies, etc.) conduct poultry market surveillance in your country?
 - If so, please briefly outline: 1) the main objective, 2) results of the market surveillance, and 3) interpretation of the results of the surveillance
-

- The objective of this surveillance was to detect influenza infection in backyard and commercial poultry, the existence of low pathogenic influenza virus circulation, and predict whether there is a risk of infection transmission from wild birds.
- Study area was Orkhon, Ulaanbaatar, Dornod, Darkhan-Uul, Bulgan andUvs that are Project implementing aimags. In total, 41 commercial and household farms were involved.
- Surveillance was conducted twice a year between 2009 and 2011. Sampling covered household and commercial poultry farmers from the target areas.

Surveillance design

Flock selection: High risk and low risk groups were identified by the local veterinarian by questionnaires.

- *High risk group:* is defined as backyard chickens without fencing, free ranging and have high risk of contact with wild birds. Oropharyngeal, cloacal swabs and blood samples were collected according to instruction from 5 flocks with about 10 chickens.
- *Low risk group:* defined as backyard chickens or indoor chickens with fencing, shelter and low probability of contact with wild birds. Estimated total of 5 flocks, each flock has 10 chickens, if flock has less than 10 chickens, samples were collected from more flocks.

Laboratory testing: Testing followed OIE recommended methods.

- *RNA extraction:*
- *Avian Influenza M gene identification by RT*
- *Virus isolation*
- *HI*

Result of the study

Samples were collected from poultry farmers of Ulaanbaatar, Uvs, Bulgan, Darkhan-Uul, Orkhon and Dornod aimags.

Samples were collected from 2 groups (high risk and low risk) that were identified by questionnaire based on flock location, housing type and bio-security level. Between 2009 and 2011 3120 samples were collected in total.

Poultry surveillance was conducted from 2009 to 2011 with 2 rounds a year. This study proved an absence of LPAI and HPAI among poultry that leads to optimising of control measures of avian influenza such as enhanced preparedness, modifying the avian influenza control strategy and improving veterinary quarantine planning measures. Also, the study has shown that there is very low risk of Avian influenza infection that would be derived from movement of poultry products for human consumption.

Avian influenza vaccination has been applied to all poultry populations since 2005-2006 due to the occurrence of HPAI among wild birds. However, in recent years, vaccination has stopped because LPAI and HPAI have not been detected in poultry farms. Therefore, the control strategy shifted to improving bio-security at the farm level instead of vaccination in order to keep farms free from diseases.

Poultry farm bio-security measures have been defined as a complex of measures that focus on restricting visitors, avoiding contact with wild birds through window or feed attraction, equipment, veterinary drug and bird changes between farms. Therefore, the strategy will focus on poultry farmer education in cooperation with the government implementation and regulating agencies and professional associations.

During the surveillance study, questionnaires were collected from all sampled farms, covering present poultry health status, information on trading between farms and the origin of flocks, providing a valuable database for further study.

(C. Taipei: Topic-1)

Your name: Dr Shu-Fen Chang

Your country: Chinese Taipei

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/ transmission/spread of H5N1 HPAI viruses in your country?

Answer:

- Taiwan, festoon of islands, sits in the middle of the Western Pacific. It is located at one of the migration way of the wild bird from northern Siberia go to Southern Hemisphere. From September to next April, a lot of migratory birds migrate in/out the wetlands. Sometimes we could detect the notifiable avian influenza (NAI) viruses, such as H7N3 and H5N2, from the drooping samples of migratory birds before NAI with same subtype outbreak in poultry. But the data of gene sequencing between viruses isolated from wild bird droppings and poultry swabs were not close related. Even though there is no H5N1 case occurred in Chinese Taipei, we believe that the migratory birds indeed play a role for NAI introduction according to the experience of disease countries, but the mechanism how migratory birds introduce/ transmit/ spread the AIV is still unclear.
- We ever conduct the pilot AI monitoring survey on resident birds, like pigeons, and all the virological results were negative for NAI. So far, we could not link the role of resident birds for the introduction/ transmission/spread of AI.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
- If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?

- AI surveillance programme of wild birds was initiated since 1998 by the government (veterinary authority). The programmes were conducted every year. The target populations are wild duck, snipe, curlew, egret...etc. and at least 3,000 dropping samples are collected for RT-PCR tests and virus isolation.
- The results of AI surveillance of wild birds were listed below:

Year	Ducks	Shorebirds	Gulls	Egrettas	Others	Total	<i>Detected subtypes (46)</i>	
1998	1,457	0	0	30	0	1,487	H1N1, H1N2, H1N3, H2N3, H2N7, H2N9, H3N2, H3N6, H3N7, H3N8, H3N9, H4N2, H4N3, H4N5, H4N6, H4N7, H4N8, <u>H5N2, H5N6,</u> H6N1, H6N2, H6N5, H6N9, <u>H7N1, H7N2, H7N3, H7N5, H7N6, H7N7, H7N9,</u> H8N3, H8N4, H9N6, H9N9, H10N1, H10N2, H10N3, H10N4, H10N6, H10N7, H10N8, H10N9, H11N3, H11N9, H12N2, H14N7	
1999	1,418	75	0	0	0	1,493		
2000	1,825	44	0	0	0	1,869		
2001	2,516	45	3	0	0	2,564		
2002	2,060	652	72	0	98	2,882		
2003	1,831	553	59	0	0	2,443		
2004	1,902	1,149	190	4	106	3,351		
2005	2,806	1,357	112	38	194	4,507		
2006	2,352	1,413	161	436	179	4,541		
2007	2,645	1,147	20	317	21	4,150		
2008	2,768	920	80	389	108	4,265		
2009	2,755	835	57	417	91	4,155		
2010	2,791	754	79	504	18	4,246		
2011	2,301	1,068	40	326	26	3,761		
Sum	31,427	10,034	873	2,461	841	45,714	<u>All isolates are LPAIV</u>	
isolates	340	14	2	6	1	363		
Prevalence(%)	1.08	0.14	0.23	0.24	0.12	0.80		

Subtype	Cleavage site of HA protein
H7	PEIPKGR*GLF
H5	PQRETR*GLF

- The main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry is for the precaution to the local and central government for well preparation and early response.
- We consider that wild bird surveillance is a useful tool to predict NAI outbreaks in poultry in your country. Sometimes we could detect the NAI viruses, such as H7N3 and H5N2, from the drooping samples of migratory birds before NAI with same subtype outbreak in poultry.

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.
-

Answer:

- According to the results of AI surveillance of wild bird, 47 subtypes of AIVs were detected from the droppings of wild birds, indicating the possible role to transmit or spread the AIV via the contaminated feces. So it's the strong evidence for government to enforce the bio-security measures, such as bird-proof net, cleaning and disinfection, human and vehicle entry control, to decrease the possibility to contact the wilds birds vomit and feces contaminated feed or materials.
- Another action is to initiate the monitoring activity around the sample spot when the NAI was detected in droppings samples taken from wild birds. The surrounding poultry farms with the 3 km radius of sampling spot would be monitored to ensure no NAI viral activity in the area. If any positive reaction were detected in the area, the corresponding response/ action would be applied to control the disease and its spreading.

(Thailand: Topic-1)

Your name: Dr. Orapan PASAVORAKUL

Your country: Thailand

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/transmission/spread of H5N1 HPAI viruses in your country?

-Thailand experienced that both migratory and resident birds had played an important role in the introduction, transmission and spread of H5N1 HPAI viruses in the country. Particularly in 2004-2005, where the HPAI-H5N1 virus was widely spreading throughout Thailand, we found that both migratory and resident birds were infected. Nonetheless, such infection might be spilt over from those overwhelmingly infected domestic poultry during that time.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
 - If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?
-

- Yes.

- *The Department of Livestock Development, Ministry of Agriculture and Cooperatives has cooperated with the Department of Natural Parks, Wildlife and Plant Conservation, Ministry of Natural Resource and Environment in conducting avian influenza surveillance in wild birds.*

-During 2004-2005, Thailand identified positive cases in natural birds by passive laboratory surveillance as the followings.

10 Anastomus oscitans

13 Columba livia

1 Dendrocygna javanica

1 Dicrurus macrocercus

1 Geopelia striata

5 Lonchura punctulata

2 Pavo spp.

1 Phalacrocorax niger

1 Streptopelia tranquebarica

3 Struthio camelus

3 Sturnus nigricollis

3 Tringa glareola

-The official figures of samples collected by the Department of Natural Parks, Wildlife and Plant Conservation are as follows.

	2004	2005	2006	2007	2008	2009	2010	2011	2012
<i>Kind of Birds</i>	205			160	120	133	117	78	82
<i>Number of Birds</i>	51,433			16,058	15,717	15,855	11,511	5,756	6,424
<i>Number of Cloacal Swab Samples</i>	3,344	9,872	5,980	6,262	5,644	5,578	4,076	2,106	2,275

NB. One tube of sample coming from 3 birds' cloacal swab sampling

- To monitor the HPAI virus in wild birds
- To study the evolution of the HPAI virus in wild birds

- Yes.

- The Department of Livestock Development assists the Department of Natural Parks, Wildlife and Plant Conservation in planning for annual avian influenza surveillance in wild birds.

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.

- Yes.

- The Department of Livestock Development analyses the data obtaining from the annual surveillance in wild birds and inform the results as well as provide information and recommendations to the Department of Natural Parks, Wildlife and Plant Conservation in reviewing/modifying the forthcoming annual avian influenza surveillance plan.

- Also the laboratory results from university laboratories who conduct research on avian influenza virus or their passive laboratory surveillance are incorporated to the revision of annual surveillance plan for avian influenza.

(Thailand: Topic-2)

Your name: Dr. Orapan PASAVORAKUL

Your country: Thailand

(Topic-2) Implications for poultry market surveillance on avian influenza in HPAI control and prevention in Asia

(Question 1 for Topic-2)

- How do you see the role of live poultry market in maintaining, spreading and transmitting H5N1 HPAI viruses in your country?

-Live bird markets is not quite a distinct business in Thailand. The LBMs are usually handled during festive seasons such as the Chinese new Year.

(Question 2 for Topic-2)

- Does your country (by veterinary authorities, public health authorities, donor agencies, etc.) conduct poultry market surveillance in your country?
- If so, please briefly outline: 1) the main objective, 2) results of the market surveillance, and 3) interpretation of the results of the surveillance

-Yes

-Thailand conducts avian influenza surveillance in the live bird markets from time to time and are trying to increase such activity due to the absent of the HPAI-H5N1 outbreak for 4 years.

-The objectives are to monitor all potential risks in pathways of poultry production and also to ensure the freedom from infection as well as to guarantee the food safety of our poultry products for consumers and the importers.

-The results were negative to HPAI –H5N1 virus.

(Question 3 for Topic-2)

- How does your country incorporate poultry market surveillance into the HPAI control and/or prevention to improve the HPAI situation in your country?
 - What actions are to be undertaken to control/prevent HPAI based on the information obtained from market surveillance?
-

-After HPAI outbreaks in Thailand in January 2004, any poultry to be moved (to either poultry market, slaughterhouse or other place) needs a movement licence. The licence is only obtained by a negative result of virus isolation from cloacal swab samples, at statistically significant sampling, during 8-10 days immediately prior to the movement.

-Poultry market surveillance is a part of the National Avian Influenza Surveillance Programme to cover every step of poultry production.

(Vietnam: Topic-1)

Name: Dr. Van Dang ky

Country: Viet Nam

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/transmission/spread of H5N1 HPAI viruses in your country?

Vietnam is in the migratory flyway of wild birds. There were some reports on HPAI in wild birds in neighboring countries such as China (including Hongkong), Mongolia. Fortunately, since 2003, there has been not any report on HPAI in wild birds in Vietnam. Potential of wild birds in the introduction/transmission/spread of H5N1 HPAI viruses in Vietnam is not high.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?

(Answer)

In Vietnam, YES. WCS and OIE conducted avian influenza surveillance of wild bird.

- If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.

(Answer)

See results from Posters.

- What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?

(Answer)

Wild birds might carry AI viruses, even H5N1 virus. We need the answer of role of wild birds with H5N1 infection through the surveillance.

- Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?

(Answer)

In Vietnam, NO. No evidence of H5N1 infection in wild birds until now.

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.
-

(Answer)

In Vietnam, with surveillance data, wild birds are not source of H5N1 outbreaks in poultry.

(Vietnam: Topic-2)

Name: Dr. Van Dang Ky

Country: Viet Nam

(Topic-2) Implications for poultry market surveillance on avian influenza in HPAI control and prevention in Asia

(Question 1 for Topic-2)

- How do you see the role of live poultry market in maintaining, spreading and transmitting H5N1 HPAI viruses in your country?

LPM is an area where poultry from different sources brought in. Practice of poultry selling at LPM is risky to transmission of H5N1 virus. It may be a source of virus maintaining and spreading.

(Question 2 for Topic-2)

- Does your country (by veterinary authorities, public health authorities, donor agencies, etc.) conduct poultry market surveillance in your country?

(Answer)

YES.

- If so, please briefly outline: 1) the main objective, 2) results of the market surveillance, and 3) interpretation of the results of the surveillance

(Answer)

Refer to Posters

(Question 3 for Topic-2)

- How does your country incorporate poultry market surveillance into the HPAI control and/or prevention to improve the HPAI situation in your country?

(Answer)

LPM surveillance helps us to identify sub-clinical carriers of poultry at markets.

- What actions are to be undertaken to control/prevent HPAI based on the information obtained from market surveillance?

(Answer)

Strengthening surveillance, disinfection, vaccination strategy, etc.

(Vietnam: Topic-1)

Your name: Dr TONG HUU HIEN

Your country: VIET NAM

(Topic-1) Implications for avian influenza of wild birds in the HPAI control and prevention in Asia

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/ transmission/spread of H5N1 HPAI viruses in your country?

The potential of wild birds in the introduction of H5N1 HPAI viruses in Viet nam is not yet clearly elucidated, because there are not samples from dead wild birds sent to NCVD for the diagnosis of H5N1 HPAI since nearly 2 years.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
- If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?

In Viet nam conducted AI surveillance of wild bird by Veterinary authorities .

- From 2009- 2012 we tested 100 birds (2 swabs/ bird – cloacal and tracheal) .Species : Anseriformes and other species of water birds . From 3 provinces : Nam dinh, Ca mau and Bac lieu . Testing method : Real-time RT-PCR for M, H5 and N1 genes from pooled swabs . Result : All were negative with H5N1 HPAI .

- My interpretation of the result is : The main role of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks determine the present of HPAV H5N1 virus in wild bird and knows that where is the virus comes from? Which is the types of virus ?

To plan the future progress against control the disease can be monitored.

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.
-

In Viet nam wild bird surveillance incorporate with domestic bird surveillance to obtain information and data for planing to predict HPAI outbreaks in poutry for planing to vaccinate , to prevent the spread of disease. Since early 2011 to now in Viet nam have experenced introductions of new virus clade 2.3.2.1 (A, B and C) in the North of VN. All most samples isoleted the virus H5N1 from ducks . Clade 1.1 virus remains as majority, and continues to evolve in the South of VN Clade 2.3.2/2.3.4 were occasionally detected.

(Q & A sheets for Topic-1)

Your name:

Dr. Md. Shariful Islam.

Your country:

Bangladesh.

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/transmission/spread of H5N1 HPAI viruses in your country?

In swampy and watery area of our country, many migratory birds are comes in winter season. About 150 species of

(Please write down your answer here.)

migratory birds are comes & about 22 species are detected as a carrier of Avian influenza virus. Few years ago in swampy area (like Nakuloki haor area) domestic ducks were affected, but not in serious form.

Resident domestic birds, like crow are infected by AI virus & died some crow. But not other resident domestic birds are infected have no report.

In our country, there is no modern slaughter house for poultry & birds. People are like to buy poultry & slaughter them and take feedable portion. Other uneatable portion (like intestine) neglected here.

Through a way in free place etc near to gangle, crow ingest it & may affected by AI virus.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
 - If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?
-

* We have veterinary authority that conduct/
conducted AI surveillance of wild bird, but have
not sufficient, man power.
(Please write down your answer here.)

* Due to surveillance of wild bird, there is no
infection/^{AI breakout} in the swampy & water area.

* Our interpretation during surveillance of wild
bird, is the one of the vital point/role for
the prevention & controlling H5N1 HPAI
in our country.

* It is useful tool & one of the vital
key role to prevent & controlling the
HPAI out-break, in our country.
So, we want & try to maintain or
setup a structure for wild bird
surveillance team.

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.
-

The main goal of all surveillance is to obtain information and data, for improving the control & prevention of HPAI infection/disease.
(Please write down your answer here.)

In our country, on the basis of surveillance, epidemiology unit established which mainly, work on control & prevention of HPAI outbreaks.

Through the surveillance, rapid action & right measure should be taken in our country. We try to continue this surveillance programme, for future years. Until control the HPAI disease.

(Q & A sheets for Topic-2)

Your name: Dr. Md. Shafiqul Islam.
Your country: Bangladesh.

(Question 1 for Topic-2)

- How do you see the role of live poultry market in maintaining, spreading and transmitting H5N1 HPAI viruses in your country?

* In our country, live poultry market serve as a source of infection, which amplify, transmit and spread the disease and it acts

(Please write down your answer here.)

as a ~~reservoir~~ of viruses.

- * live poultry market acts as a virus diplo boom which virus can easily transmitted through human/man (like consumer, seller, buyer, retailers & middle man)
- * In live poultry market, after poultry slaughter, it start in infection source.
- * In live poultry market, when birds are not sold, then if returned to home, then well birds are infected.

(Question 2 for Topic-2)

- Does your country (by veterinary authorities, public health authorities, donor agencies, etc.) conduct poultry market surveillance in your country?
 - If so, please briefly outline: 1) the main objective, 2) results of the market surveillance, and 3) interpretation of the results of the surveillance
-

(Please write down your answer here.)

- * Yes. in our country have veterinary authority, public health authority & some donor agencies conduct poultry market surveillance, regularly. But now power shift.
- * Main object of surveillance is to control and prevention of outbreak of HPAI infection. To save poultry farmer/poultry owner & to save people health.
- * Results due to surveillance of LPM is reduce in HPAI infection & less outbreak of disease.
- * Interpretation of & surveillance of LPM is helpful to control & prevention of HPAI infection & outbreak.

(Question 3 for Topic-2)

- How does your country incorporate poultry market surveillance into the HPAI control and/or prevention to improve the HPAI situation in your country?
 - What actions are to be undertaken to control/prevent HPAI based on the information obtained from market surveillance?
-

- * In our country poultry market surveillance done by the help of FAO, USAID, WHO & other donors. Due to surveillance control & prevention of HPAI situation ^(Please write down your answer here.) is improved, less outbreak occurs. We try to continue live poultry market surveillance.
- * When information found, then stamping out done, sanitary measure taken, disinfectant & disinfection spray done in respective farm & areas.
- * Now in our country AI vaccine programme should be taken in test case in two districts in six upazilla's.

(Q&A sheet for Topic-1)

Ro Korea

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/transmission/spread of H5N1 HPAI viruses in your country?
-

Wild birds are suspected to be introducing factor in Korea.

- H5N1 was isolated from wild birds and feces.
- HPAIVs isolated from wild birds and domestic HPAI outbreak farms were identified to belong in the same genetic group (HA 2.3.2.) since 2008 and 2010 cases. Especially, genetic homogeneity in 2010 outbreak case was 99.4%.
- HPAIVs isolated from domestic wild birds are similar to the virus from great-crested grebe in Chinghai, 2009 and whooper swan in Mongolia, 2009 & 2010.

Transmitting factors

- Visit by people or cars contaminated with feces of infected wild birds inhabiting the area nearby farm (Highest possibility)
- Supplying residual feed contaminated with feces of infected wild birds
- Direct contact with infected wild birds (in case of pasturage)
- Farmer's visit contaminated farm

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
 - If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?
-

Yes. OIA in Korea conduct AI surveillance for wild birds collaborating and sharing the surveillance results with environment authorities.

In 2011, OIA tested 5,148 feces samples for AI Ag and 2,008 of captured wild birds for Ag and 1,956 samples for Ab.

The results were 34 cases positive in feces sample and 2 cases positive in captured wild birds.

Also, environment authorities tested 7,704 feces samples and 1,090 captured wild birds.

**Wild birds are suspected to be introducing and Transmitting factors
in Korea.**

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.
-

Framework of HPAI control (Wild bird)

- ☐ **Outbreak Area**
 - Manage the AI Central-Preventive Headquarters
 - Set up & maintain the Control Area (10km)
 - Serological test of duck farms (Control Area)
 - Disinfection & Emergent observation
 - Equip wild bird preventing mesh in domestic farms
 - Movement control for 14days (duck) or 7days (chicken)
- ☐ **Free Area**
 - Restrict visitor access (Vehicles, Men, etc)
 - Strengthen observation of fowl farms
 - Promote AI preventive methods (sending SMS text messages)

Attachment II

(Key facts and background information)

(Topic-2) Implications for poultry market surveillance on avian influenza in HPAI control and prevention in Asia

- Live poultry markets (LPMs) are ubiquitous in most of developing countries in Asia. LPMs are essential for marketing poultry and a preferred place for local people to buy

(Q & A sheets for Topic-1)

Your name: Dx. Myint Soe

Your country: Myanmar.

(Question 1 for Topic-1)

- Given the facts/background information mentioned above, in general, how do you see potential of wild birds (both migratory and resident birds) in the introduction/transmission/spread of H5N1 HPAI viruses in your country?
-

(Please write down your answer here.)

The role of wild bird is considered as potential for introduction / transmission / spread of H5N1 virus.

But there was no evidence of seropositivity of H5N1 in wild birds, even those were some connection during HPAI outbreak in Myanmar. Some outbreaks occurred near to the areas where migratory bird.

(Question 2 for Topic-1)

- Does/Has your country (by Veterinary authorities, wildlife authorities, donor agencies, research institute, etc.) conduct/conducted avian influenza surveillance of wild bird?
- If so, please briefly outline: 1) results of AI surveillance of wild bird in your country and 2) your interpretation of the results including following points.
 - What is the main role/function of wild bird surveillance in controlling and preventing H5N1 HPAI outbreaks in poultry in your country?
 - Does your country consider that wild bird surveillance is a useful tool to predict HPAI outbreaks in poultry in your country? If yes, how can your country do so?

(Please write down your answer here.)

- No surveillance of HPAI of wild bird in our country.
But there was a study supported by FAO HPAI programme
conducted the role of duck and transmission of
HPAI from those to domestic chicken at Ayeyarwaddy
& Inlay region.
- The result of that study ~~the~~ revealed that
the role of wild bird is not very much important in
introduction, transmission, spread of HPAI.

(Question 3 for Topic-1)

- The goal of all surveillance programmes is to obtain information and data for improving the control and prevention of the disease. In this context, how does your country incorporate the wild bird surveillance into H5N1 HPAI control and prevention in poultry? What actions are to be undertaken based on the information/data obtained from wild bird surveillance in your country? Please briefly describe this point.
-

(Please write down your answer here.)

Qn. 3

The proposed programme to study wild bird surveillance has been submitted to FAO. AS programme of Myanmar since ~~2011~~ early 2012.

Even the findings of the previous study revealed that the role of wild bird is not very much important for the In / Tr / sp. of HPAS.

LBVD. has issued an guideline to separate wild bird & domestic bird in all farming system as much as possible.

(Q & A sheets for Topic-2)

Your name: _____

Your country: _____

(Topic-2) Implications for poultry market surveillance on avian influenza in HPAI control and prevention in Asia

(Question 1 for Topic-2)

- How do you see the role of live poultry market in maintaining, spreading and transmitting H5N1 HPAI viruses in your country?

(Please write down your answer here.)

The role of live poultry & market $\Rightarrow$ is important
for the potential spreading of HPAI in my country.
transmission

(Question 2 for Topic-2)

- Does your country (by veterinary authorities, public health authorities, donor agencies, etc.) conduct poultry market surveillance in your country?
 - If so, please briefly outline: 1) the main objective, 2) results of the market surveillance, and 3) interpretation of the results of the surveillance
-

(Please write down your answer here.)

- yes. poultry market surveillance has been started in Yangon since early 2011.
- No isolation of virus from live bird market but some positive to HA. HI test.

The main objective of conducting live bird market survey are -

- to understand movement pattern, volume, & risk of HPAI at LBMs.
- to be considered as a potential of disease introduction / transmission / spreading of HPAI.
- to know more detail on the epidemiology of HPAI in Myanmar.

(Question 3 for Topic-2)

- How does your country incorporate poultry market surveillance into the HPAI control and/or prevention to improve the HPAI situation in your country?
 - What actions are to be undertaken to control/prevent HPAI based on the information obtained from market surveillance?
-

(Please write down your answer here.)

IBVD is working closely with Yangon City Development Council to improve biosecurity at all live-bird markets by conducting disinfection weekly, providing disinfectant and funding for reconstructing drainage system.

Moreover, YCDC staff are checking PC₂ and clinical surveillance ~~not~~ regularly.