OIE/JTF Project
for Strengthening HPAI Control in Asia
(2008-2012)

Final report
OIE/JTF Project on Strengthening HPAI Control in Asia

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An epidemic of Highly Pathogenic Avian Influenza (HPAI) caused by Influenza A virus subtype H5N1 in Southeast Asia started in 2003. The disease was then reported in East Asia including Japan, R.O. Korea, Mongolia, P.R. China and Russia, to Europe, Middle East and to Africa, posing serious threats to the poultry sector as well as to human health, including reports of human infection and deaths.

At the time, HPAI spread crossing country borders mainly by animal movement, international trade and also possibly through migratory wild birds. Early detection through effective disease surveillance systems of domestic poultry and rapid response at source were recognised as essential for control and prevention of the disease. Under certain circumstances where stamping out either could not be implemented or was insufficient, vaccine also was applied for disease control in some countries and a regional vaccine bank for emergency was developed to support vaccination in some regions.

HPAI still remains a significant threat at the global level, as this dreadful disease has been repeatedly occurring in various regions including Asia. The situation became serious around late 2007 and early 2008, particularly in Asia, including Southeast and South Asian countries. Thus the continuous assistance from international Organisations to countries at risk was crucial and necessary for effective disease prevention and control.

Under such circumstances, the Government of Japan, through the Ministry of Agriculture, Forestry and Fisheries, decided to further cooperate with the World Organisation for Animal Health (OIE) in controlling HPAI at source in countries of Asia, for a period of five years starting from 2008. Thus, the OIE/Japan Trust Fund (JTF) Project for Strengthening HPAI Control in Asia was launched.

This report was prepared upon the completion of the project, comprehensively summarising the activities implemented including the recommendations and outputs.

Upon the successful conclusion of the project, I take this opportunity to express my appreciation to the Ministry of Agriculture, Forestry and Fisheries of Japan for its kind financial assistance and cooperation with the OIE in combating emerging zoonoses in the Asia Region.

Dr H. Kugita,
OIE Regional Representative for Asia and the Pacific
1. Background

An epidemic of Highly Pathogenic Avian Influenza (HPAI) caused by Influenza A virus subtype H5N1 in Southeast Asia started in late 2003. The occurrence and spread of HPAI in the region prompted persistent efforts towards its control as it became endemic in certain areas, posing a significant threat to livestock production and public health. Therefore, early detection and rapid response to control the disease at the source was considered crucial to manage the situation.

Under such circumstances Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF) collaborated with the OIE to implement the OIE/Japan Special Trust Fund (JSTF) Project “Highly Pathogenic Avian Influenza Control at Source in Southeast Asia” during the period 2006/2007 targeting strengthening of veterinary services in the region.

Performance of the OIE/JSTF Project on HPAI Control at Source in Southeast Asia was evaluated at the OIE Regional Workshop on HPAI in November 2007 which was held back to back with the 25th Conference of OIE Regional Commission for Asia, the Far East and Oceania in Queenstown, New Zealand. The Workshop identified the progress made throughout the region in relation to HPAI control. As a result, it was considered necessary to expand the scope of the project towards South Asia as well as East Asia.

Based on these recognitions, two new projects were inaugurated with the assistance of MAFF, namely the second phase of the OIE/JSTF Project (2008-2009) and the OIE/Japan Trust Fund (JTF) Project for Strengthening HPAI Control in Asia (2008-2012).

The present document is the formal report on the latter project.
2. Activities and Achievements

The OIE/JTF Project for Strengthening HPAI Control in Asia was launched in April 2008 and carried out for five years to March 2012. The project consisted of three components as follows:

- **Component I**: Strengthening Information Networking in Asia
- **Component II**: Strengthening Capacity of Veterinary Services
- **Component III**: Surveillance of wild birds and poultry along migratory flyways

The diagram for project components is shown in Figure 1.

2.1. Inception Meeting

The Inception Meeting was held in Tokyo, Japan in April 2008 and attended by H.E. Mr Masatoshi Wakabayashi, Minister of Agriculture, Forestry and Fisheries of Japan, representatives of OIE Headquarters, Members in Asia, donors and other relevant Organisations.

The meeting confirmed the importance of strengthening disease control measures in respective countries and the regional cooperation on animal health information exchange. Accordingly, the action plan for each component of the project was discussed and confirmed.

![Diagram of project components. In the course of project implementation, this diagram was modified as necessary in view of addressing the new situation and lessons learned.](image)
2.2. Regional Meetings for Strengthening Information Networking

A series of these meetings was held, the main objective of which was to provide participating Members with a platform to regularly share and exchange up-to-date information on animal health situation and on disease control and prevention. In addition it was expected there would be identification of the constraints which Members were facing and a finding of countermeasures to resolve or alleviate those problems.

Before organising the 1st meeting in August 2008, a questionnaire was sent to 24 regional Members. The main points covered by the questionnaire were:

1) Legislation support on Animal Health and disease control;
2) Animal disease reporting mechanism;
3) HPAI control and prevention;
4) Diagnostic capacity of HPAI.

The answers were analysed and served for effective organisation of the meetings. During the project period, five such meetings were held where participating Members were able to identify problems which they were facing at various stages along the animal disease notification flow and discussed how to improve their own animal health situation and capacity of veterinary services.

Table 1: showing the number of participants in respective meetings:
2.3. Regional Expert Group Meetings for Implementation of the Programme on Surveillance of Wild Birds and Domestic Animals along Migratory Flyways

The Expert Group consisted of two types of groups: 1) an Advisory Group to provide technical advice to the project for developing an effective surveillance plan and its smooth implementation and 2) Working Groups, to provide technical assistance to the surveillance activities.

The Expert Groups provided technical views for effective control measures of virological surveillance of AI and epidemiological study related to flying routes of migratory birds. Based on the discussion at the annual meeting of the Expert Groups, surveillance in some locations in the region and tracking of migratory birds were conducted.

2.4. Surveillance of AI in domestic and wild birds

Surveillance activities had two main objectives: (1) virological surveillance in migratory birds and poultry along migratory routes and (2) tracking and monitoring of bird migration routes to address hypotheses for transmission of AI in regional countries. In order to achieve these objectives, the project conducted surveillance programmes in Vietnam, Laos and Mongolia, and obtained samples from Hong Kong.

2.4.1. Surveillance in Vietnam:

AI virus surveillance in wild and domestic birds was performed in northern and southern parts of Vietnam from 2009 to 2012. Samples from wild birds and domestic birds in the same area were collected at the same period. As for wild birds, all samples from a total of 607 birds tested negative for AI virus.

For domestic birds, more than 5,600 samples were taken from both backyard farms and live bird markets. AI viruses were isolated from 4.72% of all samples, with 3.87% being Low Pathogenic AI (LPAI) viruses and 0.85% being HPAI viruses. Positive isolation rate of AIV from LBM were markedly higher than that of backyard, with the positive percentage of 9.34% and 1.16% respectively. These data suggest the importance of live bird markets in AI surveillance to target for prevention and control measures in order to set biological barrier at human and animal interface.

2.4.2. Surveillance in Laos:

In Laos, samples from 111 wild birds and from 350 domestic birds were collected in the proximity area from 2009 to 2010. All samples tested negative for AI virus.


2.4.3. Surveillance and migratory flyways study in Mongolia

Virological surveillance in wild birds and environments nearby their habitats, as well as telemetry studies to track and monitor migratory routes, were carried out in four locations in Mongolia during 2009 – 2012 (Fig. 3).

In total, 319 cloacal swabs from 50 species of wild birds, and 8643 environmental samples (fresh droppings and lake water), were collected. No Influenza A viruses were detected from cloacal swabs samples while 6 LPAI viruses were detected from fresh droppings. These findings indicated at least 2 important aspects. First, naturally wild birds in Mongolia unlikely to carry AIV; therefore, there is a minor chance that they will cause outbreak in poultry. Secondly, AIV could be detected from fresh droppings; hence, collecting fecal samples should be considered as appropriate and cost-effective method for AIV surveillance in wild birds, rather than catching and restraining the birds.

Forty two migratory birds were attached with Satellite Transmitters, 36 of which were whooper swans. A total of 11 whooper swans were tracked, and they migrated from Mongolia to south-eastward and wintered in central-east China: Xinjiang, Gansu, Shaaxi and Shandong provinces. Migratory routes identified in this study were parallel to that of whooper swans migration from north-east Mongolia to the Korean peninsula reported by FAO-USGS satellite tracking studies (Fig.4). Although present study did not demonstrate that there is a direct flyway from China or Mongolia to Korean peninsula or Japan, the possibility was discussed in the report prepared by Yamashina Institute of Ornithology that waterfowls coming from Mongolia and Far East Russia would share AIV while wintering in China and then carry AIV to Far East Russia which is a common breeding site of waterfowls wintering in China, Korean peninsula and Japan. Thus, further study on wild birds’ movement or interaction between the two parallel flyways, and on AIV surveillance including the wintering sites in central-east China may serve to understand AIV movement in East Asian Region namely Mongolia, China, Korean peninsula and Japan.
2.4.4. Sample provision by Hong Kong

Considering that Hong Kong had been implementing comprehensive AI surveillance for both wild and domestic birds, it was agreed that the Project would not collect samples in Hong Kong, but instead receive samples collected under their own surveillance programmes. A total of 300 samples from domestic birds were tested, and obtained negative results. Eight AI viruses isolated from wild birds in Hong Kong were sent to Hokkaido University for genetic characterization of which information was uploaded to the University's AIV Database (see 2.5).
2.4.5. Comments provided by experts at the 5th meeting

As the 5th Expert Group Meeting was considered also as the wrap up session of the five-year project and an opportunity to discuss the possible way forward, international experts provided the following comments:

**Domestic Poultry Surveillance**

Following the global threat of HPAI, many Asian countries have already established a surveillance system for screening domestic poultry. Such surveillance systems should be maintained but with greater efficiency by designing surveillance based on risk factors including: 1) suspicious clinical signs in farms, 2) history of laboratory samples, 3) bird holdings in waterside, and 4) live bird markets. Such risk-based targeted surveillance would contribute to cost effectiveness. Surveillance and control based on an “Epi-zone approach” which requires coordination between neighboring countries was referred as a possible future step for eradication of the disease.

**Wild bird surveillance**

Country reports presented at the meeting indicated wild bird movement as a possible source of introduction of AI viruses. Asian countries located along the wild bird migratory flyways cannot help being concerned about such possibility. Thus, two different approaches may be considered as a way forward depending upon the feasibility and economic situation of the countries involved:

1. Passive surveillance for detecting HPAI in sick/dead wild birds - This approach could be taken for countries which need to focus their resources more on surveillance of domestic birds especially where outbreaks have been frequently reported in domestic birds.
2. Active surveillance considering risk factors such as aquatic habitats - This approach is appropriate for countries which are considered as free from HPAI in domestic birds.

**Live bird markets**

Live bird markets (LBM) where a backward movement of poultry is allowed could facilitate mixing of AI viruses. No proper surveillance mechanism is in place in many countries. LBM practice is considered as a high risk factor for spreading infection among poultry farms and for posing public health risks. Therefore, it is critical to stress the importance of LBMs; active targeted surveillance should be encouraged, the positive cases should be traced back for further investigations, biosafety and biosecurity measures should be adopted, and appropriate education to the people involved should be provided.
2.5. Strengthening Database of HPAI viruses

As an OIE Reference Laboratory for highly pathogenic avian influenza and low pathogenic avian influenza (poultry), the Laboratory of Microbiology, Graduate School of Veterinary Medicine, Hokkaido University, has been of assistance to many countries in Asia to implement surveillance in domestic poultry, ducks and migratory birds. Throughout the project, it has been engaged in virus isolation from the samples collected in participating countries and regions, followed by identification and characterisation. Based on the agreements with the participating Members, virus data obtained have been used to update the Influenza Virus Database System at Hokkaido University. One of the aims of this database is to share data and biological materials for research and development of vaccines and diagnostic use for the control of animal and human influenza. Further information on the database is available at [http://virusdb.czc.hokudai.ac.jp/index.html](http://virusdb.czc.hokudai.ac.jp/index.html) as shown in Figure 5.

All 280 LPAI and HPAI viruses isolated in this project were registered in the database of Hokkaido University and on release at website. Of these isolates, sequence information of 137 LPAI and HPAI viruses was also registered in public database, DDBJ/ENA/GenBank. The accession numbers of DDBJ/ENA/GenBank were also cross-linked to the database of Hokkaido University.

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Figure 5. Influenza Virus Database at Hokkaido University

2.6. Strengthening Capacity of Veterinary Services

2.6.1. Training for HPAI diagnosis

Total of six participants from Hong Kong, Laos, Mongolia and Vietnam attended the one-day technical meeting on AI surveillance in OIE Reference Laboratory for HPAI and LPAI at Hokkaido
University in 2009. The participants were explained the sampling procedures, handling of samples and HAPI diagnostic methods.

Staff of the State Central Veterinary Laboratory of Mongolia participated in training courses for HPAI diagnosis including molecular techniques. Training was offered both in Japan and in Mongolia with the support of experts of Hokkaido University in 2011 and 2012.

2.6.2. Sharing experience in controlling and management of HPAI outbreaks

Considering the importance of sharing experience of HPAI outbreak control, the participants of the second Regional Meeting of Strengthening Animal Health Information Networking in Asia were provided with an opportunity to hold discussions with veterinary officials of the Kyoto Prefectural Government. The participants learned how the Kyoto Prefectural Government had managed the 2004 HPAI outbreak as a practical example. The key objectives of the exercise were: 1) to provide the participants with knowledge on legislative and regulatory requirements of veterinary services in facing an emerging outbreak and 2) to raise their awareness of activities of other Organisations/authorities emphasising that cooperation within and beyond the veterinary authority is critical for successful management of HPAI outbreaks.

2.7. Expert Group Meeting on Swine Influenza in Asia-Pacific Region

It is thought that the infection of swine with Influenza A virus has a role in the mutation of Influenza A viruses leading to their becoming pathogenic to humans, the Donor wished to extend the project to a consideration of Swine Influenza (SI) issues.

The Expert Group on Swine Influenza met on 23 April 2013 in Tokyo. In the meeting, activities implemented under OIE/JTF Project for Strengthening HPAI Control in Asia, Global Update on Swine Influenza, OFFLU activities, SI surveillance in Thailand, Vietnam and Japan as well as the activities implemented by FAO in relation to SI were discussed.

Interesting points noted in the presentation on surveillance include: 1) isolation of reassortants between human seasonal influenza and a triple reassortant SI virus originated from North American strains in Vietnam and 2) the highest virus isolation rate was among pigs aged six to ten weeks in Thailand.

The Expert Group noted that information on SI is deficient probably because it is not an OIE notifiable disease. In addition, the group considered it important to request both animal health and human health sectors to employ certain flexibility in conducting their activities of common interest, especially in sharing information related to the genetics of viruses.

Recommendations from the Expert Group include raising awareness among stakeholders, enhancing public-private collaboration, collaborative interventions of animal health and human health sectors to avoid consumer misperception on SI, promoting antigenic analysis and characterization and enhancing the capacity of veterinary services for surveillance and diagnosis of SI. Further, it was recommended to conduct cost-benefit analysis at different production levels in relation to vaccination against SI as well.
3. **Major Outcomes**

During the five year project, annual information networking meetings facilitated among Asian Members exchange of information about national HPAI control strategies and the seeking of opportunities for regional cooperation and alliance for disease control measures. The project also provided ample opportunities for the Member countries to share epidemiological information on HPAI and to be provided with the findings of the surveillance programme conducted by the project through the Regional Expert Group Meetings. Accordingly, regional information networking on HPAI control among Asian Members was strengthened, which should facilitate further improvement of national and regional disease control strategies.

The project also provided training courses in HPAI diagnosis using molecular techniques in Japan and Mongolia to strengthen the capacity building of laboratory staff in Mongolia. The Asian Members were also able to learn how the Kyoto Prefectural Government managed the 2004 HPAI outbreak, as a practical example of AI control and management.

The surveillance of wild birds and poultry was conducted in Laos, Vietnam and Mongolia, with technical support by Hokkaido University and Yamashina Institute of Ornithology, to track and monitor migratory flyways and to study HPAI viruses in wild and domestic birds. Telemetry studies in Mongolia showed that the breeding population of whooper swans migrates from Mongolia to China, with a migratory route parallel to that previously reported by FAO/USGS.

HPAI virus was not isolated from any samples from wild birds, fresh droppings and lake water, but a few LPAI viruses were isolated from droppings. Therefore it can be suggested that sampling from fresh feces and dead birds should be a priority to catching birds for the collection of cloacal swabs in migratory bird surveillance activities.

AI viruses were isolated from the samples taken from both backyard farms and live bird markets during the surveillance period of the project. The isolation rate was significantly higher in live bird markets, suggesting that live bird markets should be focused on planning AI surveillance and control activities in domestic poultry. This was considered critical from a public health perspective as well.

The project also assisted in strengthening the database for isolated viruses and their genetic information through enhancing the Influenza Virus Database System at Hokkaido University. OIE Member countries can access this AI virus database to use such information for further improvement of surveillance programmes as well as diagnosis and vaccine development.

In summary, the OIE/JTF Project for Strengthening HPAI control in Asia (2008-2012) facilitated improvement of HPAI control in Asia by strengthening regional information networking on animal health through regional meetings, assisting members to strengthen national veterinary services through training and exercises, and providing information on AI viruses through surveillance of wild birds and poultry along migratory flyways.
4. Acknowledgement

OIE RRAP and the participating regional Members acknowledge the generous assistance of MAFF to establish and operate the OIE/JTF Project for Strengthening HPAI Control in Asia 2008/2012.

5. Useful Links for Regional Meetings

Summary Report for Inception Meeting:

Regional Information Networking Meetings:
http://www.rr-asia.oie.int/programme/regional-programme/hpai/oiejtf-programme/component-i/

Regional Expert Group Meetings
http://www.rr-asia.oie.int/programme/regional-programme/hpai/oiejtf-programme/component-iii/

Expert Group Meeting on Swine Influenza