

No. 84 (February 11, 2014)

The Status of AI Outbreak and Response and the Direction of Preventive Measures

Huh Duk, Han Bong-hee, Kim Hyeong-jin, Lee Hyung-woo, Kim Jin-nyoun

1. AI Cases around the World	3
2. HPAI Cases in Korea	5
3. Japan's Response to AI Outbreak and its Significance	13
4. Direction of Preventive Measures against AI	19

KREI

Supervisor: Senior Research Fellow, Jeong Min-kook 02-3299-4263 mkjeong@krei.re.kr
Contents enquiries: Senior Research Fellow, Huk Duk 02-3299-4261 huhduk@krei.re.kr
Data enquiries: Won Dong-hwan 02-3299-4274 wondh@krei.re.kr

- "KREI Agricultural Policy Focus" relates to analysis and description of the trend of and policy for agriculture and rural areas.
- This is also provided at the KREI website (www.krei.re.kr).

◇ Abstract ◇

- Highly Pathogenic Avian Influenza (HPAI) and Low Pathogenic Avian Influenza (LPAI) have broken out in 37 countries all over the world since 2012 and have recently been detected in four countries as of January 2014.
 - Those who are infected with or died of AI that broke out since November 2003 have been reported in 15 countries generally in the Asian region.
- HPAI has been detected five times in Korea, and experts presume that the influenza virus could enter the country by migratory birds.
- According to the urgent AI Standard Operating Procedure (SOP), which was revised to prevent the spread of HPAI all over the nation and eradicate the virus at an early stage, the authorities issued a nationwide “temporary standstill” order twice to Jeollanam-do and Jeollabuk-do Provinces, Gwangju Metropolitan City (for 48 hours), Gyeonggi-do, Chungcheongnam-do and Chungcheongbuk-do Provinces, Daejeon Metropolitan City and Sejong City (for 12 hours), for the first time since the system was introduced.
- Since 2004, AI broke out five times in Japan, and experts have identified wild birds as one of the causes of the infection in all of five cases and sought for countermeasures against the spread of AI through wild birds.
- The Japanese government’s preventive measures against AI are more specific and detailed than the SOP of the Korean government.
 - In Japan, the authorities use the detailed feeding management checklist to probe the current status, and choose sampling methods and designate farms that should be under control, in a more scientific approach.
 - The Korean SOP suggests guidelines only for the occasion in which wild birds are officially identified as the cause of the AI infection. On the contrary, the Japanese measures provide thorough preventive guidelines and even anti-virus countermeasures against the AI infection from wild birds even for farms.
- In order to improve the current preventive policy against AI infection,
 - firstly, complementary plans for the sustainable eco-friendly livestock policy are needed to resolve fundamental problems of animal diseases;
 - secondly, responding guidelines should be more specific, and interdepartmental cooperative relationships and information network should be established;
 - finally, a joint research network among Northeast Asian countries including Korea, China, Taiwan and Japan should be established to reinforce the quarantine system at the borders and seek for preventive measures against the transmission of the virus through wild birds.

1. AI Cases around the World

- Since 2012, HPAI and LPAI have broken out in 37 countries all over the world. The AI virus has also been detected in four countries recently including Egypt, Indonesia, China and Korea as of January 2014.
 - The virus spread in 21 countries in 2013.

- Since 2012, the AI infection has been reported in a total of 18 Asian countries, and the virus has been identified as highly pathogenic in most cases. The virus spread frequently in Nepal, Vietnam, China and Hong Kong.

Table 1. The Status of AI Outbreak in Asia since 2012 (as of January 29, 2014)

Country	Type	Date of Outbreak	Country	Type	Date of Outbreak
India	H5N1 (HP)	Jan 3, 2012	Cambodia	H5N1 (HP)	May 27, 2012
		Oct 12, 2012			Jan 9, 2013
		Feb 27, 2013	Aug 12, 2013		
Iran	H5N1 (LP)	The first and second half of 2012	Myanmar	H5N1 (HP)	Feb 20, 2012
			China	H5N1 (HP)	Sep 11, 2012
May 13, 2013					
Dec 27, 2013					
Nepal	H5N1 (HP)	Aug 27, 2012		H5N2 (HP)	Dec 21, 2013
	H5 (HP)	Oct 16, 2012	H7N9 (LP)	Apr 4, 2013	
Sri Lanka	H5N2 (LP)	Jan 20, 2012	H7N9 (HP)	Continuous outbreak	
			Iraq	LP	Jan-May and Jul-Dec, 2012
Israel	H5N1 (HP)	Mar 7, 2012			
			Mar 13, 2013	Nov 17, 2012	
Palestine	LP	The second half of 2012	H5N1 (HP)	Jul 7, 2012	
			H5N2 (LP)	Nov 12, 2012	
Saudi Arabia	LP	The second half of 2012	H5N3 (LP)	Jul 3, 2013	
			Vietnam	H5N1 (HP)	Oct 7, 2013
H7 (LP)	Jan 15, 2013	North Korea			
Indonesia	H5N1 (HP)	Continuous outbreak	Mongolia	HP	The first half of 2012

Source: Summary of the materials from the World Organization for Animal Health (OIE) and Japan's Ministry of Agriculture, Forestry and Fisheries

※ Avian Influenza (AI) occurs when the virus that develops among wild birds spreads to poultry. AI can be generally classified into two different types: HP and LP. Since HPAI is particularly contagious and its mortality rate reaches nearly 100 percent, most countries including Korea classify HPAI as a major infectious animal disease and run the special control system for the disease.

- HPAI has high mortality rate and reduces spawning rates, incurring huge economic loss to related upstream and downstream industries. Moreover, as the disease has an enormous impact on the livestock trade between countries, most countries tightly restrict imports of poultry products from nations with AI outbreaks (KREI, 2008, An Economic Impact and Countermeasure Policies of Highly Pathogenic Avian Influenza)

○ The infectious agents of the AI virus are assumed to be migratory or resident birds. The AI virus has been detected in wild birds in Nepal, Hong Kong, Japan, Korea and China.

○ The death from AI is reported largely in the Asian region.

- Since November 2003, human infection with and death from the AI virus have been reported in two African countries, four Middle East countries and nine Asian countries.
- Since 2013 in China, about 130 people have been infected with the AI virus and about 40 of them died.

※ The death in China was caused by the H7N9 and H10N2 influenza. The H5N1 virus, which has once developed in Korea in the past, is reported to have caused human infection and death in foreign countries. In Korea, there has been no human infection with or death from the H5N1 virus yet.

2. HPAI Cases in Korea

2.1. Past Outbreaks of HPAI¹⁾

- HPAI has occurred five times in Korea from the first outbreak of AI in 2003 to 2014.
 - 1st outbreak (April 2003): 19 cases occurred in 10 cities/counties in 102 days; 5.285 million poultry from 392 farms were stamped out and buried; and the government subsidized KRW 87.4 billion as the compensation for stamping-out.
 - 2nd outbreak (July 2006): 7 cases occurred in 5 cities/counties in 104 days; 2.8 million poultry from 460 farms were stamped out and buried; and the government subsidized KRW 33.9 billion as the compensation for stamping-out.
 - 3rd outbreak (2008): 33 cases occurred in 19 cities/counties in 42 days; 10.204 million poultry from 1,500 farms were stamped out and buried; and the government subsidized KRW 181.7 billion as the compensation for stamping-out.
 - 4th outbreak (November 2010): 53 cases occurred in 25 cities/counties in 139 days; 6.473 million poultry from 286 farms were stamped out and buried; and the government subsidized KRW 80.7 billion as the compensation for stamping-out.
- The countermeasures against AI outbreak have improved with accumulated experiences.
 - Establishing the AI SOP: The standard guidelines were designed for the urgent preventive action including stamping-out and restriction on mobility of livestock.

1) *The White Paper of High Pathogenic Avian Influenza*. The Ministry of Agriculture, Food and Rural Affairs.

- Expanding the AI infection test of wild birds, and implementing forecasting for farms near areas prone to AI outbreak and habitats for migratory birds
- Establishing comprehensive plans to improve the preventive measures against AI
- The current special preventive action in winter ⇨ year-round regular preventive action
- Revising the AI SOP: Enhancing the level of crisis alert, adding standstill orders all over the nation, organizing the animal disease prevention body, and materializing guidelines for stamping-out and disposal of infected livestock

Table 2. Comparison of HPAI Cases in the Past in Korea

Classification	1st outbreak (H5N1)	2nd outbreak (H5N1)	3rd outbreak (H5N1)	4th outbreak (H5N1)
Outbreak conditions	<ul style="list-style-type: none"> - From Dec 10, 2003 to Mar 20, 2004 (102 days) - 19 cases in 10 cities/counties (chicken: 10 cases / duck: 9 cases) 	<ul style="list-style-type: none"> - From Nov 22, 2006 to Mar 6, 2007 (104 days) - 7 cases in 5 cities/counties (chicken: 4 cases / duck: 2 cases / quail: 1 case) 	<ul style="list-style-type: none"> - From Apr 1, 2008 to May 12, 2008 (42 days) - 33 cases in 19 cities/counties (chicken: 26 cases / duck: 7 cases) 	<ul style="list-style-type: none"> - From Dec 29, 2010 to May 16, 2011 (139 days) - 53 cases in 25 cities/counties (chicken: 18 cases / duck: 33 cases / quail: 1 case / pheasant: 1 case)
Quarantine actions	<ul style="list-style-type: none"> - Determining the range of disposal based on the epidemiologic conditions, and stamping out and burying chickens and ducks (5.285 million poultry from 392 farms) 	<ul style="list-style-type: none"> - Stamping out and burying chickens and ducks in risky areas with AI outbreak (2.8 million poultry from 460 farms) 	<ul style="list-style-type: none"> - Stamping out and burying chickens and ducks in risky areas with AI outbreak (10.204 million poultry from 1,500 farms) 	<ul style="list-style-type: none"> - Stamping out and burying chickens and ducks in risky areas with AI outbreak (6.473 million poultry from 286 farms)
Infection Process (assumed)	<ul style="list-style-type: none"> - Spread through migratory birds - Spread to farms through resident birds that once stayed in the area contaminated by 	<ul style="list-style-type: none"> - Spread through migratory birds - Spread to farms through people or vehicles contaminated with excrements of mi- 	<ul style="list-style-type: none"> - Spread through migratory birds - Spread to nearby areas through contaminated vehicles, people or infected animals 	<ul style="list-style-type: none"> - Spread through migratory birds - Spread to nearby areas through contaminated vehicles, people or infected ani-

	migratory birds - Spread to nearby areas through contaminated vehicles, people or infected animals	migratory birds - No epidemiologic relevance is found between the areas with AI outbreak	- Spread through small dealers or people who bought contaminated chickens or ducks at traditional markets	mals
Actual subsidies	- KRW 87.4 billion as the compensation for stamping-out and etc.	- KRW 33.9 billion as the compensation for stamping-out and etc.	- KRW 181.7 billion as the compensation for stamping-out and etc.	- KRW 80.7 billion as the compensation for stamping-out and etc.
Recovery of the status as an AI-free country	- 6 months after the completion of quarantine action for the last area with AI outbreak (Sep 21, 2004)	- 3 months after the completion of quarantine action for the last area with AI outbreak (Jun 18, 2007)	- 3 months after the completion of quarantine action for the last area with AI outbreak (Aug 15, 2008)	- 4 months after the completion of quarantine action for the last area with AI outbreak (Sep 5, 2011)

Source: The Korean Ministry of Agriculture, Food and Rural Affairs

- The cause of the spread of HPAI into Korea is assumed to be migratory birds, but the virus can be transmitted by other agents.
 - The virus is largely transmitted between farms or areas by indirect contact with vehicles or equipment rather than direct contact with infectious agents.
 - The virus is likely to spread through the purchase of contaminated chickens or ducks at traditional markets or through small dealers.
- When HPAI is detected, not only infected poultry but also those in potential risk should be disposed to prevent further spread of the disease, causing a huge loss to farms and destabilizing the supply and demand of related industries.
 - At the first outbreak of AI, the price of broiler fell by 46.3 percent from the previous price. At the second and third outbreaks, in contrast, the price dropped by 7-28 percent and around 10 percent respectively, showing the effect of lessons from past experiences.
 - At the fourth outbreak, foot-and-mouth disease and AI occurred at the same time, encouraging alternative consumption between beef

and pork and poultry products (chickens, ducks and eggs) and thereby increasing the price of poultry all the more.

2.2. HPAI Outbreaks in 2014

- On January 16, 2014, suspected AI symptoms were reported from a parent stock (duck) farm in Gochang, Jeollabuk-do. After the disease was officially identified as HPAI (the fifth outbreak) on the 17th, the virus spread to all over the country including Buan (Jeollabuk-do), Haenam (Jeollanam-do), Miryang (Gyeongsangnam-do), Cheonan (Chungcheongnam-do), Jincheon (Chungcheongbuk-do) and Hwaseong (Gyeonggi-do).
- While the past AI outbreaks were caused by a strain of the H5N1 virus, the recent outbreak was caused by the H5N8 virus.
 - The H5N8 virus spread twice among turkeys in Ireland in 1983 and among mallards in China in 2010.
 - The first, second and third outbreaks of AI were caused by the H5N1 virus, which was first detected in chickens (broiler and layer chickens). The fourth AI outbreak, also caused by the H5N1 virus, was discovered in chickens and ducks while the fifth outbreak was caused by the H5N8 virus and detected in parent stocks (duck).
 - As of February 7, 2014, suspected AI symptoms were reported 22 times, and 17 out of them have been officially identified as HPAI.

Table 3. The Status of AI-suspected Reports and Outbreaks (spread to 17 farms in 10 cities/counties, as of February 9, 2014)

AI Outbreaks (17 cases)	<ul style="list-style-type: none"> - 1st outbreak in Sillim-myeon, Gochang-gun, Jeollabuk-do (report on Jan 16, confirmation on Jan 17): parent stocks (duck) - 2nd outbreak in Julpo-myeon, Buan-gun, Jeollabuk-do (report on Jan 17, confirmation on Jan 18): broiler ducks - 3rd outbreak in Julpo-myeon, Buan-gun, Jeollabuk-do (report on Jan 18, confirmation on Jan 20): broiler ducks - 4th outbreak in Haeri-myeon, Gochang-gun, Jeollabuk-do (report on Jan 21, confirmation on Jan 23): broiler ducks - 5th outbreak in Hongsan-myeon, Buyeo-gun, Chungcheongnam-do (report on Jan 24, confirmation on Jan 25): grandparent stocks (chicken) - 6th outbreak in Songji-myeon, Haenam-gun, Jeollanam-do (report on Jan 24, confirmation on Jan 26): parent stocks (duck) - 7th outbreak in Gyeonhwa-myeon, Buan-gun, Jeollabuk-do (report on Jan 25, confirmation on Jan 28): broiler ducks - 8th outbreak in Seji-myeon, Naju-si, Jeollanam-do (report on Jan 25, confirmation on Jan 28): parent stocks (duck) - 9th outbreak in Jiksan-eup, Cheonan-si, Chungcheongnam-do (report on Jan 26, confirmation on Jan 28): parent stocks (duck) - 10th outbreak in Iwol-myeon, Jincheon-gun, Chungcheongbuk-do (report on Jan 27, confirmation on Jan 28): parent stocks (duck) - 11th outbreak in Deokjin-myeon, Yeongam-gun, Jeollanam-do (report on Jan 28, confirmation on Jan 30): parent stocks (duck) - 12th outbreak in Seosin-myeon, Hwaseong-si, Gyeonggi-do (report on Jan 28, confirmation on Jan 30): parent stocks (chicken) - 13th outbreak in Chodong-myeon, Miryang-si, Gyeongsangnam-do (report on Jan 29, confirmation on Jan 30): Korean native chickens - 14th outbreak in Deoksan-myeon, Jincheon-gun, Chungcheongbuk-do (report on Feb 1, confirmation on Feb 3): broiler ducks - 15th outbreak in Daeso-myeon, Eumseong-gun, Chungcheongbuk-do (report on Feb 2, confirmation on Feb 4): parent stocks (duck) - 16th outbreak in Onseok-dong, Hwaseong-si, Gyeonggi-do (report on Feb 6, confirmation on Feb 9): parent stocks (chicken) - 17th outbreak in Dupo-myeon, Yeongam-gun, Jeollanam-do (report on Feb 6, confirmation on Feb 9): layer chickens
AI-suspected Reports under Examination (0 case)	
No. of Disposed Poultry (sum, as of February 6, 2014)	- 2.823 million animals (in 136 farms)
No. of AI-suspected Reports	- 22 reports (actual outbreaks: 17 / negative reaction: 5 / under examination: 0)

- Compared to outbreaks in 2008 and 2010, the virus has developed not frequently for a month but individually and sporadically in 10 different cities and counties in 2014.

Table 4. Comparison of the Frequency of HPAI Outbreaks

Classification	Within 2 weeks since the last outbreak	4 weeks	6 weeks	7 weeks	Total No. of outbreaks
1st outbreak (2003/2004)	14	16	17	18	19
2nd outbreak (2006/2007)	2	4	5	6	7
3rd outbreak (2008)	13	23	33	-	33
4th outbreak (2010/2011)	23	40	41	53	53
5th outbreak (2014)	13	15	-	-	-

2.3. AI Infection Route

- Although the exact infection route has not been identified yet, considering the epidemiologic relations of HPAI outbreaks, the HPAI virus is assumed to be transmitted by wild birds (migratory birds).
 - As a result of the examination of wild birds, the H5N8 strain of HPAI was officially identified in Baikal teals and bean geese around habitats for migratory birds.
 - 19 out of 197 samples of excrements and dead bodies of wild birds were confirmed as positive for the AI virus.
 - As experts find no epidemiologic relation between farms with HPAI outbreaks, the transmission of the virus is likely to be attributed to wild birds.

Table 5. The Status of Requested Examination of Wild Birds

Confirmation of the AI Virus in Wild Migratory Birds (19 cases)	<ul style="list-style-type: none"> - Dongnimji Reservoir in Gochang-gun, Jeollabuk-do: Baikal teals, bean geese, coots - Geum River Estuary in Gunsan, Jeollabuk-do: spot-billed ducks - Geum River Estuary in Seocheon-gun, Chungcheongnam-do: Baikal teals - Sapgyo Stream in Dangjin, Chungcheongnam-do: Baikal teals - Sinan-gun, Jeollanam-do: mallards - Suwon, Gyeonggi-do: bean geese - Ongjin-gun, Incheon: bean geese - Yeongam-gun, Jeollanam-do: mallards
Under Examination (42 cases)	<ul style="list-style-type: none"> - 42 cases (e.g. Ruddy Shelducks in Gimpo, Gyeonggi-do)
Total No. of Examination	<ul style="list-style-type: none"> - 197 cases (Outbreaks: 19 / negative: 136 / under examination: 42)

2.4. The Implementation of Quarantine Measures

- When a suspected infection of AI was reported in Gochang-gun, Jeollabuk-do on January 16, related institutions including the Ministry of Security and Public Administration, local governments, the Ministry of National Defense and the Korean National Police Agency divided duties and cooperated with each other to implement systematic quarantine measures including the disposal of infected animals and those in potential risk of infection and the restriction on mobility of animals.
 - Issuing of crisis warning at first outbreak: Caution (Oct 4, 2013) ⇨ Alert (Jan 17, 2014)
- The authorities could respond to the AI outbreak this year at an early stage more swiftly than the past by using the vehicle registration database, which was introduced in 2013, and tracing vehicles of farms that are suspected to be infected with the virus.
 - Strengthening the quarantine measures and examination for epidemiologically related farms

-
- Domestic animals of farms that are infected, epidemiologically related, or close to contaminated areas were disposed and buried for the purpose of prevention.
 - On January 21, the range of disposal was expanded (500m → 3km, targeting duck farms in Gochang-gun, Jeollabuk-do), and the range of burial was also expanded.
 - The range of stamping-out: 2.823 million poultry at 136 farms (as of February 6)
 - Several livestock facilities including a slaughterhouse in Naju, Jeollanam-do were shut down as the facility was identified to have slaughtered and distributed duck products which came from duck farms with HPAI outbreak.
 - A nationwide temporary “standstill order” was issued for the first time since its introduction in 2010.
 - First issuance: A standstill order was issued for poultry and related workers and vehicles in Jeollanam-do, Jeollabuk-do and Gwangju for 48 hours from 00:00 on January 19 to 24:00 on the 20th.
 - Second issuance: A standstill order was issued in Gyeonggi-do, Chungcheongnam-do, Chungcheongbuk-do, Daejeon and Sejong for 12 hours from 06:00 to 18:00 on January 27.
 - The authorities carried out the examination of HPAI infection status continuously by identifying the travel route of wild birds and collecting samples from habitats for migratory birds.

3. Japan's Response to AI Outbreak and its Significance

3.1. AI Outbreaks in Japan

- In Japan, AI occurred five times since 2004 and the last outbreak was detected between 2010 and 2011. The nation regained the AI-free country status on June 24, 2011.
- Japan presumes that wild birds (migratory and resident birds) are highly likely to be a cause of AI outbreaks for all of five occasions.

Table 6. Past AI Outbreaks in Japan

Date and period of AI outbreaks	Areas and the type of virus	Cause and remarks
From Nov 2010 to Mar 2011 (5th outbreak)	HPAI (subtype H5N1) detected in 24 farms in 9 prefectures	- Wild birds were considered as a main cause. - Declared as an AI-free nation on Jun 24, 2011
From Feb 27 to Mar 29 in 2009 (4th outbreak)	AI (possibly H7N6) detected in 7 quail farms in Toyohashi, Aichi Prefecture	- Failed to identify the infection route due to the lack of data - The virus that had invaded into quail farms long ago could have remained latent within and between farms.
From Jan to Feb in 2007 (3rd outbreak)	AI (subtype H5N1) detected four times in the areas including Shintomi, Hyuga and Kiyotake (Miyazaki Prefecture) and Takahashi (Okayama Prefecture)	- The virus was probably transmitted by migratory birds into the country, and spread to farms through resident birds or wild animals.
From Jun 25 to Dec 2 in 2005 (2nd outbreak)	AI (subtype H5N2) detected 41 times in Ibaraki Prefecture and Saitama Prefecture	- It cannot be denied that an unapproved vaccine that contained an extract of a virus from Latin America or the virus itself could be illegally brought to the country. - According to the result of the epidemiological research, the virus was probably transmitted by chickens in the process of transfer between farms, and related people or equipment could be other major cause.
From Jan to Mar in 2004 (1st outbreak)	AI (H5N1) detected 4 times in Yamaguchi Prefecture, Oita Prefecture and Kyoto	- The AI virus might be transmitted through migratory birds from the Korean Peninsula, resident birds, rats or contact with people.

Source: Summarized by the author based on the data from the website of the Japanese Ministry of Agriculture, Forestry and Fisheries (www.maff.go.jp)

3.2. Key Points of the Response to AI Outbreaks

- The Nature Conservation Bureau of Japan's Ministry of the Environment developed the Technical Manual on Wild Bird Highly Pathogenic Avian Influenza Surveillance for Local Government Officials to respond to AI outbreak caused by wild birds (migratory and resident birds).
 - The manual specifies preventive actions against AI infection for ordinary situation and the duty of each institution and the information network for the occasion of actual AI outbreak.
 - It stipulates action guidelines in detail by stage (the early stage: from AI outbreak suspicion by discovering dead migratory birds to the confirmation of outbreak / the next stage: from the confirmation of outbreak to the implementation of countermeasures).
 - It also stipulates the implementation of international cooperation.
- Based on the manual, the Japanese authorities not only take quarantine actions against AI outbreak, but also seek for long-term countermeasures by carrying out research on preventive methods after AI outbreak.
 - Research contents: Project of Study and Storage of new strains of the AI virus, and development of Influenza A virus subtype H1N1 vaccine
 - The implementation is decided by the Council for Science and Technology Policy and is supported by Special Coordination Funds for Promotion of Science and Technology under the jurisdiction of Japan's Ministry of Education, Culture, Sports, Science and Technology.
- The actions are tailored for each stage (prevention, outbreak and post-outbreak) and implemented based on the manual. In order to prevent the spread of the virus, the manual stipulates thorough

preparation for the actions 1) to prevent AI outbreak and 2) to detect and notify the outbreak of the disease at an early stage.

- Preventive actions against the spread of the disease: Farms with over 1,000 poultry should report any suspected AI infection immediately and report the number of dead poultry on a regular base.
 - Farms with less than 1,000 poultry and pet breeders should also follow a separate action.
- The manual also stipulates handling of AI vaccines and the identification of the infection route.
- The authorities conduct research on the ecology of resident and migratory birds, collect test samples by capturing birds, examine viruses, and analyze pathogenicity with cooperation with related departments.
 - The manual requires the authorities to conduct a thorough review on related research and strengthen international cooperative network.
 - The Japanese Ministry of Agriculture, Forestry and Fisheries established the HPAI Infection Route Elucidation Team with experts to swiftly identify the infection route of the virus.

3.3. Significance

- Japan's manual specifies more detailed provisions about quarantine measures for farms compared to Korea's SOP.²⁾
- Korea's SOP stipulates forecasting of poultry farms and quarantine instructions by stage and examining the current status, spawning rate, mortality rate and disinfection status of each farm.

2) Japan declared the Quarantine Guidelines for Specific Domestic Animal Diseases in regard to HPAI and LPAI on October 1, 2011, and 2012 Reinforcement of Quarantine Guidelines for HPAI in September 10, 2012.

-
- The Japanese authorities probe if farms observe the feeding sanitary management standards and strictly follow the preventive plan against the invasion of wild birds.
 - Farms with over 100 poultry (in case of ostrich: over 10) are designated to be monitored by the feeding sanitary management system.
- In Japan, the quarantine officials should visit poultry farms under each jurisdiction and examine the feeding sanitary status with the feeding management checklist.
- The sanitary status of poultry farms is thoroughly examined under the feeding sanitary management system that includes the preventive plan against the invasion of wild animals.
 - Key points of the feeding management checklist:
 - 1) Identifying the latest information about livestock health control (1 question)
 - 2) Designating the sanitary management zone (2 questions)
 - 3) Preventing the invasion of pathogen into the sanitary management zone (11 questions)
 - 4) Preventing the invasion of pathogen through wild animals (9 questions)
 - 5) Securing the sanitary status in the sanitary management zone (5 questions)
 - 6) Monitoring the health of livestock and responding to detected problems (6 questions)
 - 7) Arranging quarantine actions including burial (1 question)
 - 8) Recording and storing related data to identify the outbreak status including infection route at an early stage (2 questions)
 - 9) Taking additional actions for large-scale poultry farms (2 questions)
- The provisions related to wild birds in Korea's SOP do not provide poultry farms with preventive measures or precautionary plans against the invasion of virus through wild birds.

- Korea's SOP stipulates the actions only for officially identified infection through wild birds.
- Japan's manual includes almost all provisions of Korea's SOP, and in addition, it stipulates diversified actions and preparation in detail, including the standards of examination and test on wild birds.
- The Japanese manual includes an intensified monitoring method in addition to a monitoring that is conducted by designating a certain spot.
 - In an intensified monitoring, certain numbers of farms should be tested to enable detection of 10 percent of infection with 95 percent of reliability.
 - Selecting farms to be tested by grouping farms by size of breeding and conducting random sampling
 - Grouping by size of breeding: 1) 100-999 livestock, 2) 1,000-9,999 livestock, 3) over 10,000 livestock
 - Deciding the number of samples depending on the size of population

Table 7. Number of Samples by Size of Population

Population	No. of Samples
1-15 farms	All
16-20	16
21-40	21
41-100	25
Over 101	30

- In order to prevent the infection from wild birds, animals and insects, the Japanese manual has the records of features of each animal and past infection cases and provides the summary of matters that require particular attention.
 - Key points of the preventive measures for farms (examples)
 - 1) Keeping felled trees or grass away from livestock facilities
 - 2) Removing telegraph poles near chicken-breeding facilities

- 3) Blocking up any gaps or holes through which wild animals including rats enter into farms
- 4) Creating the circumstance in which wild animals cannot easily approach by maintaining the sanitary status of farms

Table 8. Comparison of Korea and Japan's Preventive Measures of Farms against the Infection through Migratory Birds

Classification		Korea	Japan
Title of manual		- AI Standard Operating Procedure	- The Technical Manual on Wild Bird Highly Pathogenic Avian Influenza Surveillance for Local Government Officials
Prevention stage	Preventive rules against the infection of birds	- Abstract	- Stipulated in detail for each stage (prevention, detection and notification at an early stage) - Separately stipulated in terms of small-scale farms and pet breeders
	Rules for application of vaccine	- None	- Included
	Forecasting of farms	- Examination of productivity and disinfection status by stage of quarantine action	- Thorough examination with the feeding management checklist (39 questions)
	Provisions related to wild birds	- None (observation of the Ministry of Environment)	- Preventive measures against the spread of diseases through wild birds and response guidelines for farms - Sampling and examination with the statistical basis
Outbreak stage	Duties of each institution and quarantine methods in the occasion of AI outbreak	- Stipulated in detail	- Stipulated in detail
	Rules for application of vaccine	- None	- Included
Post-outbreak stage	Establishment of infection route elucidation team	- Post-outbreak	- Post-outbreak and frequent

4. Direction of Preventive Measures against AI

Developing complementary measures for sustainable eco-friendly livestock policies to resolve fundamental problems of domestic animal diseases

- Although the sustainable eco-friendly livestock policy was recently released, there should be more continuous efforts to complement the policy including domestic animal disease control plans, considering the recent AI outbreak.

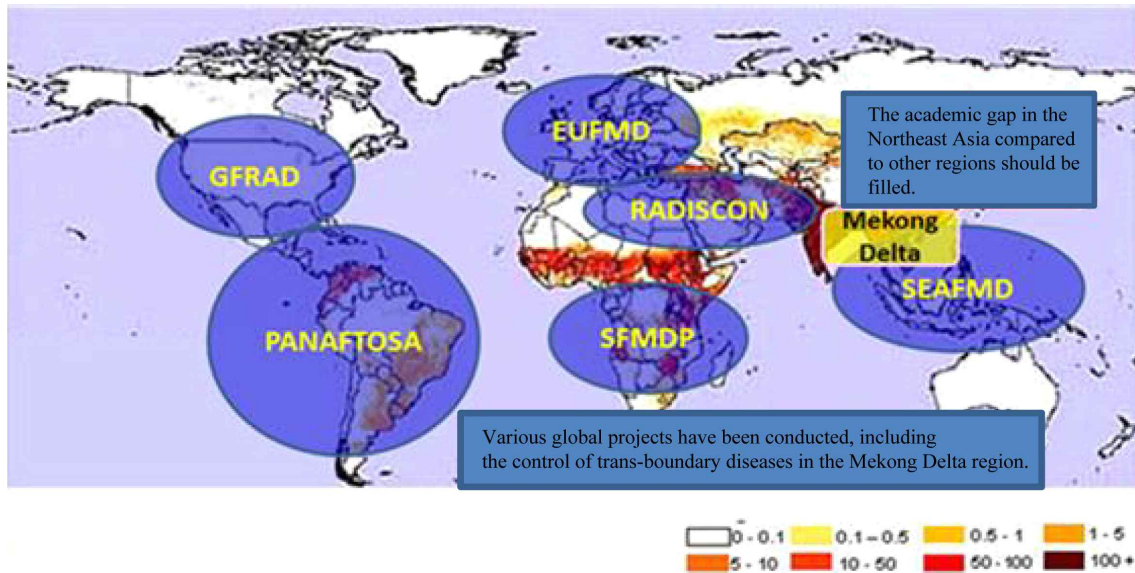
Elaborating technical response manuals

- The technical response manual should be more elaborate and include isolation and quarantine plan at farm level to prevent the spread of virus into farms through wild birds or animals.
 - The manual should specify the intensive surveillance period for wild birds, the crisis alert system and response guidelines for farms.
- The central and local governments should establish a cooperative information sharing network with farms and provide the manual with open information.
 - The information, which was recently released, has been said to be less diversified than the past data. In this condition, the quarantine system could be led to confusion due to the lack of information.
 - The information about those who have been in contact with the virus should be sufficiently provided for the examination of epidemiological relations.
- The interministerial and interdepartmental cooperative framework should be established.

-
- There should be cooperative systems among the central and local governments, the Ministry of Agriculture, Food and Rural Affairs (MAFRA), the Ministry of Environment and the Ministry of Food and Drug Safety, and between the Livestock Bureau and the departments in charge of food safety and consumption of the MAFRA.
 - Information about domestic animal diseases should be mandatorily reported on a regular base even in the ordinary situation.
 - The information about regular forecasting led by the private sector (farms, pet breeders, schools, poultry product facilities, etc.) should be reported mandatorily on a regular base in addition to the information collection led by the government.
 - The research project team for the study on trans-boundary diseases should be established to prepare for the frequent collection and provision of information.
 - The research team can provide assistance for swift decision-making in the quarantine action process.
 - The authorities should also seek for effective control plans in response to the outbreak of diseases.
 - Media reporters can be the agent of the secondary transmission of the virus.
- Strengthening the quarantine system at borders and developing preventive measures against the spread of virus through wild birds**
- The quarantine system at borders should be tightened to prevent the transmission of fatal viruses like H7N9 that has broken out in China and threatened the lives of people.

- Since AI outbreaks are closely related to migratory and resident birds, the countermeasures should be developed in detail.
- The cause of trans-boundary diseases including AI and foot-and-mouth disease is connected with natural environment, socio-economic and environmental risk factors, and human health-related risk factors, as well as those related to livestock and wild animals.
- Trans-boundary diseases cannot be resolved solely by the efforts made by Korea. Therefore, there should be international cooperation to prevent the spread of diseases.
 - Before the international cooperation is made, the authorities should conduct research on a joint quarantine system.
- In the Northeast Asian region including Korea, there has been no AI-related joint research yet, and the current research bloc of foot-and-mouth disease is also nothing but nominal group.
 - Many global research groups have already established research blocs with regard to foot-and-mouth disease.
 - In the Northeast Asian region including Korea, there has been no AI-related joint research yet, and the current research bloc of foot-and-mouth disease is also nothing but nominal group. In 2011, a joint symposium was once held to establish a research network in the Northeast Asian region led by Japan, but it is currently nominal due to the absence of China.

Figure 1. Joint Research Blocs for the Quarantine Measures against Trans-boundary Animal Diseases including FMD



Note: European Commission for the control of Foot-and-Mouth Disease (EUFMD)

Global Foot-and-Mouth Disease Research Alliance (GFRA)

Pan American Foot-and-Mouth Disease Center (PANAFTOSA)

Southeast Asia Foot and Mouth Disease Campaign (SEAFMD)

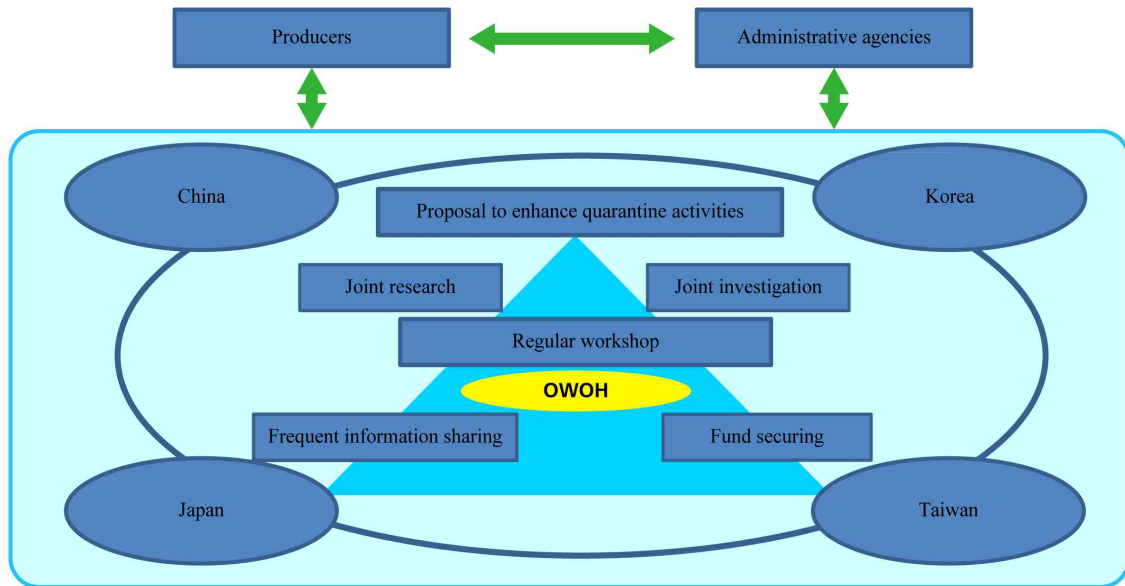
SADC Foot and Mouth Disease Project (SFMDP)

Regional Animal Disease Surveillance and Control Network for North Africa, the Middle East and the Arab Peninsula (RADISCON)

Source: Okamoto, Karoku. "Road to Global Control of Trans-Boundary Animal Diseases." *Academic Network on Trans-Boundary Animal Diseases in Northeast Asia Region*. Ed. Kagoshima University, March 2011.

- There should be an academic network in the Northeast Asia, which is led by Korea and jointly run by Japan, Taiwan and China.
 - The joint academic network should enable cooperative research and frequent information sharing and provide a regular joint workshop.

Figure 2. Plan for the Establishment of Academic Network in the Northeast Asian Region to Prevent Trans-Boundary Animal Diseases



Note: OWOH (One World One Health)

KREI Agricultural Policy Focus No. 84

The Status of AI Outbreak and Response
and the Direction of Preventive Measures

Registration No.6-0007 (May 25, 1979)

Printed February 10, 2014

Published February 11, 2014

Publisher Choi Sei-kyun

Operation committee Park Seong-jae, Kim Byung-ryul,
Park Joon-kee, Seong Joo-in,
Han Suk-ho

Publishing institution KREI

130-710, 117-3, Hoegi-ro, Dongdaemoon-gu,
Seoul, Korea

+82-2-3299-4000 <http://www.krei.re.kr>

Printed by Munwonsa

+82-2-739-3911 munwonsa@hanmail.net

ISBN: 978-89-6013-622-9 93520

- The contents in this book do not necessarily represent the official opinion of KREI.
 - The contents in this book can be cited, provided that the source is clearly stated. Unauthorized reproduction or copying is illegal.
-