CURRENT STATUS OF IMPORTANT TRANSBOUNDARY ANIMAL DISEASES IN THE PHILIPPINES

Ronnie D. Domingo, Emelinda L. Lopez, Laarni Z. Cabantac, Arlene A.V. Vytiaco, Angeles D. De Mayo, Anthony C. Bucad
Bureau of Animal Industry
Department of Agriculture, Philippines

E-mail: ronniedomingo@gmail.com

ABSTRACT

The livestock and poultry industries in the Philippines grew last year by 4.66 % and 1.01 % respectively. The Bureau of Animal Industry (BAI) of the Philippine Department of Agriculture manages the national veterinary services of the country. It adopted the OIE list of diseases as notifiable in the Philippines. After more than a decade in implementing the progressive zoning approach, the World Organisation for Animal Health (OIE) finally recognized the Philippines in 2015 as free from foot-and-mouth disease. Official disease-free status for peste des petits ruminants and African horse sickness was also awarded to the Philippines. To maintain the foot-and-mouth disease-free status, both passive and active surveillance systems are in place for early detection of possible disease re-introduction.

With support from USDA’s Food for Peace program, the Philippines is currently implementing a three-year project that aims to profile economically important diseases of swine and cattle in the Philippines. The country’s Avian Influenza (AI) Protection Program has been operational since 2005. Samples from high risk areas are examined biannually by the National Avian Influenza Diagnostic Laboratory in partnership with the six project-upgraded regional AI laboratories. A Newcastle disease outbreak occurred between November 2015 and April 2016. About 40 provinces were affected and the reported poultry mortalities were about one million. The 2002 Classical Swine Fever (CSF) Control Program underdoes revision to conform to the ASEAN Regional Framework for the Control and Eradication of animal diseases. The number of CSF reports has declined starting in 2010.

Starting in 2014, BAI has conducted 16 seminar-workshops on outbreak investigation and management with more than 400 registered attendees. A National Advisory Committee for Animal Disease Control and Emergency meets every month to assess disease situation and programs. Regional quick response teams have been organized.

Keywords: Country report, Transboundary diseases, Animal health, Philippines

INTRODUCTION

The Republic of the Philippines is a tropical archipelago occupying a total land area of approximately 300,000 square kilometers. It lies southeast of mainland Asia. Using the interferometric synthetic aperture radar (IFSAR), the National Mapping and Resource Information Authority recently announced its discovery of additional 400 islands in the southern part of the Philippines thereby increasing the total island count from 7101 in 1945 to 7,500 islands (Torres, 2016). The 2015 Philippine census indicated there are now 101 million Filipinos (Bersales, 2016).
The Philippines does not share land borders with other Asia-Pacific countries. The seas and numerous islands act as major natural barriers to the spread of diseases. However, the development and expansion of land and air transport systems can potentially circumvent natural barriers. There are now 85 airports in the Philippines, 10 of these are international gateways (CAAP, 2015).

Due to its geographic location, the Philippines is highly prone to natural disasters such as earthquakes, volcanic eruptions, tropical cyclones and floods (Señires, 2016). An average of 20 tropical cyclones (TCs) enters the Philippine Area of Responsibility (PAR) every year and nine TCs make landfall. A recent study reported an increasing trend in economic losses and damages due to TCs (Cinco et al., 2016).

**The livestock industry**

In spite of the annual calamities, the livestock and poultry industries registered modest increases (Fig. 1). While the crops subsector shrunk by 8.55%, livestock and poultry production in the first quarter of 2016 grew by 4.66% and 1.01% respectively (PSA, 2016). Hogs and chickens provided the main growth catalyst to the total agricultural production (17.18% contribution from swine and 15.85% from poultry).


The smallholder farming system remains as the pillar of the Philippine livestock industry. The backyard farmers rear more than 90% of the total cattle, buffalo (known locally as “carabao”) and goat population (Table 1). In the hog industry, the commercial sector has gradually increased their share in the total inventory to 35%. When it comes to the poultry industry, the commercial producers recorded greater impact by contributing 55% to the national avian population of 176 million domestic birds. The largest layer and broiler farms operate around Metro Manila while the native chicken production is highest in Region VI (Western Visayas) located in Central Philippines (Fig. 2).
Table 1. Commercial and smallholder distribution of livestock in the Philippines, 2015

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>Smallholder</th>
<th>Commercial</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of heads</td>
<td>Percent (%)</td>
<td>Number of heads</td>
</tr>
<tr>
<td>Carabao</td>
<td>2,842,768</td>
<td>99.58</td>
<td>12,070</td>
</tr>
<tr>
<td>Cattle</td>
<td>2,367,997</td>
<td>93.44</td>
<td>166,246</td>
</tr>
<tr>
<td>Goat</td>
<td>3,613,645</td>
<td>98.35</td>
<td>60,541</td>
</tr>
<tr>
<td>Hog</td>
<td>7,782,290</td>
<td>64.85</td>
<td>4,217,432</td>
</tr>
</tbody>
</table>

Source: (PSA, 2016)

Fig. 2. Choropleth map of the broiler (A), layer (B) and native (C) chicken inventory in the Philippines, 2015. Darker colors indicate increasing density of birds.

Regulation and development of the Philippine agriculture fall under the domain of the Department of Agriculture (DA). The latter provides national technical and policy leadership but now has limited line management over agricultural services in the provinces. The provinces are funded directly from the Department of Finance (DOF), and not through the DA. The latter serves as the administrative umbrella for various agriculture-related bureaus and agencies such as the Bureau of Animal Industry, the National Meat Inspection Service, the Philippine Carabao Center, DA-Regional Field Offices and the National Dairy Authority.

Veterinary services and accomplishments

The Bureau of Animal Industry (BAI), created as a line bureau in 1930, manages the national veterinary services (VS) of the country. It exercises research and regulatory functions to protect and promote the livestock industries and veterinary public health. However in 1987, its regional line functions were decentralized as stipulated in Executive Order 292 (Administrative Code of 1987).
With the enactment of the Philippine Local Government Code in 1991, most of the veterinary field services were devolved to the local government units (LGU’s). These legal changes disabled the direct authority of the BAI over local livestock industries in various places. Now as a staff bureau, it has to partner with these LGUs, industry stakeholders, veterinary schools and international agencies in order to address the concerns for disease prevention, control and eradication. There are 160 veterinarians currently employed at the BAI.

Adopting dynamic and multifaceted control strategies, the government has effectively controlled disease problems and even eliminated several diseases. The last case of rinderpest was reported in 1955 and that was about 31 years before the Food and Agriculture Organization of the United Nations (FAO), as a worldwide competent executive agency, started the global eradication programme (Kouba, 2013).

Recently, the World Organisation for Animal Health (OIE), through the adoption of a resolution by the World Assembly of Delegates (Assembly) of the OIE at the General Session and in accordance with its procedure for official recognition of disease status, recognized the Philippines as free from foot-and-mouth disease (FMD), peste des petits ruminants (PPR) and African horse sickness (AHS, see Fig. 3).

![Official certificates of recognition of freedom from disease (specifically for FMD, PPR and AHS) awarded to the Philippines by the World Organisation for Animal Health (OIE)](image)

**Veterinary diagnostic laboratories**

To support the animal health program, the Philippine government operates a central laboratory facility that processes requests for confirmatory animal disease diagnosis, accredits government and private veterinary laboratories and conducts regular competency training for laboratory personnel. This is the Animal Disease Diagnosis and Reference Laboratory (formerly known as the Philippine Animal Health Center).

Strategically located in the archipelago are 12 Regional Animal Disease Diagnostic Laboratories (RADDLs). Several provincial veterinary laboratories have also been constructed including those in the provinces of Bulacan, Negros Occidental, Negros Oriental, and Palawan. Disease-specific laboratories also complement the existing diagnostic services. Examples are the rabies laboratories of...
the Department of Health-Research Institute for Tropical Medicine (RITM), Ilocos Norte, Negros Occidental, and Negros Oriental Provincial Rabies Diagnostic Laboratories and the Avian Influenza laboratories in Regions II, III, VII, IX, X, and XII.

With a US$3.5 million loan from USDA’s Food for Peace program, the Philippines is currently implementing a three-year project entitled “Profiling of Economically Important Diseases of Swine and Cattle in the Philippines for Enhanced Disease Management, Surveillance and Control” (Arejola, 2016). The project features the active partnership of BAI, the National Dairy Authority (NDA) and top veterinary schools to renovate academic laboratories, enhance their diagnostic capabilities, and characterize bacterial, viral, fungal, parasitic diseases of poultry and swine in the Philippines.

At the end of the project, the implementers expect to develop rapid test kits and establish a reference laboratory. Disease surveillance in the Philippines had been heavily dependent on imported and expensive diagnostic kits. In many instances, local samples from animals had to be sent to other countries with reliable laboratory services. The project has started collecting biological materials which can be used as sources of antigens for diagnostic purposes and vaccine production. In a separate project funded by the Philippines’ Department of Science and Technology (DOST), a test kit that is exceptionally simplified and economically designed has been developed to detect the porcine epidemic diarrhea virus (PEDV). The virus is responsible for the economically devastating disease that has affected commercial piggery farms in the Philippines since 2010. The test is based on the principle of Loop-mediated Isothermal Amplification method (LAMP) which is recognized by the World Assembly of Delegates of the OIE in May 2012 as an alternative technique to PCR (Domingo & Paraguison-Alili, 2015).

Emergency preparedness

The Animal Health and Welfare Division of the BAI serves as the main arm of the government to monitor and manage animal diseases. Disease prevention starts with its function of accreditation of livestock and poultry farms in the country. Its Epidemiology Section runs the surveillance system while the Animal Disease Control Section provides the technical and material assistance to field units during disease outbreaks. Disease reporting follows a prescribed flowchart (Fig 4). The Division also develops and distributes information, education and communication (IEC) materials for animal health and welfare (Fig. 5).
Fig. 4. Animal disease reporting system in the Philippines
The Philippines maintains a unique National Advisory Committee for Animal Disease Control and Emergency (NAC-ADCE). The latter is a multi-agriculture sectoral Committee composed of representatives from leading private entities and government agencies that give advice to the Secretary of the Department (Ministry) of Agriculture. NAC-ADCE regularly meets every month to track issues and programs affecting the animal industry. Its well-crafted recommendations helped in eradicating Foot and Mouth Disease in the Philippines and maintaining the Avian Influenza-free status of the country.

Starting in 2014, the BAI has conducted 16 seminar-workshops on outbreak investigation and management at the national, regional and municipal levels. More than 400 animal health workers have attended these gatherings to become familiar with essential steps of outbreak investigation and disease reporting. Middle of April this year, the government through the BAI gathered veterinary representatives from all regions to strengthen the manpower structure for emergency preparedness. An integrated quick response flowchart was crafted and the regional quick response teams (QRTs) were identified. The remaining months of 2016 shall be devoted to the organization of the QRTs at the provincial and municipal levels.

Consultations with regional officials and local veterinarians on the preparedness of the country to any animal disease outbreak identified common areas of weakness in the system. Top issues include insufficient funds to sustain the animal check points in strategic geographical points, the lack of veterinarians in some municipalities and delays in disease notifications. Such problems however had been progressively addressed with appropriate and doable solutions.
Priority diseases

Through a department memorandum, the DA adopted the OIE list of diseases as Notifiable in the Philippines (Alcala, 2012). The list of more than 100 animal diseases include the 12-14 diseases of a transboundary nature (foot-and-mouth disease, rinderpest, contagious bovine pleuropneumonia, sheep and goat pox, peste des petits ruminants, highly pathogenic avian influenza, Rift Valley fever, Newcastle disease, African and classical swine fever, equine encephalitidies, and under certain circumstances rabies and brucellosis) as identified by the FAO's Emergency Prevention System for animal health (Lubroth, de Balogh, & Burgos, 2011). This paper focuses on selected priority diseases that have attracted so many resources from the government and various stakeholders. Animal rabies is covered adequately in another report from the Philippines.

FOOT-AND-MOUTH DISEASE

The control of FMD in the Philippines which started in the 1970s can be described as mainly reliant on mass vaccination. When the disease incidence (caused by FMD virus serotype O Cathay topotype) had its peak in 1995 and the susceptible hosts changed from ruminants to swine, the government adopted a revised approach with broader control strategies (Benigno, Santos, & Umandal, 2002). The National FMD Task Force (NFMDTF) was created at the height of this FMD epidemic affecting 98,000 pigs. Support from the Australian Agency for International Development (AusAID) commenced in December 1996. The four components of the strategy included disease monitoring and surveillance, public awareness, animal movement management and vaccination.

The 15-year successful control program went through three phases. Phase one (1996-2000) aimed to diminish the incidence of FMD in high incidence places and at the same time to remove clinical cases in moderate and low incidence areas. The second phase (2000-2004) – concentrated on the elimination of cases in the high-risk areas and intensification of disease surveillance activities. Implementation of the progressive zoning approach characterized the last phase (2004-2009) which focused on Luzon to achieve disease eradication (Morales, Umandal, & Magcalas, 2011). The southern part (Mindanao) was declared as FMD-free zone in 2001, the central part (Visayas) in 2002 and three regions in the northern part (Luzon) in 2004.

Now that the OIE has declared the Philippines as FMD-free without vaccination, the government adopted a surveillance system with a double purpose of detecting re-introduction of FMD and demonstrating freedom from disease to foreign traders. Both passive and active surveillance systems are in place to ensure early detection and quick response. The passive system collects negative monitoring reports from LGU’s, checkpoint monitoring reports from active quarantine checkpoints, and slaughterhouse reports from meat inspectors (AHWD, 2014). The active surveillance component involves serum examination of susceptible animals. Through a 2012 BAI memorandum, a sampling plan was developed to collect a minimum number of samples every six months from Luzon (1,530 samples), Visayas (840 samples) and Mindanao (1,110 samples) for a total of 3,480 samples or 6,960 samples/year. These samples shall come from swine, large ruminants, and small ruminants at a distribution rate of 50%, 25%, and 25% respectively.

Several biosecurity measures were retained as part of the prevention program. These activities included disinfection of livestock carriers at veterinary quarantine checkpoints, provision of footbaths and wheel baths at major ports and seaports, and for slaughterhouses, regular cleaning and disinfection and strict observance of “all in-all out” policy (Vytiaoco, 2016). The government also regulated the local transport of animals by licensing the livestock traders and their transport carriers, supporting quarantine checkpoints/stations, instituting farm accreditation standards, and requiring the animal transporters to secure three important documents: veterinary health certificate, authority to ship, and shipping permit.
Reintroduction of the virus was addressed by prohibiting importation of live animals from FMD-infected countries. Any live animal imported is subjected to a 30-day quarantine period and its importer required to follow the protocol from documentation, disinfection to inspection at arrival. Meat and meat products are routinely inspected and samples collected for laboratory analysis within 24 hours of arrival in the Philippines. At any given time, the BAI maintains a stockpile of 100,000 doses of FMD vaccine.

Capacity building of frontline veterinary services is sustained by conducting a series of workshops on risk and crisis communication among regional and local veterinary personnel. There is also an annual National FMD Coordinators Meeting. Numerous publications about FMD prevention have been created and distributed to target sectors in the livestock industry.

CLASSICAL SWINE FEVER

Classical swine fever (CSF or Hog Cholera in the Philippines) remains endemic throughout the country. It used to be the major cause of swine mortality. Although FMD has been successfully eradicated, the endemicity of CSF can still limit the Philippine potential export of pork and pork products to neighboring Asian countries. Several reports from 2002 to 2013 indicated a prevalence ranging from 30 to 60% among unvaccinated pigs under smallholder systems (Garcia, Felix, & Garcia, 2013; National Hog Cholera Control Task Force, 2003).

In 2002, the government launched the CSF Eradication Program that involved mass immunization of pigs, disease surveillance, serological monitoring, identification of CSF-protected zones and soliciting legislative support from Philippine Congress local government units. The number of CSF reports started to decline in 2010. There were no reported CSF outbreaks in Visayas and Mindanao from 2010-2014. Bukidnon, a province in southern Philippines, after demonstrating in 2011 serological absence of CSF antibodies even in smallholder pigs, made a local declaration of being CSF-free in 2014. However, the declaration is yet to be validated officially by the BAI and OIE.

There is an on-going revision of the CSF control program in order to conform to the ASEAN Regional Framework for the Control and Eradication of animal diseases. The CSF Program will follow the Progressive Control Pathway Stepwise Compartmentalization Approach in order to achieve its goal of CSF eradication in the Philippines. Three phases have been identified and the country has just completed the Preparatory Phase (2014-2015) where multi-sectoral consultations, research scoping and organizational valuations were carried out. This year brings the government to the second phase of the program. In collaboration with various government agencies, schools and private groups, the BAI shall undertake foundational activities such as epidemiological characterization of the current disease pattern, genetic characterization of the virus, strategic mass vaccination to reduce occurrence of the disease, and creation of CSF-free zones and compartments. The Bureau’s website (http://goo.gl/BNAqWg) shows 14 government-registered commercial vaccines for immunization against hog cholera in the Philippines. The Third or Eradication Phase shall commence in 2020.

NEWCASTLE DISEASE

In a recent online survey with Filipino poultry practitioners, Newcastle disease (ND) has a low endemicity in the country. Some estimate that the prevalence or number of farms affected by the disease is less than 1% and that the outbreaks occur at any time of the year. However, some practitioners observed more cases occurring during the months of March. A more accurate picture of the disease situation could be generated by involving the poultry farmers in developing and operating a health surveillance system for their sector.

The Philippines recently experienced an increase of ND outbreaks in various provinces of the country. The reported ND-related poultry mortalities started in November 2015. The first peak of
reported cases was the last week of December and the second peak was on the first week of February 2016. After this date, the number of reports has tapered off. At least 40 provinces were affected and the reported chicken mortalities were about one million. The Quick Response Team organized by BAI to investigate and manage the outbreak incorporated the “MaBISA” components (“Mabisa” is a local word for “effective”). The acronym MaBISA stands for mass vaccination, biosecurity, information dissemination, surveillance and arrested animal movement. Recommendations on vaccine type and vaccination schedules came from the Philippine College of Poultry Practitioners. The government purchased vaccines were supplemented with vaccine donations from commercial poultry companies in the country. In the province of Nueva Ecija, the village-level immunization of chickens conducted by the local government field workers received free student and faculty support from the College of Veterinary Medicine of Central Luzon State University.

Through the regional, provincial and municipal veterinarians, the poultry farmers were advised on proper disposal of sick and dead birds, farm cleaning and disinfection, farm quarantine, and restriction of entry and exit of both human and animals in the farm. Leaflets about the disease were developed and distributed to various groups in printed or soft copy. The BAI personnel attended scientific conferences, farmers’ meetings and media interviews to warn and guide poultry stakeholders about the outbreak.

 Bulk of the field data used by the surveillance team to plot the disease pattern came from reports of LGU veterinarians. Although hotlines and online portals were provided to the public for disease reporting, very few used this route. Laboratory examination of samples by Philippine and Australian experts confirmed the causative agent as Class II Newcastle Disease virus. Provincial checkpoints and quarantine officers were alerted and poultry transporters were required to present animal health certificates. Introduction of unvaccinated birds had been identified as the likely route for disease outbreak in the past (Tapdasan et al., 2015). An FAO-assisted investigation has started to rule out Avian Influenza.

**AVIAN INFLUENZA**

Alerted by the possible spill over of HPAI viruses from mainland Asia to the Philippines, the government commissioned experts from both human and veterinary medical fields to develop and implement the Philippine Avian Influenza Protection Program (AIPP) in 2005. Because of the highly commercialized poultry production in the Philippines, any introduction of HPAI virus to the local flocks could destroy the poultry industry and disrupt the supply of the most popular source of protein among Filipinos – the chicken meat. Worse, the outbreak can endanger the lives of the Filipinos and terminate existing trade with foreign countries.

The original program identified four stages of the avian influenza threat: Stage 1 when the country status is Avian influenza-free; Stage 2 when Avian influenza is detected in domestic fowls in the Philippines; Stage 3 when there is confirmation of avian influenza transmission from poultry to humans in the Philippines; and Stage 4 when human-to-human transmission of Avian Influenza has occurred in the country. Each stage commands a specific response plan. All current activities being enforced by the government fall under the Stage 1 Response Plan. The Manual of Procedures (National Inter-agency Task Force, 2005) enumerated these key components that have effectively kept the Philippines bird flu-free for a decade now. Excerpts from the publication include the following:

1. Ban on importation of all live domestic and wild poultry and of all poultry products from AI affected countries;
2. Minimum biosecurity measures for all poultry holding facilities should have documentation or recording of movement to and from the facility. Rest period must be strictly implemented. Critical areas in the farms must be inaccessible to stray animals and free flying birds. All poultry mortalities should be disposed of properly within farm premises. Poultry and swine must not be grown in the same holding facility;
3. Surveillance and prevention programs in airports and seaports. All international and domestic airports & seaports shall have footbath installations to be placed at the nearest possible point from disembarkation from the plane or vessel. Signage on the Bird Flu Prevention should be displayed properly. Designated officials should inspect luggage of travellers on direct flight from or in-transit through an AI-affected country. Any live poultry and/or poultry products have to be reported and managed according to the protocol;

4. Surveillance of poultry in critical areas in the Philippines. These areas are frequently visited by migratory birds. The surveillance target poultry population in twenty (20) identified critical areas shall be the native chickens, ducks, turkeys, backyard game fowls and quails;

5. Enforcement of the 2001 Wildlife Act. The latter declares the policy of the State to conserve the country’s wildlife resources and their habitats for sustainability. Under this law, the mandated government agency can suspend and/or disapprove the issuance of certification for wildlife coming from AI-affected countries;

6. Preventive measures in humans. All workers directly or indirectly involved with handling live poultry should be given the appropriate influenza vaccine. The DOH shall ensure the availability of prophylactic medicines for humans in the event of an outbreak of Avian Influenza in poultry;

7. Information, Education and Communication (IEC) or communication, education, participation and awareness (CEPA). This component covers trainings and the development and production of AI prevention-related materials such as pamphlets, brochures, posters, comics, television ads and radio plugs; and

8. Establishment of compartmentalized AI-free poultry production zones. The National Task Force shall establish and recognize defined territories or compartments where natural or manmade barriers can prevent entry and limit/stop spread of avian influenza.

The Philippines also established a National Avian Influenza Diagnostic Laboratory (NAIDL) within the existing premises of the BAI. The NAIDL is equipped with Real Time Reverse Transcriptase Polymerase Chain Reaction (RRT-PCR) machine to rapidly detect the presence of HPAI. Thus, results will be available within 24 hours. The NAIDL is also capable of performing ELISA test, HA-HI test, AGID test and virus isolation. Rapid test kits are also available for rapid screening of cloacal or tracheal samples from suspected farms. The NAIDL has a total of seven staff assigned to work on the samples obtained from the different provinces, whether it is for surveillance or shipment purposes. When laboratory surveillance commenced in 2005, around 6000 samples were tested to demonstrate freedom from disease. To this date, more than 100,000 samples have been processed by the government laboratories (Table 2).

Table 2. Samples collected yearly for Avian Influenza surveillance, 2005-2015.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>No. of Samples Collected and Tested*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>5,976</td>
</tr>
<tr>
<td>2006</td>
<td>21,285</td>
</tr>
<tr>
<td>2007</td>
<td>16,123</td>
</tr>
<tr>
<td>2008</td>
<td>16,421</td>
</tr>
<tr>
<td>2009</td>
<td>5,423</td>
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<tr>
<td>2010</td>
<td>3,318</td>
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<tr>
<td>2011</td>
<td>6,461</td>
</tr>
<tr>
<td>2012</td>
<td>6,292</td>
</tr>
<tr>
<td>2013</td>
<td>10,947</td>
</tr>
<tr>
<td>2014</td>
<td>12,009</td>
</tr>
<tr>
<td>2015</td>
<td>13,353</td>
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</tbody>
</table>
To bring the diagnostic support closer to the high risk areas, collaborative projects were inked with overseas funding agencies. The Regional AI Diagnostic Laboratories (RAIDLs) in Regions 2 and 12 were established under the AusAID Project, Region 3 under the New Zealand International Aid and Development Agency Project and Regions 7, 9 and 10 under the Japan Special Trust Fund Project. These projects also incorporated advanced training of laboratory staff on AI diagnosis in developed countries.

**CONCLUSION**

The Philippine experience indicates that national development and population growth will continue to stimulate intensified livestock and poultry production. Such peri-urban concentration of animal farms and the liberalization of international animal trade provide the best situation for transboundary animal disease eruption. Unremitting collaboration of government veterinary authorities and industry stakeholders protects animal and public health.

**REFERENCES**


