ILRI/IFPRI
Background paper – 1st draft

Overview on poultry sector and HPAI situation for Indonesia with special emphasis on The Island of Java

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1. Introduction

HPAI of subtype H5N1 first found in Indonesia in August 2003

Spread rapidly and being endemic in many parts of Indonesia

Highest number of human deaths, 108 confirmed fatal cases since 2005

Decided focus more specific on Java?:

- the limited time and difficulties in obtaining consistent and updated data

- Java represents 60% of the human and 70% of poultry population of Indonesia

- Cases of HPAI H5N1 continuously reported for poultry and sporadic for humans

If some information on the poultry sector not available:

- a group of experts was asked on their specific opinion.
- 2 epidemiologists, 1 field vet, and 1 vet employed commercial farm.

2. Review of the poultry sector, actors, and bio-security

2.1 General figures

Table 1. Poultry Population in Indonesia (MoA, 2007)

	Population
Native poultry	317 million
Layer	106 million
Broiler and	175 million
Ducks	35 million

2.2 Breeding industrial poultry production in Java

Table 2: Industrial poultry production in Indonesia

Breeding	Present in country	Number (2006)	Number (predicted 2007)
Pedigree pure lines	No-	-	-
Great grand parents	No	-	-
Grand parents stock	Yes	436,000	475,000
Parent stock layer	Yes	1,000,000	1,000,000
Broilers	Yes	1,150,000,000	1,250,000,000
Layers	Yes	87,000,000	94,000,000
Male layers	Yes	52,000,000	57,000,000

Source: The Indonesian Poultry Society Forum (2007) in MoA, 2007

2.3 Data on commercial sector for Java

Table 3: Overview on commercial sector located in Java

Type	No. of birds	Lifespan of birds
Parent stock	7 million per cycle	65-67 weeks
Hatchery	25,800,000/weeks	-
Broiler	15,500,000/weeks	35 days
Layer	4,500,000/weeks	80 weeks

2.4 Poultry industry and support actors (Table 4)

Actors	Number	Location	Throughput (birds per year)
Feed mills companies	2 branches All other NA	CP, Tangerang, Sidoardjo, Wonokoyo, Serang Banten dan gempol Pasuruan Japfa comfeed, Sidoarjo, Purwakarta, Sragen Anwar Sierad, Bogor, Serang Malindo Suja, Samsung	1,85 millions ton/years 1,2 millions ton/years 1,6 million tons/years NA 120,000 tons/years NA

2.4 Poultry industry and support actors

Actors	Number	Location	Throughput (birds per year)
Feed transport company	NA* (most feed company using other transport company)	NA	NA

2.4 Poultry industry and support actors

Actors	Number	Location	Throughput (birds per year)
DOC companies	**2 branches** **All other consist of one branch** **(most using other transport company)**	**Charoen Phokphand** **Japfa Comfeed** **Wonokoyo** **Anwar Sirad** **Malindo** **Patriot** **Cibadak** **BIP**	**337,44 millions DOC** **58,150 millions/years** **All others NA**

2.4 Poultry industry and support actors

Actors	Number	Location	Throughput (birds per year)
Companies transporting eggs	NA	All over Java Island	NA
Transport of broilers and spent layers to abattoirs	4 branches NA (most producers using own and frequently also other transport companies	CP, Five star Japfa C, Cikupa, Parung Anwar Sirad, Bellfood, Dellfood, Bogor	NA

2.4 Poultry industry and support actors

Actors	Number	Location	Throughput (birds per year)
Egg packing plant	NA	Non big company, but only small enterprise	NA
Meat processing plant	**2 branches** **1 branch** **1 branch** **1 branch**	**CP, Bale Raya, Serang, Banten and Surabaya** **Japfa Comfeed Cikupa, Tangerang** **A Sirad, Bellfood, Dellfood, Bogor** **Wonokoyo MPP, Pasuruan**	**22.500 birds/days (Serang)** **22.000 birds/days (Rungkut)** **12.000 birds/days** **10.000 birds/days**

2.4 Poultry industry and support actors

Actors	Number	Location	Throughput (birds per year)
Abattoirs	**2 branches**	**CP,**	
		- Baleraya, Serang	**22,500 birds/days**
		- Rungkut Surabaya	**22.000 birds/days**
	All others 1 branch	**Japfa C, AgriNusa Unggas Jaya, Jakarta Barat**	**12,000 birds/days**
		A Sirad, Bellfood, Dellfood, Bogor	**10,000 birds/days**
		Wonokoyo	**20.000 birds/days**

2.4 Poultry industry and support actors

Actors	Number	Location	Throughput (birds per year)
Poultry Vaccine Producers (some have own vaccinators)	10	-PT Medion* -Vaksindo (local) -Qilu Animal Health, Product, RRC -Qian Yuan Hao Biologicals, Co, RRC -Harbin Weike Biological Co, RRC -Harbin Weike Technology Co, RRC -Laboratory AVI-Mex, Mexico -Boehringer Ingelheim, -Vetmedica, Bio Imune, Mexico -Intervet, Nedherlands	Import = 191 million doses, Local = 55 million doses, Free sale for public 18 millions

2.4 Poultry industry and support actors

Actors	Number	Location	Throughput (birds per year)
Specialized poultry vets or equivalent	**More than 100**	**All feed, chicken, vaccine companies have own vets**	**NA**

2.5 Backyard Poultry Production

estimated 106 m birds reared by approx. 60-70 % of Java human pop.

a) Types of business (farming system)
- kept to provide an additional income
- provides usually only a small part as complementary income
- few of kampong farmers as core business of their living

b) Production system
- three rearing systems (intensive, semi-intensive and extensive traditional)
- kept traditional, scavenging during daytime and kept in fenced during nighttimes.
- a small part is managed intensively using “all in all out” system..

c) Type of commodity

- Approximately 70% only manages kampong chicken farming.
- 30% apply mixed poultry farming's (kampong chickens,duck, quails, pigeon etc).

d) Origin of feedstuff

- a small part procure feed from feed mill companies.
- ± 40% of farmers produce their own poultry feed
- about a half of farmers, get their feed from left-over foods.

e) Production scale

- estimated several - 100 birds
- most farmers rear < 50 birds.

f) Health management

- Farmers keep about 50 birds often apply ND vaccination → government intervention and program.
- a sufficient coverage vaccination → about 50% without booster application.

Table 5: Backyard poultry-keepers

Species	Present in Java	Significant *	Numbers**	Distribution geographical	Breeds
Chicken	yes	60 – 70 %	7	All Districts of Java (West 29,319,161; East 40,058,195; Central 33,158,078 Yogya 3,970,670)	Kampong, Pelung, Kedu
Turkey	Yes	Not Significant	1	Some district of Java	Local Turkey

* Kept by more than 1 in 1000 people (based on expert opinion if no data)
** Score 7: More than 1 million; 6: 100,000 to 1,000,000; 5: 10,000 to 99,999; 4 1,000 to 9,990; 3: 100 to 999; 2 10 to 99; 1: 1 to 9; 0: None present in country; NA no information available

Table 5: Backyard poultry-keepers

Species	Present in Java	Significant *	Numbers**	Distribution geographical	Breeds
Duck	Yes	8 – 10 %	7	All province of Java (West 5,296,757, East 2,430,767, central 4,614,460, Yogya 419,734)	Tegal, Magelang, Mojosari, Turi duck
Moving duck	Yes	2 – 3 %	7	Yogyakarta, Tegal, Brebes, Pemalang, Batang, Blitar, Kediri Mojokerto (Report ACIAR)	Tegal, Magelang, Mojosari, Turi duck

Table 5: Backyard poultry-keepers

Species	Present in Java	Significant *	Numbers**	Distribution geographical	Breeds
Geese	Yes	Not significant	4	All distric of Java (Central 94,686, West NA, East 564,437; Yogya NA)	Local geese
Guena fowl	Yes	Not significant	1	NA	One breed Guinea fowl (ayam mutiara)

Table 5: Backyard poultry-keepers

Species	Present in Java	Significant *	Numbers**	Distribution geographical	Breeds
Quil	Yes	2 – 5 %	7	All province of Java (West NA East 693,021 Central 4,296,542 Yogya NA)	NA
Dove/pigeon	Yes	1 %	6	All province of Java (West 921.556, East, central, and Yogyakarta NA)	Local, King Post

Table 5: Backyard poultry-keepers

Species	Present in Java	Significant*	Numbers**	Distribution geographical	Breeds
Song bird	Yes	30 %	7	All district of Java	The breed of vary greatly
Wild bird	Yes	NA	6	All district of Java	The breed of vary greatly

2.6 Vertical and horizontal integration with other actors

Table 6: Stability of each actor over time and space

		Present	Numerical trend	Location	Geographic trend
Commercial	Rearing	30 years (1970s)	Up	Urban	Up
	Broiler	30 years (1970s)	Up	Urban	No change
Backyard	Chick	Always	Up	All of districts	No change
	Duck	Always	No change	All of districts	No change
Support services	Feed mill	30 years	Up	Peri-urban	Up
	Transport day old chick	30 years	Up	City suburban	No change

2.7 Specific description of selected main actors

a) Breeder and commercial layer farms classified as sector 1 or 2

- **General information**
  - **Typical species is chicken**
  - **Typical production types are broiler, layer, breeders, and hatcheries**

- **Bio-security**

- **Use of poultry health service provider**
  - **In house veterinary services usually based on employed private veterinarians**
  - **The access to those farms for official veterinarians often very limited.**
  - **Information is mainly based on company's compliance**

2.7 Specific description of selected main actors

a) Breeder and commercial layer farms classified as sector 1 or 2

- **Routine animal health practices**
  - **Sufficient vaccination done by 100 %**
  - **approximately 80 % in breeding and commercial layer flocks**
- **Feeding**

  For most of the big companies, feed is obtained from own feed mill enterprise (fully integrated system)

2.7 Specific description of selected main actors

b) Kampong chicken

c) Poultry slaughter houses (CSH) and slaughter places

- divided in least 3 categories (modern, semi-modern CSH, and traditional)
- Modern CSH produce more hygienic and expensive chicken meat.
- traditional CSH less hygienic and relatively cheap chicken meat

Figure 1: Modern CSH in Java

- Traditional CSH, called Chicken Slaughter Places
  - have no room classification.
  - step meat processing conducted in a single room.
  - low or non biosecurity measures applied.
  - PPE is usually not used by the workers
  - Critical in the handling of disposal

Figures 2: Traditional CSH, some people call Chicken Slaughter Places

2.7 Specific description of selected main actors

d. Market

- Traditional markets (Pasar traditional)
  - all the daily need including live birds
  - live birds selling, slaughtering, and carcass
  - inadequate hygienic and sanitary conditions
  - sometime called wet market → dirty, non-hygienic, and non sanitary conditions

- Poultry/live bird markets
  - can be divided into pet bird markets and poultry markets.
  - usually temporally operating markets → may open every 5th day
  - only in early morning until around 8am

2.7 Specific description of selected main actors

d. Market

- **main factors contributing to continue AI reports for**
  - very limited bio-security measures
  - Non separation by species
  - Traders/collectors moving around
  - Knowledge of market chains is very limited
  - No proper handling of disposal
  - Only limited control by Veterinary services

3. Bio-security, control and selected risk factors

o Vaccination

- increase the poultry immunity, to prevent poultry mortality, and to reduce virus shedding to the environment

- Vaccination against avian influenza has been used widely in large commercial sectors but less so in other sectors.

- first responses in an attempt to control the disease already in 2004.
- used was local produced vaccine using local seed virus of H5N1

- since 2006 → vaccination has only been implemented in 11 high risk provinces using a more targeted approach

Table 7: AI vaccine government provision (excluding imports) (MoA, 2008)

	Local	
2004	132 M	H5N1
2005	143 M	H5N1
2006	103 M	H5N1, H5N2
2007	98.5 M	-

The main constraints for a successful vaccination program in Indonesia are:

- Veterinary authority in provinces and districts (autonomic area)
- Low vaccination coverage duo to wide areas to be covered, extensive production systems (no housing, difficulties to catch chicken etc.)
- Various species infected
- Limited human resources
- Low operational budget

- Kampong chicken of sector 4 the high turn-over rate has to be taken into account (expected >25%).
- should be applied to ensure sufficient vaccination coverage,
- overload capacities of the country, around 317m native chicken should be vaccinated quarterly

3. Bio-security, control and selected risk factors

- The disposal of surplus males

  Extra males chicken are distributed to society for pet chickens (coloured DOC as toys for kids) at some regions of Java.

3. Bio-security, control and selected risk factors

- Disposal of manure to the environment

  - virus can survive in faeces up to several weeks
  - manure from infected farms to uninfected areas → may trigger infections to other farms or regions
  - strong indication that this aspect exists at levels of poultry farms
  - urgent need information on the scope of manure movement

3. Bio-security, control and selected risk factors

o Disposal/handling of dead chicken

- Beside of “proper” handling of dead birds (burning and burial) frequently farmers dispose them direct to the environment.
- Includes “thrown to the river” or the use of ”traditional dust bin”
- many farmers (including Sector 3) may dispose dead chicken to cat fish ponds.

Figure 6: Dead chicken found at a poultry market

3. Bio-security, control and selected risk factors

- Marketing of poultry, not controlled, no disinfection policy, no control of animal movement, species not separate etc.

The government has instructed the practice of bio security by using disinfection. However, no standardized procedure is available

Moreover, disinfection should be always follows proper cleaning. However, often not applied accordingly.

4. **Threats and incidences of relevant poultry diseases (excluding of AI)**

4.1 New castle disease

- **The reported number of chickens infected by Newcastle disease virus has been fluctuating: 201,196 cases in 2002, 324,470 in 2003 and 56,848 in 2004**
- The disease is endemic throughout the country and causes high mortality particularly in indigenous chickens.

4.2 Infectious bursal disease (Gumboro disease)

- The reported number of cases of infectious bursal disease in the country has been fluctuating: 10,298 in 2002, 22,040 in 2003 and 1,225 in 2004

- The control program for the disease is conducted through sanitation, monitoring and surveillance as well as vaccination.

4.3 Pullorum disease

- The distribution: Aceh, North Sumatra, Bengkulu, Lampung, East Nusa Tenggara, South Sulawesi and Southeast Sulawesi.
- Sporadic cases of disease reported in 2004, mainly in kampong chickens.

Table 8: Poultry threats and measures

	Presence	Prev	Public contrl	Private contrl	Effective
HPAI H5N1	Yes	Endemic	Yes	Yes	No
Newcastle disease	Yes	Endemic	Yes	Yes	?
Gumboro disease	Yes	Endemic	Yes	Yes	?
Poultry Campylobacter	Yes	Endemic/ sporadic	No	No	No
Poultry Salmonella	Yes	Endemic	Yes	Yes	Yes

5. Occurrence of HPAI in the country

5.1 Situation in poultry

HPAI due to H5N1 broke out in Java in August 2003 and spread to many different parts

10.5 million birds were reportedly lost in 2004 due to disease and culling.

The disease has infected poultry in 31 out of 33 provinces and in 286 out of 444 Districts

Incidence varies across the country

5.1 Situation in poultry

PDS teams interview farmers searching for evidence of clinical outbreaks matching with HPAI in poultry using a clinical outbreak definition

A mortality event consistent with clinical HPAI and a positive rapid test in affected poultry is considered a confirmed detection of HPAI

All data are entered into a database at the regional Local Disease Control Centres (LDCCs)

5.1 Situation in poultry

the number of carried out interviews and confirmed cases and the calculated detection rate for 2008 by regions based on the weekly PDSR report

gaps for 2088 for other islands may be caused by a time lack for data entry

The calculated detection rates varies considerable between the provinces.

The sensitivity and specificity of the PDSR system is currently topic of on-going ILRI research

5.2 Situation in human

Since 2005, reported 108 human deaths, 13 observed in 2008.

The latest cases in West Java, including urban centres.

2004		2005		2006		2007		2008		TOTAL	
Cases	**death**	**Cases**	**deaths**	**Cases**	**deaths**	**Cases**	**deaths**	**Cases**	**deaths**	**Cases**	**deaths**
0	0	20	13	55	45	42	37	16	13	133	108

6. Country-level Oganization for HPAI Management

6.1 General considerations (NSP)

(a) National Strategic Plan

The guidelines for the country related control of HPAI in Indonesia are formulated in the National Strategic Work Plan (NSP) for the year 2006-2008.

The plan has nine main components:

1. Campaign Management Unit
2. Enhancement of HPAI Control (including vaccination)
   - o Systematic vaccination of sector 3 and 4 poultry
   - o Controlling outbreaks by stamping-out (including compensation)
   - o fencing of birds
   - o Biosecurity
   - o Quarantine, movement control and tracing

The plan has nine main components:

3. Surveillance and epidemiology

- Effective early detection
- Integrated Surveillance Information System
- Institute a targeted surveillance program
- Vaccination program monitoring
- Surveillance following recognition of a human case
- Surveillance of potential reservoirs

4. Diagnostic laboratory services

- Increased laboratory capacity
- Vaccine production and quality assurance

The plan has nine main components:

5. Animal quarantine services
6. Regulation (Legislation and enforcement)
7. Communication
8. Research and development
   - Epidemiological and socio-economic factors
   - New vaccine technologies
   - Diagnostic and vaccination regim
   - Technology transfer and sharing information
9. Poultry Industry Restructuring

7. Risk Factors

7.1 Potential different pathways of introduction: Wild birds

- Migratory and residents wild birds
- Still little evidence that migratory birds carrying and transmitting H5N1
- However, there is also clear evidence that for some countries first introduction through infected wild birds has played an essential role in the past (e.g. Germany in 2005 and 2006),
- No recent information for Indonesia about prevalence of avian influenza in wild birds

7.2 Illegal imports

- **Indonesia is comprised of more than 13.000 islands,**
- **very long coastline (81,000 km) and 8,000,000 km2 of territorial waters.**
- **That represents difficult to control,**
- **easily used as entry points for smuggling**
- With this geographical condition, Indonesia is vulnerable to illegal import

8. Previous research and on-going research in Indonesia

- According to the CMU are the key objectives of the on-going research as follows:
  1. Improve the management, planning and capacity for HPAI control
  2. Reduce the risk and improve HPAI prevention
  3. Improve detection and response capacities across all sectors
  4. Epidemiological studies on HPAI (CMU, 2008)

9. Conclusions

9.1 Summary of main findings

- **The country is characterised by highly density areas for poultry and humans**

- **The applied mitigation practices (including vaccination) failed to control AI and were unable avoid the establishment of an endemic situation**

- **The main constraints for a successful control include:**
  - **Almost uncontrolled poultry trade in many parts of the country**
  - **Low bio-security at markets, slaughter houses, and farms (in particular of sector 3 and 4)**
  - **Failure to reach an appropriate vaccine coverage (sector 3 and 4).**
  - **Applied vaccination policy not transparent and uniform (around 20 vaccines are currently used)**
  - **Limited access of governmental vet. to farm sector 1 or 2.**

- **Decentralised structure of the country. Therefore, veterinary authority in provinces and districts**

- **Other factors include the handling of dead or sick chicken (including improper disposal) and the problem of scavenging ducks**

- **Despite various research has been carried in Indonesia since 2004 on the field of AI the situation remains still critical also due to difficulties in implementation of research finding .**

10. Current knowledge gaps

According to the existing main research gaps CMU stated in a recent presentation that a considerable amount of research has been conducted in Indonesia, especially

- Results of previous studies needs to be followed up
- Study results covering identified research gaps needs to be implemented
- In particular further studies are needed to evaluate prevention and control options Indonesia

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11. Current knowledge gaps

Based on the presented paper the research gaps are as follows:

Epidemiological section

- **General research gaps to be considered:**
- **Epidemiology of HPAI not yet fully understand**
- **Effective evidence based control measures are still lacking**
- **More specific research gaps:**
- **Appropriate country adapted monitoring and surveillance schemes**
- **Mechanism of spread of HPAI within the country needs more research on all sectors (including specific disease spread models to support specific control measures)**
- **Current scope and efficiency of applied mitigation practices needs more attention**
- **Risk assessment (so far only applied sporadic and for specific sectors)**
- **Risk mapping (including remote sensing, e.g. ducks versus rice areas)**
- **Research on appropriate control of poultry trade (intra and inter regions)**


PONDOK DAUN
TRANSAKSI PINGGIR JALAN


TERIMA KASIH