Avian Influenza and Bangladesh

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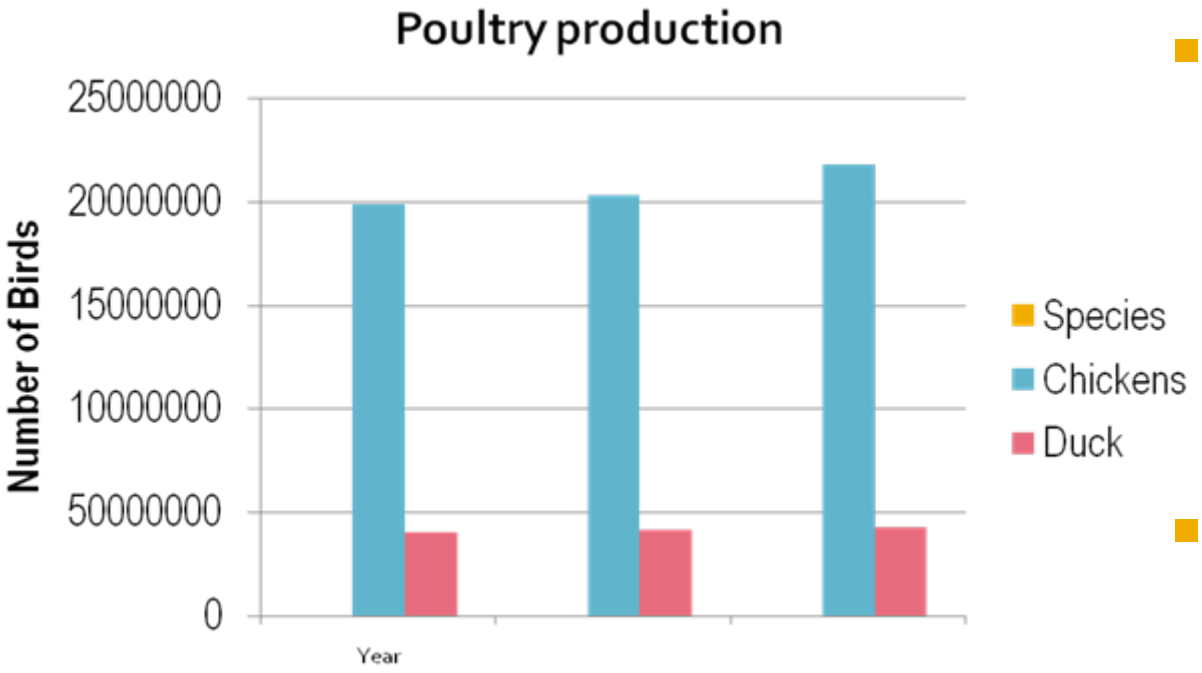
1.1 Farms by production sector

- Most poultry farms are classified as sector 3 or 4
- All commercial chicken farmers source chicks from breeding farms through agents. Some ducks are also hatched in breeding farms.
- Ducks are generally kept free range. There are also free range chicken.
- Free roaming migratory ducks are present in winter

Category	No. of farms	No. of poultry		
		Chicken	Ducks	Other
Sector – 1	348	4,716 ,100		
Sector – 2	6,950	26,890 ,470	100,000	
Sector – 3	41,353	33,117, 987		unknown
Sector – 4		95,800,000	45,000,000	unknown
TOTAL				

* In government level, 10 duck breeding farms are there.

1.1 Poultry production



- Growth is slow due to many factors including avian influenza and feed costs
- Demand for poultry products remains high

	Year		
Species	**2009**	**2010**	**2011**
Chickens	198,417,000	203,184,000	218,072,000
Duck	40,171,000	41,537,000	42,949,000
TOTAL	**238,588,000**	**244,721,000**	**261,021,000**

1.2-3 Challenges and Good practices

1.2 MAIN PROBLEMS/CHALLENGES

- Biosecurity practices and status at the farm level
- Uncontrolled movement of birds
- Close proximity of backyard poultry to commercial farms
- High poultry density
- Large number of backyard poultry including mixing of species
- Insufficient disease reporting

1.3 GOOD PRACTICES &LESSONS LEARNT

- Community based active surveillance using SMS technology to improve disease reporting
- Ability to respond quickly to outbreaks (response time has decreased from 4.8 to 1.3 days in five years)
- Effective compensation of poultry farmers affected by H5N1

2.1 Live poultry markets in Bangladesh

- Vast majority of poultry are sold in live bird markets.
- Poultry move through several markets before being sold; from small rural markets to urban/regional collection centres, to regional markets and larger wholesale markets and then to retail markets and shops.
- Slaughtering, processing and disposal are performed on site in an open environment with low biosafety
- Live bird markets are located within the market place with no separation from other sections

2.1 Live poultry markets in Bangladesh

- All live bird markets in Dhaka City to have a weekly day off for cleaning and disinfection.
- Renovation of 28 markets and the construction of nine new LBM's to upgrade biosafety through a comprehensive package .
- Advocacy and capacity building activities including the distribution of posters and display of educational video
- The total number of poultry wholesale markets in the country is around 80.
- There are thousands of live bird markets.
- In each of 500 Sub-districts more than one, each of 64 Districts and seven Divisional cities including the capital city have a quite good number of live bird markets.

2.2 LMB improvements now and into the future

2.2 REDUCING RISKS AT LMBS INTO THE FUTURE

- Development of a poultry distribution and processing centre.
- Provision of separate markets for ducks and chickens.
- Continual improvement of LBMs following the models already developed by DLS.

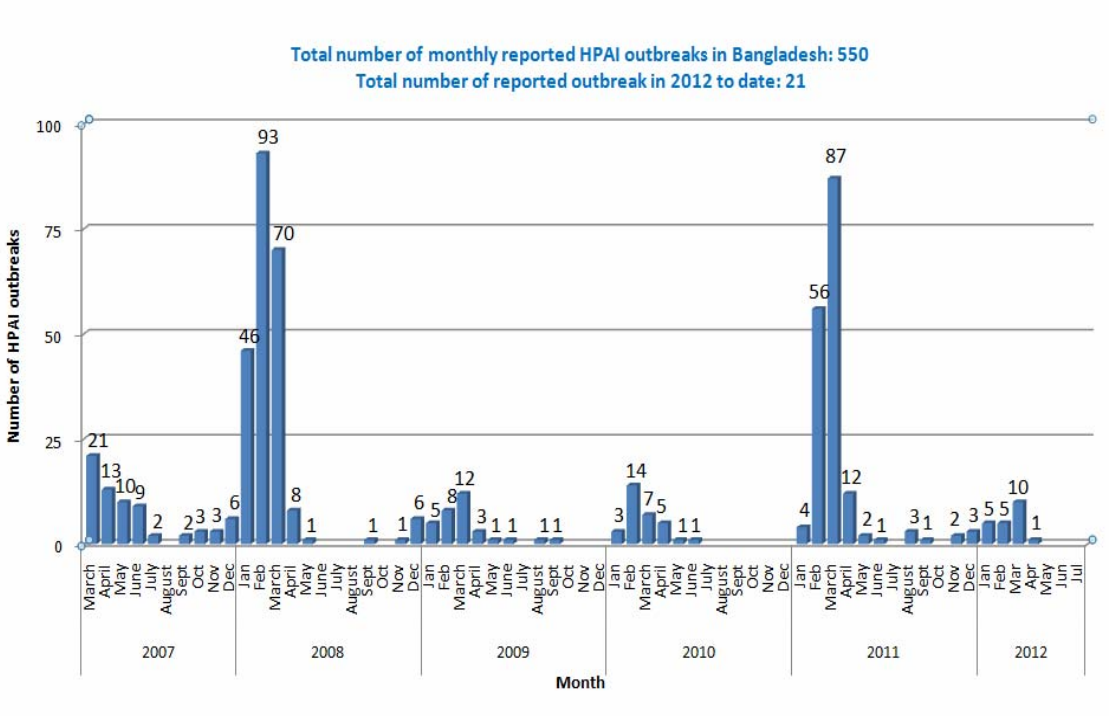
2. 3 GOOD PRACTICES IMPLEMENTED AT LBMS

- Weekly market closures
- Training in and implementation of decontamination practices
- Continuous advocacy and awareness raising

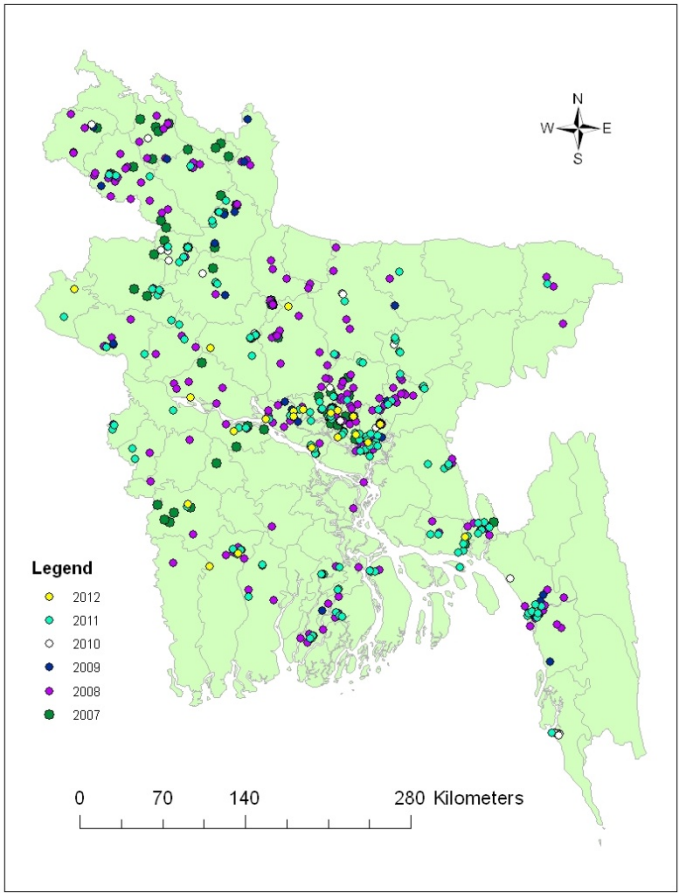
3.1 H5N1 outbreaks - summary

- 223 outbreaks from 2010 – 2012 in domestic poultry (chickens, ducks, quail).
- 550 outbreaks have occurred since the disease was first reported in 2007.
- During early 2011 there were three major mortality events in crows. H5N1 of clade 2.3.2.1 was identified

3.1 H5N1 outbreaks in domestic poultry



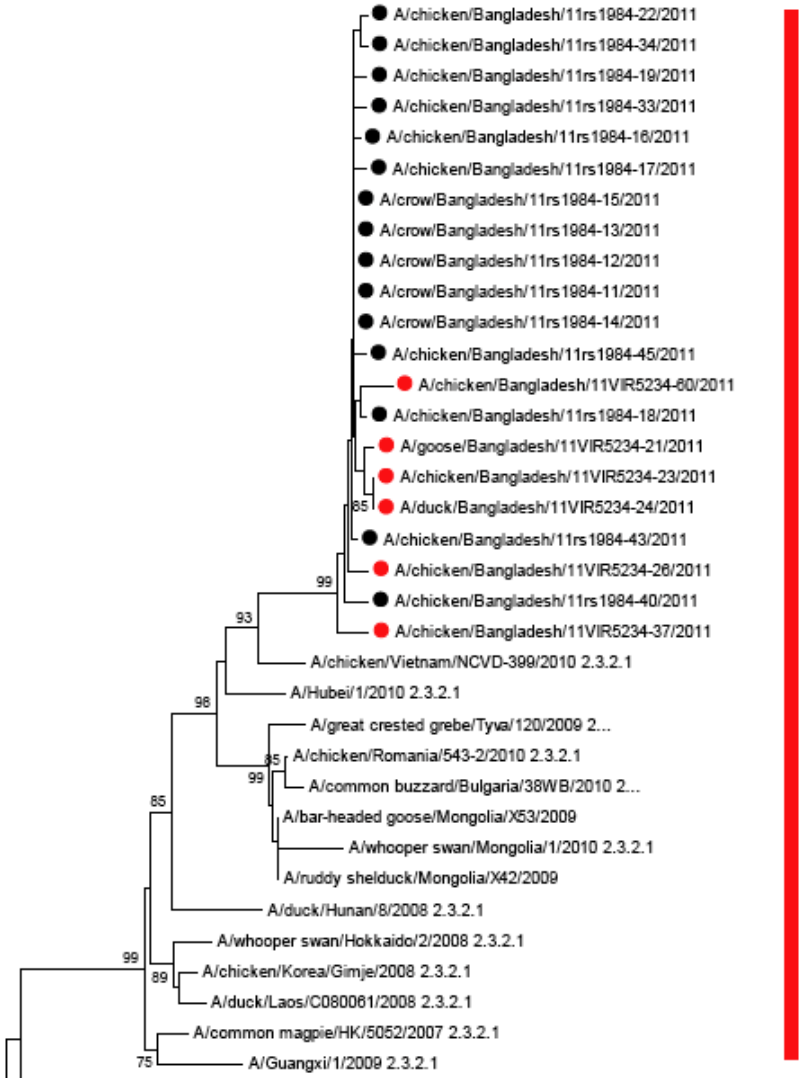
Year of Report date	Farming System: Commercial (broiler)	Commercial (layer)	Commercial*	Backyard	Total
2007			44	25	69
2008			208	18	226
2009			23	9	32
2010		29		2	31
2011	5	163		3	171
2012		21			21
Total	5	213	275	57	550



***production data not collected before 2010**

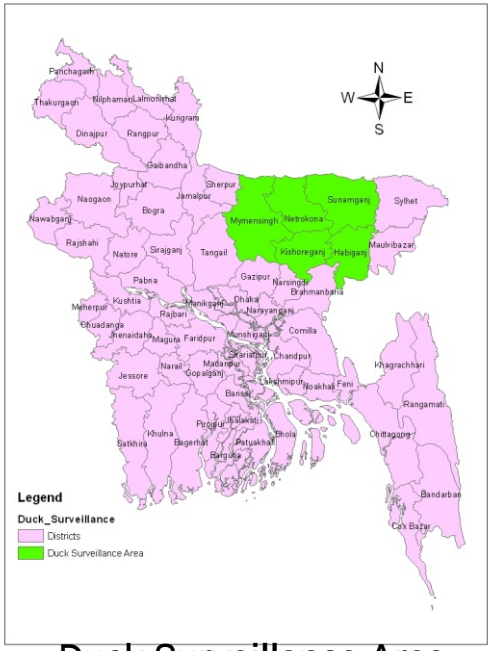
3.1.4 Clades in Bangladesh

- Three clades have been identified:
  - 2.2
  - 2.3.2.1
  - 2.3.4



4.1 Active surveillance in domestic birds

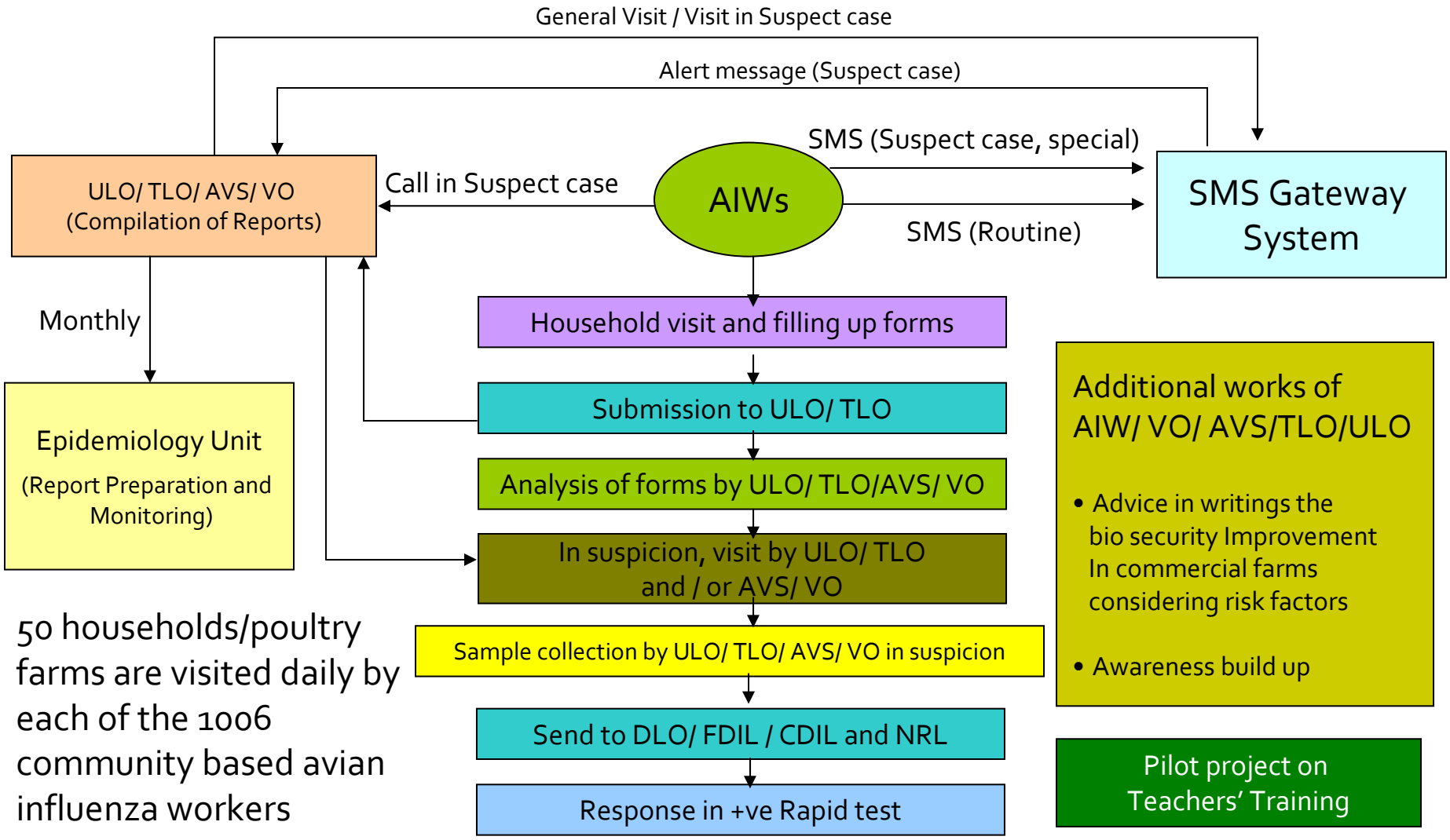
	SMS Gateway	Nomadic ducks
Aim	Early detection and response	Identify reservoir
Timing	Year round.	10/11 – 3/12
Target species	Chicken	Duck
Target premises	Backyard and commercial farms nationwide	Five districts free range ducks
Sample type	Tracheal and Cloacal swab	Tracheal and cloacal swab
Sample scale	Suspected birds only	13 500 samples
Target	H5N1	Influenza A
Testing method	Rapid antigen detection test kit PCR rRT PCR	rRT PCR
In case of positive	Sample sent to National reference laboratory for confirmation by rRT PCR. Control measures (culling, decontamination) applied.	



Duck Surveillance Area

4.1 SMS Gateway

Modus Operendi of HPAI Surveillance



50 households/poultry farms are visited daily by each of the 1006 community based avian influenza workers

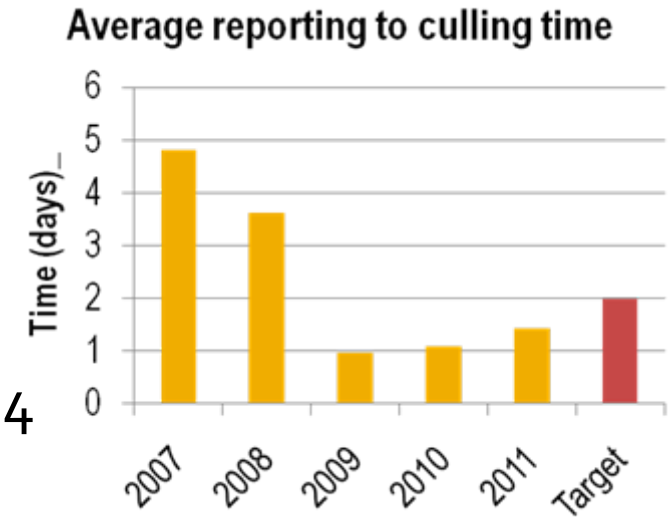
Additional works of AIW/ VO/ AVS/TLO/ULO

- Advice in writings the bio security Improvement In commercial farms considering risk factors
- Awareness build up

Pilot project on Teachers' Training

4.2 Results of surveillance programmes and control measures

- Results of surveillance programmes
  - Identified ducks as carriers/reservoirs
  - Improved response times
  - Clades identified recently: 2.3.2.1, 2.3.4



- Control measures to be undertaken if H5N1 positive case is detected.
  - Quarantine
  - Culling and disposal
  - Decontamination
  - No restocking for three months
  - Compensation

4.3 Control measures for positive cases

- Quarantine
- Culling and disposal
- Decontamination
- No restocking for three months
- Compensation

Influenza A virus prevalence studies

- Prevalence studies have been completed in live bird markets.
  - FAO and DLS
  - BLRI
  - Chittagong Agricultural University and
  - Bangladesh Agricultural University
- Research and studies done by:
  - icddr,b (Humans, poultry, enivironment)
  - FAO has collected samples
  - IEDCR(humans)

6.1 Surveillance in wild birds

(1) Surveillance programme on wild birds

- Bangladesh Livestock Research Institute
- Chittagong Veterinary and Animal Science University
- icddr,b
- FAO (study completed two years ago)

(2) The main aim of conducting surveillance programme on wild birds

- To find out, if there is any new introduction

(3) Period for conducting surveillance on wild birds

- During winter season

(4) Timing of sampling: Winter season

(5) Target species: HPAI susceptible wild birds

(6) Sample category: Feces (7) Sample scale (8) Target serotype of influenza A virus

(9) Testing method (RNA detection by PCR)

(10) If a sample tests positive for H5N1 at the 1st stage of testing, what is the next step?
Sequencing and comparing with circulating strain.

- Steps undertaken:
  - Disposal and decontamination
  - Strengthening good disposal practices in nearby live bird markets with the assumption that dead poultry may be the source.

7.1-4 Control measures

- Vaccination
  - Vaccination is not currently in practice.
  - The Government of Bangladesh is planning to conduct a vaccination trial in two districts in 2012.
- Stamping-out:
  - Stamping out is part of the response practices
  - Initially culling within a three kilometre radius of the infected property was practiced. Since 2009 the practice has been to cull only the infected farm (commercial farms) and within a 500 metre radius for backyard poultry.
- Control measures for outbreaks:
  - Quarantine
  - Culling and disposal
  - Decontamination
  - No restocking for three months

8.1 Why H5N1 may be persistent in Bangladesh

- Low farm biosecurity
- Insufficient movement controls during outbreaks
- Preference for purchase of live birds
- Presence of asymptomatic carriers (ducks, wild birds)

8.2 Strategies to decrease virus circulation (next 5 yrs)

- Advocacy for and implementation of biosecurity and biosafety measures at both farm and market level
- Strengthening surveillance and diagnostic capacity.

- Detection of and control virus reservoirs with the aim to eliminate the virus.
- Vaccination is on trial.
- Closure of live bird market & supply processewd chicken
- Zoning and movement control

Thank you

HPAI H5N1 RECENT SITUATION AND SURVEILLANCE IN VIETNAM

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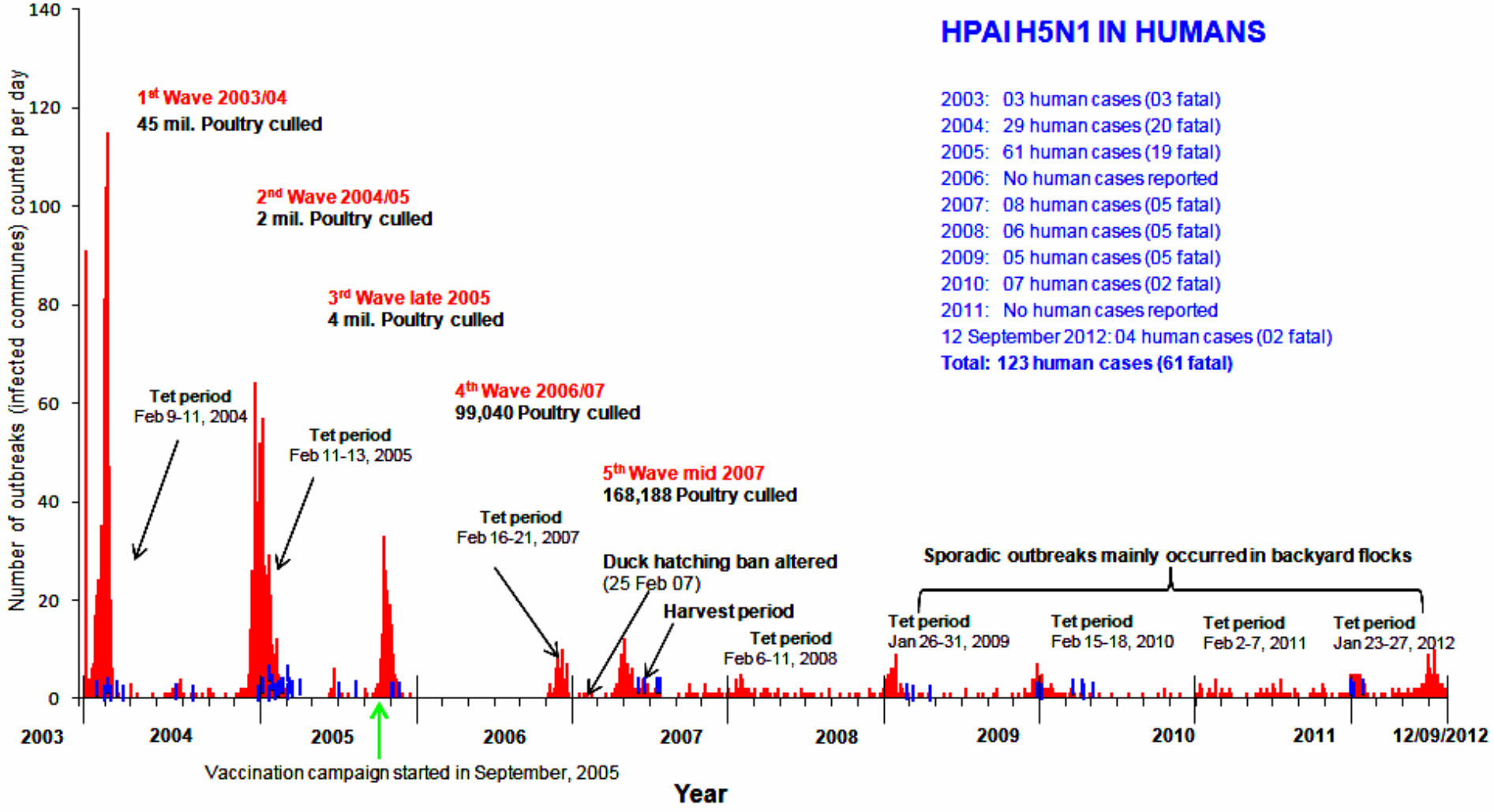
Report 1 – Recent HPAI H5N1 outbreaks

Year	# of province infected	# of district infected	# of commune infected	Disposed poultry *(bird)*			
				Chicken	*Duck*	*Muscovy duck*	Total
2007	33	113	250	37.385	184.724	5.823	227.932
2008	27	54	80	40.525	61.027	4.506	106.058
2009	18	35	71	24.686	85.038	3.123	112.487
2010	23	36	62	21.938	52.809	1.022	75.769
2011	22	43	82	60.787	89.204	1.365	151.356
2012	32	121	296	117.946	479.859	8.303	616.109

A TIMELINE OF HPAI H5N1 IN VIETNAM

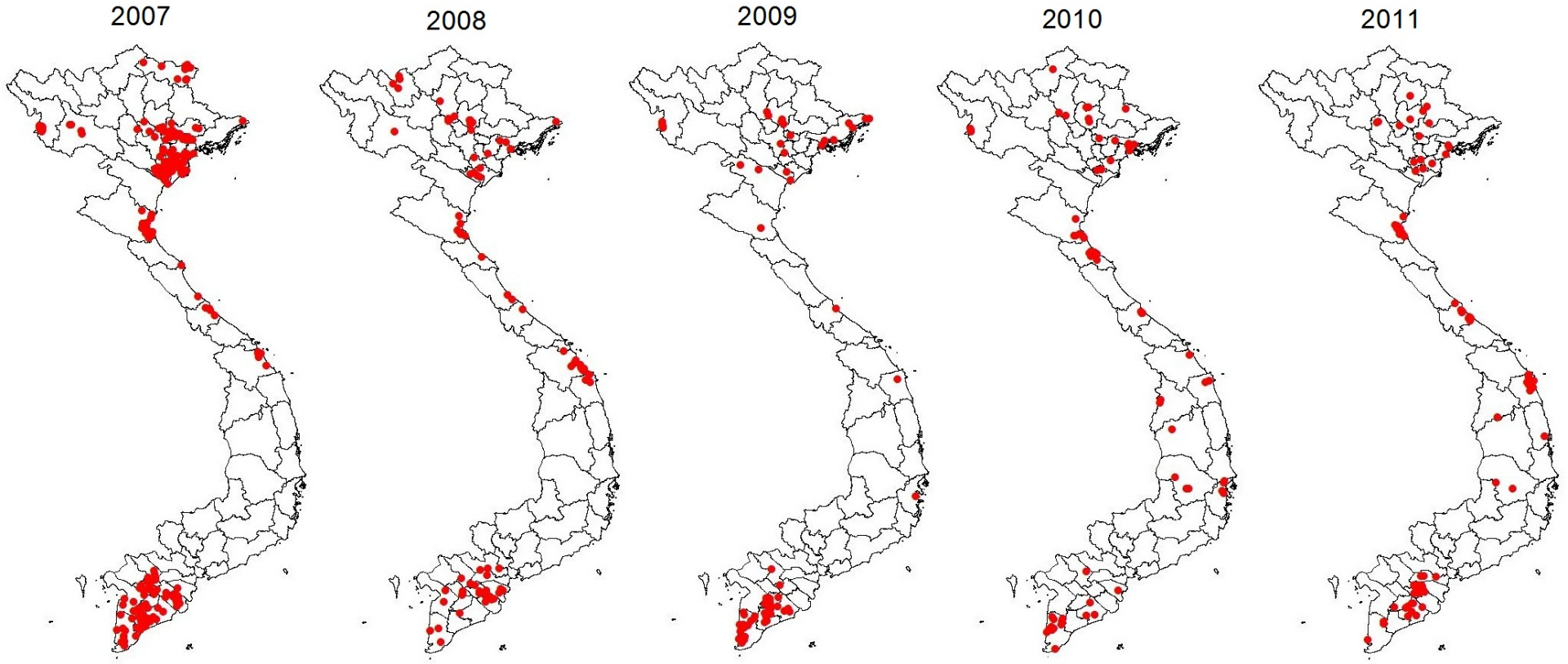
(12 December 2003 – 12 September 2012)

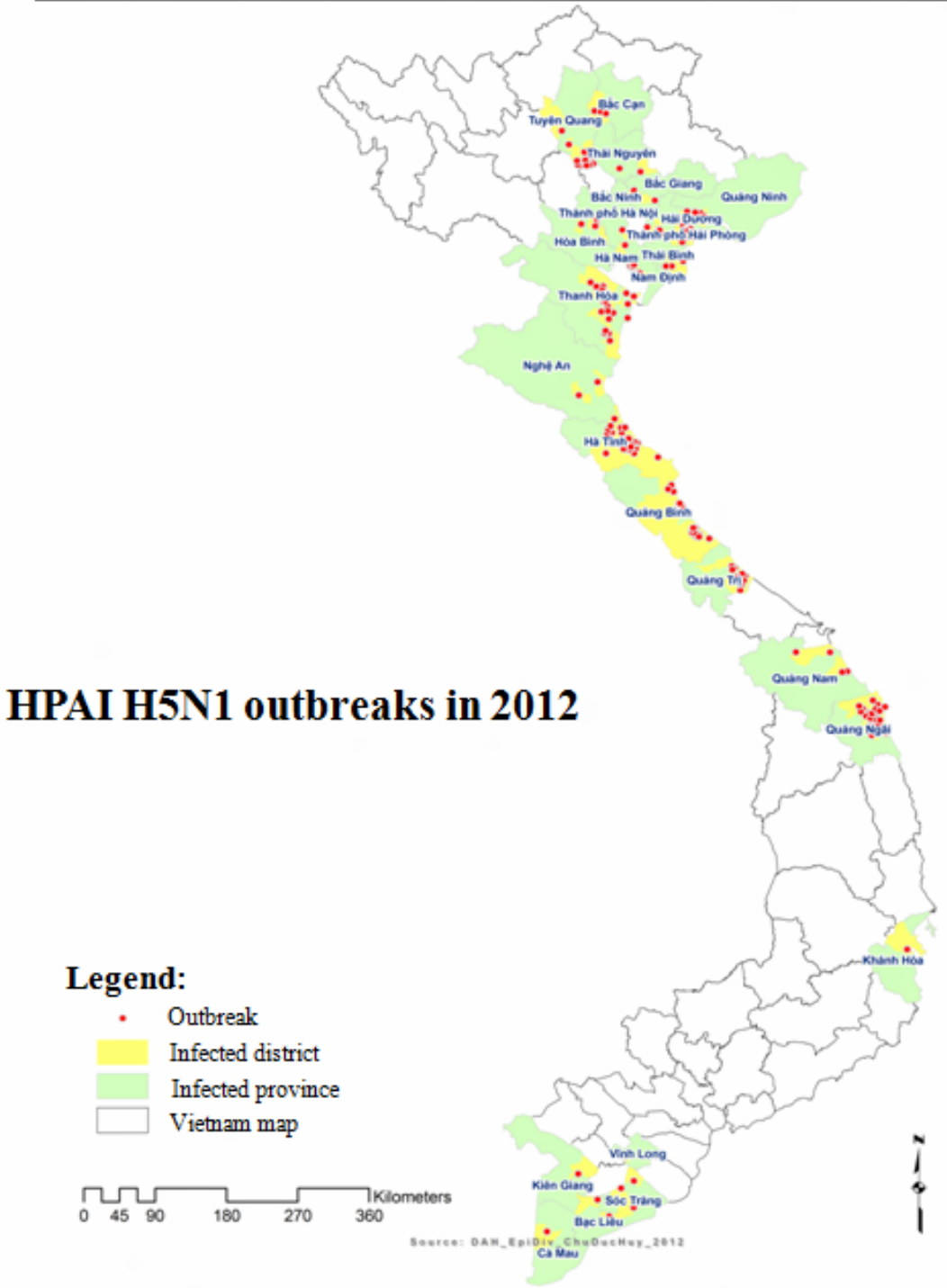


Data sources (up to 12 September 2012): DAH & WHO, 2012

Prepared by Nguyen Van Long, Epi.Div, DAH

HPAI spatial distribution during 2007 – 2012




HPAI H5N1 outbreaks in 2012
Legend:
Outbreak
Infected district
Infected province
Vietnam map
0 45 90 180 270 360
Kilometers
Source: DAH_EpiDiv_ChuDucHuy_2012
Bắc Cạn
Tuyên Quang
Thái Nguyên
Bắc Giang
Quảng Ninh
Bắc Ninh
Thành phố Hà Nội
Hải Dương
Thành phố Hải Phòng
Hòa Bình
Hà Nam
Thái Bình
Nam Định
Thanh Hóa
Nghệ An
Hà Tĩnh
Quảng Bình
Quảng Trị
Quảng Nam
Quảng Ngãi
Khánh Hòa
Vĩnh Long
Kiên Giang
Sóc Trăng
Bạc Liêu
Cà Mau

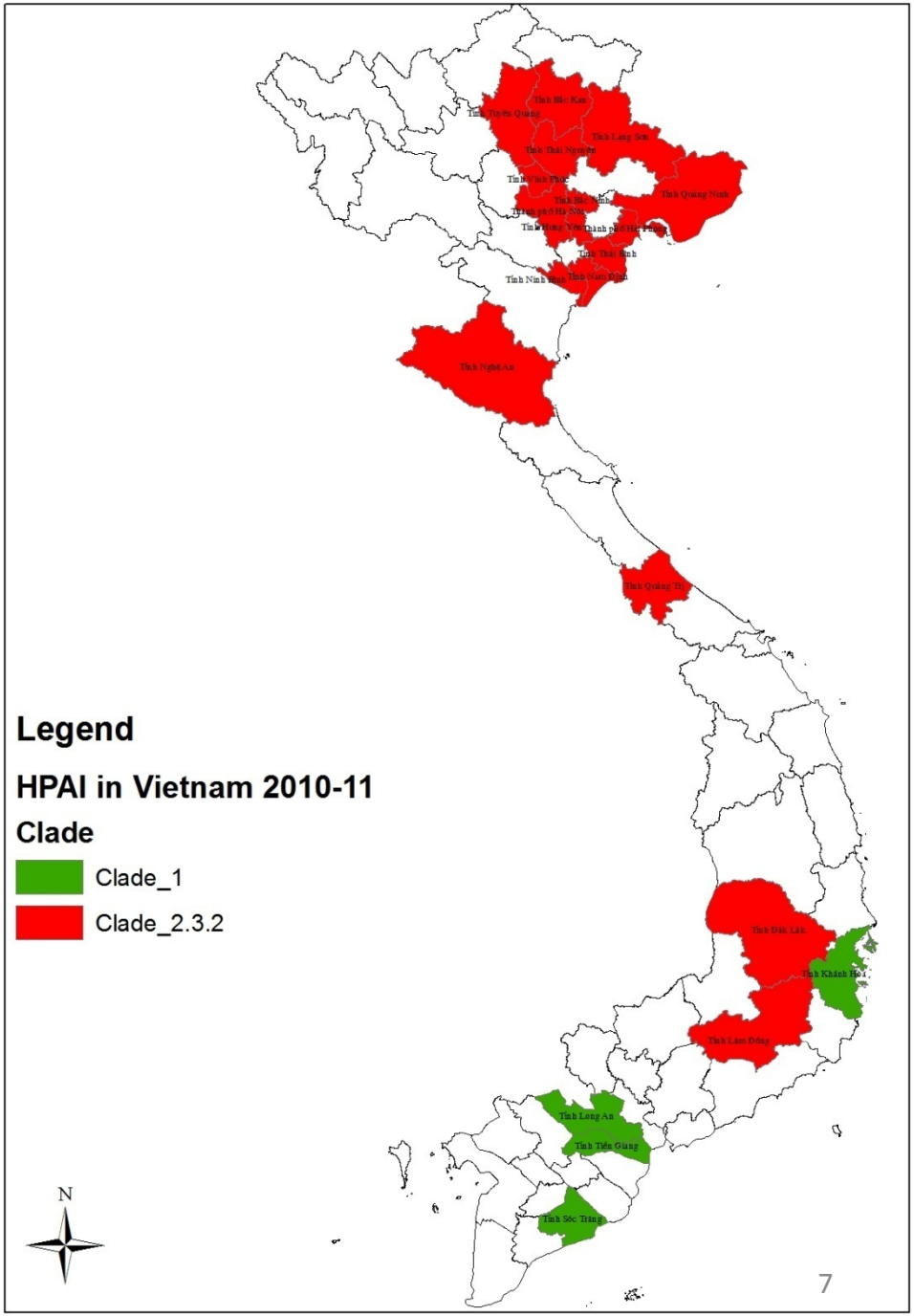
Summary of H5N1 virus changes in Vietnam

Year	North	South
2003-2005	Introduction of HPAI H5N1 viruses to Vietnam Clade 1 virus were the majority.	
2007-2008	Complete shift of clade from 1 to 2.3.4 Clade 7 virus detected in smuggled chicken	Clade 1 virus remains as majority, and continues to evolve. Clade 2.3.2/2.3.4 were occasionally detected.
2009	Multiple sub-lineages of clade 2.3.4 virus were identified	
2010	Re-introduction of clade 2.3.2 which is similar to Monglia, Hong Kong, etc.	
2011-2012	Complete shift of clade from 2.3.4 to 2.3.2 (2.3.2.1-A; 2.3.2.1-B; 2.3.2.1-C)	

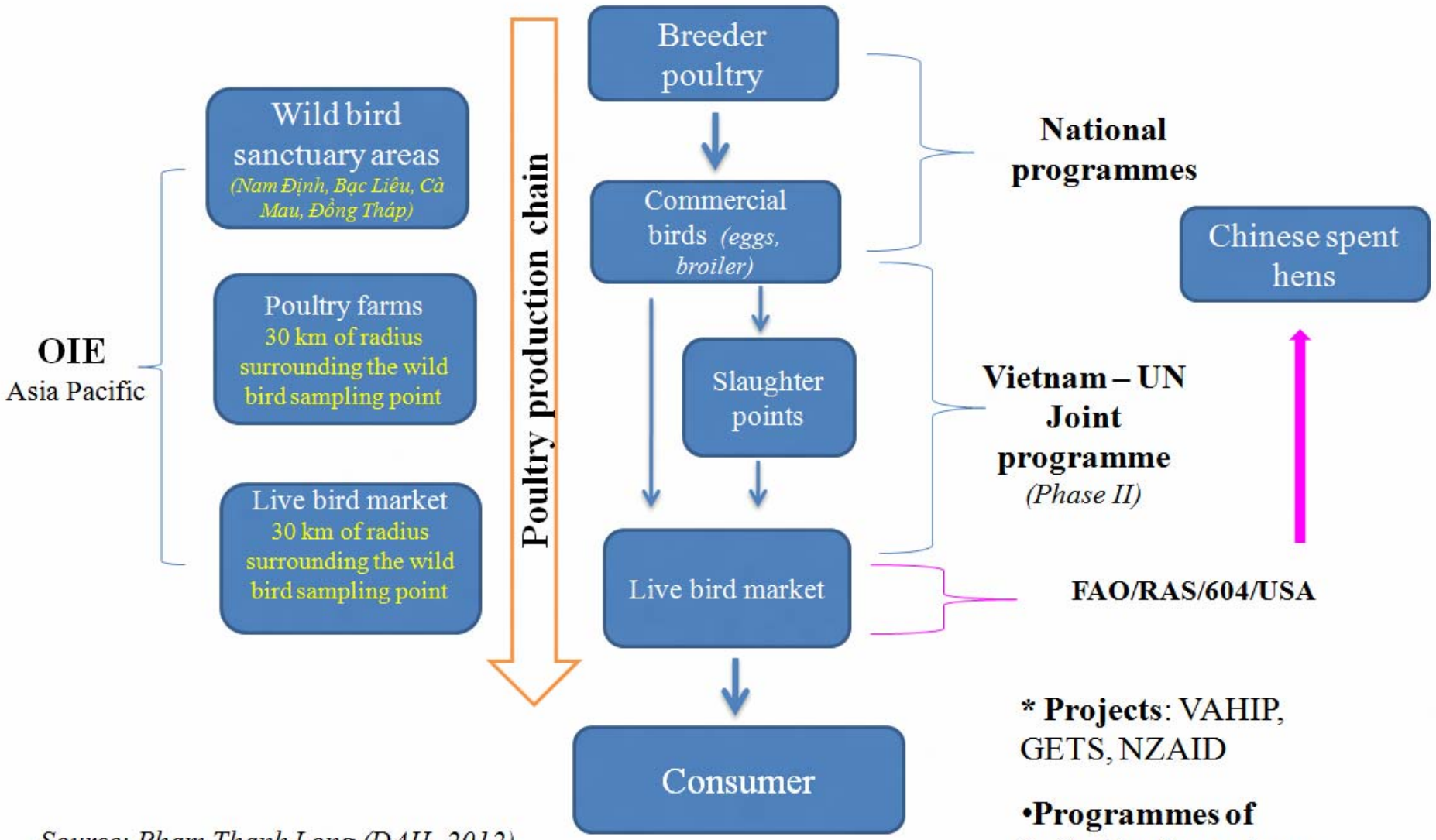
◆ Major changes of virus were due to the new introductions in the north.

• In 2010-2012: New clade of H5N1 circulated in the North and Central Vietnam so-called 2-3-2. Clade 1 keeps remaining in the South of Vietnam.

• Vaccine H5N1 Re-5 does not work well against these strains.



Active surveillance on HPAI in Vietnam during 2007 - 2012



Source: Pham Thanh Long (DAH, 2012)

Report 2 – Avian influenza active surveillance programme of domestic birds

Results of live bird market surveillance period 2011 – 2012 *(in brief)*

Objectives:

- To determine the presence of HPAI H5N1 virus in ducks at markets
- To determine the temporal and spatial distribution of influenza A and HPAI H5N1 virus in ducks at markets
- To collect HPAI H5N1 data with a standardized methodology, so future progress against control the disease can be monitored

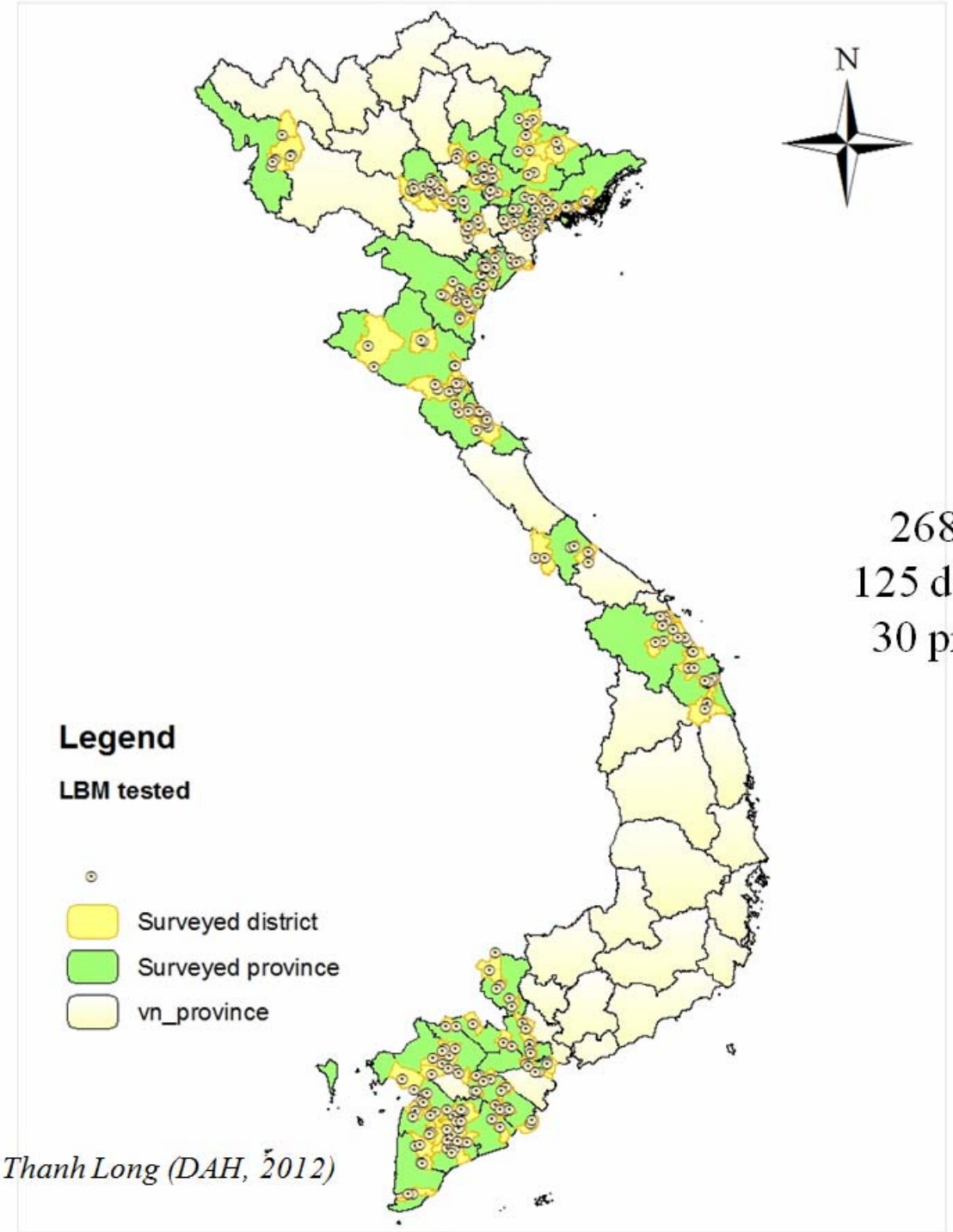
Study design

Location:

- **250** Live-bird markets **(LBM)** of **125** districts in **30** provinces, cities.
- Target specie: **duck** *(Anas platyrhynchos)*
- Type of samples: **oro –pharyngeal swab**
- Time: **4 consecutive months** (from Sep. 2011 to Feb. 2012)
- Frequency: each LBM was sampled **every month**.
- Sample size: **20 samples/LBM**, pooling 5 single samples into 1 test sample

Tesing method:

- Real-time RT-PCR.
- For: M, H5 & N1 genes from pooled swabs
- All swabs and RNA positive with M gene were submitted to NCVD for futher analysis.



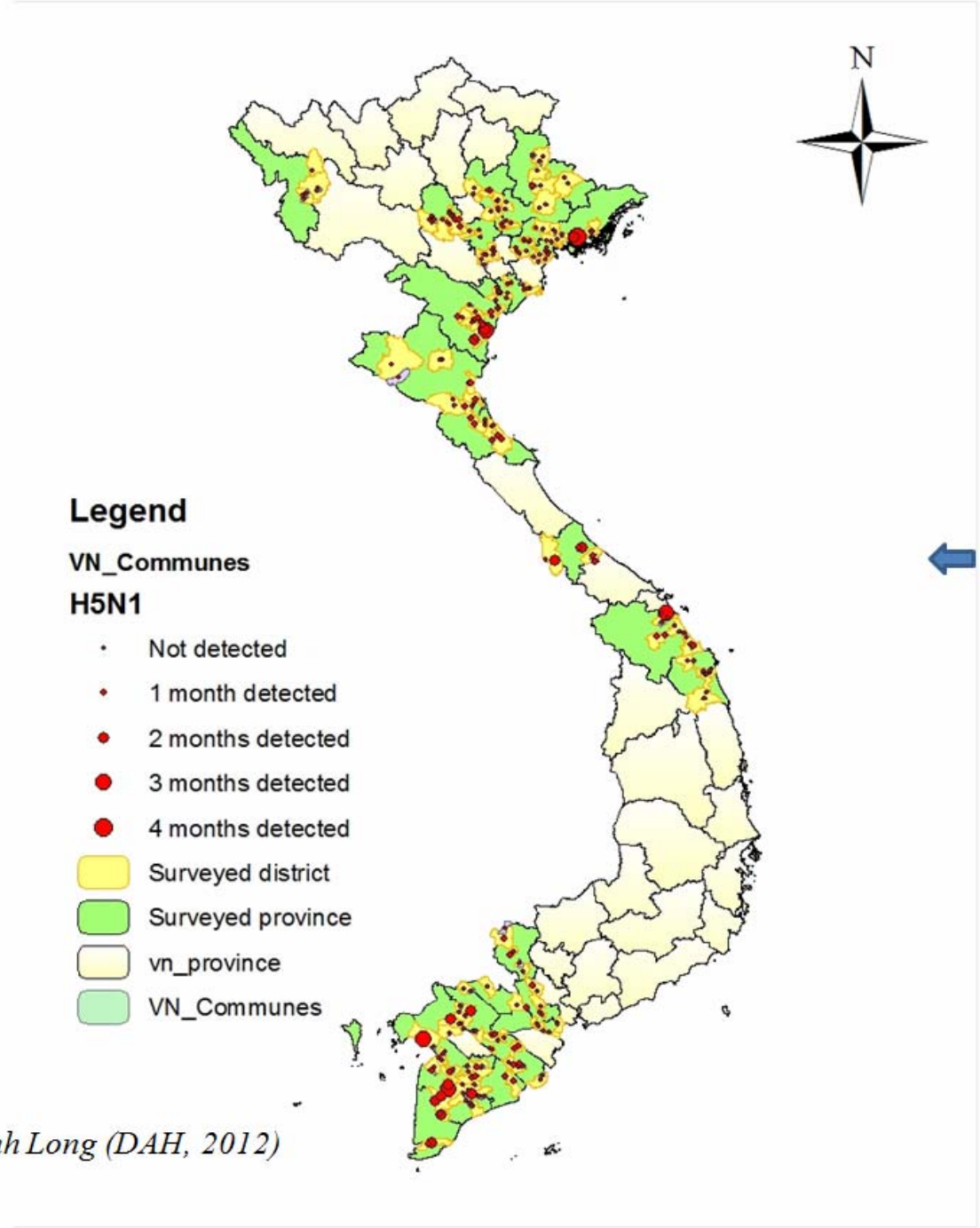
268 LBMs
125 districts in
30 provinces

Source: Pham Thanh Long (DAH, 2012)

Proportion of AI virus detection

	Total number	Influenza A	%	H5	%	H5N1	%
Province	**30**	29	*96.67*	23	*76.67*	20	*66.67*
District	**125**	107	*85.60*	53	*42.40*	47	*37.60*
Commune	**276**	185	*67.03*	78	*28.26*	69	*25.00*
LBM	**268**	187	*69.78*	79	*29.48*	69	*25.75*
Poultry	**3,952**	743	*18.80*	187	*4.73*	161	*4.07*

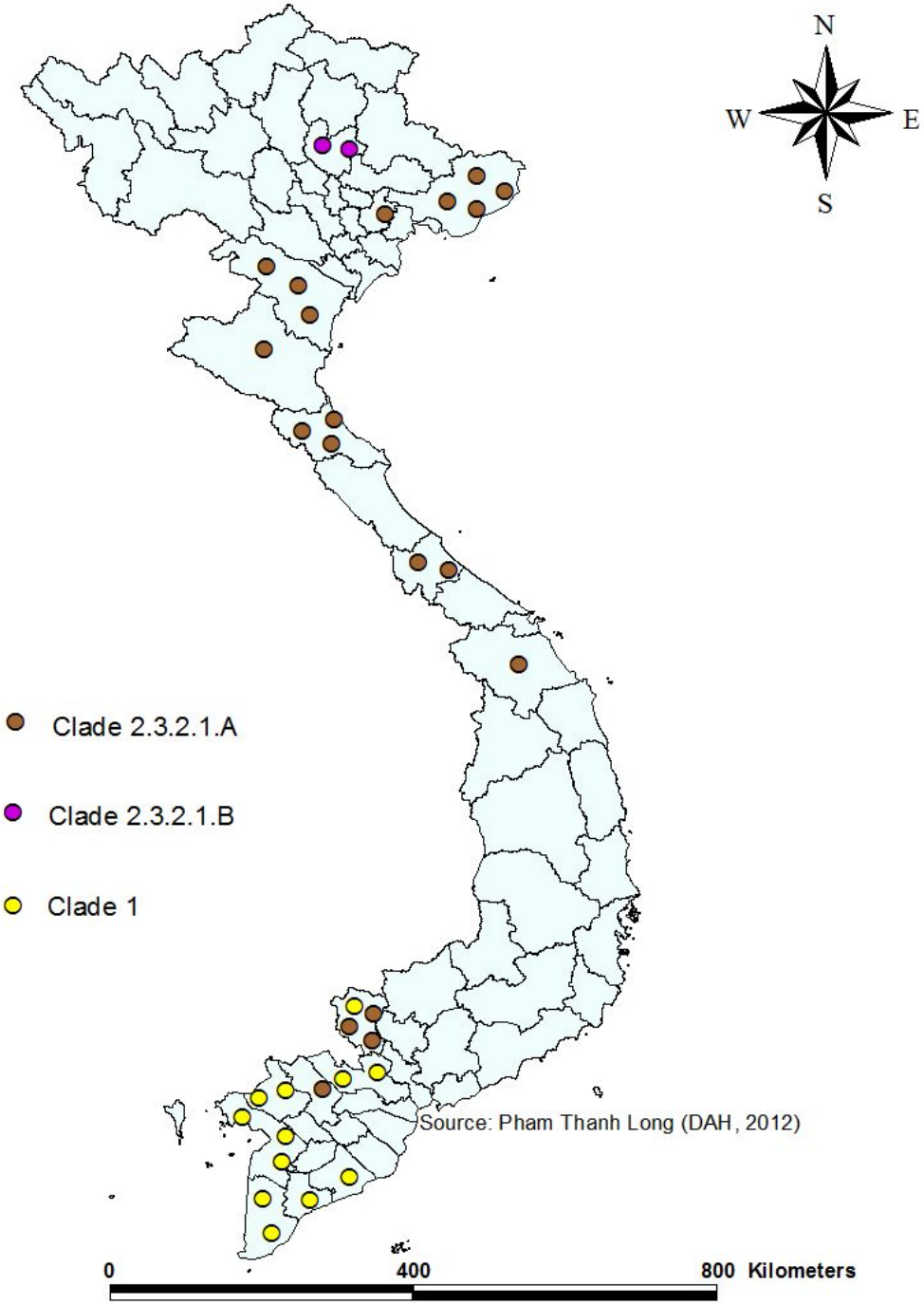
Source: Pham Thanh Long (DAH, 2012)



H5N1

Source: Pham Thanh Long (DAH, 2012)

H5N1 virus clade distribution from LBM surveillance



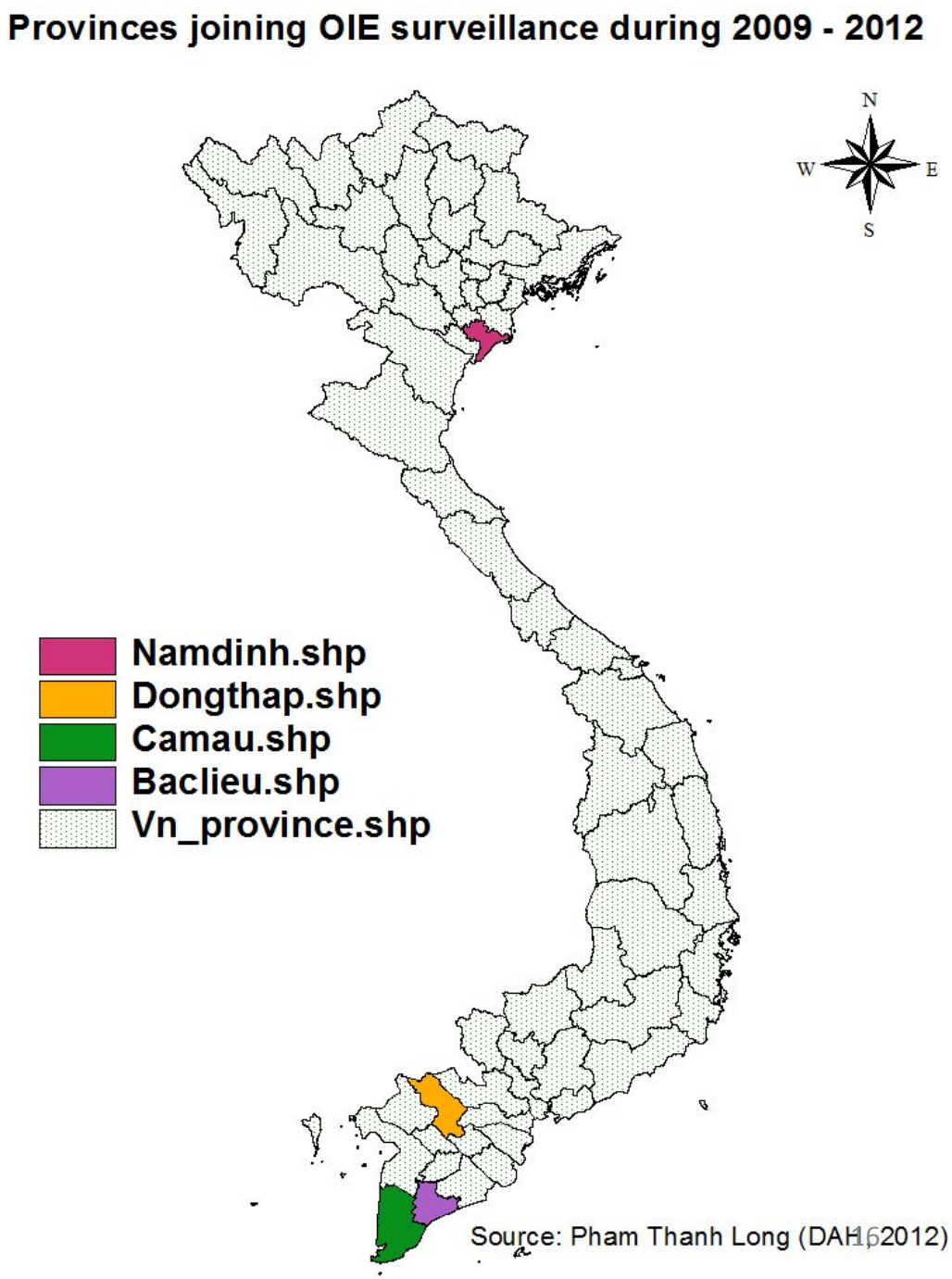
Report 3 – Avian influenza active surveillance programme of wild birds

OIE's surveillance in Vietnam during 2009 - 2012

Sampling method: AI virus study		
Wild bird	* ***Number:***	100 birds
	* ***Sample:***	2 swabs (cloacal & tracheal)
	* ***Species:***	Anseriformes and other species of water birds
Domestic bird	* ***Number:***	600 birds
	* ***Sample:***	2 swabs (cloacal & tracheal)
	* ***Species:***	Ducks, Muscovy ducks, chickens
	* ***Premise***	Backyard farm & live bird market (within 30 km radius of wild bird capturing sites)
Environment	* ***Number:***	10 samples
	* ***Sample:***	fresh-droppings, carcasses, water in lake

Time to conduct sampling: *12 rounds*

- **Nam Dinh**: Mar., 2009
- **Bac Lieu**: Apr., 2009
- **Nam Dinh**: Jan., 2010
- **Bac Lieu**: Mar., 2010
- **Bac Lieu**: Oct., 2010
- **Ca Mau**: Feb., 2011
- **Nam Dinh**: Sep., 2011
- **Ca Mau**: Oct., 2011
- **Dong Thap**: Feb., 2012
- **Nam Dinh**: Apr., 2012
- **Nam Dinh**: Aug., 2012
- **Dong Thap**: Oct., 2012 *(last round)*



A summary of OIE surveillance for period 2009-2012

	Mar. 2009	Apr.2009	Jan. 2010	Mar.2010	Oct.2010	Feb. 2011
	Nam Dinh	**Bac Lieu**	**Nam Dinh**	**Bac Lieu**	**Bac Lieu**	**Ca Mau**
1. Wild bird	Negative	Negative	Negative	Negative	**ND***	Negative
2. LBM	Negative	H3N2 *(n=1)*	Negative	H9N6 *(n=1)*	H6N2 *(n=6)*	**H5N1** *(n=1)*
		H3N8 *(n=1)*			H9N2 *(n=18)*	H6N2 *(n=7)*
		H9N2 *(n=8)*			H11N6 *(n=1)*	H11N5 *(n=1)*
		H11N3 *(n=3)*				H11N9 *(n=2)*
		H11N9 *(n=1)*				H12N5 *(n=2)*
3. Farm	Negative	H4N6 *(n=7)*	Negative	Negative	**ND**	Negative
		H9N2 *(n=19)*				

***ND: Not done**

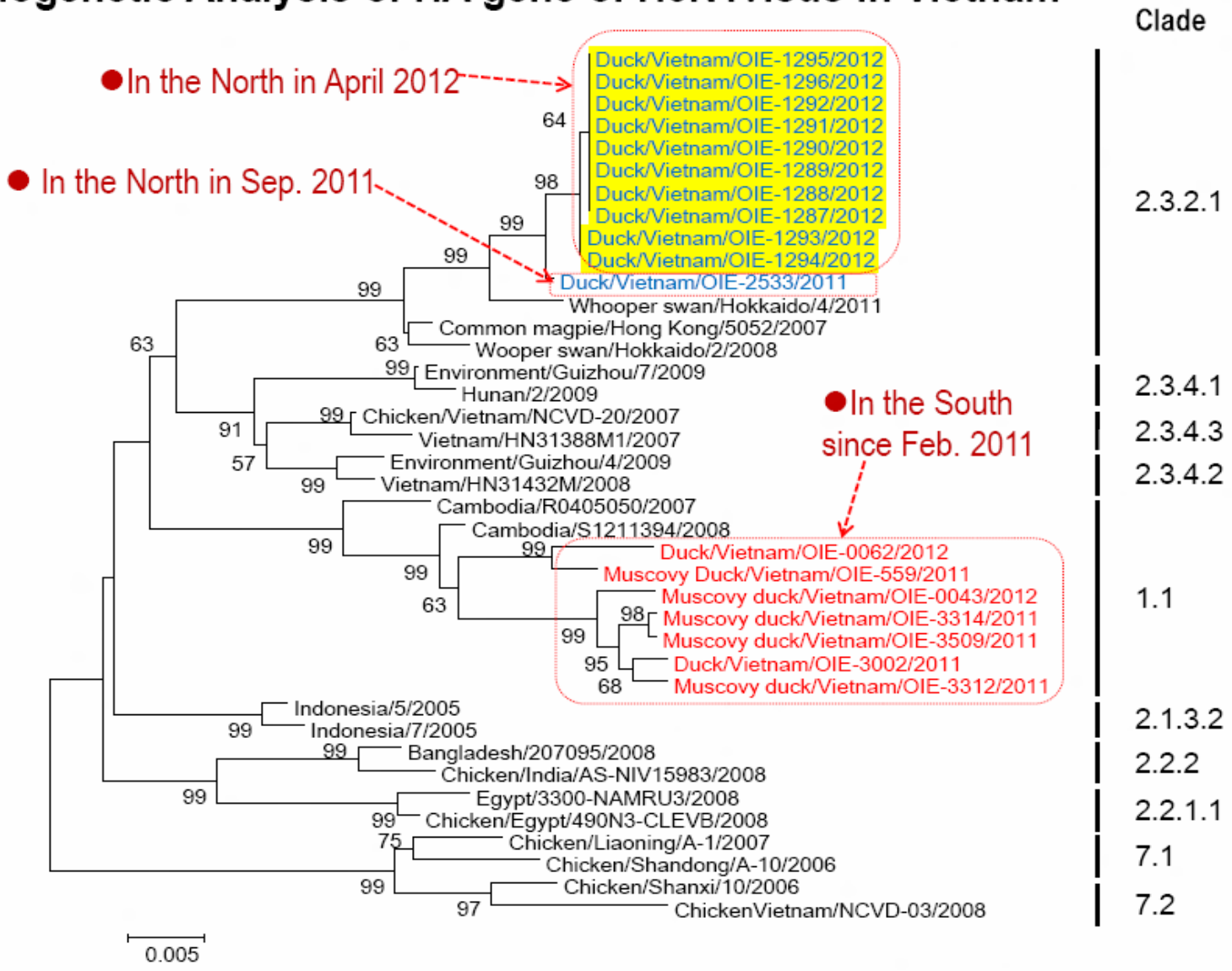
Source: Pham Thanh Long (DAH, 2012)

A summary of OIE surveillance for period 2009-2012

	Sep. 2011	Oct.2011	Feb.2012	Apr. 2012	Aug. 2012	Oct. 2012
	Nam Dinh	**Ca Mau**	**Dong Thap**	**Nam Dinh**	**Nam Dinh**	**Dong Thap**
1. Wild bird	**ND**	Negative	Negative	**ND**	**ND**	**ND**
2. LBM	H3N8 *(n=1)*	H3N6 *(n=1)*	H4N6 *(n=1)*	H3N2 *(n=4)*	H3N8 *(n=7)*	*Processing*
	H4N2 *(n=1)*	H3N8 *(n=7)*	**H5N1** *(n=5)*	H3N6 *(n=3)*	**H5N1** *(n=14)*	
	H5N1 *(n=1)*	N4N6 *(n=1)*	H6N2 *(n=1)*	H3N8 *(n=2)*	H5N2 *(n=1)*	
	H6N6 *(n=3)*	**H5N1** *(n=15)*	H7N1 *(n=1)*	**H5N1** *(n=10)*	H9N2 *(n=5)*	
		H6N2 *(n=39)*	H9N2 *(n=11)*	H6N6 *(n=5)*	H9N8 *(n=1)*	
		H6N9 *(n=2)*	H9N8 *(n=1)*			
			H11N3 *(n=2)*			
3. Farm		H4N6 *(n=3)*	H7N1 *(n=1)*	H3N2 *(n=4)*		*Processing*
			H9N2 *(n=1)*	H3N6 *(n=3)*		
			H9N8 *(n=1)*	H4N6 *(n=4)*		
			H10N7 *(n=1)*	H6N6 *(n=1)*		
			H10N8 *(n=1)*	H11N9 *(n=1)*		

Source: Pham Thanh Long (DAH, 2012)

Phylogenetic Analysis of HA gene of H5N1visus in Vietnam



Source: OIE Asia Pacific, 2012

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

- under the OIE/JTF Project for Strengthening HPAI Control in Asia -

Tokyo, Japan, 13-14 December 2012

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HPAI Control Measures in Thailand

- **Thailand prohibits AI vaccination in poultry**
- **Depopulation** of the affected premises,
- **Compensation 75 %** of the local market price
- **Disinfection** of premises & infected materials
- **Disposal** of carcasses, products & infected materials
- **Quarantine** the suspected premises & surroundings
- **Movement control** in the radius of 10 km , 30 days
- **Active surveillance** timely in all groups in risk areas
- **Public awareness & special Campaigns**
- **Coordination** with all authorities concerned – MOPH Environment & Natural Resources, Prov. Governor

HPAI Case Definition

1. **Broad signs to cover all AI potential cases**
2. **AI Case Definition (since January 2004) and further Revisions :-**

   a) Almost 100% mortality

   - **Poultry death ≥10% within a day (July 2004 Revision)**
   - **Poultry death ≥5% within 2 days (Revised since July 2005)**
   - **Farmed poultry death ≥1% within 2 days OR 20 % reduction in feed & water intake during a day**

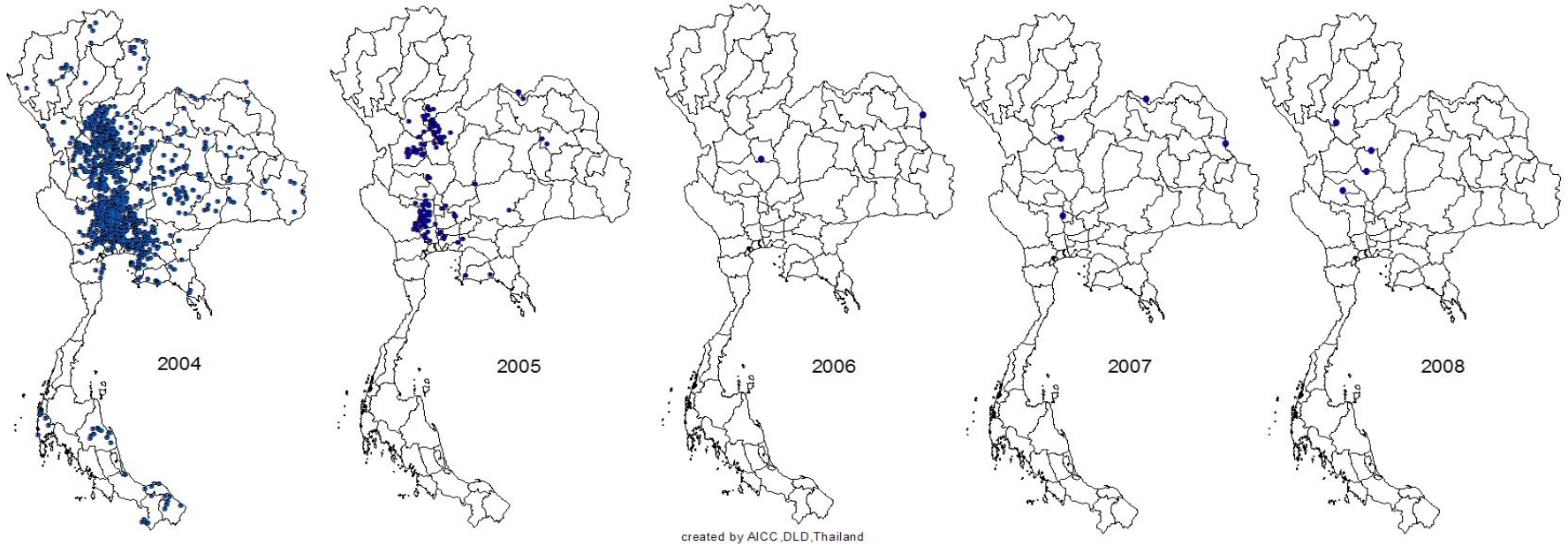
   b) Severe respiratory signs with excessively watery eyes & sinusitis, cyanosis of the combs, wattle and shanks, edema of the head, ruffled feathers (Eye opacity in some ducks)

   c) Diarrhoea and nervous signs (torticollis, seizure)

   d) Sudden death OR cumulative death up to 40% in 3 days, depress, off feeding, egg drop, abnormal eggs OR no clinicals

3. **If any one criterion is observed, disease control measures will be executed**

HPAI H5N1 Outbreaks in Thailand during 2004-2008



Outbreaks and affected Areas	2004	2005	2006	2007	2008
Numbers of Outbreak	1740	194	2	4	4
Sub-district	797	110	2	4	4
District	298	58	2	4	4
Province	60	21	2	4	4

Types of Birds Affected with H5N1

Type of Poultry	2004	2005	2006	2007	2008	Total	%
Backyard Chicken	1000	153	1	2	3	1159	59.61
Duck	477	20		1		498	25.61
Broiler	109	5			1	115	5.91
Layer	90	8	1	1		100	5.14
Quail	40	7				47	2.41
Geese	15	1				16	0.82
Others	9					9	0.46
Total outbreaks	1740	194	2	4	4	1944	100

Cost of HPAI Control in Thailand since 2004

	Numbers of outbreak	Poultry Destruction	Compensation Baht (US $)	Numbers of Collected & tested samples*	Budget allocated for AI control Baht (US $)
2004	1740	60.811.081	5,196,231,843 ($ 148,463,767)	150,648	3,559,040,000 ($ 101,686,857)
2005	194	3,694,423	195,129,620 ($ 5,575,132)	253,960	333,209,100 ($ 9,520,260)
2006	2	393,430	51,681,810 ($ 1,476,623)	900,334	555,949,700 ($ 15,884,277)
2007	4	110,022	6,011,258 ($ 171,750)	788,611	3,031,139,500 ($ 85,603,986)
2008	4	63,081	3,233,400 ($ 92,383)	778,382	506,954,200 ($ 14,484,406)
2009	0	20,728	1,189,200 ($ 36,036)	728,101	333,590,500 ($ 10,108,803)
2010	0 (30 Sep 10)	23,349	1,173,803 ($ 36,117)	484,863	323,818,600 ($ 9,963,649)

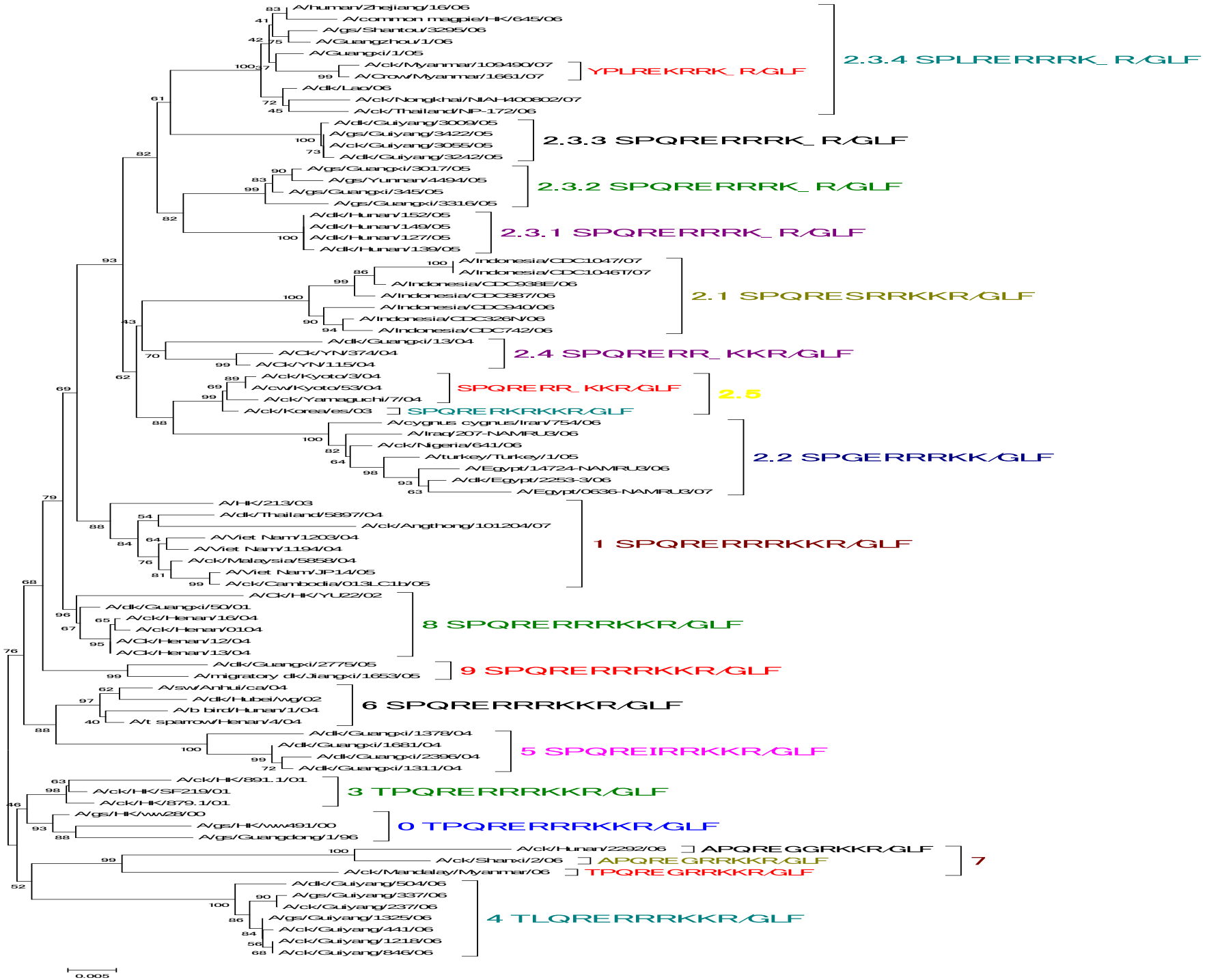
NB: The collected samples* were carcasses and cloacal swabs.

Clades of HPAI Virus in Thailand

1. CLADE 1 (Indochina strain).
   Cleavage site " PQRERRRKKR/GLF"
   2006:- A/ck/Pichit1/06

2. CLADE 1 (Amantadine resistance strain)
   Cleavage site " PQREKRRKKR/GLF"
   2006:- A/ck/Pichit2/06
   2007:- A/ck/Angthong/NIAH101204/07
   2008:- A/ck/Nakhonsawan/NIAH600567/08
   A/ck/Phichit/08

3. CLADE 2 subClade 3.4 (Fujian virus like strain)
   Cleavage site " PLRERRRK_R/GLF
   2006:- A/ck/Nakhonpanom/NIAH113718/06
   2007:- A/ck/Nongkhai/NIAH400802/07
   A/ck/Mukdahan/NIAH403901/07


A/human/Zhejiang/16/06
A/common magpie/HK/645/06
A/gs/Shantou/3295/06
A/Guangzhou/1/06
A/Guangxi/1/05
A/ck/Myanmar/109490/07
A/Crow/Myanmar/1661/07
YPLREKRRK_R/GLF
A/dk/Lao/06
A/ck/Nongkhai/NIAH400802/07
A/ck/Thailand/NP-172/06
2.3.4 SPLRERRRK_R/GLF
A/dk/Guiyang/3009/05
A/gs/Guiyang/3422/05
A/ck/Guiyang/3055/05
A/dk/Guiyang/3242/05
2.3.3 SPQRERRRK_R/GLF
A/gs/Guangxi/3017/05
A/gs/Yunnan/4494/05
A/gs/Guangxi/345/05
A/gs/Guangxi/3316/05
2.3.2 SPQRERRRK_R/GLF
A/dk/Hunan/152/05
A/dk/Hunan/149/05
A/dk/Hunan/127/05
A/dk/Hunan/139/05
2.3.1 SPQRERRRK_R/GLF
A/Indonesia/CDC1047/07
A/Indonesia/CDC1046T/07
A/Indonesia/CDC938E/06
A/Indonesia/CDC887/06
A/Indonesia/CDC940/06
A/Indonesia/CDC326N/06
A/Indonesia/CDC742/06
2.1 SPQRESRRKKR/GLF
A/dk/Guangxi/13/04
A/Ck/YN/374/04
A/Ck/YN/115/04
2.4 SPQRERR_KKR/GLF
A/ck/Kyoto/3/04
A/cw/Kyoto/53/04
A/ck/Yamaguchi/7/04
SPQRERR_KKR/GLF
A/ck/Korea/es/03
SPQRERKRKKR/GLF
2.5
A/cygnus cygnus/Iran/754/06
A/Iraq/207-NAMRU3/06
A/ck/Nigeria/641/06
A/turkey/Turkey/1/05
A/Egypt/14724-NAMRU3/06
A/dk/Egypt/2253-3/06
A/Egypt/0636-NAMRU3/07
2.2 SPGERRRKK/GLF
A/HK/213/03
A/dk/Thailand/5897/04
A/ck/Angthong/101204/07
A/Viet Nam/1203/04
A/Viet Nam/1194/04
A/ck/Malaysia/5858/04
A/Viet Nam/JP14/05
A/ck/Cambodia/013LC1b/05
1 SPQRERRRKKR/GLF
A/Ck/HK/YU22/02
A/dk/Guangxi/50/01
A/ck/Henan/16/04
A/ck/Henan/0104
A/Ck/Henan/12/04
A/Ck/Henan/13/04
8 SPQRERRRKKR/GLF
A/dk/Guangxi/2775/05
A/migratory dk/Jiangxi/1653/05
9 SPQRERRRKKR/GLF
A/sw/Anhui/ca/04
A/dk/Hubei/wg/02
A/b bird/Hunan/1/04
A/t sparrow/Henan/4/04
6 SPQRERRRKKR/GLF
A/dk/Guangxi/1378/04
A/dk/Guangxi/1681/04
A/dk/Guangxi/2396/04
A/dk/Guangxi/1311/04
5 SPQREIRRKKR/GLF
A/ck/HK/891.1/01
A/ck/HK/SF219/01
A/ck/HK/879.1/01
3 TPQRERRRKKR/GLF
A/gs/HK/ww28/00
A/gs/HK/ww491/00
A/gs/Guangdong/1/96
0 TPQRERRRKKR/GLF
A/ck/Hunan/2292/06
APQREGGRKKR/GLF
A/ck/Shanxi/2/06
APQREGRRKKR/GLF
A/ck/Mandalay/Myanmar/06
TPQREGRRKKR/GLF
7
A/dk/Guiyang/504/06
A/gs/Guiyang/337/06
A/ck/Guiyang/237/06
A/gs/Guiyang/1325/06
A/ck/Guiyang/441/06
A/ck/Guiyang/1218/06
A/ck/Guiyang/846/06
4 TLQRERRRKKR/GLF
0.005

Active surveillance programme on domestic birds

Groups of Poultry & Sampling:-

1. Poultry Compartmentalisation
2. DLD certified farms for Good Agricultural Practice (GAP)
3. Non GAP certified farms
4. Native poultry or fighting cocks with basic biosecurity
5. Backyard poultry
6. Free grazing ducks
7. Natural & Migratory birds

Active/passive surveillance programme in wild birds

Materials on AI Surveillance in Natural Birds

- DLD cooperates with Dept of Wildlife, Min of Nat. Resources & Environment
- Sampling cloacal swabs from habitats of natural and wild migratory birds throughout the country
- Bird e.g. pigeons, open-billed storks, turtle doves, *Sturnidae spp.* etc

AI Surveillance in Natural Birds : 2004 - 2012

	Kinds of bird	Numbers of bird collected	Numbers of cloacal swab sample
2004	205	51,433	3,344
2005			9,872
2006			5,980
2007	160	16,058	6,262
2008	120	15,717	5,644
2009	133	15,855	5,578
2010	117	11,511	4,076
2011	78	5,756	2,106
2012	82	6,424	2,275

H5N1 in Natural Birds & Wildlife

Animal species	No of animals	Remarks
Anastomus oscitans	10	นกปากห่าง
Columba livia	13	นกพิราบ
Dendrocygna javanica	1	นกเป็ดแดง
Dicrurus macrocercus	1	นกแซงแซวหางปลา
Geopelia striata	1	นกเขาชวา
Lonchura punctulata	5	นกกระติ๊ดขี้หมู
Panthera tigris	147	Captive tigers in a zoo
Pavo spp.	2	นกยูง
Phalacrocorax niger	1	นกกาน้ำเล็ก
Streptopelia tranquebarica	1	นกเขาไฟ
Struthio camelus	3	นกกระจอกเทศ
Sturnus nigricollis	3	นกกิ้งโคลงคอดำ
Tringa glareola	3	นกชายเลนน้ำจืด

Plan for 2013 forward

- Daily active clinical surveillance & reporting
- Periodical intensive & active laboratory surveillance, at least twice a year (OIE)
- Encouraging poultry farmers for compartmentalisation
- Biosecurity improvement for all poultry rearing places
- Restructuring of free grazing ducks & backyard poultry
- Registration & ID
  - Fighting cocks /owners / farms / rings & arenas
  - Free grazing duck flocks
- Sampling & testing those Sector 4-Poultry, prior to movement
- Development of **community networks** for disease surveillance and control ***(Sub-district Administrative Body)***
- Special campaigns e.g. HPAI Public Awareness and Disinfection Campaign, Poultry Products Safety Consumption during Chinese New Year etc.
- Simulation exercise (or Table-top exercise)

AI Surveillance Plan in Brief: 2013

- Chicken
  - Active clinical surveillance - daily basis
  - Passive laboratory surveillance - sampling 2-5 dead birds
  - Active laboratory surveillance – every 6 month sampling
    - cloacal swab samples@20 birds/flock
    - Serum samples@20 birds/flock
- Duck
  - Active clinical surveillance - daily basis
  - Passive Laboratory surveillance- sampling 2-5 dead birds
  - Active laboratory surveillance – every 6 month sampling
    - cloacal swab samples @60 birds/flock

Avian Influenza Surveillance Programme in Thailand: 2013

Poultry Management	Farm status	Clinical Surveillance	Laboratory surveillance		
			Cloacal swab sampling		Serum Sampling
			During rearing Period	Before Movement	
1. Poultry Farms in Compartment	Pending to be certified as NAI free status (13 farms; @ sampling 5 houses, 20 b/house)	Daily	Jun & Dec 520 VTM samples (=2,600 birds)	-	Feb & Aug 2,600 samples
	To be maintained for NAI free (293 farms; @ sampling 5 houses; 20 b/house)	Daily	-	-	Feb & Aug 58,600 samples
	Buffer zone 1,694 households or farms (@ 20 birds/house; 5 houses/farm; 4 households or	Daily	Jun & Dec 2,432 VTM samples (=12,160 birds)	-	Feb & Aug 12,160 samples

Avian Influenza Surveillance Programme in Thailand: 2013

Poultry Management	Farm status	Clinical Surveillance	Laboratory surveillance		
			Cloacal swab sampling		Serum Sampling
			During rearing Period	Before Movement	
2. DLD certified GAP Poultry farms	Broiler farms 7,234 farms (@ 20 birds/farm)	Daily	every 6 month 57,872 VTM samples (=289,360 birds)	-	every 6 month after Cloacal swab sampling
	Breeder/Layer farms (@ 20 birds/farm)	Daily	Jun & Dec 17,408 VTM samples (=87,040 birds)	-	Feb & Aug
3. Non GAP certified Poultry farms	Broiler farms (@ 20 birds/farm)	Daily	-	8-10 days All farms	-
	Breeder/Layer farms (@ 20 birds/farm)	Daily	Jun & Dec	8-10 days All farms	-

Avian Influenza Surveillance Programme in Thailand: 2013

Poultry Management	Farm Status	Clinical surveillance	Laboratory surveillance		
			Cloacal swab		Serum Sampling
			During rearing Period	Before Movement	
4. Native poultry,fighting cocks with basic biosecurity (1,774 holdings)	Rearing places with basic biosecurity	Daily	Jun & Dec ≤10 b/flock (7096)	-	Feb & Aug 10 b/flock (35,480)
5. Backyard poultry	Rearing places for backyard poultry or fighting cocks with no biosecurity	Daily		8-10 days	-
6. Free grazing duck flocks (Multi-stage stratified sampling 450 flocks)	-	Daily	Jan & Jul 450 flocks 60 b/flock	8-10 days All flocks 60 b/flock	Jan & Jul 450 flocks 30 b/flock
7. Natural & Migratory birds	-	-	~ 6,500 birds	-	-

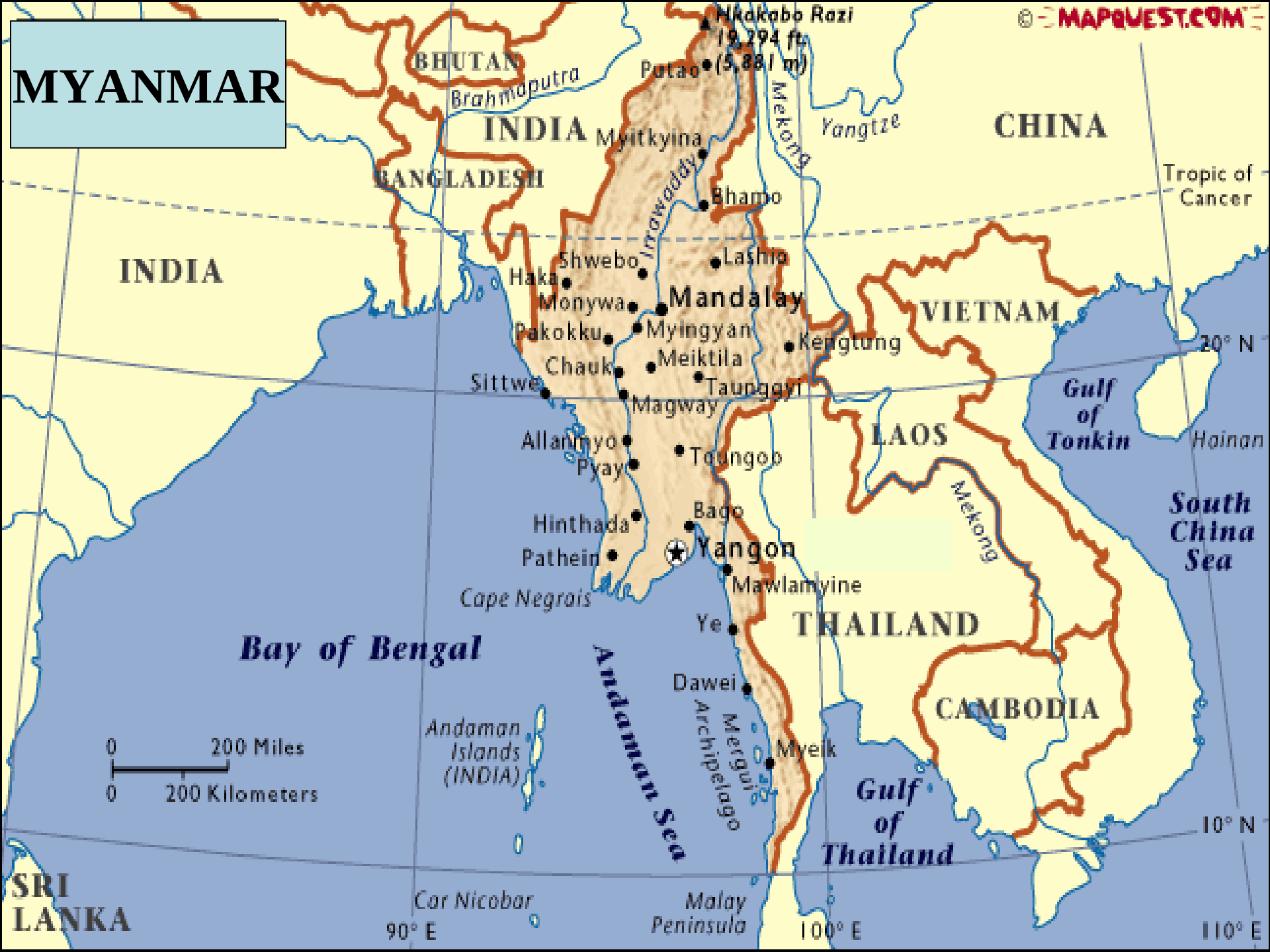
Country Report

5th OIE Regional Expert Group Meeting for Implementation of the Programme on Surveillance of Wild & Domestic Birds along Migratory Flyways under the OIE/JTF Project for Strengthening HPAI Control in Asia

Presented
By

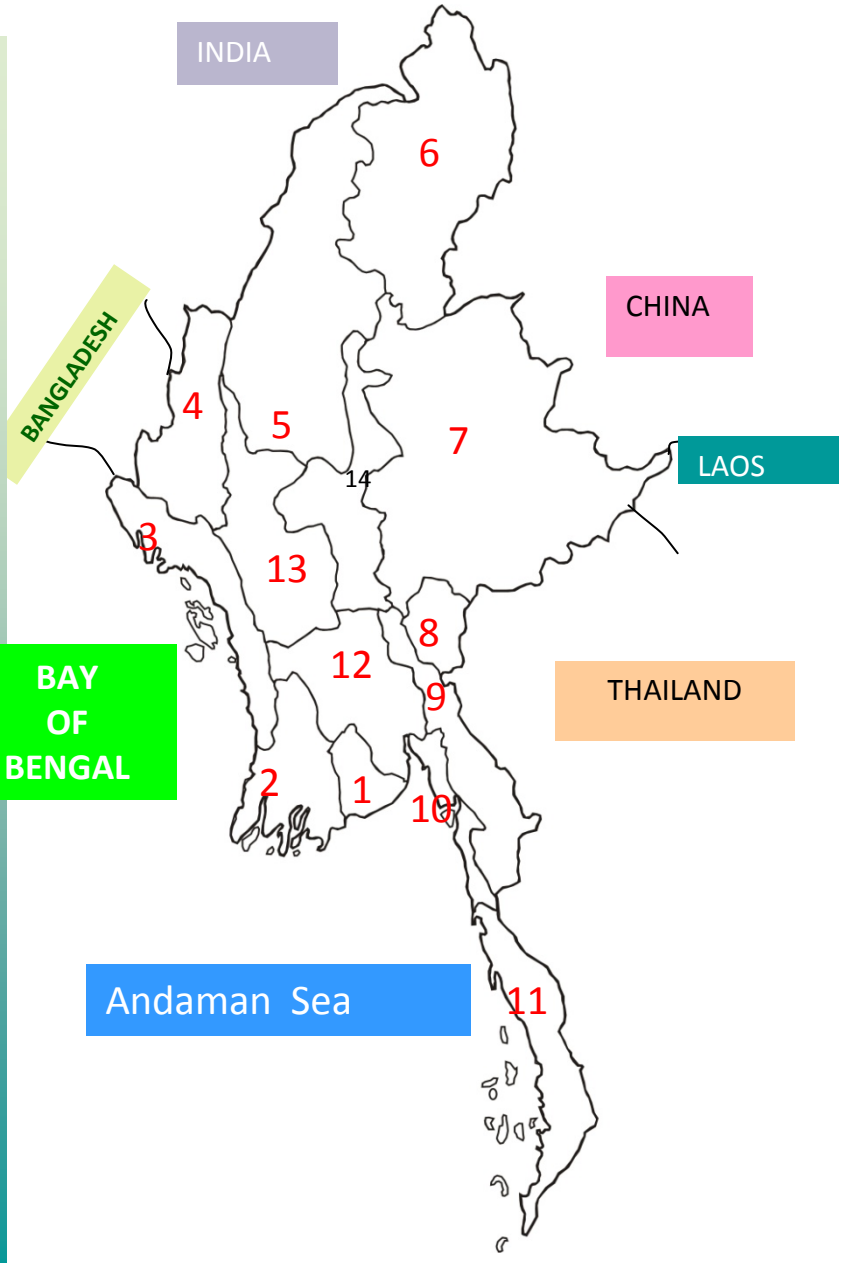
Dr. Myint Soe
Assistant Director

Livestock Breeding and Veterinary Department,
Ministry of Livestock and Fisheries, Myanmar.


MYANMAR
©MAPQUEST.COM
Hkakabo Razi
19,294 ft.
(5,881 m)
BHUTAN
Putao
Brahmaputra
INDIA
Myitkyina
Mekong
Yangtze
CHINA
BANGLADESH
Irrawaddy
Tropic of Cancer
Bhamo
INDIA
Shwebo
Lashio
Haka
Monywa
Mandalay
VIETNAM
Pakokku
Myingyan
Kengtung
20° N
Chauk
Meiktila
Sittwe
Taunggyi
Magway
Gulf of Tonkin
Hainan
LAOS
Allanmyo
Toungoo
Pyay
Mekong
South China Sea
Hinthada
Bago
Pathein
Yangon
Mawlamyine
Cape Negrais
THAILAND
Ye
Bay of Bengal
Andaman Sea
Dawei
CAMBODIA
Andaman Islands (INDIA)
Archipelago
Mergui
Myeik
0 200 Miles
0 200 Kilometers
Gulf of Thailand
10° N
SRI LANKA
Car Nicobar
Malay Peninsula
90° E
100° E
110° E

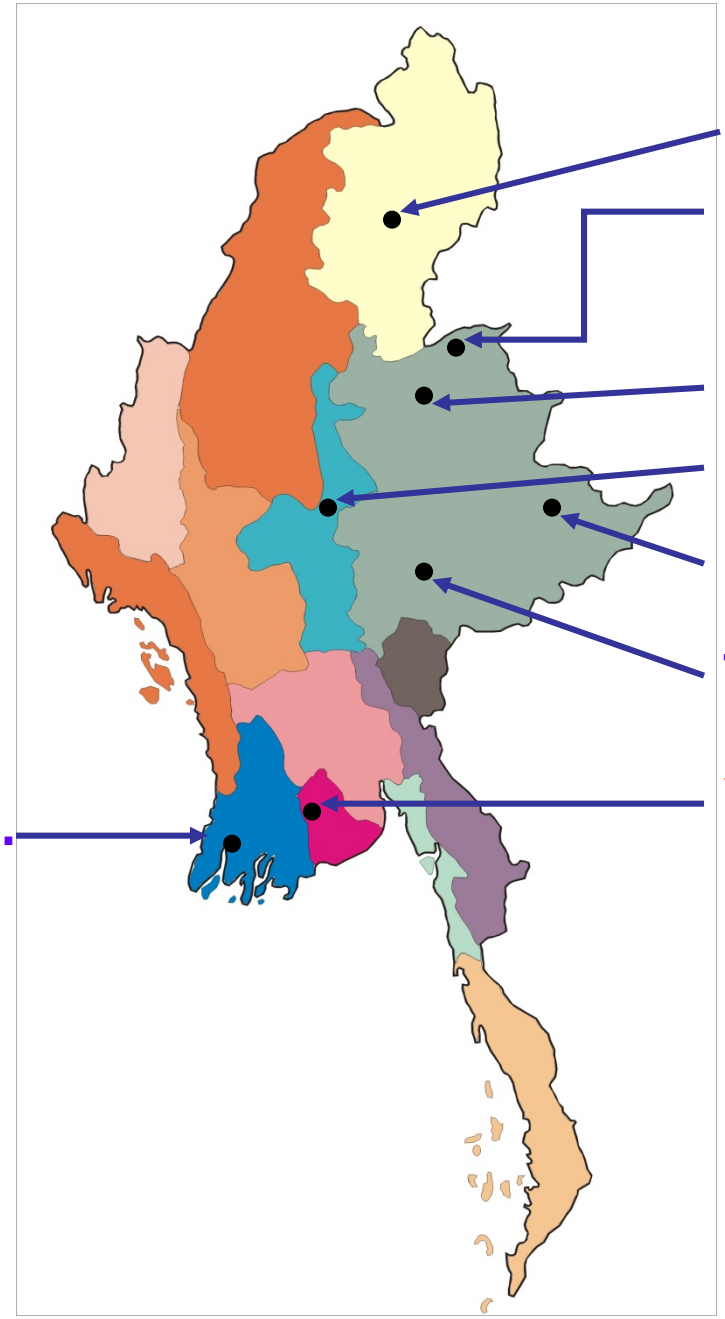
Country borders and Myanmar administrative regions

1. Yangon Region
2. Ayeyarwady Region
3. Rakhine State
4. Chin State
5. Sagaing Region
6. Kachin State
7. Shan State
   (South, North , East)
8. Kayah State
9. Kayin State
10. Mon State
11. Tanintharyi Region
12. Bago Region
    (West, East)
13. Magway Region
14. Mandalay Region



Diagnosis Capacity in Myanmar

Location of Different Diagnostic Laboratories



Note:

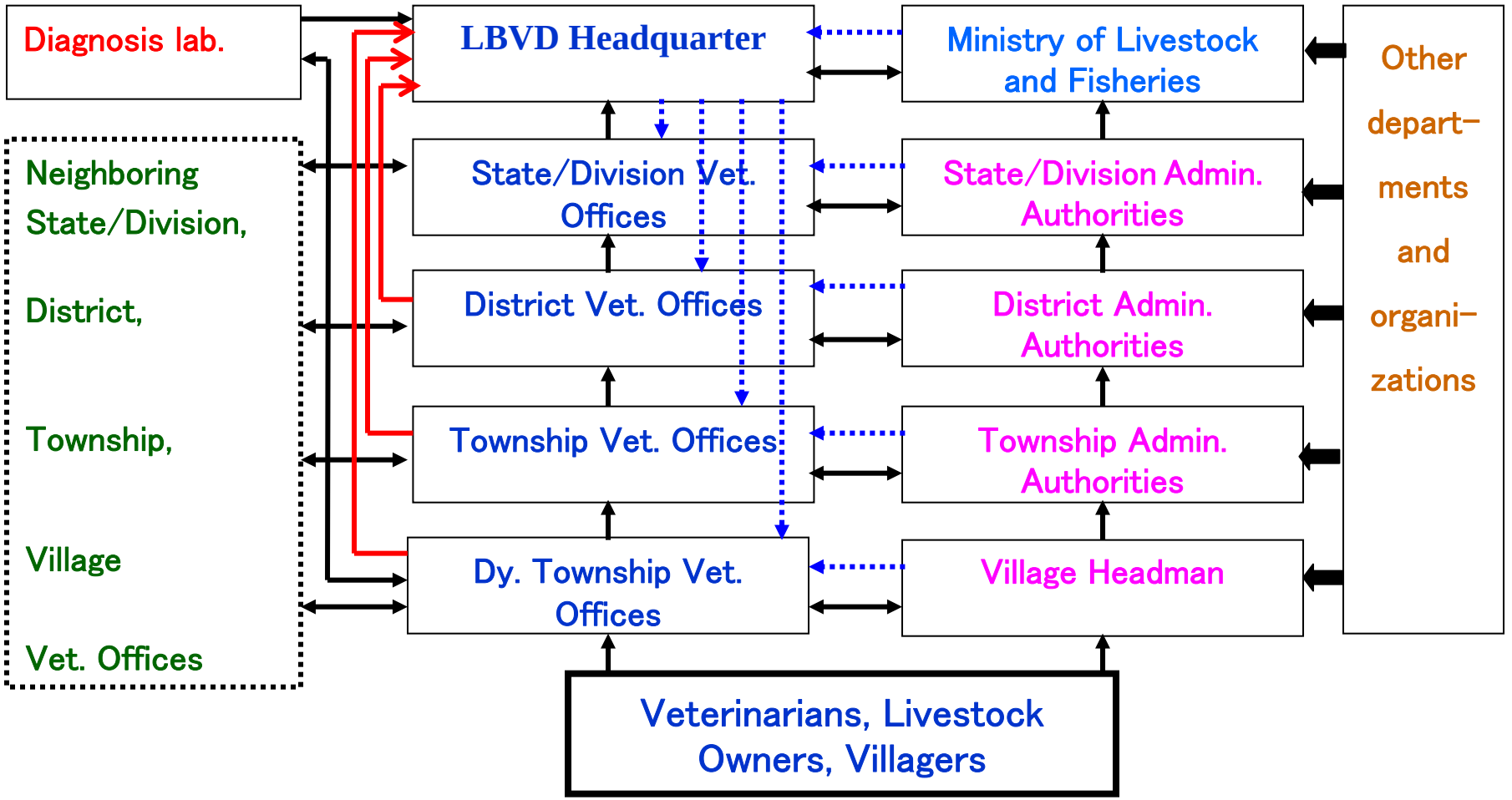
A/Q= Animal Quarantine

- **Township**

Disease Diagnosis and Control Sub-division (LBVD)

- Diagnostic Unit (Yangon Lab)
  - Mandalay Regional Lab.
  - Taungyi Regional Lab.
  - Pathein Regional Lab.
    - Monywa Lab
    - Muse Quarantine Lab.
    - Lashio Quarantine Lab.
    - Myitkyinar Quarantine Lab.
    - Kyaingtong Quarantine Lab.
- Epidemiology Unit
- Animal Quarantine Unit
- Veterinary Assay Unit

Information Pathway



Livestock Production Pattern

- 75% of country population is rural people
- Draft cattle, buffalo, sheep/goat, local pig, local chicken and duck are kept in small scale by rural farmers
- Most livestock farming is under backyard system
- Commercial breed such as pig, layer and broiler are kept in intensive system by urban and peri-urban people

Investment opportunities in livestock sector

- **Chicken production**

  - Large scale with high bio-security level chicken production
  - Meat processing plant

HPAI situation in Myanmar

Description	Date	Affected area	No.of Farm	No.of Birds dead and culled
First wave of outbreak (Mandalay & Sagaing)	8-2-06	13 township	545	0.66 million
Second Wave of Outbreak (Yangon,Mon,Bago)	27-2-07 to 19-10-07	12 township	76	0.113 million
Third wave of outbreak (Kengtung, Mongphyat)	18-11-07	2 township	Village chicken	0.03 million
Fourth wave of Outbreak	2-2-2010	3 township	31	0.16 million
Fifth wave of Outbreak	19-1-2011	4 township	195	1.24 million
Sixth wave of Outbreak	24-2-2012	2 township	4	0.03 million

Avian Influenza Outbreaks in Myanmar

First Wave of H5N1
8-2-06, Saging & Mandalay
(13) T/S:, 545 Farms,
Destroyed birds (6.6 Lakh)

Second Wave of H5N1
28-2-07, Yangon , Bago & Mon
(10) T/S:, 76 Farms,
Destroyed birds (1.1Lakh)

Third Wave of H5N1
18-11-07, Shan State(East),
(2) T/S, Backyard poultry
Destroyed birds (0.3 Lakh)

Fourth Wave of H5N1
2-2-10, Sagaing & Yangon
(3) T/S:, 31 Farms,
Destroyed birds (0.16 Lakh)

Fifth Wave of H5N1
19-1-11, Rakhine & Sagaing
(4) T/S:, 195 Farms,
Destroyed birds (1.24 Lakh)

Sixth Wave of H5N1
24-2-12, Sagaing & Bago
(2) T/S:, 4 Farms,
Destroyed birds (0.03 Lakh)

Occurred States and Regions (7)	Occurred Townships (36)
Grand Total	
Affected Farms (851)farms	Destroyed birds (0.943)million

Strategies for HPAI Control in Myanmar

(Asean eight strategies for Emergency, 28-10-2005 Asean Ten countries CVOs and FAO/ OIE Regional Consultant)

- Disesase surveillance and Alert System
- Effective Containment, Quarantine and Movement Control
- Disease Diagnosis Capabilities
- Information Sharing System
- Stamping out (destroyed all birds within 1 km or 3 km radius from infected farm) and Vaccination Policy
- Emergency Preparedness Plan
- Establishment of Disease Free Zone
- Public Awareness and Communication Network

Main Activities on Successful Control of HPAI Outbreak

Management approach

- Administrative allocation
- Management integration
- Resources mobilization
- International assistance and cooperation

Main Activities on Successful Control of HPAI Outbreak

Identification of disease and response

- Early reporting- from field to LBVD
- Early detection- farm investigation and laboratory identification
- Rapid response- quarantine, movement control and culling
- Early information- dissemination to FAO, OIE and Public notification

Main Activities on Successful Control of HPAI Outbreak

Main Activities

- Effective Containment by stamping out activity
- Backward Tracing to identify the source of infection
- Forward Tracing to control the spread of disease
- Postoutbreak surveillance for absence or presence of virus shedding
- Restocking Programme (Rehibilitation, Restructuring, Restocking, Relieving)

Laboratory Capacities for HPAI

Yangon Diagnostic Laboratory Capacity

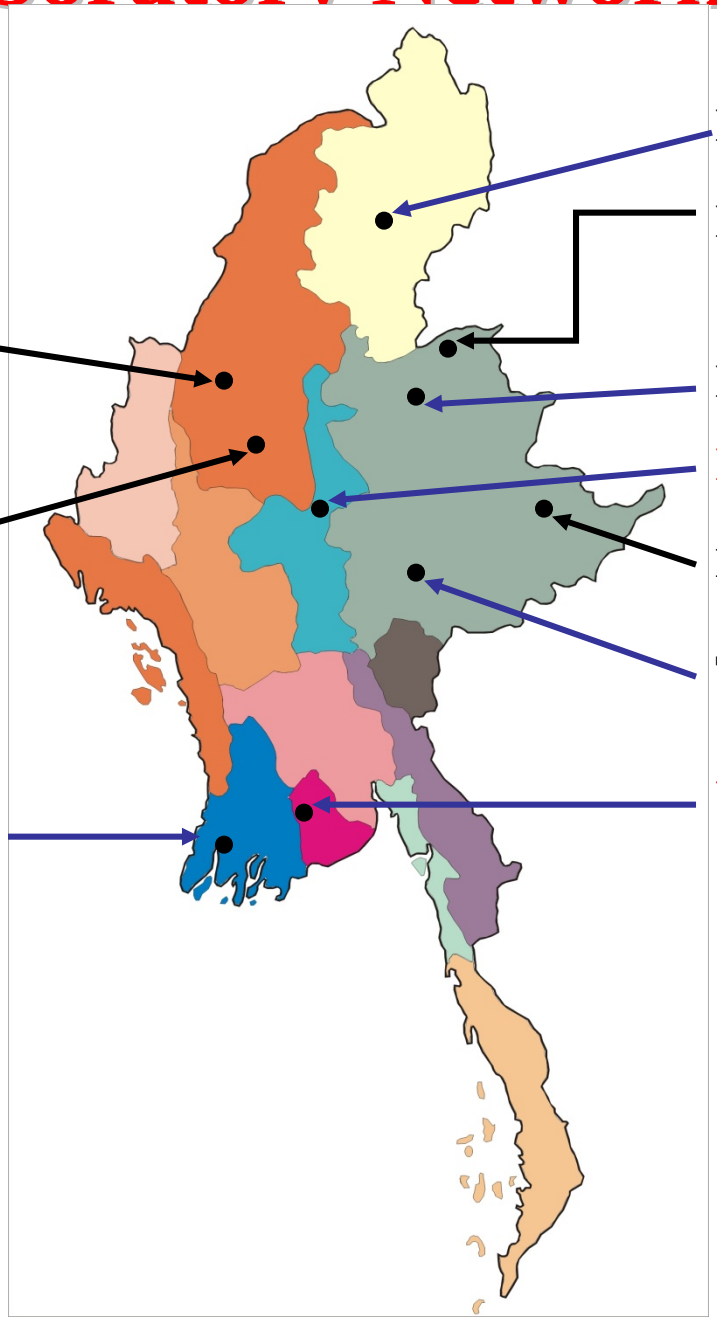
- Rapid test using SD Bioline antigen rapid test kit, Innova Flu A, and Antigen test kit for type A, Antigen test kit for subtype H5.
- H.A., H.I. test using standard AI antigen & antiserum for subtype H (1) – H (15)
- AGID test for type A
- ELISA test kit for type A
- RT-PCR test for type A, subtype H5N1and subtype H7 and H9.
- Real Time PCR test is established
- Upgrading of BSL 2+ existing laboratory is under construction

Mandalay Diagnostic Laboratory Capacity (Upper Myanmar)

- Rapid test using SD Bioline antigen rapid test kit, Innova Flu A, and Antigen test kit for type A, Antigen test kit for subtype H5.
- H.A.,H.I. test using standard AI antigen for H5N1
- Tissue culture method for H5 using MDCK
- RT-PCR and RRT-PCR tests have been established
- New BSL 2+ Laboratory is under construction

National Laboratorv Networking

Location of Different Diagnostic Laboratories



A/Q= Animal Quarantine

National Laboratory Networking

- Yangon Diagnostic Laboratory = National Reference Laboratory
- Mandalay Diagnostic Laboratory = Regional Diagnostic Laboratory
- Taung Gyi Diagnostic Laboratory = Regional Diagnostic Laboratory
- Pathein Diagnostic Laboratory = Regional Diagnostic Laboratory
- Animal Quarantine Laboratory = Kyaingtong; Shan East
- Animal Quarantine Laboratory = Muse; Shan North
- Animal Quarantine Laboratory = Lashio; Shan North
- Animal Quarantine Laboratory = Myitkyeenar; Kahin State
- Mon Ywa Diagnostic Laboratory (Mini)= Mon Ywa, Sagaing Division
- Kalay Diagnostic Laboratory (Border) = Kalay; Sagaing Division

Virus Characterization

1st Wave Outbreak	**Clade 7**	**March-April 2006**
2nd Wave Outbreak	Clade 2.3.4	March-October 2007
3rdWave Outbreak	Clade 2.3.4	December 2007
4th Wave Outbreak	Clade 2.3.2/2.3.4	Jan -March 2010
5th Wave Outbreak	Clade 2.3.2/2.3.4	Jan -March 2011
6th Wave Outbreak	Clade 2.3.4.2	Feb -March 2012

The Activity Planned & The Way Forward

1. Strengthening emergency response;
2. Routine Surveillance up to entire Country Level;
3. Continuation of Active Surveillance at High-risk areas;
4. Up-grading Capacity and Capability on Diagnosis at Local Level;
5. Promotion of Veterinary Education and Human Resource Development;
6. Further Promotion of Public Awareness and Communication;
7. Strengthening veterinary Services; and
8. Coordination and Collaboration.


Thank you for your attention.

Country Poster Presentation "Avian Influenza Surveillance"

Dr Nar Bahadur Rajwar

Director General, Department of Livestock Services

OIE Delegate, Nepal

5th OIE Regional Expert Group Meeting for Implementation of the Programme on Surveillance of Wild Birds and Domestic Animals along Migratory Flyways, 13-14 December, 2012.


Warm Welcome to all

Nepal: General Information

- Nepal is a landlocked country with an area of 147480 Sq. Km. with 26.62 million Human population (CBS, 2011).
- Altitude of the country ranges from 70 m (Kechana) to 8848 m Sagarmatha (the highest point on earth).
- Ecologically, Nepal has three geographical regions;
  - High Mountains (35%)
  - Mid Hills (42%)
  - Terai (23%)

Country Map


MAP OF NEPAL
ADMINISTRATIVE DIVISION
75 Districts, 14 Zones, 5 Regions
International Boundry
Regional Boundry
Zonal Boundry
District Boundry
KTM - Kathmandu
B - Bhaktapur
©ncthakur.itgo.com
CHINA
INDIA
FAR WESTERN REGION
MID WESTERN REGION
WESTERN REGION
CENTRAL REGION
EASTERN REGION

Importance of Livestock

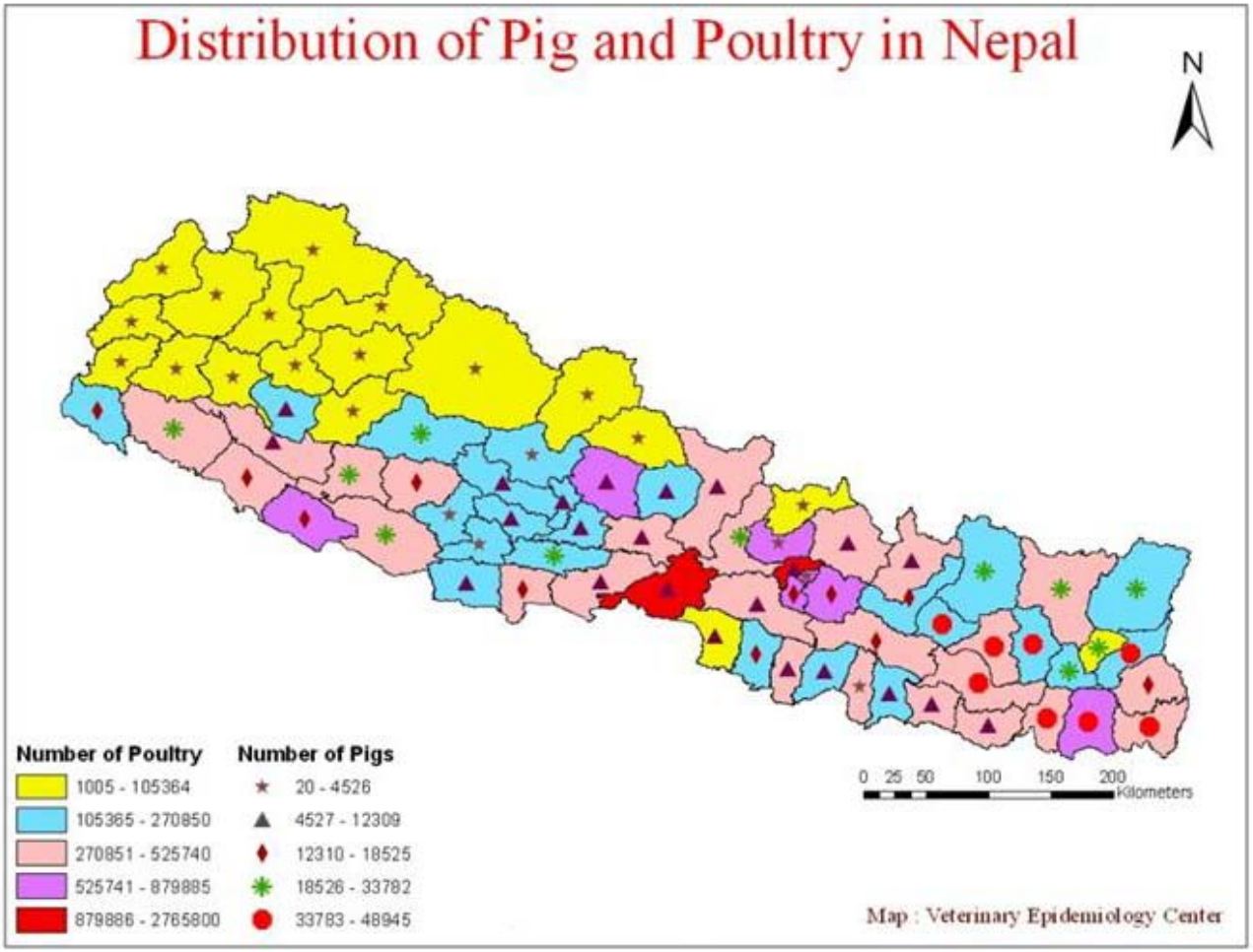
- Backbone of rural economy
  - ✓ Around 65% of the population is engaged in agriculture.
  - ✓ Almost all household engaged in agriculture rear certain species of livestock
  - ✓ Important sector contributing for employment and poverty reduction
- Livestock contributes to-
  - ➢ GDP – 13%
  - ➢ AGDP – 27 %
    - Dairy – 62.6%
    - Meat – 32.4%
    - Eggs – 5.0%

Importance of Poultry

- Poultry sub-sector alone contributes about 3 – 4 % in AGDP.
- Commercial Poultry sub-sector is providing employment opportunities to more than 0.1 Million
- Cheap source of protein, Contribute to national food & nutrition security.

Poultry Population of Nepal

Year	Poultry Population
05/06	23.2
06/07	23.9
07/08	24.6
08/09	24.4
09/10	25.7
10/11	27.0
Growth %	5.2



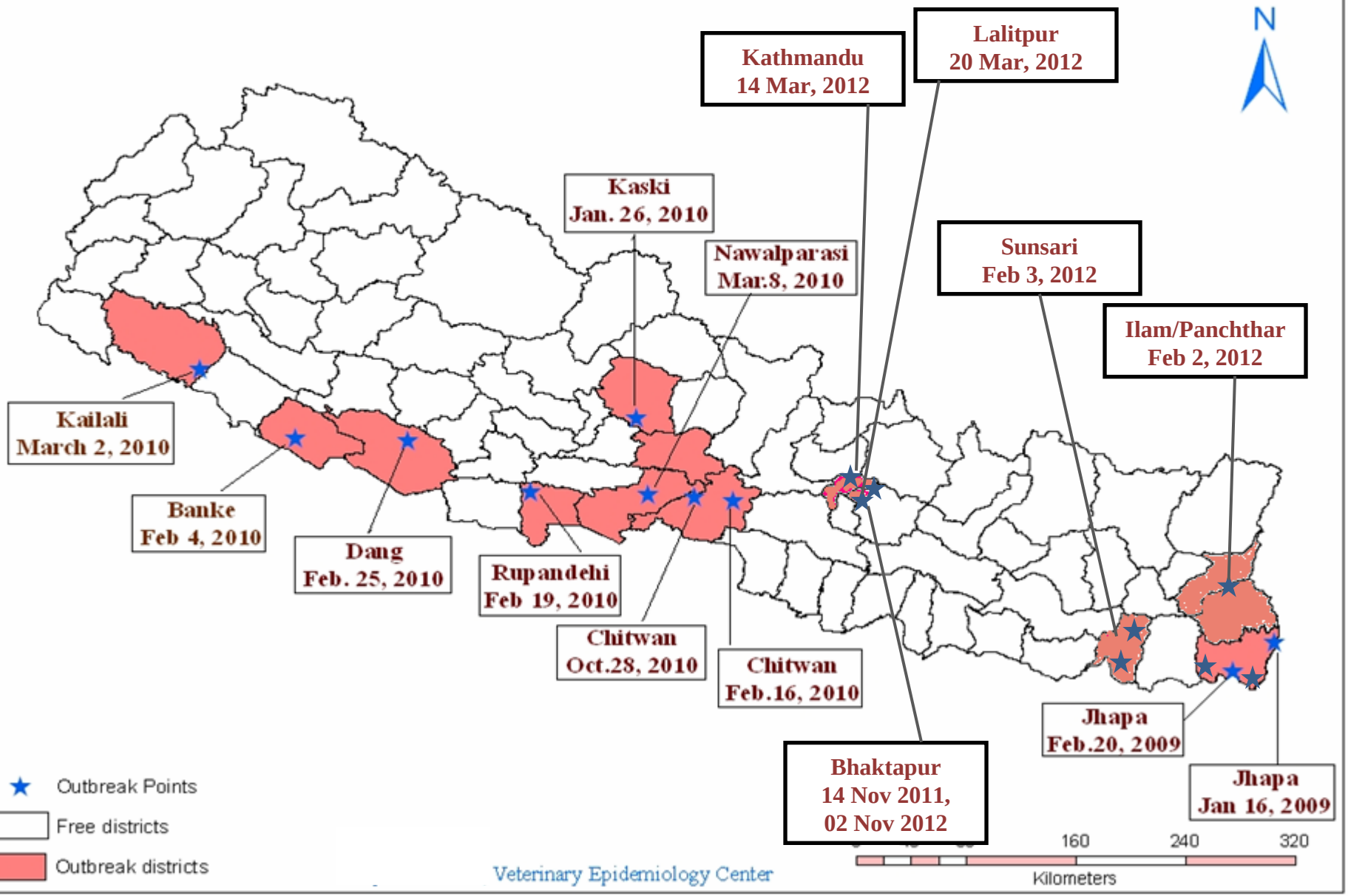
REPORT- 1

Recent HPAI outbreaks andH5N1 HPAI virus characterization in domestic and wild birds

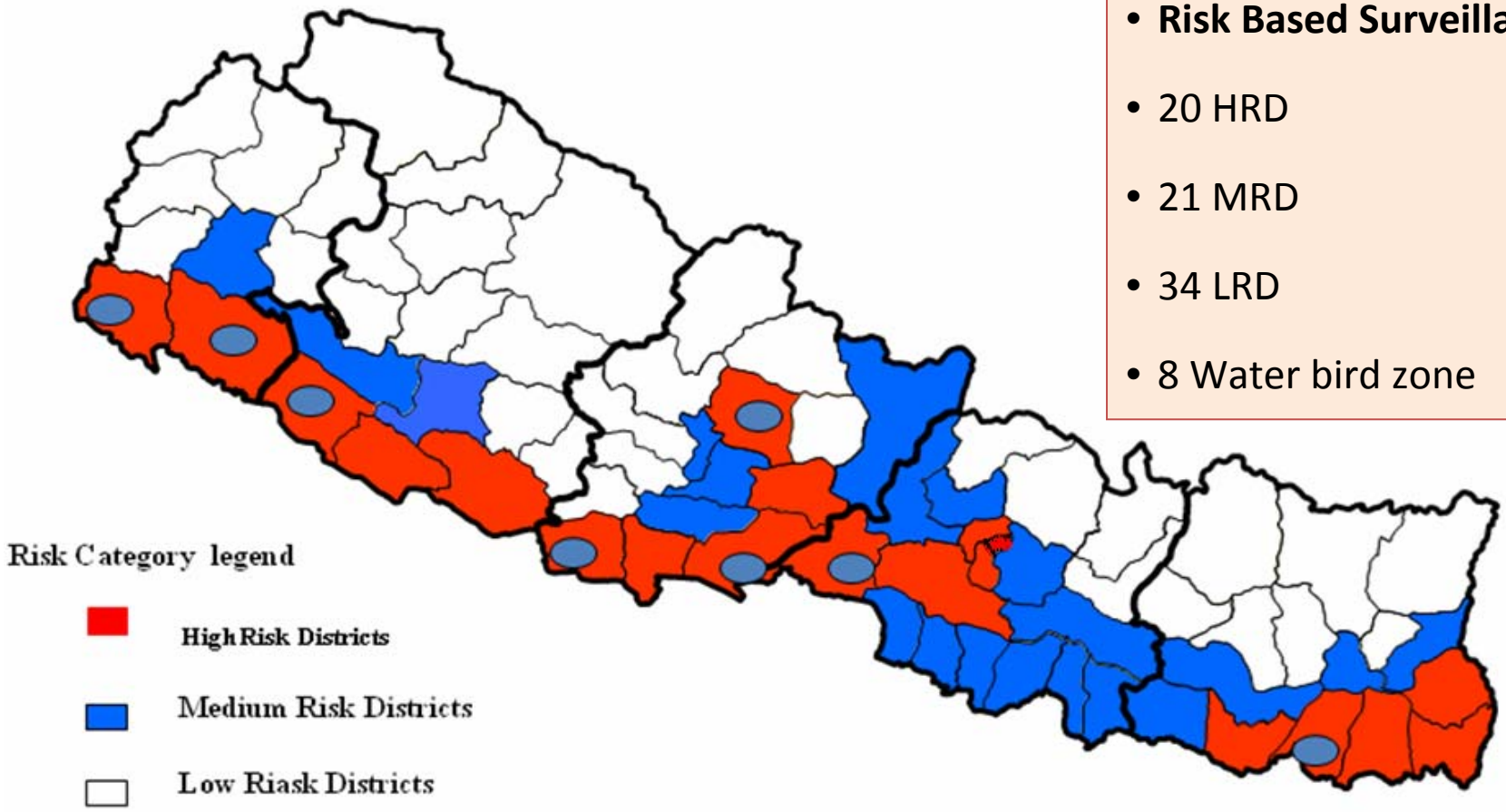
HPAI Outbreaks in Nepal

S.N	District	Date	Cases	Destroyed	Total	Type of Birds
1	Jhapa	16-Jan-2009	14	24689	24703	Backyard
2	Jhapa	20-Feb-2009	150	2871	3021	Backyard
3	Kaski	26-Jan-2010	153	11128	11281	Backyard /Commercial
4	Banke	4-Feb-2010	351	286	637	Backyard
5	Chitwan	16-Feb-2010	30	194	224	Backyard
6	Rupandehi	19-Feb-2010	256	358	614	Backyard
7	Dang	25-Feb-2010	2	0	2	Backyard
8	Kailali	2-Mar-2010	40	83	123	Backyard
9	Nawalparasi	8-Mar-2010	216	4551	4767	Backyard
10	Chitwan	28-Oct-2010	66	11437	11503	Commercial Layers
11	Bhaktapur	14-Nov-2011	88	308	396	Backyard
12	Kathmandu	27-Jan-2012	4		4	Crow (Corvus spp)
13	Ilam/Panchthar	2-Feb-2012	500	241	741	Backyard
14	Sunsari (3)	3-Feb-2012	7370	7282	14652	Commercial /Backyard
15	Jhapa (5)	9-Feb-2012	1665	1365	3030	Backyard and Commercial
16	Kathmandu	14-Mar-2012	15160	60	55220	Commercial
17	Lalitpur	20-Mar-2012	6646	2954	9600	Commercial
18	Bhaktapur	02-Nov-2012	1220	780	2100	commercial
		Total	**33931**	**68587**	**142618**	**24 Outbreaks**

Outbreaks of Highly Pathogenic Avian Influenza (HPAI) in Nepal



HPAI Surveillance in Nepal



- **Risk Based Surveillance**
- 20 HRD
- 21 MRD
- 34 LRD
- 8 Water bird zone

Clades of H5N1 Viruses Identified

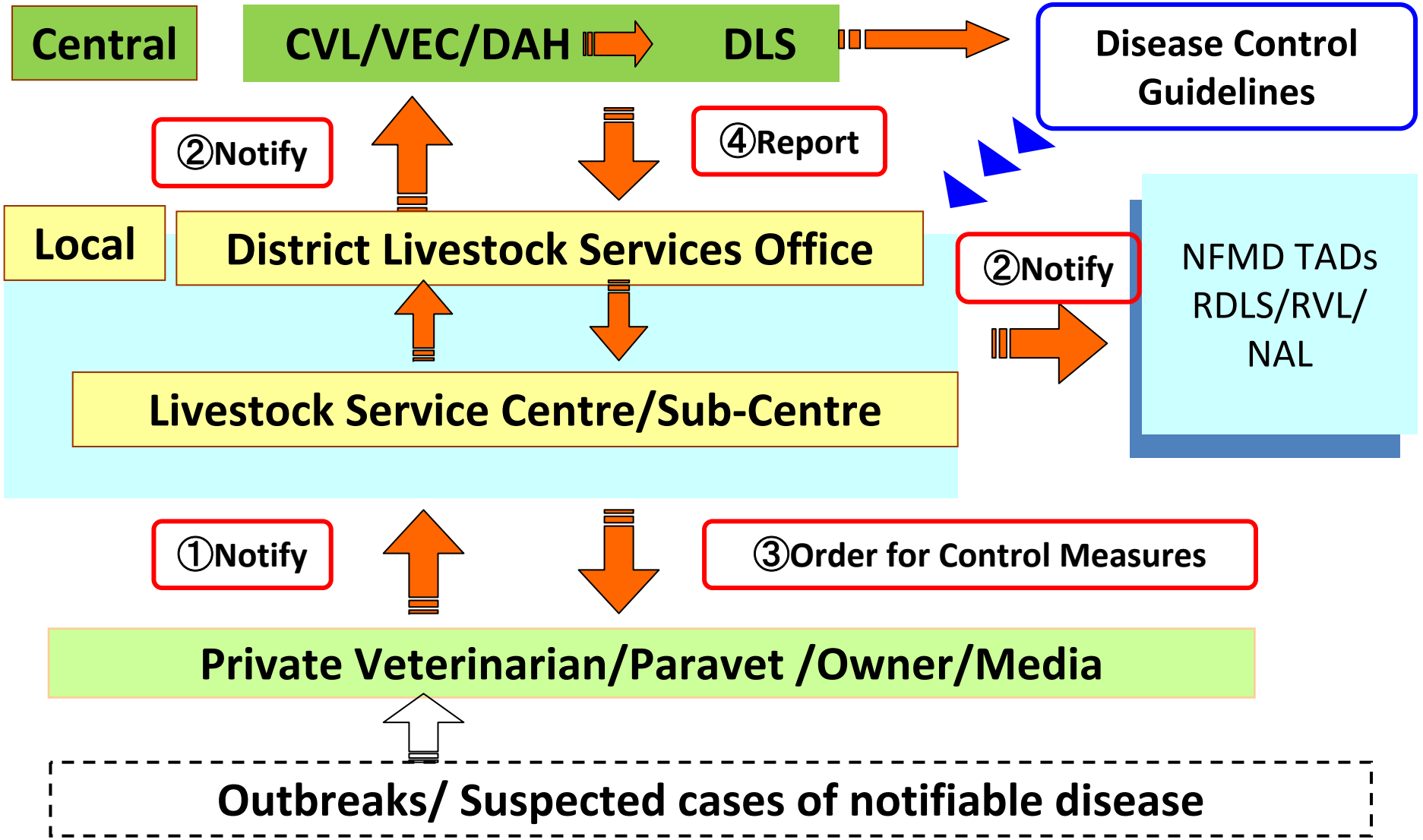
- Clade 2.2 (2009)
- Clade 2.3.2 and 2.2 (2010)
- Clade 2.3.2.1 (2011-2012)

No Human cases so far

REPORT 2

Active AI surveillance/monitoring programme of domestic birds

National Disease Notification System



Method of surveillance

- **Passive**
  - **Poultry producers**
  - **Associations,**
  - **Community organizations,**
  - **Wildlife,**
  - **NGO participatory groups,**
  - **Private Practitioners/ Village animal health workers**
    - **advised to report "trigger" points.**

- Active
  - Visiting ,
    - ✓commercial farms,
    - ✓backyard poultry premises and
    - ✓ live markets
      - for clinical Examinations
  - Swab sampling from sick and dead birds
  - Collecting blood samples from healthy Ducks,
  - Fresh Fecal Sample from wild birds (waterfowl)

Sampling Plan

Tracheal swab : Chickens (Sick or Dead)
Cloacal swabs : Ducks (Healthy, Sick, Dead)
Fresh, wet fecal swabs: Wild birds and live markets
Blood (serological) sample: Ducks and other wild water birds (whether healthy or showing any signs of disease)
Collection of dead birds: Whole carcass is extremely valuable (any species of bird)

Technical Modality

Active Surveillance

- Clinical Examination
  - Interview to owner
  - Public awareness Message Delivering
  - Distribution of pamphlets etc
- Sampling
  - Collection , packing & dispatch
  - Communication

Rumor Verification

- Rumor register
- News Papers
- Phone calls etc.

Control Strategy for HPAI

- Stamping out of birds up to 3 km radius (infected zone) from the epicenter
- Intensification of active surveillance in 7 Km radius out side the infected zone and through out the country
- Cleaning and disinfection
- Movement control

- Quarantine inspection inside the country and across the border
- Import ban on poultry and products from infected countries
- Compensation
- No Vaccination
- No treatment of affected birds

HPAI Control- 2012

Disease Information Data Management

- Data managed at Veterinary Epidemiology Center/DAH
- Data managed using
  - Excel (HPAI)
  - Access (Monthly epidemiological reporting)- NEPCEU
  - TAD info (Initiated for HPAI surveillance data)
- Data Analysis
  - Analyzed reports published by VEC (Annually/Six Monthly) and distributed to all stakeholders
  - Reporting to OIE (Six Monthly/Annually)

REPORT 3

Active/passive AI surveillance/monitoring/investigation programme of wild birds

Sampling Methods for Wild birds

Fresh, wet fecal : Wild birds

Blood (serological) sample: Ducks and other wild water birds (whether healthy or showing any signs of disease)

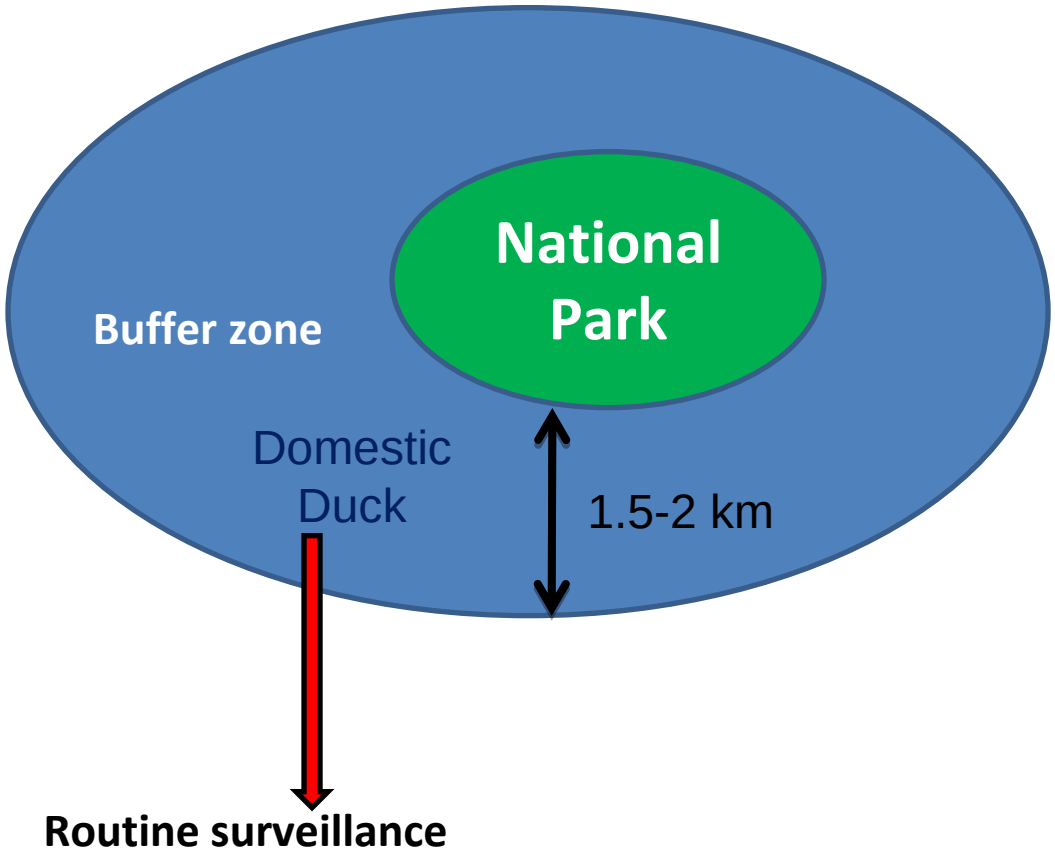
Collection of dead birds: Whole carcass is extremely valuable (any species of bird)

Diagnostics Methods for wild Birds

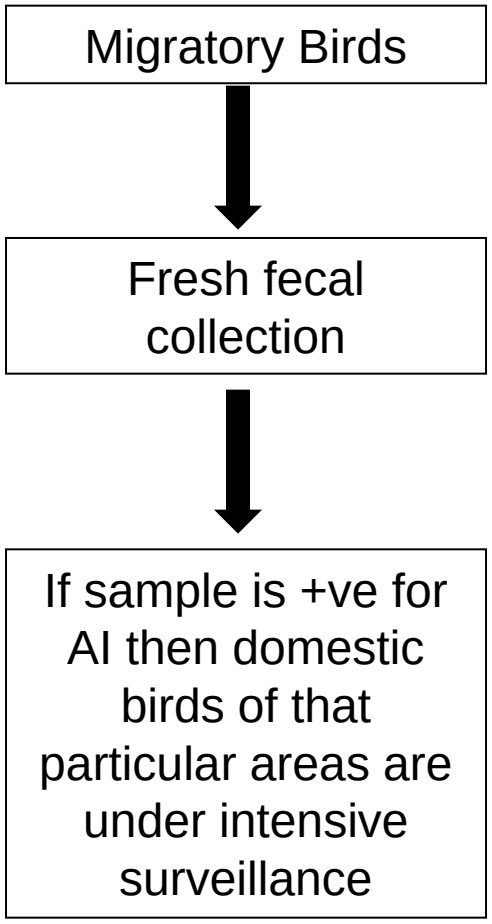
Serological analysis
Molecular analysis

surveillance programme of wild birds

8 water bird zone



surveillance programme of Migratory Birds



Lesson Learned from HPAI Control in Nepal

- Determination
- Good Coordination between stakeholders
- Management of Logistics
- Communication
- Monitoring
- Compensation
- Cross border collaboration

Issues and Challenges

- **Movement of the poultry and products**
- **Unauthorized Live/Wet markets**
- **Financial, Logistics and human resources management during multiple outbreaks**
- **Cross border cooperation**


Enjoy the beauty of Himalayan Country
Thank you