VIET NAM

Avian Influenza

COUNTRY REPORT

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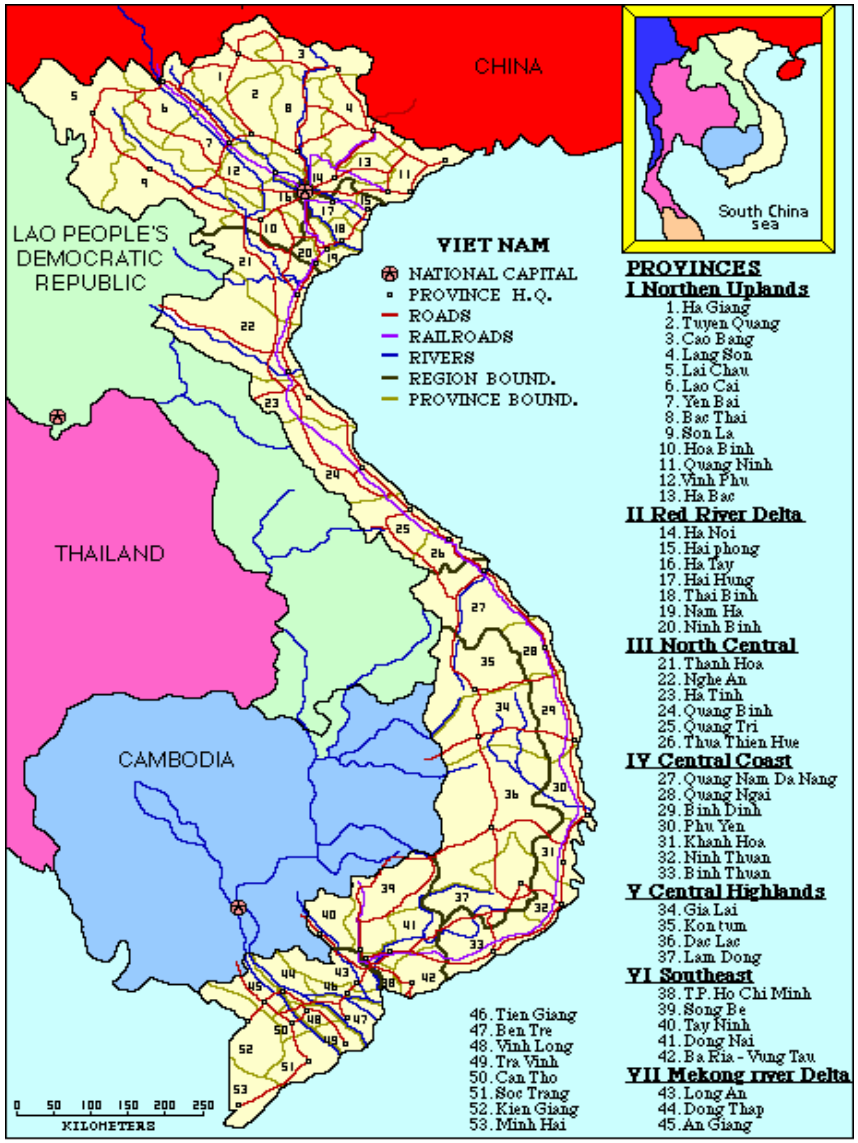
SOME FIGURES OF VIET NAM



Source : World Bank, Viet Nam Assessment and Strategy, 1995

* **Total area : 331,000 km ^{2}**
- **Human Population : 80 millions (80 % live in rural areas).**
- **Agriculture production contributed about 25.6% of national GDP.**
- **Crops and livestock are major sectors in argiculture production.**
- Livestock contributed about 19.7% of total agricultural GDP

Gen. Dept. of Statistics

Poultry production in Vietnam

Number (FAO, 2004):

Poultry = 252 millions

Rapid increasing.

Sectors 1 & 2:

Only <10%

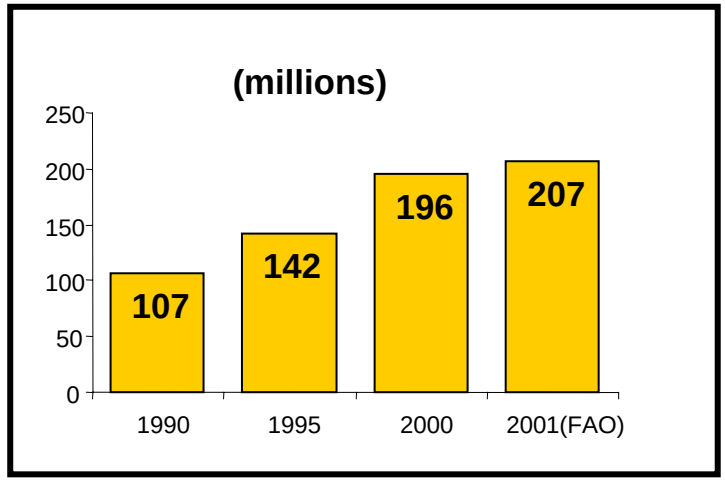
Slaughtering:

Live bird markets

Transport:

All means

Particularities: Ducks: 75 millions in 2004 and fighting cocks



Animal sanitary system

- >3000 veterinarians working at central, provincial and district levels but not at the commune level.
- Veterinary Service in provinces belong to the provincial governments.
- No preparedness for AI (diagnosis, knowledge, surveillance…) in 2003.

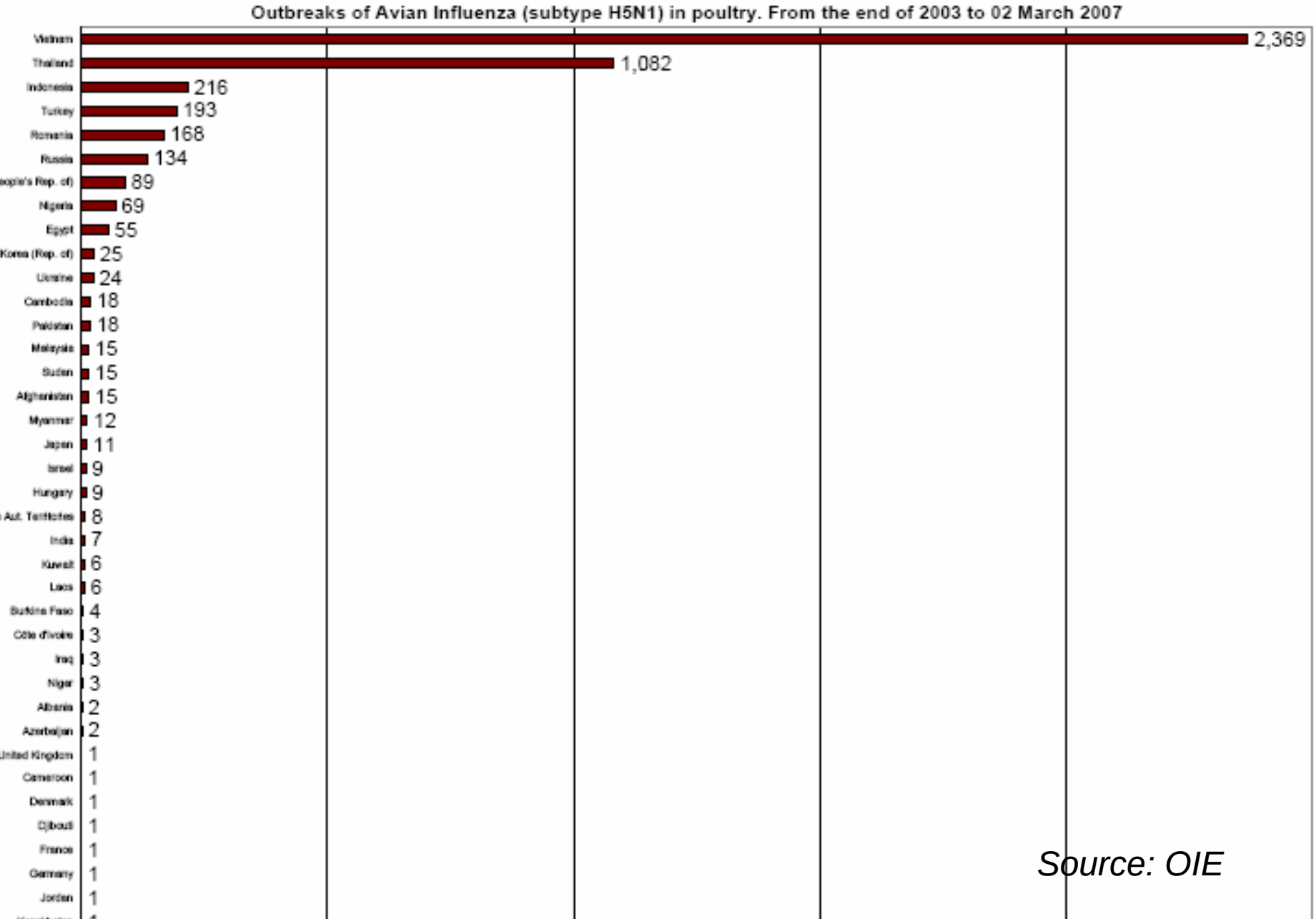
The Veterinary Services are weak and not properly considered due to the cultivation culture and tradition

AI outbreak

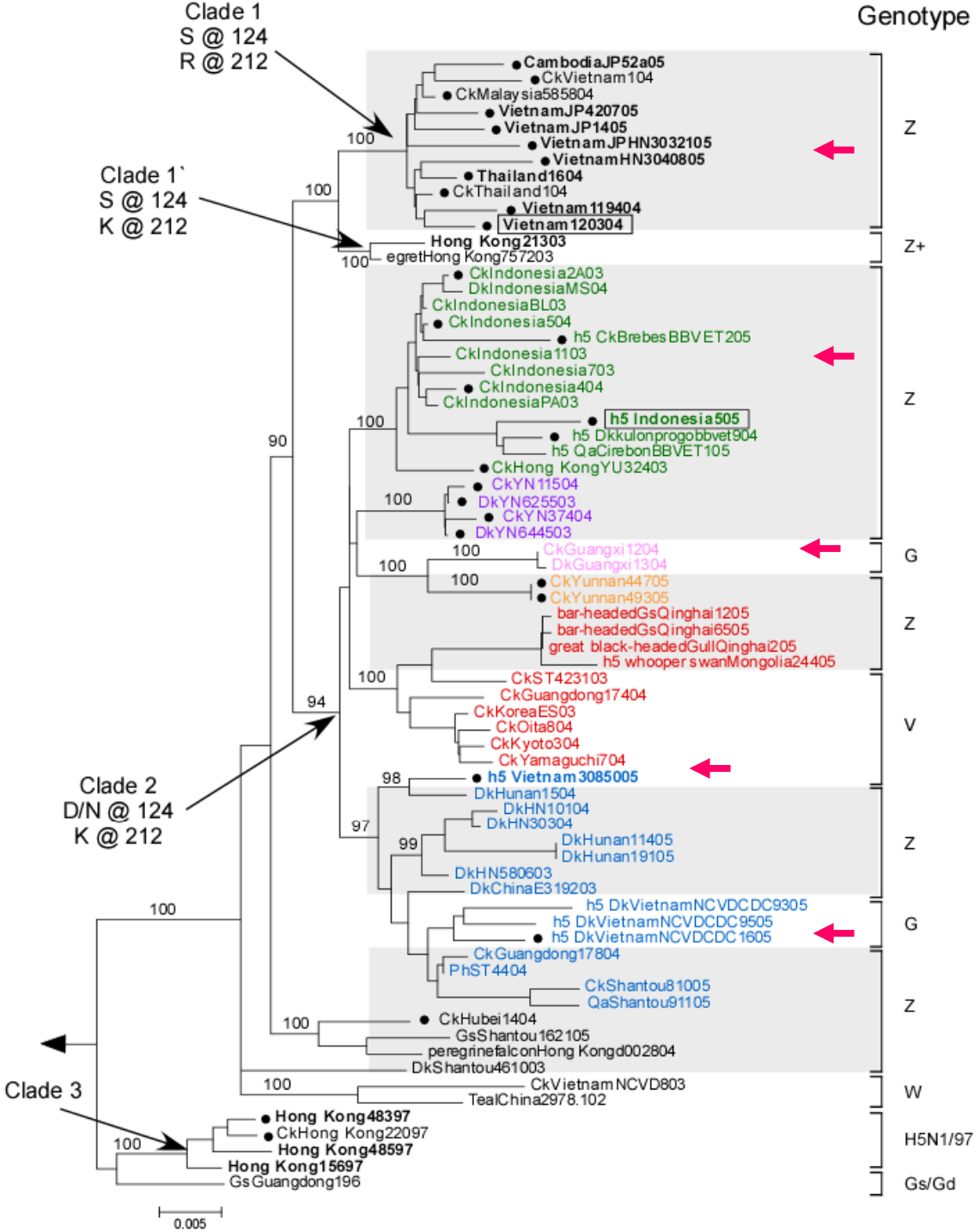
- Begins by Nov. 2003 and in two months time, 57/64 provinces affected.
- Reasons and comparison with other countries
  - Detection, confirmation,
  - Legal aspects,
  - Economic issues.
  - Human health issue
  - Consensus problems.
- 43 millions chickens and ducks culled in 3 months.

Continuation

- Second wave: late 2004
- Endemic in 2005
- Vaccination by end 2005
- No bird outbreak nor human case in 2006
- Recent wave in the South and 3 outbreaks in the North.


Outbreaks of Avian Influenza (subtype H5N1) in poultry. From the end of 2003 to 02 March 2007
Vietnam 2,369
Thailand 1,082
Indonesia 216
Turkey 193
Romania 168
Russia 134
89
Nigeria 69
Egypt 55
25
24
Cambodia 18
Pakistan 18
Malaysia 15
Sudan 15
Afghanistan 15
Myanmar 12
Japan 11
Israel 9
Hungary 9
8
India 7
Kuwait 6
Laos 6
4
3
Iraq 3
Niger 3
Albania 2
Azerbaijan 2
1
Cameroon 1
Denmark 1
Djibouti 1
France 1
Germany 1
Jordan 1

Source: OIE

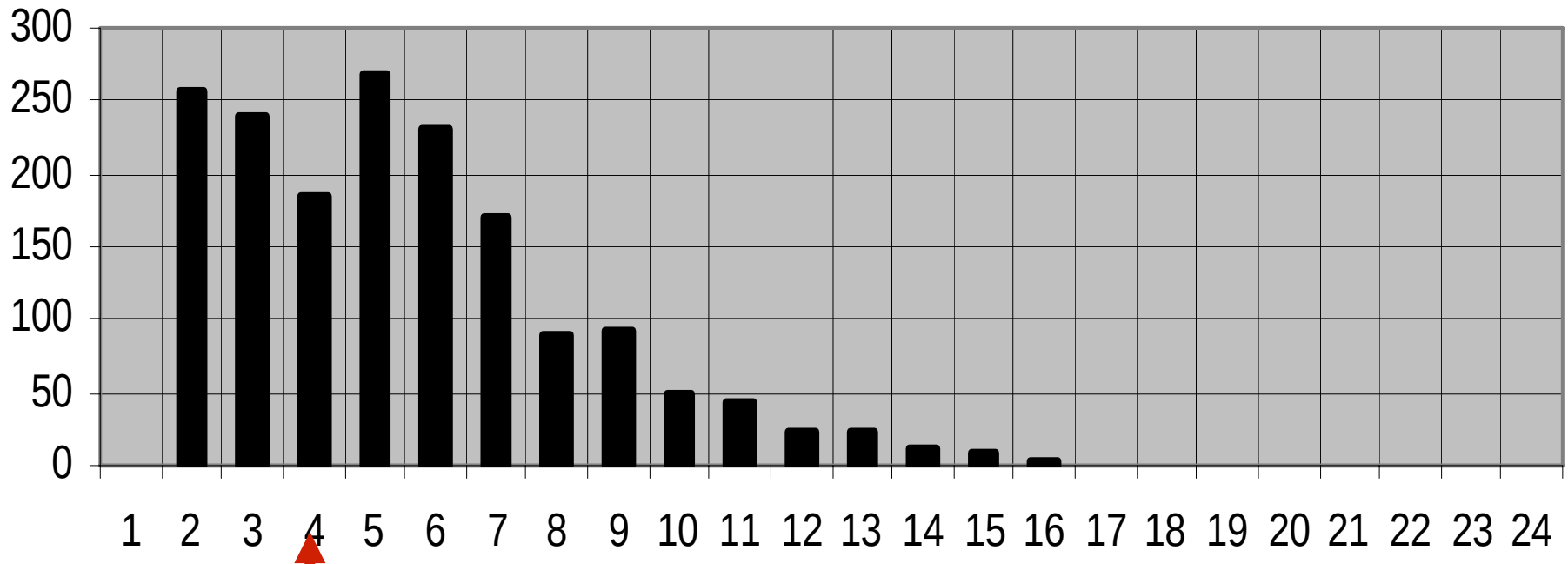

Clade 1
S @ 124
R @ 212
Clade 1`
S @ 124
K @ 212
Clade 2
D/N @ 124
K @ 212
Clade 3
Genotype
CambodiaJP52a05
CkVietnam104
CkMalaysia585804
VietnamJP420705
VietnamJP1405
VietnamJPHN3032105
VietnamHN3040805
Thailand1604
CkThailand104
Vietnam119404
Vietnam120304
Hong Kong21303
egretHong Kong757203
CkIndonesia2A03
DkIndonesiaMS04
CkIndonesiaBL03
CkIndonesia504
h5 CkBrebesBBVET205
CkIndonesia1103
CkIndonesia703
CkIndonesia404
CkIndonesiaPA03
h5 Indonesia505
h5 DkkulonprogobbvetI904
h5 QaCirebonBBVET105
CkHong KongYU32403
CkYN11504
DkYN625503
CkYN37404
DkYN644503
CkGuangxi1204
DkGuangxi1304
CkYunnan44705
CkYunnan49305
bar-headedGsQinghai1205
bar-headedGsQinghai6505
great black-headedGullQinghai205
h5 whooper swanMongolia24405
CkST423103
CkGuangdong17404
CkKoreaES03
CkOita804
CkKyoto304
CkYamaguchi704
h5 Vietnam3085005
DkHunan1504
DkHN10104
DkHN30304
DkHunan11405
DkHunan19105
DkHN580603
DkChinaE319203
h5 DkVietnamNCVDCDC9305
h5 DkVietnamNCVDCDC9505
h5 DkVietnamNCVDCDC1605
CkGuangdong17804
PhST4404
CkShantou81005
QaShantou91105
CkHubei1404
GsShantou162105
peregrinefalconHong Kongd002804
DkShantou461003
CkVietnamNCVD803
TealChina2978.102
Hong Kong48397
CkHong Kong22097
Hong Kong48597
Hong Kong15697
GsGuangdong196
100
100
100
100
90
100
100
100
100
94
98
97
99
100
100
100
Z
Z+
Z
G
Z
V
Z
G
Z
W
H5N1/97
Gs/Gd
0.005

Source : CDC

Measures adopted

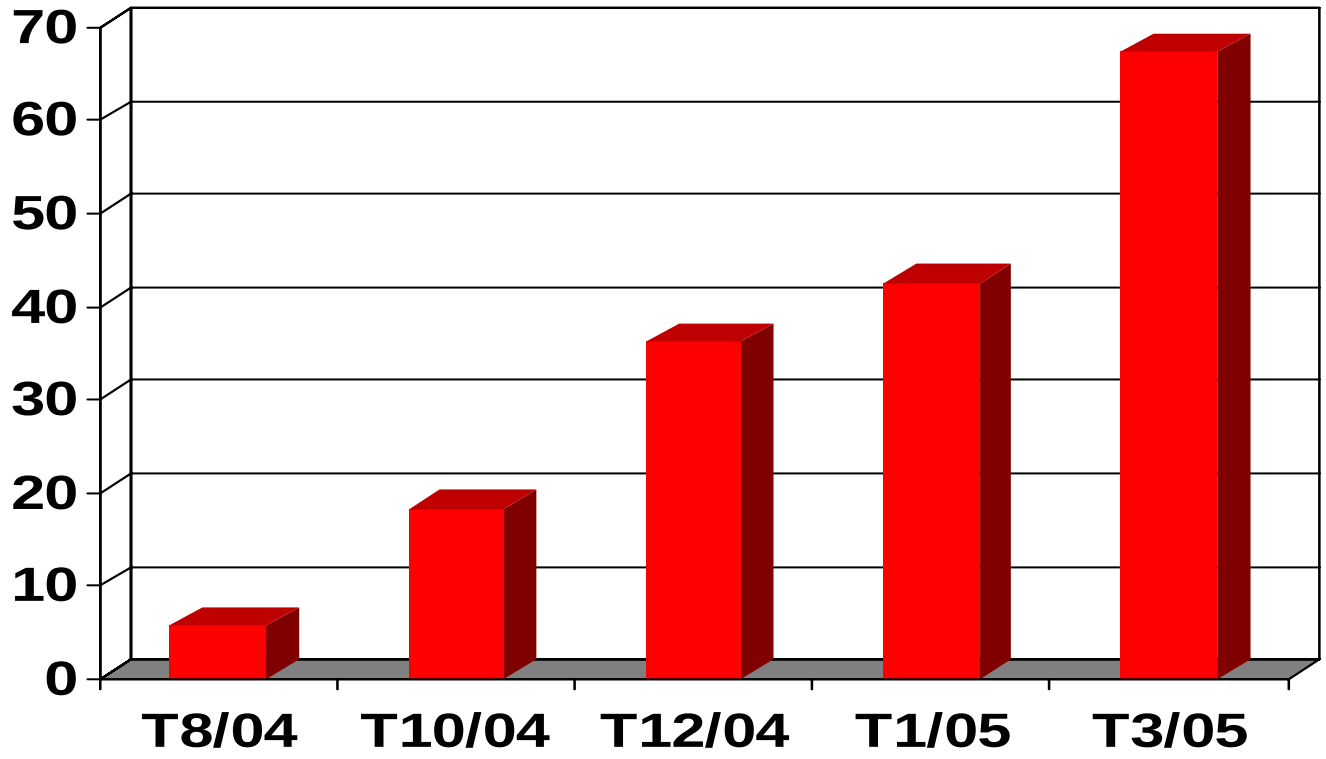
- Institutional: Steering Committee (MoA).
- Financial: compensation
- Technical:
  - Animal movement restriction
  - Disinfection
  - Ban of poultry consumption
  - Culling infected flocks
  - Surveillance and detection.
  - Researches: Epidemiology
  - Awareness campaign.

Achievement



(Source DAH Vietnam)

Sero-surveillance of H5N1 in ducks in Mekong delta

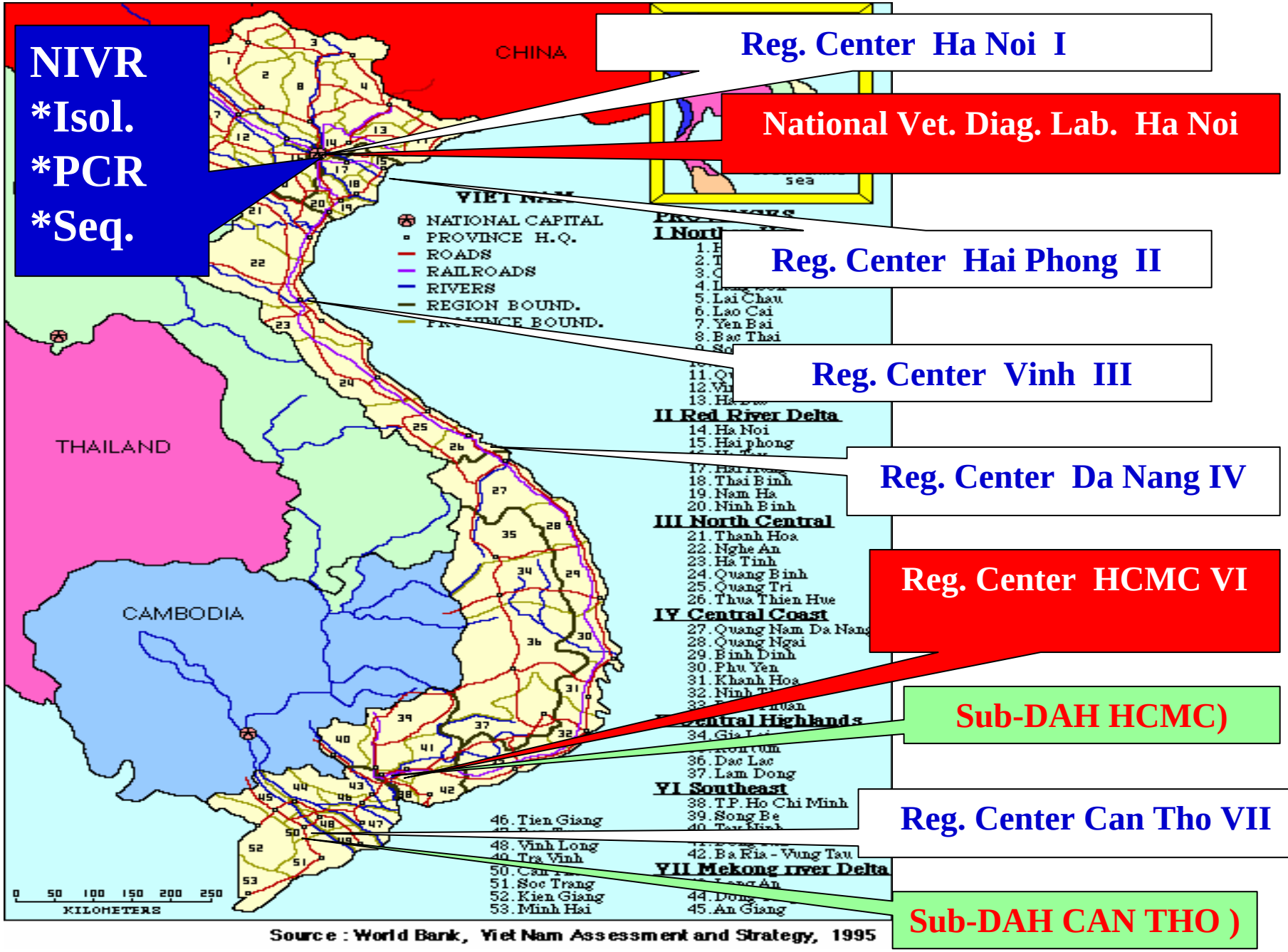


Then

- Vaccination was adopted
- Post vaccination surveillance.
- Arisen difficulties

Diagnosis

- Number of labs
- Methods used



Source : World Bank, Viet Nam Assessment and Strategy, 1995

Methods of diagnosis

- **Serology**: HI all labs. for surveillance
- **Virology**:
- RT-PCR and RRT- PCR all 8 labs
  - M gen then HA gene
- Isolation then HA and HI test: NIVR
- NI and sequencing : NIVR

Genome changes of the Vietnamese AI H5N1 isolates

Cleavage site patterns of the Vietnamese isolates

Type	*Sequence*	*Isolate name*
1	qrerrrkkrg	A/Chicken/VN/27/03
2	qrerr-kkrg	A/Dk/VNM/219/04
3	QRERIRKKRG	A/Ck/VNM/147/04
4	qrerrr-krg	A/Dk/VNM/568/05
5	qregrrkkrg	A/Dk/VNM/2/07

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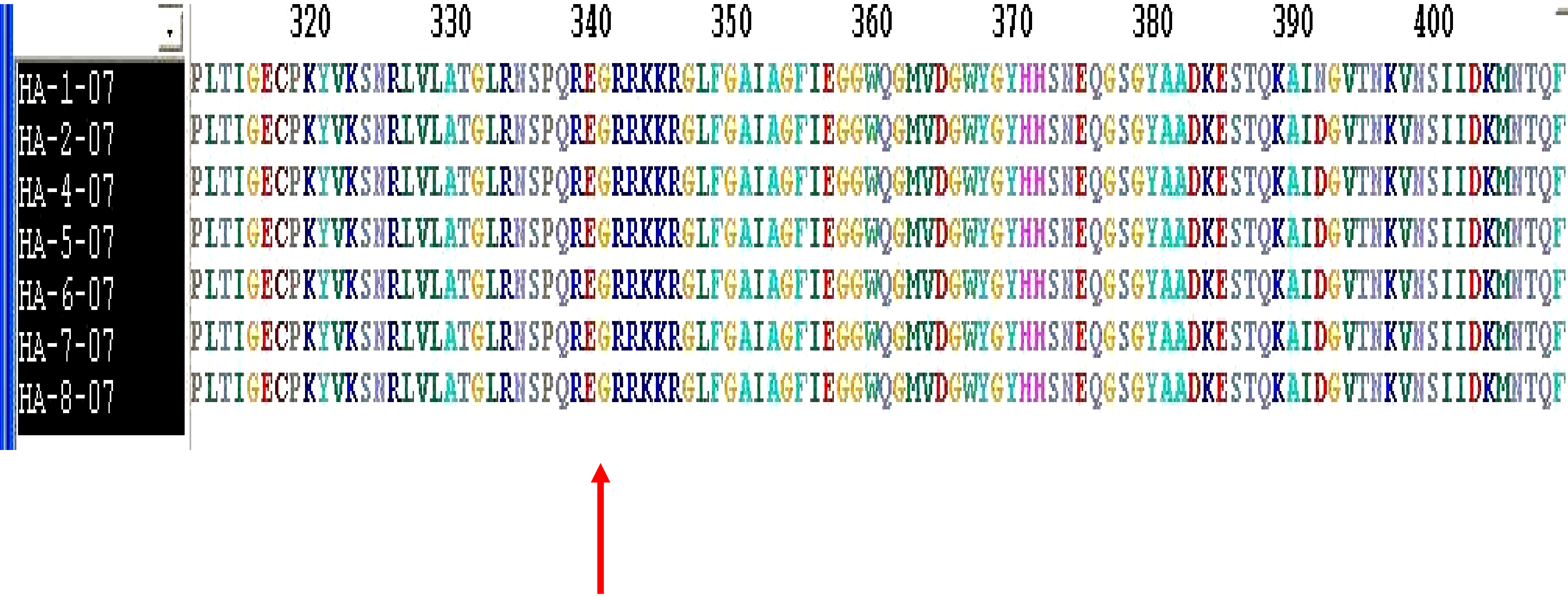
Cleavage site sequence of the 7 recent isolates



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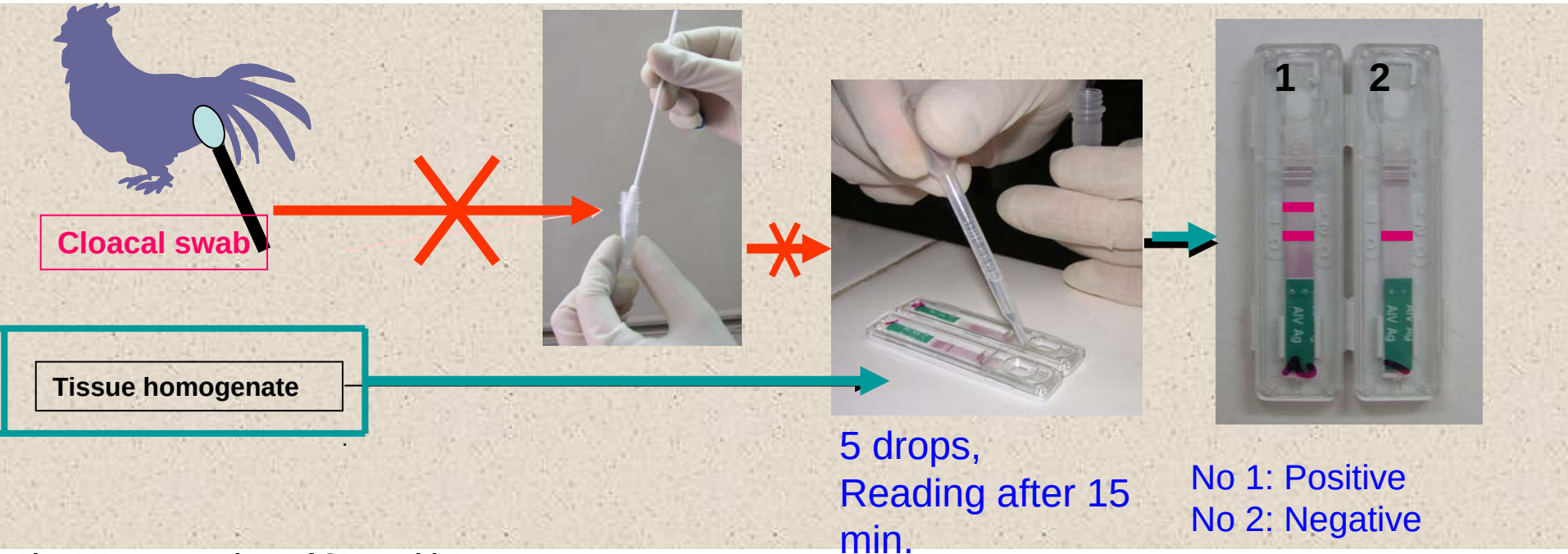


Fig. 1 Test procedure of SD Rapid Test

Virus titer/MDCK (log 10 $TCID_{50}$)	RT-PCR		Rapid test
	NP	H5 (Jap)	
4	P	P	P
3	P	P	N
2	P	P	N
1	P	P	N
0	P	N	N
0,1	N	N	N

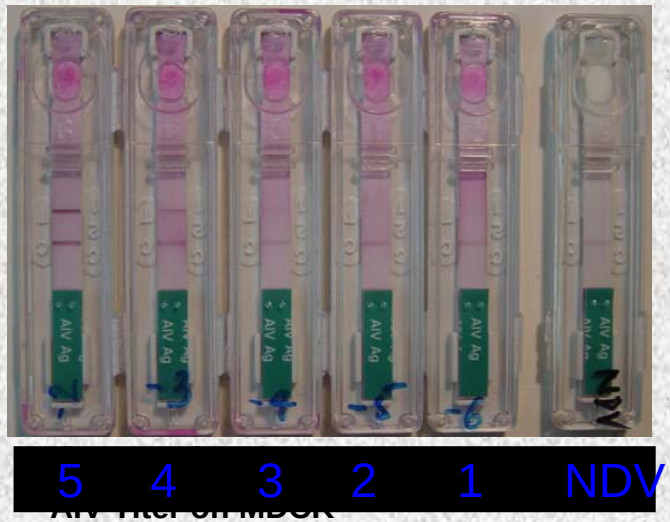
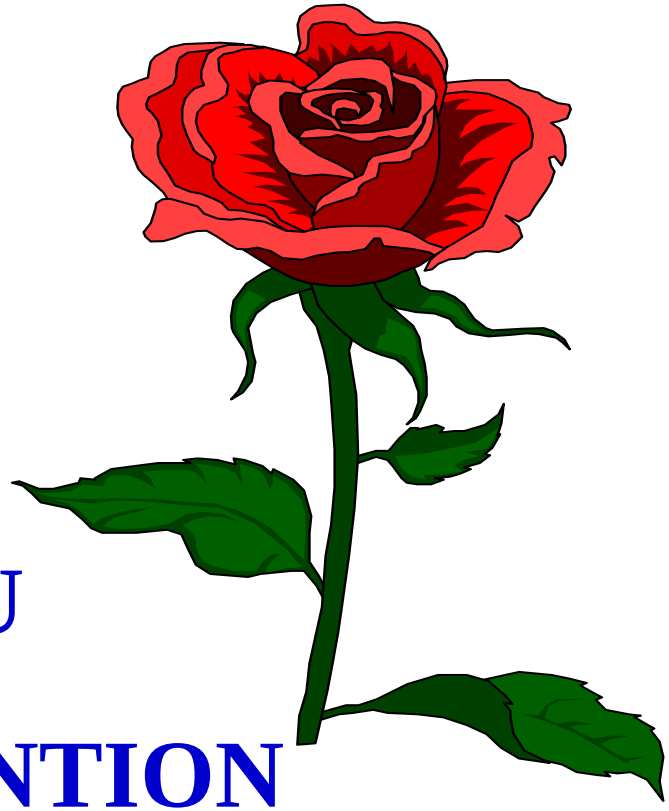


Fig. 2 Sensitivity of SD Rapid Test compared with virus titer and RT-PCR

Modern or conventional method?



THANK YOU

FOR YOUR ATTENTION