Diagnosis and passive surveillance in Southern countries

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Definition of passive surveillance

- Detection of suspicions: clinical cases
- Based on poultry keepers/vets/field teams
- Is essential for disease detection
- Requires precise case definition

Challenges of HPAI Passive Surveillance in Southern countries (1)

- Infrastructure: vet services/private vets
- Rare contacts between poultry keepers and vets
- Establish confidence btw vet services/farmers
- Private/public relationship?
- High proportion of village poultry
- Poultry populations = huge (chickens and ducks)
- Short-lived animals
- No denominator: poultry census?

Challenges of HPAI Passive Surveillance in Southern countries (2)

- Incentives to report HPAI suspicions?
- Culling/compensation schemes? Do vets know how to react to a suspicion?
- Differential diagnosis with Newcastle disease?
- Case definition in vaccinated populations?
- Short-lived animals
- Fatigue
- Sustainability of active HPAI passive surveillance?

Passive surveillance in the long term

- Need for traceability systems
- HPAI focus and not poultry health
- General poultry health issues= no data
- H5N1 cases detected: not linked to risk-based surveillance, but to passive surveillance
- Communication and information: critical

PDSR system in Indonesia

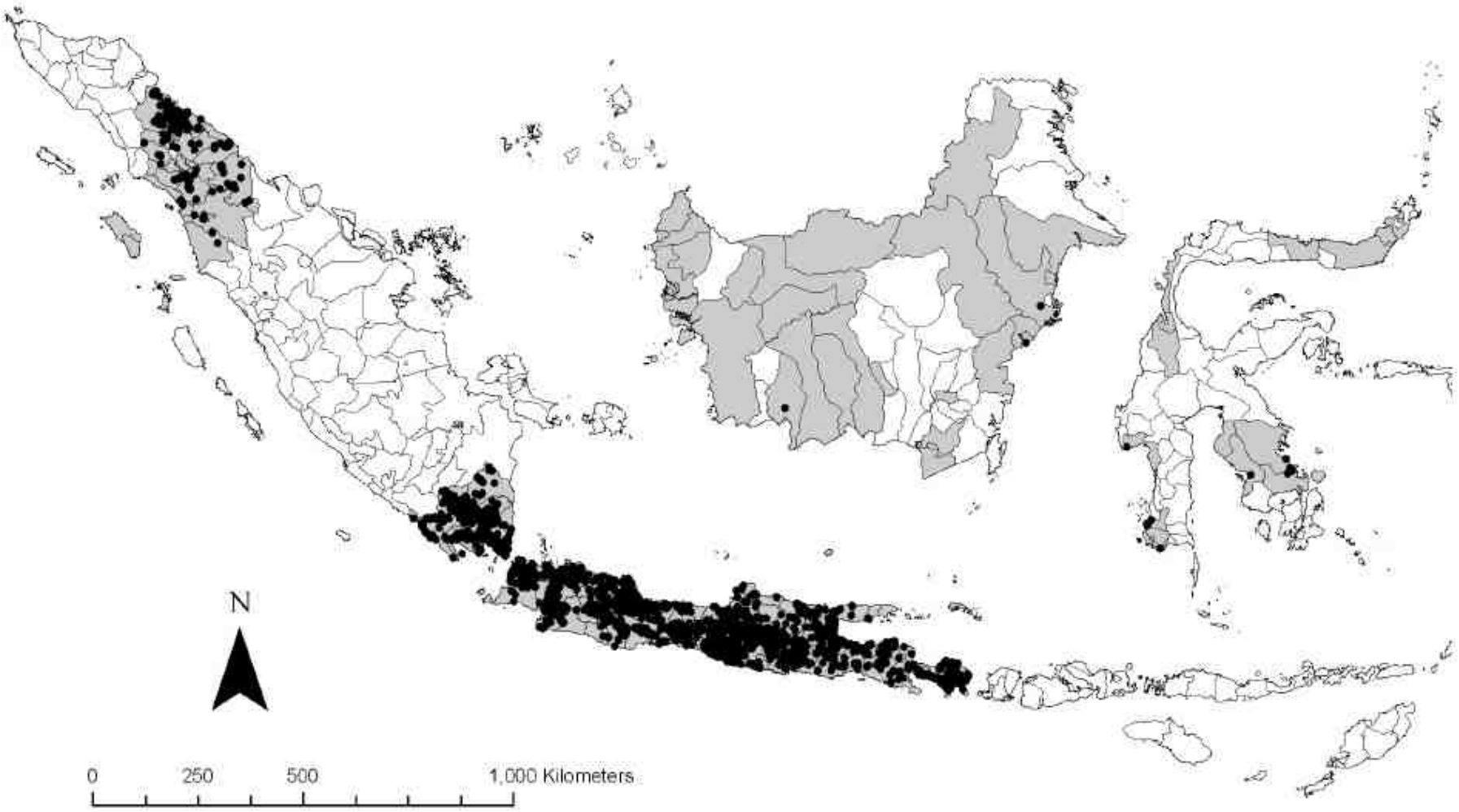
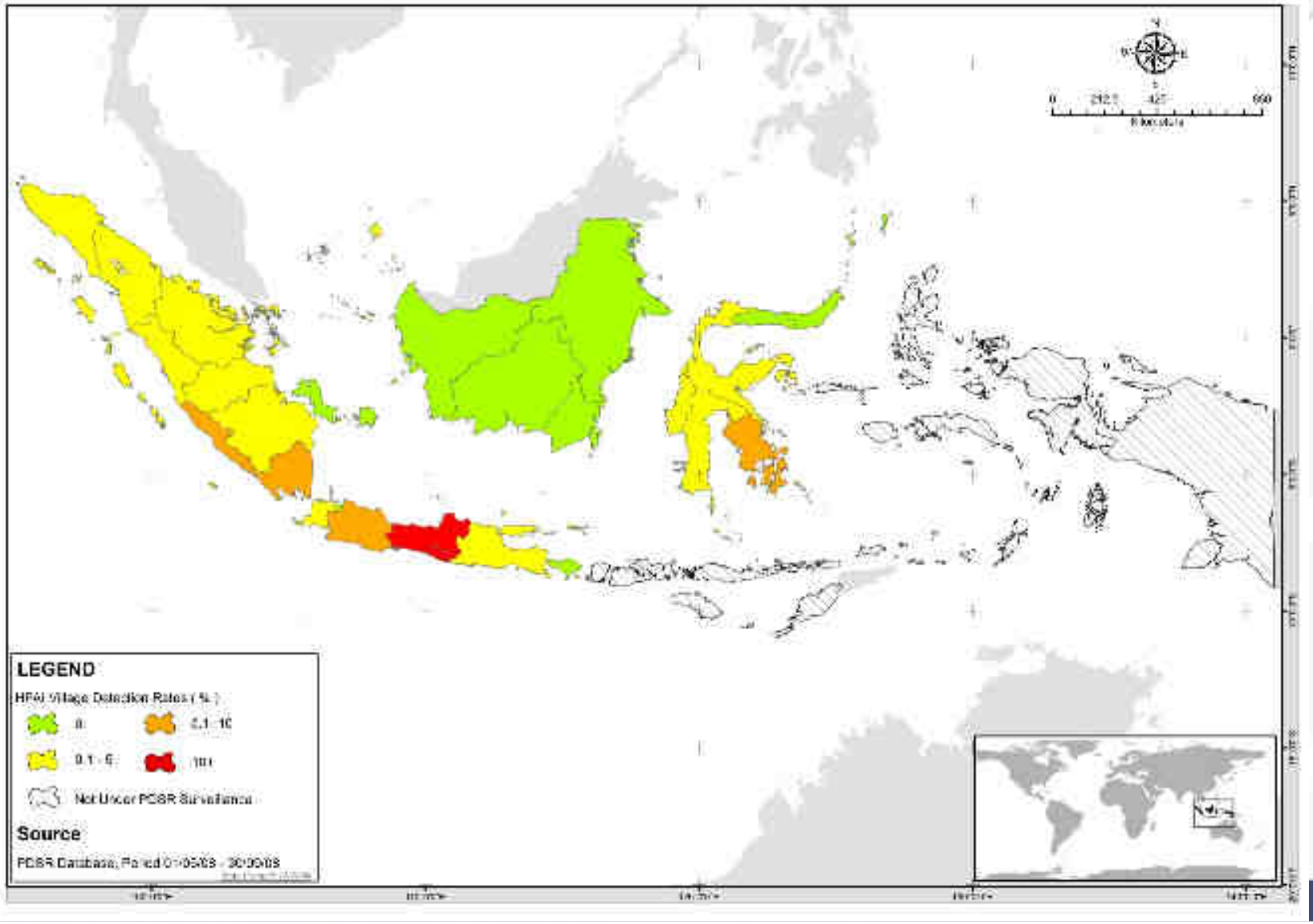


Figure 2: Map showing the location of districts where PDS interviews were conducted from 1 January 2006 – 5 April 2008 (Grey). The black dots indicate the location of the detection of HPAI during PDS interviews in the period 1 January 2006 – 5 April 2008.

PDSR system

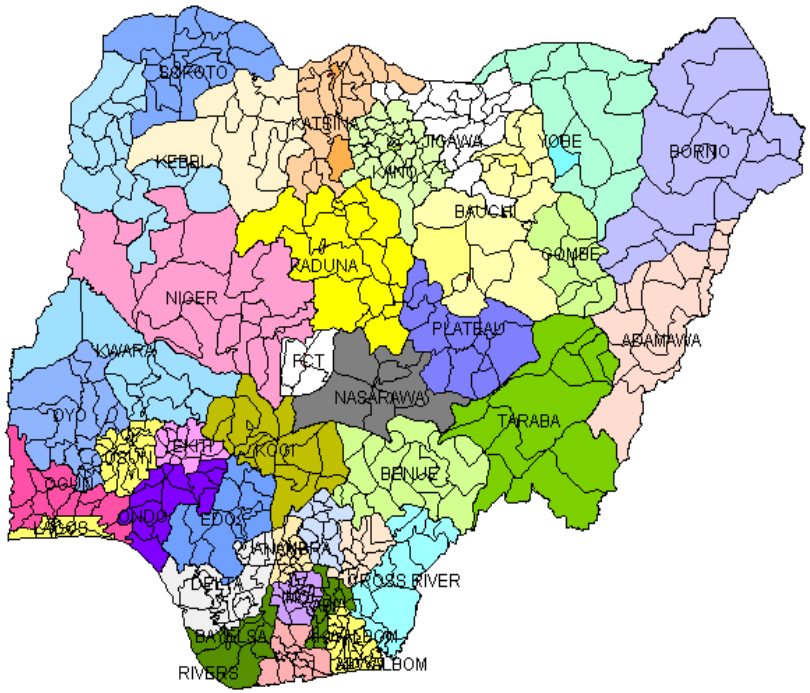


Nigeria: Passive surveillance

Main Features

- Immediate report system – daily report
- Monthly Disease reports
  - Covers all OIE listed diseases
  - All Area Veterinary Offices (on LGA basis) – 774
  - Specific forms and guidelines
- Abattoir report – (all major abattoirs)
- Case data capture form for all TADs (in case of confirmed outbreak)
- Performance Indicators and sanctions

Map - Area Vet offices



Nigeria:
Performance Indicators and Sanctions

- Number of Immediate notifications received within time limit
- Number of Monthly reports received versus Number expected
- Number of abattoir reports received versus number expected
- Timeliness of reporting
- Accuracy, Quality and Completeness of the report
- Follow up and Timeliness of action taken in case of confirmed outbreak
- Apply sanctions where necessary

Summary of Samples collected in Nigeria, 2006-2008

SN	ACTIVITY	Number of Samples collected	No of samples Positive for HPAI
1	**Targeted Surveillance at Wetland areas and major poultry farms (NVRI – Oct – Dec 2005)**	1200	0
2	**Passive surveillance (suspicions as at 31st October 2008)**	1590	300
3	**Specialist Diagnostic Teams (Investigations)**	471	0
4	**Nation wide Random surveillance**	12,145	0
5	**Targeted surveillance at LBM (1st and 2nd phase)**	13,876	5
6	**Wild bird surveillance (exercise still on-going)**	536	0

Source Tony Joanis, Vom, Nigeria

Surveillance in Bangladesh

	Visits	Suspect cases	Confirmed cases
Backyard	150.000	1.021	0
Commercial farms	2.037	489	16

2005 - 2007 HPAI outbreaks and migratory path

Sweden
United Kingdom
Denmark
Russian Federation
Poland
Germany
Czech Rep.
Austria
Slovakia
Hungary
Ukraine
Kazakhstan
France
Slovenia
Romania
Croatia
Bosnia
Serbia
Bulgaria
Georgia
Turkey
Spain
Switz.
Italy
Greece
Occupied Palestinian Territory
Albania
Azerbaijan
Israel
Iraq
Iran
Afghanistan
Jordan
Kuwait
Pakistan
Egypt
India
Niger
Burkina Faso
Sudan
Djibouti
Benin
Ghana
Togo
Cote d'Ivoire
Nigeria
Cameroon

446
1629
733
452
731
1504
1265

Legend

Stopover site

Species Infected

Domestc

Wild

Season

Breeding season

Moult and fall migration

Over wintering

Spring migration

** Migratory distances are expressed in Kilometers*

Diagnostic capacities

- Very variable: no capacity to whole genome sequencing
- Most severely infected countries: Egypt, Indonesia, Vietnam, China, Pakistan, India, Nigeria, (Bangladesh): good testing capacities.
- Many countries: capacities still weak
- Use of rapid antigen detection tests

West and Central Africa laboratory network

General observations from country reports

- Very variable ranging from no functional facilities to good laboratories
- General organisation and good lab practices: weak
- Biosafety levels deficient
- No BSL3 (few virus isolation)
- Basic equipment/training provided
- Low amounts of reagents
- Low number of samples submitted to labs
- Needs in training + reagents (esp. molecular biology)

West and Central Africa laboratory network: annual meeting December 2007

Average numbers of samples collected for AIV tests (serology + virology)- 20 countries

	Year	
	2006	2007
including Nigeria	791	822
excluding Nigeria	317	296

Proficiency test for 26 countries (Oct/Nov 08)
organised by IZVSVe and FAO

Western Africa
Benin
Tchad
Burkina faso
Cote d'Ivoire
Sénégal
Ghana
Mali
Niger
Nigeria
Guinea Conakry#

Central Africa
Centrafrican Rep#
Cameroun
RD Congo

Middle East
Saudi Arabia
Iran
Jordan
Egypt

Eastern Africa
Ethiopia
Sudan
Kenya

SADC Africa
Tanzania
Namibia
South Africa

Northern Africa
Morocco
Tunisia
Algeria

#only serology

Serological proficiency test panel

10 coded sera

Sera	HI titre
H5N1	1:512
H5N2	1:256
H5N2	1:64
H7N1	1:256
H7N1	1:32
H9N2	1:1024
NDV	1:512
NDV	1:64
H10N1	1:64
SPF	-

Techniques:

- ELISA AI type A Ab
- ELISA H5 Ab
- AGID
- Haemagglutination inhibition test

Expected Information:

- Negative/Positive AI
- Specific Ab subtype
- HI titre

Virus proficiency test panel

10 coded antigens

Virus		EID_{50}
A/mallard /It/3401/05	H5N1	$10^{4.83}$
A/mallard /It/3401/05	H5N1	$10^{4.83}$
A/duck/It/775/04	H5N3	$10^{4.84}$
A/turkey/It/2962/03	H7N1	$10^{6.37}$
A /turkey/It/2962/03	H7N1	$10^{5.37}$
Ulster 2C	NDV	$10^{5.26}$
Ulster 2C	NDV	$10^{4.26}$
A/mallard/It/3817-34/05	H9N2	$10^{5.03}$
A/cockatoo/England/72	H4N8	$10^{5.60}$
Allantoic fluid		-

Techniques:

Conv./Real-time RT-PCR
- gene M
- H5
- H7

Expected Information:

Virus identification

Proficiency test

Participants	26
Submitted results (Dec)	21
Serology and molecular results	14
Conv. RT-PCR	11
Real-time RT-PCR	9
Lack of reagents	5

Serological assays (21 labs)

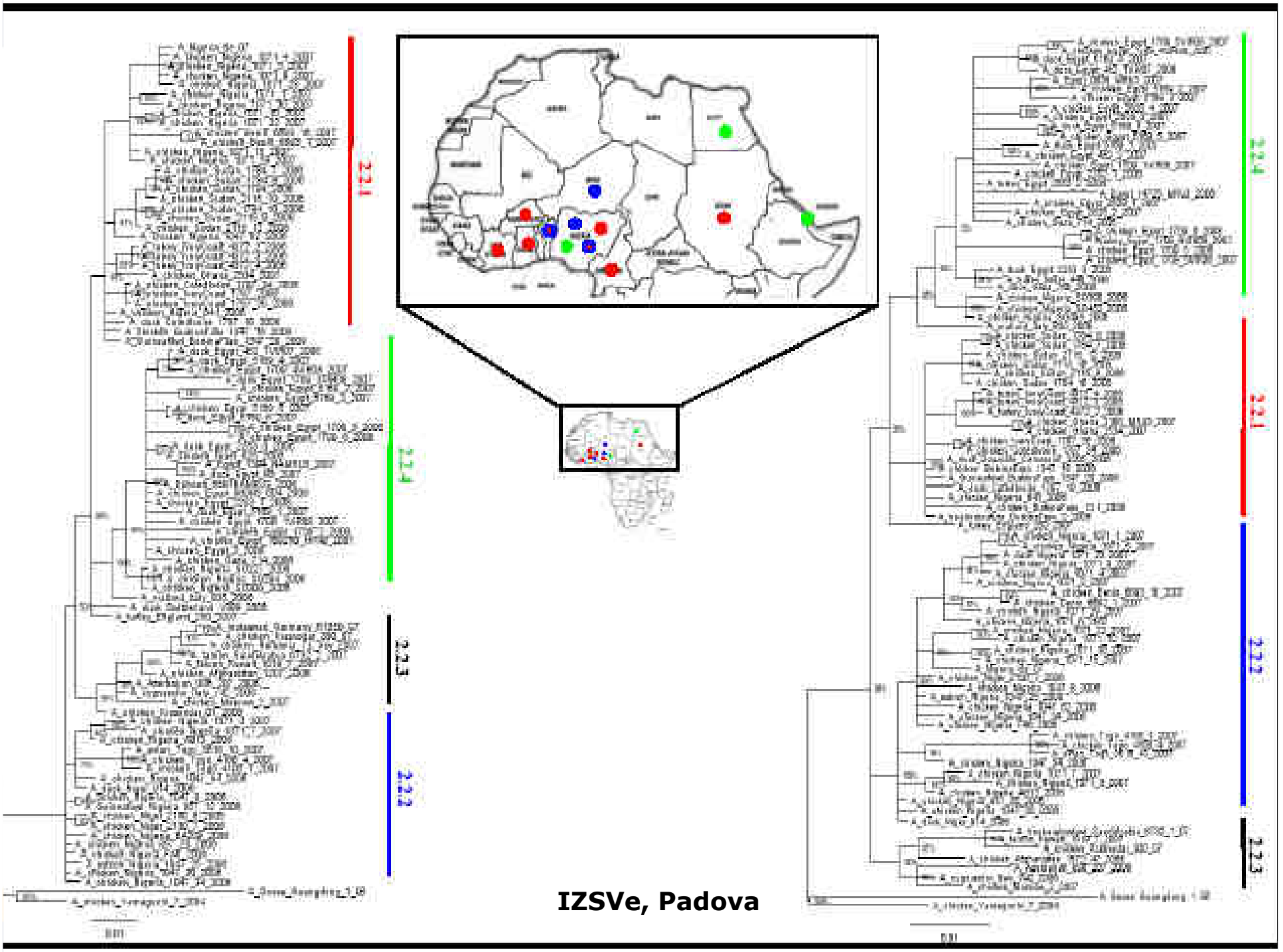
Test	Number of labs that performed the test	Labs that gave ≥ 90% correct results
HI test	18/21	8/18
ELISA test	9/21	8/9
AGID	13/21	6/13

Molecular diagnosis

Test	Number of labs that performed the test	Labs that gave ≥ 66% correct results
Conv. M	**10/14**	**7/10**
Conv. H5	**11/14**	**7/11**
Real-time M	**9/14**	**7/9**
Real-time H5	**8/14**	**5/8**

How to improve diagnosis?

- Sustain efforts and investment
- Regional laboratory and epidemiosurveillance networks
- Twinning/collaborations with international laboratories (FAO/OIE reference laboratories)
- Collaborations with human health sector
- Provision to countries of good quality reagents and of standard protocols (ex. EU protocols)
- Regular proficiency tests
  - ex. IZSVe in 2008
  - ex. AAHL (8 Indonesian labs, PCR/sero)
  - ex. Croatian lab for Balkan region



IZSVe, Padova

Conclusions
Passive surveillance

- Challenging, especially in backyard poultry
- Variable sensitivity.
    - o Depends of compensation mechanisms, field teams, sectors, commitment of national authorities...
- Much focused on HPAI
- Information/communication = critical
- Public/private partnership = critical

Conclusions

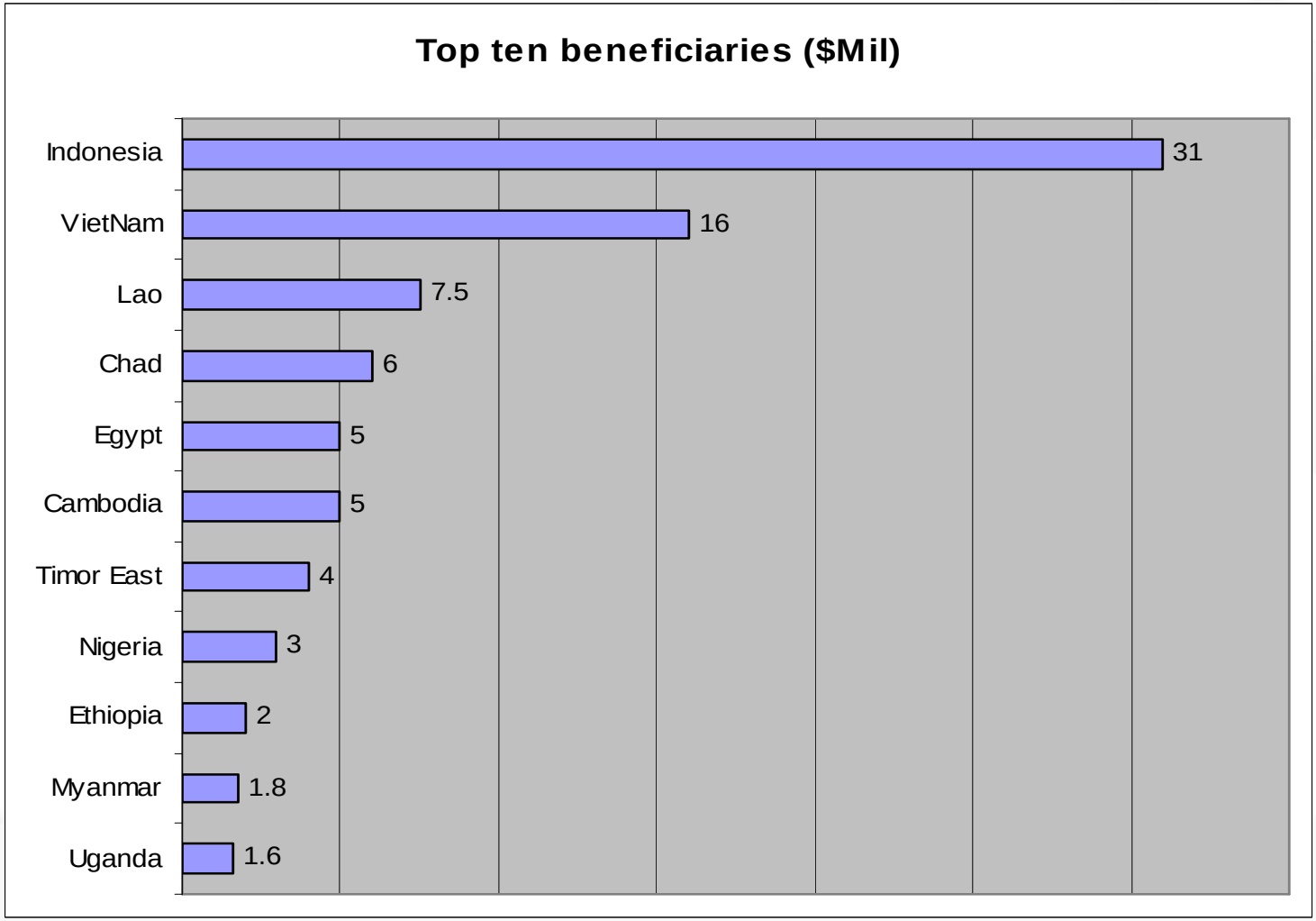
- HPAI crisis (FAO: 300 millions $-5 years): diagnostic and surveillance capacities have much improved, especially in infected countries but it is still limited in many countries
- Quality of laboratory results and sensitivity of HPAI surveillance are still questionable in many countries
- Insufficient number of samples and provision of reagents
- False sense of security: investments in lab capacities + surveillance but few stimulation exercises + fatigue + lack of QA
- Sustainability of HPAI surveillance and detection?

Thank you for your attention...

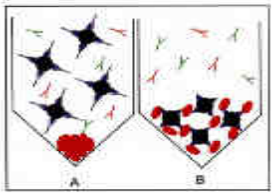




Funding: Main country allocation

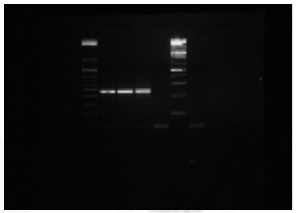


HI test : 18/21 countries

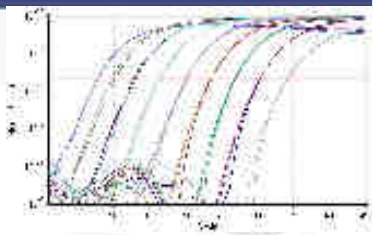


Countries	% of correct result
1	100%
7	90%
4	80%
2	70%
3	60%

Conventional RT-PCR



	Countries	% of correct result
Gene M	4	100%
	3	80%
	3	60%
H5	5	100% (3/3)
	2	66%(2/3)
	4	33%(1/3)
H7	4	100% (2/2)
	1	0% (0/2)



Real-time RT-PCR

	Countries	% of correct result
Gene M	3	100%
	2	90%
	2	80%
	1	60%
	1	50%
H5	5	100% (3/3)
	2	33%(1/3)
	1	0% (0/3)
H7	3	100% (2/2)
	1	50% (1/2)
	1	0% (0/2)