

*Regional Workshop for Avian Disease Prevention and Control in Asia and the Pacific
Qingdao, P. R. China*

Prevention and Control of HPAI and ND in China

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World Organisation
for Animal Health
Founded as OIE

中华人民共和国农业农村部

Ministry of Agriculture and Rural Affairs of the People's Republic of China

- *Poultry production and disease management in China*
- *Prevention and control of HPAI in China*
- *Prevention and control of ND in China*



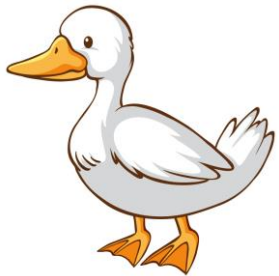


Poultry production in China



20%

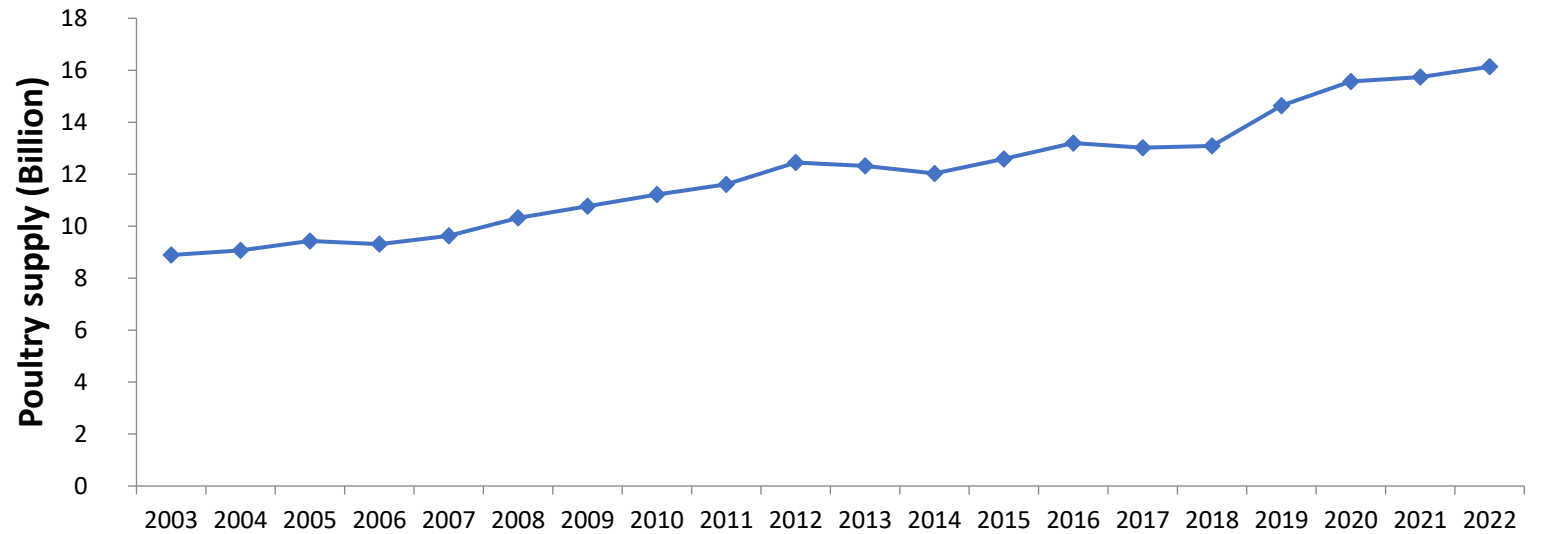
- China has the largest number of raised poultry in the world.
- In 2022, the supply numbers of poultry was 16.1 billions.



60%



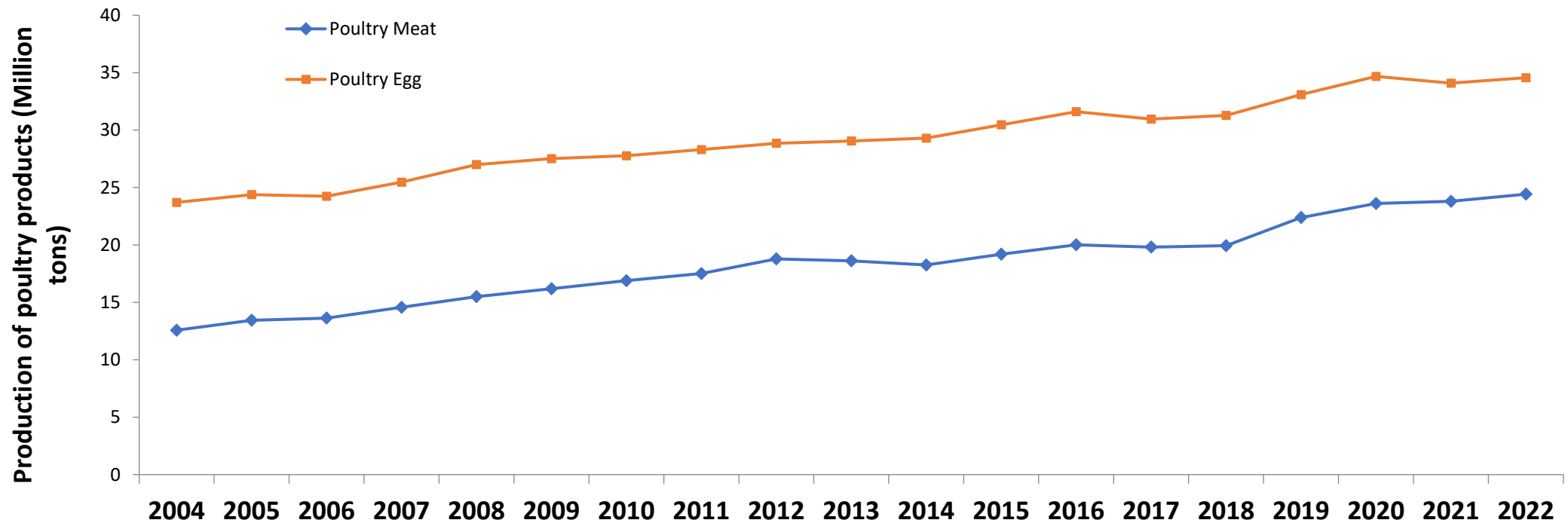
80%





Production of poultry products

- *The productions of poultry meats and eggs increased gradually in recent years.*
- *In 2022, the production of poultry meats and eggs were 24.4 and 34.6 million of tons respectively, ranked first and second globally.*





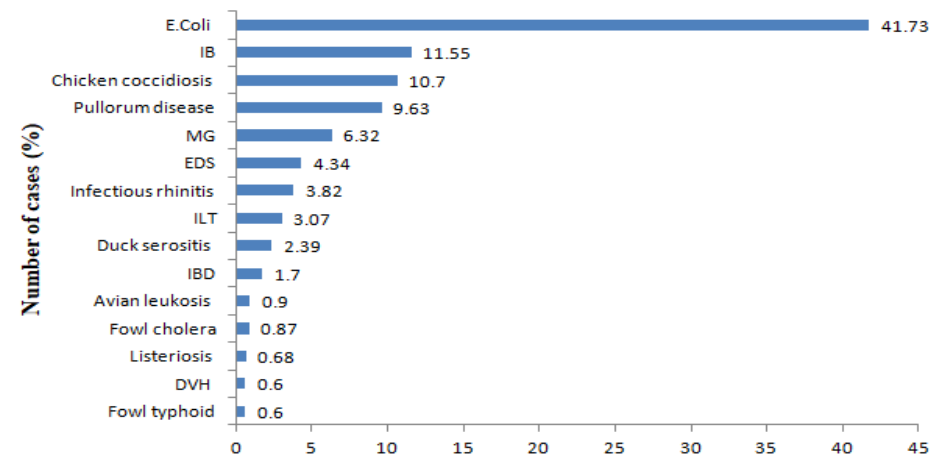
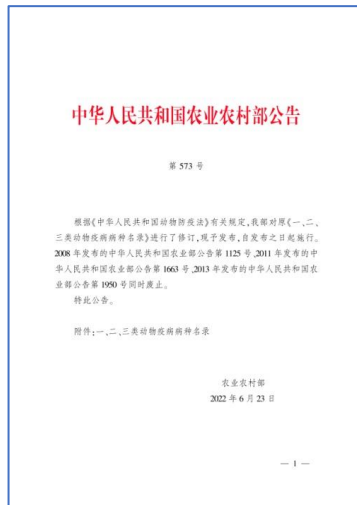
National surveillance plan for animal diseases

- The Ministry of Agriculture and Rural Affairs (MARA) is responsible for national animal health network.*
- Animal disease control institutions at all levels undertake the collection, analysis and report of local animal diseases information.*
- China Animal Health and Epidemiology Center (CAHEC) undertake the outbreak investigation and epidemiological survey for specific diseases.*
- National Veterinary Reference and Para-reference Laboratories perform the risk-based surveillance for virus identification and vaccine evaluation.*



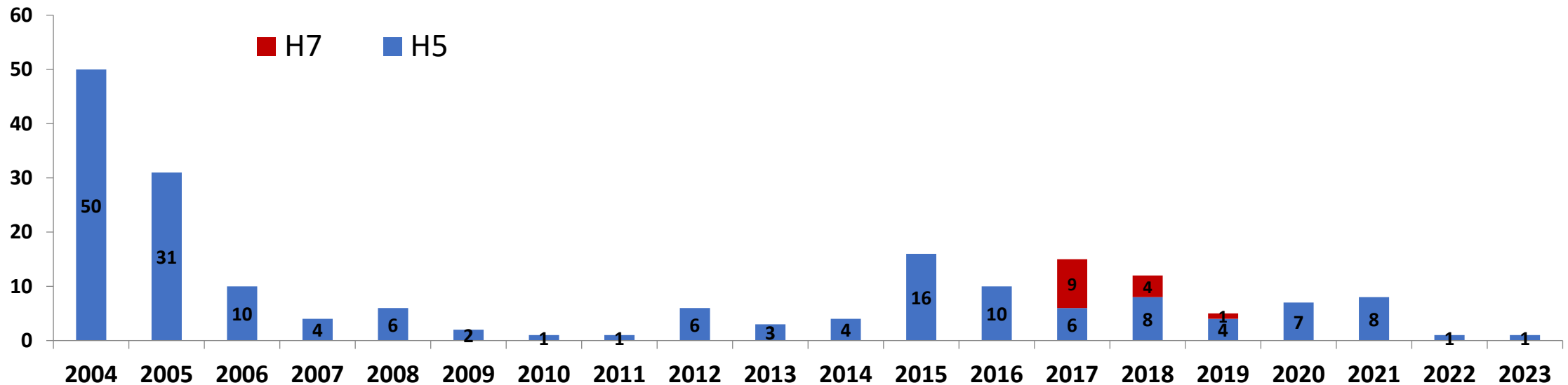
List of notifiable poultry diseases

- *MARA updated the list of notifiable poultry diseases in 2022*
 - *List I : HPAI (1)*
 - *List II : ND, Duck Plague, Gosling Plague(3)*
 - *List III: IB, E.Coli, MG,IBD, etc. (31)*
- *In 2022, 25 poultry diseases including one outbreak of H5N1 in wild birds in Qinghai were reported, and caused 4.3 million sick wit 0.37 million death.*
- *Most of cases were caused by the infection of E.Coli , IBV, etc.*



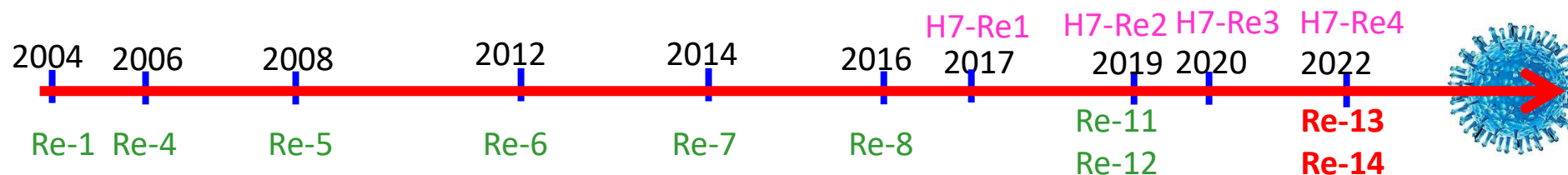
HPAI situation in China

- *HPAI has been well-controlled in poultry in China in recent years.*
- *No outbreak was reported in domestic poultry since 2021.*
- *One outbreak of H5N1 in Brown-headed Gulls was confirmed in Tibet in 2023.*
- *The virus belonged to 2.3.4.4b, and showed 99.3% homology to A/large-billed crow/1503b017/Niigata/2023(H5N1).*



National prevention and control plan for HPAI

- *Compulsory vaccination combined with stamping out*
- *Integrated surveillance*
- *Quarantine and movement control*
- *Zoning and compartmentalization*
- *Enhance biosecurity and scalization*
- *Timely update vaccines based on surveillance*
- *Implementation of “1110” policy in LBMs*



Vaccination of HPAI in China

- *China has adopted a compulsory vaccination policy since 2005.*
- *All susceptible species of poultry including waterfowl were vaccinated.*
- *Almost 20 years' practice has shown that compulsory vaccination can effectively stop the transmission of HPAI among poultry and from birds to humans.*
- *Improved vaccine production and supply system: 11 authorized production companies can produce 17 billion milliliters.*
- *Inactivated vaccines (H5 and H7) have been widely used, 5.4 billion milliliters vaccines has been used in 2022.*
- *Post-vaccination surveillance indicated the immune antibody qualified rate was 97.3% in 2022.*





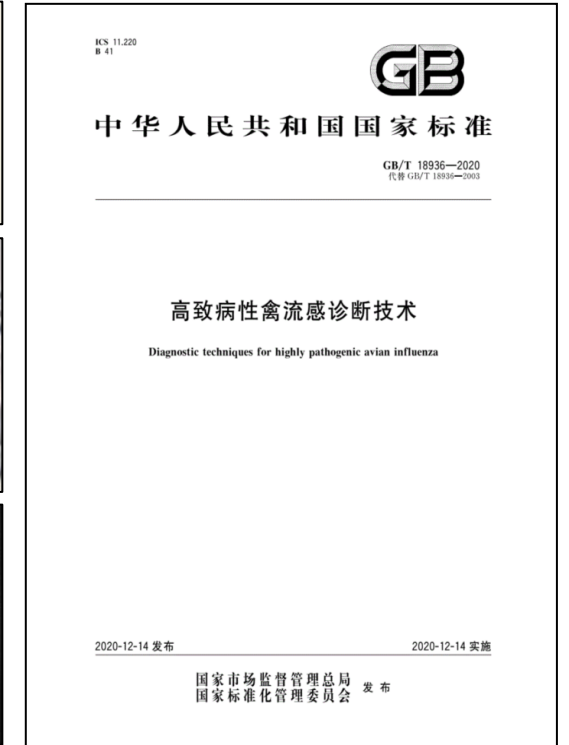
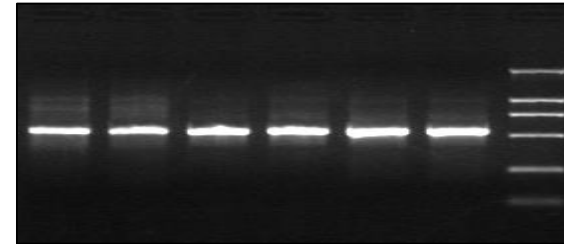
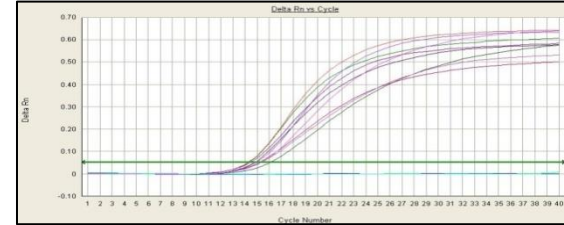
Comprehensive surveillance

- *Strengthen the post vaccination monitoring*
 - *Large farms*
 - *Small farms*
- *Strengthen active risk-based pathological surveillance*
 - *Live bird markets*
 - *Interface of wild birds and waterfowl*
- *Strengthen passive surveillance and outbreak investigation*
 - *Serological surveillance*
 - *Pathological surveillance*
- *Strengthen virus mutation analysis*
 - *Phylogenetic analysis*
 - *Antigenicity difference analysis*
 - *Animal challenge test*





- **Virological diagnosis**
 - *Real-time RT-PCR: screening test*
 - *RT-PCR and sequencing*
 - *Virus isolation :BSL-3*
- **Serological diagnosis**
 - *HI*
 - *ELISA*





- *Standard of evaluation for HPAI free zone*
 - *Matching with the General Rules for disease free zone: zoning, human resources, financial support, surveillance and report, movement control, quarantine and supervision, record, etc.*
 - *Have the protected areas, artificial or geographical barriers between neighboring HPAI infected countries or regions.*
 - *Having an effective disease report system.*
 - *All animal health measures in the region are effectively implemented.*
 - *Having an effective surveillance system. The surveillance is carried out according to the Guidelines for Surveillance of HPAI, and demonstrates that no HPAI infection in poultry in the last 12 months.*
- *Standard of evaluation for HPAI free compartment*
 - *Matching with the General Rules for disease free compartment: Licensed, biosecurity management system, supervision, surveillance, etc.*
 - *No HPAI infection in the last 12 months.*

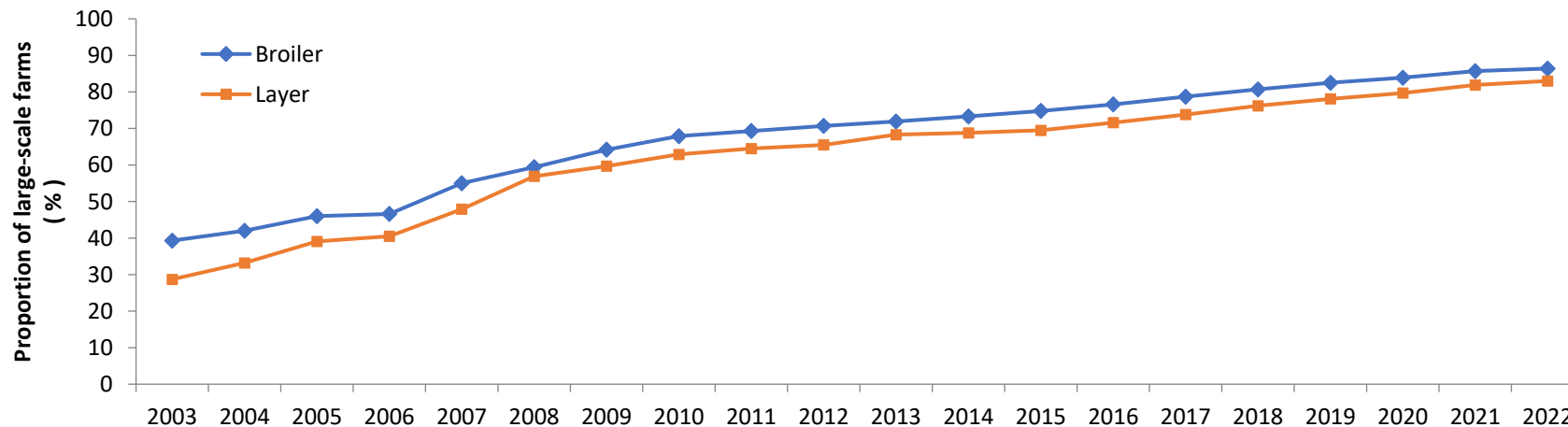
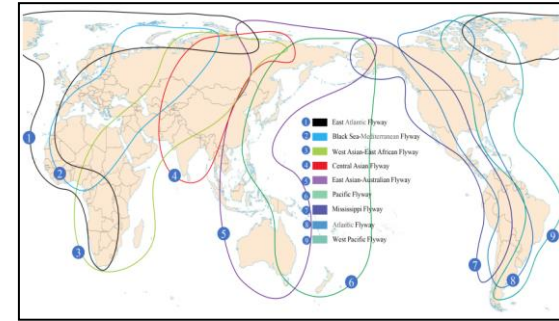


- **Zone free from HPAI**
 - Vaccination free
 - Shandong Province has been authorized by MARA
- **Compartment free from HPAI**
 - Vaccination or non-vaccination free
 - 6 compartments have been authorized by MARA.
- **Compartment free from ND**
 - Vaccination free
 - 3 compartments have been authorized by MARA.



Challenges and possible solutions

- *Incursion of new virus by migratory birds: surveillance on interface*
- *Silent infection of waterfowl: more active surveillance*
- *Management on LBMs: enhance 1110 policy*
- *Vaccination for waterfowl: hard to catch and vaccinated*
- *Low-scale population: enhance biosecurity*
- *Virus mutation: update vaccine timely*

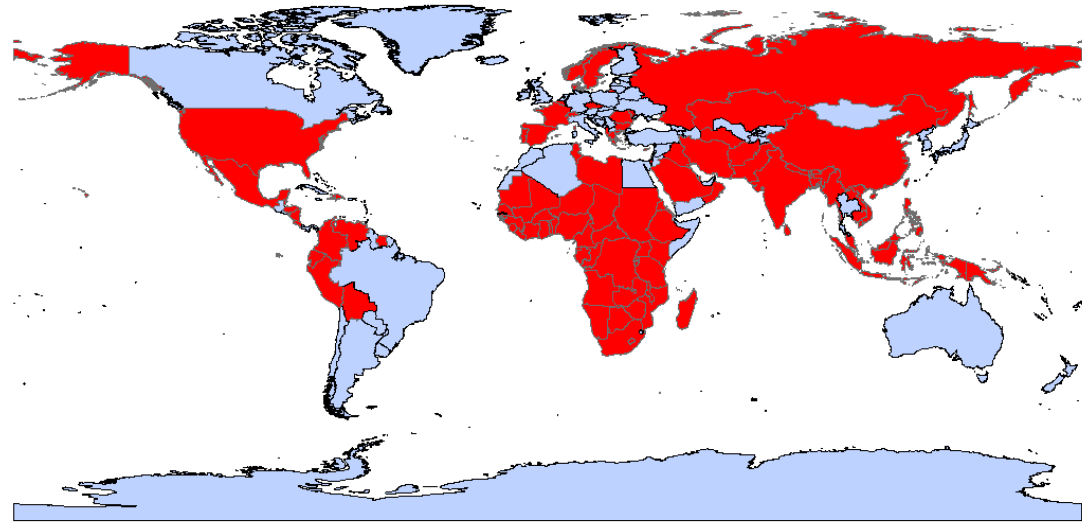


Future plan for HPAI prevention and control

- *Enhance surveillance and early warning: joint surveillance on wild birds*
- *Research on new vaccines: recombinant live vector vaccine*
- *Improve biosecurity: reduce the number of low-scale poultry farm*
- *Control of low-pathogenetic avian influenza: H9*
- *Establish more disease free zone and compartment*
- *Change on consumption patterns: reduce the risk of exposure for human health*



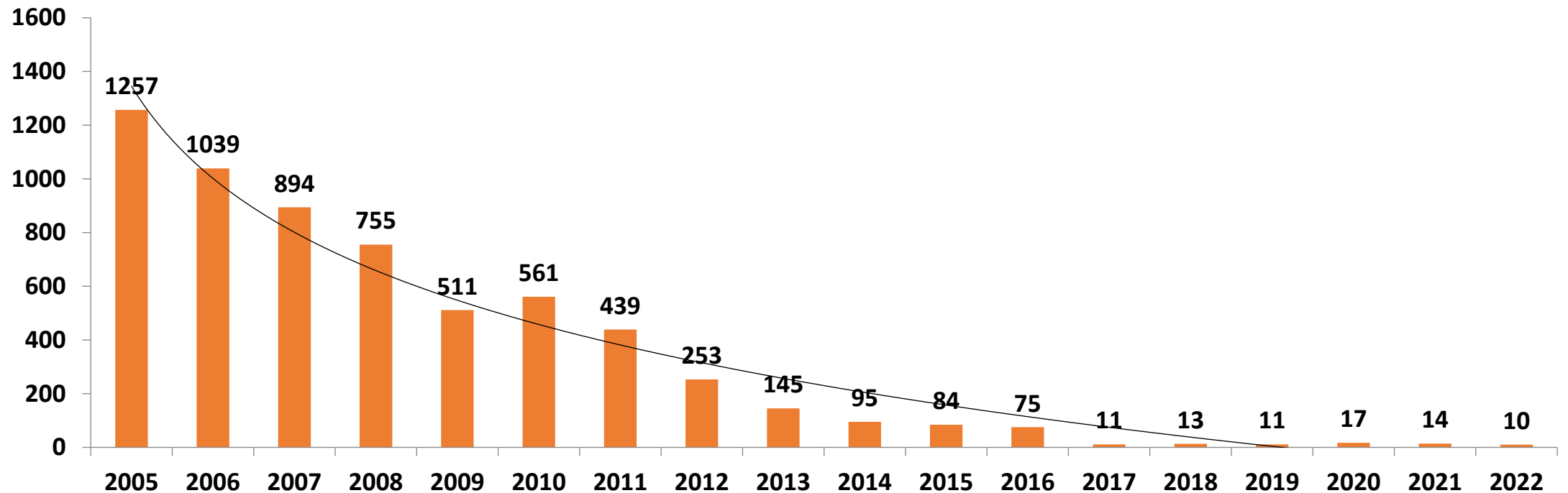
- *There are few areas of the world that have not been affected by ND.*
- *The disease has been endemic for several decades in most developing countries.*
- *111 WOAHA members reported ND during 2015 to 2023.*
 - *Asia : 33*
 - *Africa : 48*
 - *Europe : 15*
 - *North America : 8*
 - *South America : 6*
 - *Oceania : 1*



Data source: WOAHA-WAHIS (<https://wahis.woaha.org>)



- *ND is an important notifiable disease with priority on intervention.*
- *Comprehensive vaccination has been used for several decades since 1980s.*
- *The outbreaks of ND declined gradually in recent years.*



- *Purpose*

- *Identification of prevalent virus*
- *Evaluation of molecular diagnosis methods*
- *Evaluation of vaccine*

- *Risk-based surveillance*

- *Live birds markets*
- *Wild birds*
- *Waterfowl*

- *Test methods*

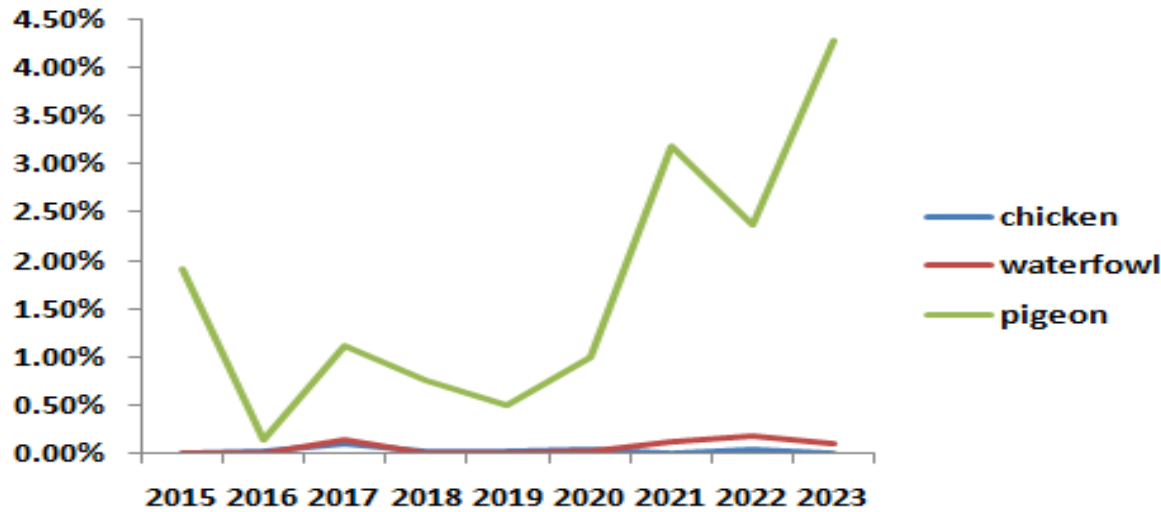
- *Virus isolation*
- *RT-PCR and sequencing*





Molecular characterization of circulating vNDV

- 149 vNDV has been isolated since 2015.
- The NDVs in different species showed the host-specificity.
 - Chicken: Genotype VII.2
 - Pigeon: Genotype VI
 - Goose: Genotype XII



VI

Class II

III

IX

IV

V

VIII

VII.1.1

VII

VII.2

XII

Class I





- **Rescue of vaccine strains: reverse genetics**

- Genotype VI: pigeon
- Genotype VII: chicken

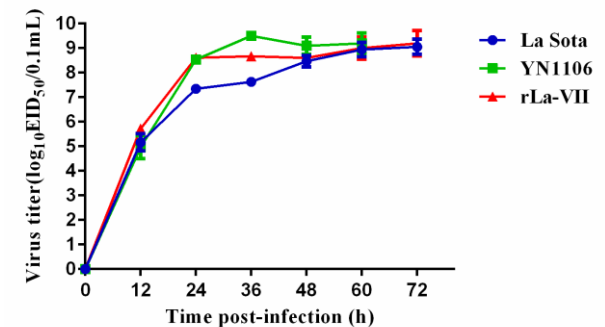
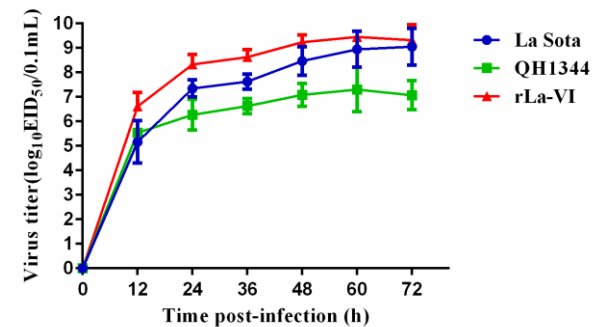
- **Biological characteristics**

- Genetically stable
- Higher replication
- Lower virulence

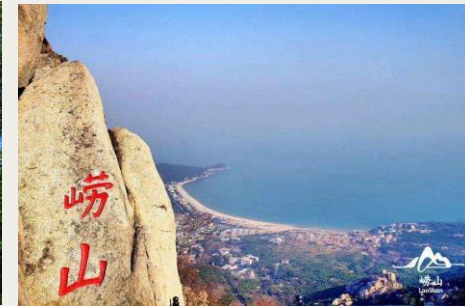
- **Immune efficiency**

- 100% protection
- No virus shedding

Strain	HA titer	Virus titer ($\log_{10} EID_{50}/0.1mL$)	ICPI
rLa-VI	2^{11}	9.37	0.36
rLa-VII	2^{10}	9.17	0.31
La Sota	2^{10}	9.18	0.4



Thank you!



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