16TH CONFERENCE OF
THE OIE REGIONAL COMMISSION
FOR THE MIDDLE EAST

3-4 NOVEMBER 2021

Highly Pathogenic Avian Influenza IN EGYPT

Summary experiences , challenges faced and socio-economic impact on the livelihood (2006-2021)

15/11/2021

Presentation Outline

1. Historical view of the disease
2. Subtype detection in Egypt(2006-2021)
3. Historical and current situation of the HPAI in Egypt
4. Spatial distribution of confirmed HPAI (2006-6/10/2021)
5. Historical and current situation of the HPAI in Egypt (HUMAN)
6. Integrated national plan for avian influenza
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8. Improve the animal health surveillance system in Egypt
9. Surveillance measures implementation in Egypt
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11. How did the Egyptian government overcome the bad Socioeconomic impact of the HPAI
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In 2007

Egyptian government has been "exemplary—having more openness than just about any other country on bird disease and human cases from bird disease".

David Nabarro,2007
senior UN systems coordinator
for avian and human influenza

Historical view of the disease

- The highly pathogenic H5N1 avian influenza virus was first confirmed in Egypt in domestic poultry in February, 2006, and has since become deeply entrenched in this poultry population
- It started in 3 governorates and spread thereafter to all governorates(. Outbreaks in both commercial poultry farms , households, market, Zoo….etc. are regularly reported, and occasionally humans are infected when in close contact with sick birds

Now in 2021 (from 1/1-6/10)

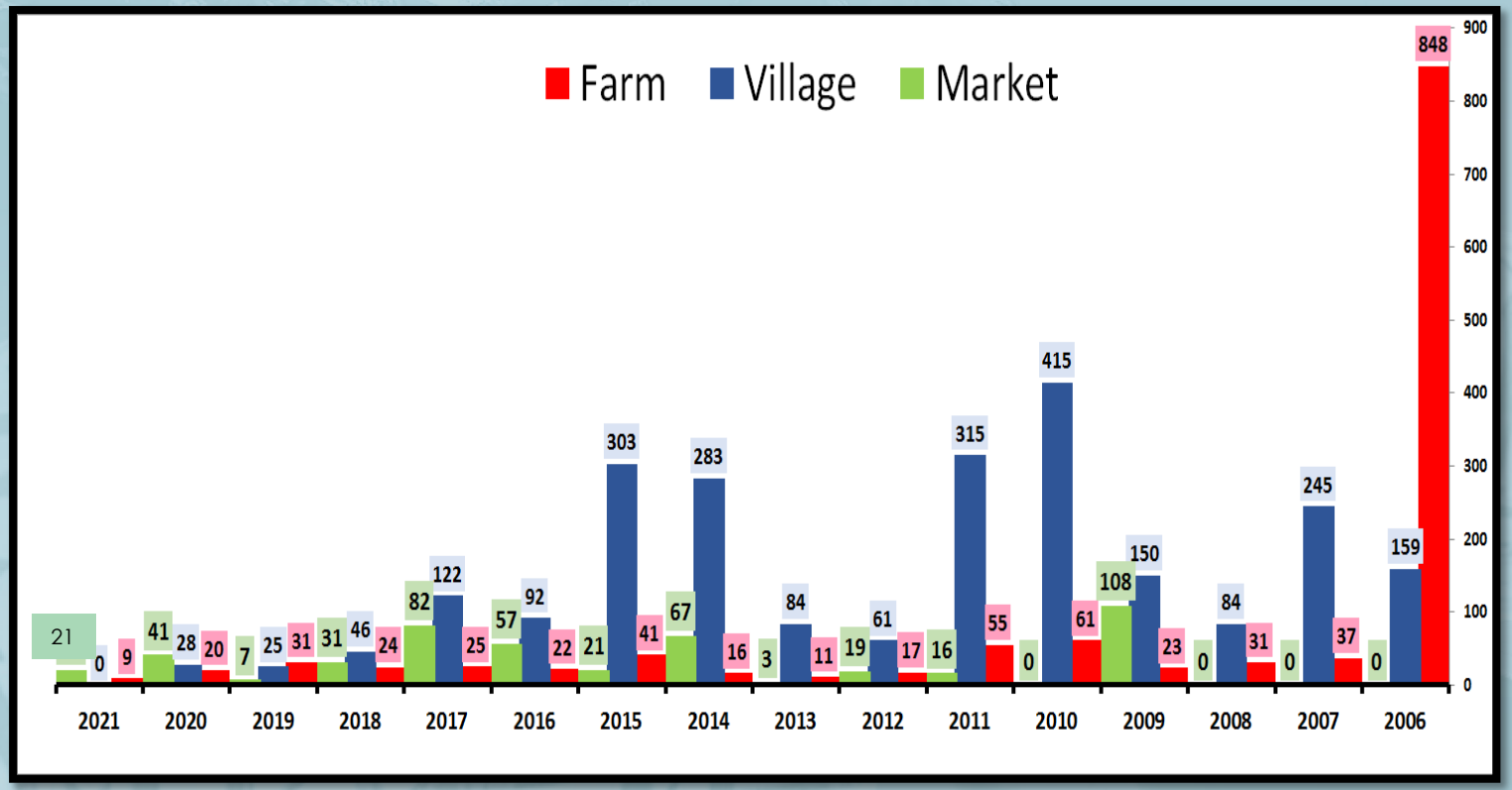
HPAI confirmed only in 11 governorates out of the 27 (The infection was isolated from Farm and Market only)

Subtype detection in Egypt(2006-2021)

- Egypt's poultry industry has been plagued by endemic infections with highly pathogenic avian influenza (HPAI) virus, subtype **H5N1**, clade 2.2.1 in 2006
- Low pathogenicity avian influenza (LPAI) virus of subtype **H9N2**, introduced in 2011
- HPAI **H5N8** (clade 2.3.4.4b) introduced in 2016
- At 2019 -A novel re-assortment highly pathogenic avian influenza A (**H5N2**) virus in one poultry farms in Egypt. This virus carries the hemagglutinin (HA) gene of HPAI clade 2.3.4.4b **H5N8** virus and 7 genome segments derived from Egyptian **H9N2** viruses .
- **H6N2** subtype detected in one migrating bird at 2017

Historical and current situation of the HPAI in Egypt

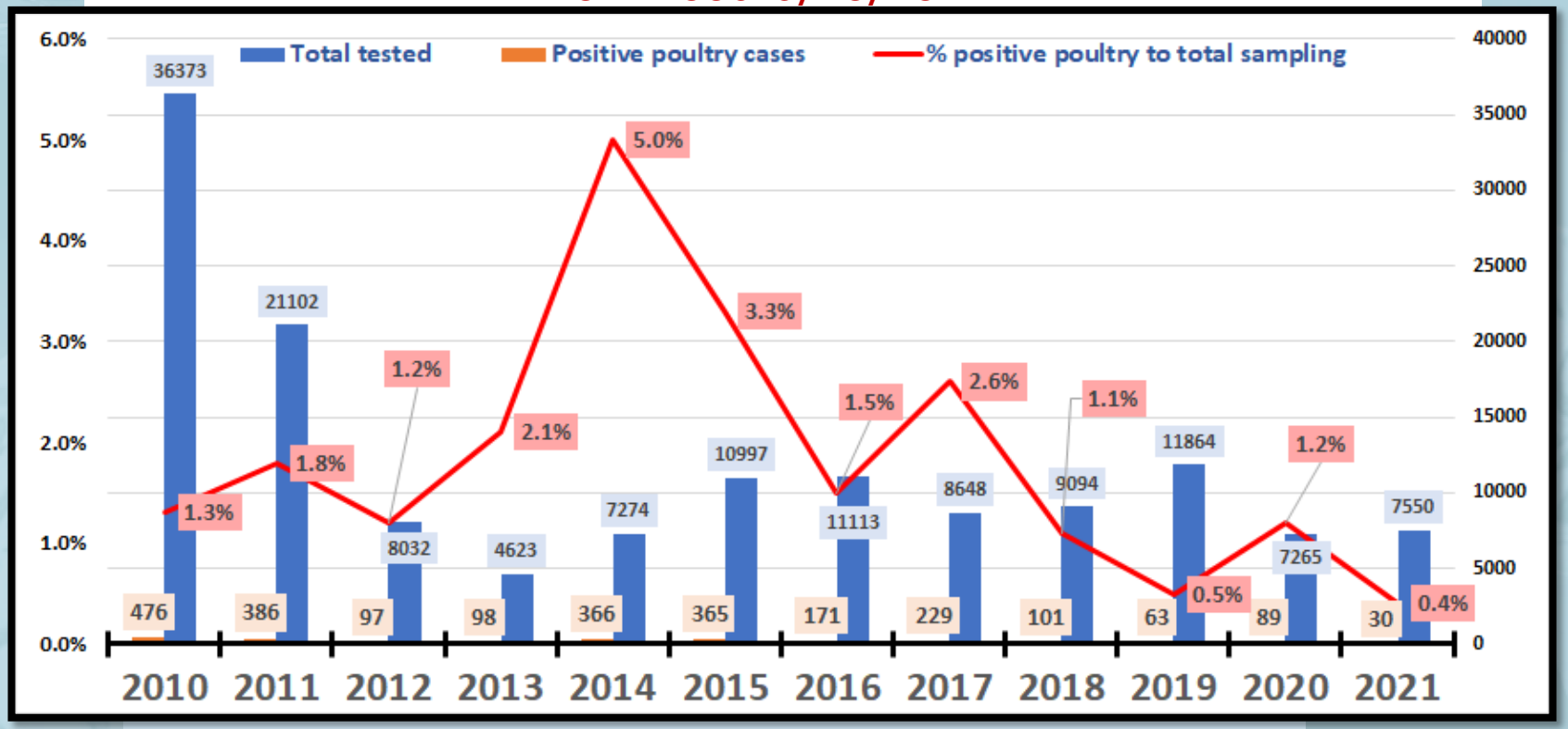
HPAI positive cases by sampling source (2006-6/10/2021)



*Sample= one Farm or one Villages or one market

Historical and current situation of the HPAI in Egypt

Total sampling and positive cases of HPAI with % of positive to total sampling From 2006-6/10/2021



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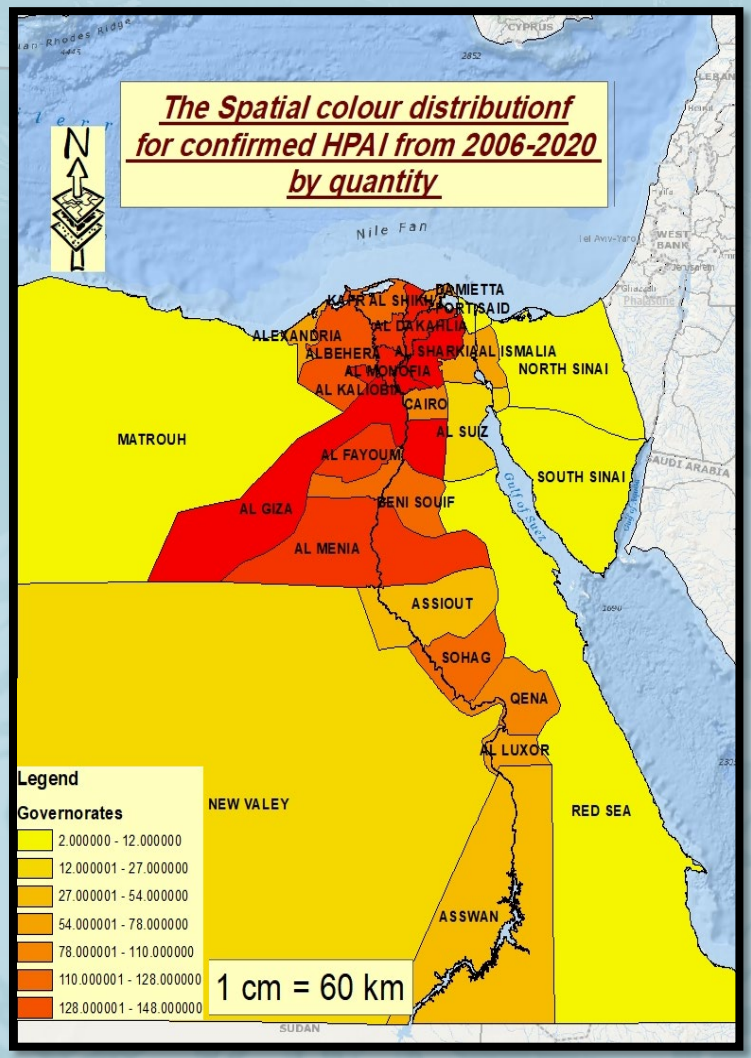
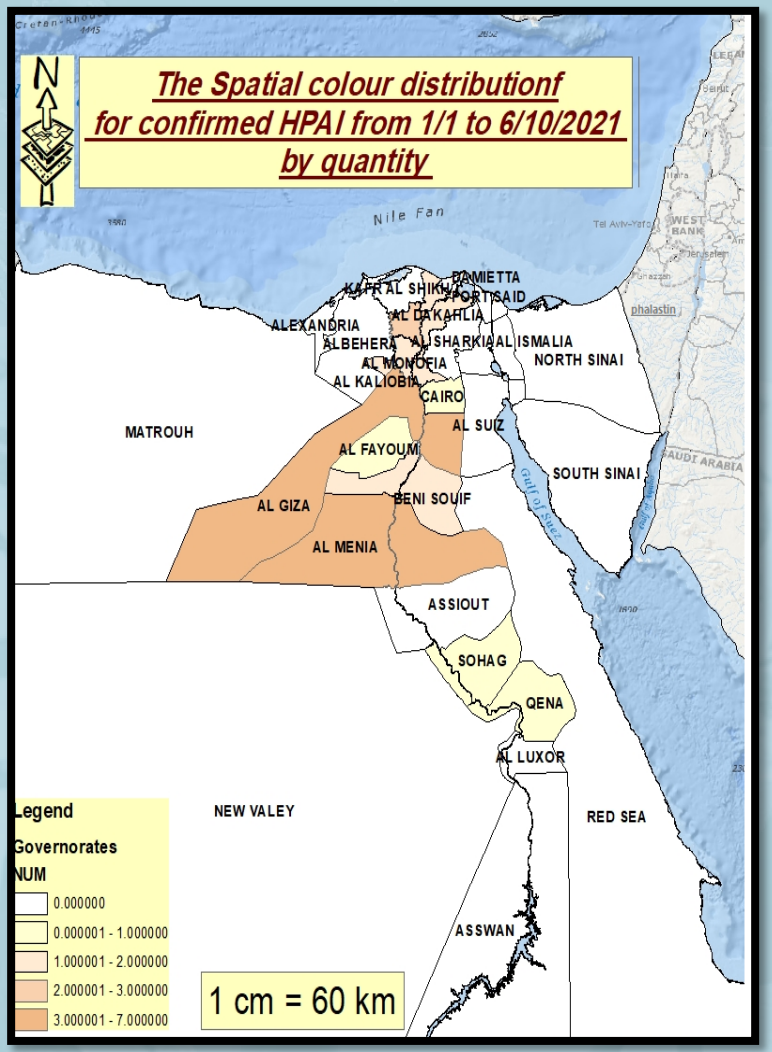
Spatial distribution of confirmed HPAI (2006-6/10/2021)





Historical and current situation of the HPAI in Egypt (HUMAN)

No records for any H5N1 outbreak since late 2017 until now 2021

Cumulative number of confirmed human cases for avian influenza A(H5N1) reported to WHO, 2003-2021

Country	2003-2009*		2010-2014*		2015-2019*		2020		2021		Total	
	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths
Azerbaijan	8	5	0	0	0	0	0	0	0	0	8	5
Bangladesh	1	0	6	1	1	0	0	0	0	0	8	1
Cambodia	9	7	47	30	0	0	0	0	0	0	56	37
Canada	0	0	1	1	0	0	0	0	0	0	1	1
China	38	25	9	5	6	1	0	0	0	0	53	31
Djibouti	1	0	0	0	0	0	0	0	0	0	1	0
Egypt	90	27	120	50	149	43	0	0	0	0	359	120
Indonesia	162	134	35	31	3	3	0	0	0	0	200	168
Iraq	3	2	0	0	0	0	0	0	0	0	3	2
Lao People's Democratic Republic	2	2	0	0	0	0	1	0	0	0	3	2
Myanmar	1	0	0	0	0	0	0	0	0	0	1	0
Nepal	0	0	0	0	1	1	0	0	0	0	1	1
Nigeria	1	1	0	0	0	0	0	0	0	0	1	1
Pakistan	3	1	0	0	0	0	0	0	0	0	3	1
Thailand	25	17	0	0	0	0	0	0	0	0	25	17
Turkey	12	4	0	0	0	0	0	0	0	0	12	4
Viet Nam	112	57	15	7	0	0	0	0	0	0	127	64
Total	**468**	**282**	**233**	**125**	**160**	**48**	**1**	**0**	**0**	**0**	**862**	**455**

* 2003-2009, 2010-2014 and 2015-2019 total figures. Breakdowns by year available on subsequent tables.
Total number of cases includes number of deaths.
WHO reports only laboratory-confirmed cases.
All dates refer to onset of illness.
Source: WHO/GIP, data in HQ as of 15 April 2021

World Health Organization

Integrated national plan for avian influenza

- ***Development of national HPAI control strategies*** developed and endorsed by MoALR in 2007 and reviwed at 2010.
- ***The Goal of the Strategy is:***

To achieve a situation with H5N1 HPAI in Egypt in which the disease no longer represents a significant threat to human health

- *Control Phase*
- *Consolidation phase*
- *Eradication phase*

Integrated national plan for avian influenza

Control Phase

1. **Strengthen** those elements of government veterinary services that are essential for improved livestock disease control
2. **Define epidemiological** parameters of HPAI in Egypt
3. **Describe the economic** and cultural elements of poultry production and marketing that influence the maintenance and spread of HPAI
4. **Improve the bio security** of commercial and household poultry sectors
5. **Improve vaccination** in commercial poultry production units
6. **Improve veterinary hygiene** management along the poultry value chain
7. **Increase incident reporting** through appropriate outbreak response measures

Ministry of Agriculture and Land Reclamation (MALR) represented by General organization for veterinary services (GOVS) is responsible for the progressive control of HPAI H5N1 in domestic poultry

The main activities that targeted by veterinary services are:

- 1) Strengthen surveillance systems (passive reporting and all types of active surveillance)
- (2) improvement of laboratory capacities
- (3) genetic and antigenic characterization of currently circulating viruses
- (4) laboratory- and field-level vaccine effectiveness trials
- (5) disease mitigation BY
- Encouraging the various studies that deal with the dynamics and pattern of the highly pathogenic avian influenza virus, its risks, and methods of spread to help in disease control
- Promoting farm biosecurity and risk reduction measures

Improve the animal health surveillance system in Egypt

- The AI surveillance programme has served as an effective early warning tool, enabling the veterinary authority to early detect and rapidly respond to emerging or new virus strains.
- Veterinary services improved their capacity for detection through the regular development and sustained implementation of value-chain and risk based surveillance strategies (H5N1, H7N9, H9N2, H5N8)

As a result, the following strains of AI virus have been detected during routine surveillance activities:

1. **H5N8 HPAI** was detected in migratory birds (Common coot) at a fish market in Damietta governorate in November 2016 by CAHO team
2. Detection of first re-assortamnt strain **H5N2** (between two Egyptian circulating strains; H5 gene from highly pathogenic H5N8 and N2 gene from low pathogenic H9N2 virus) in a commercial duck farm in 2018 by Active surveillance programme

That triggering rapid response actions including culling, disposal, de-contamination and ring vaccination.

Improve the animal health surveillance system in Egypt

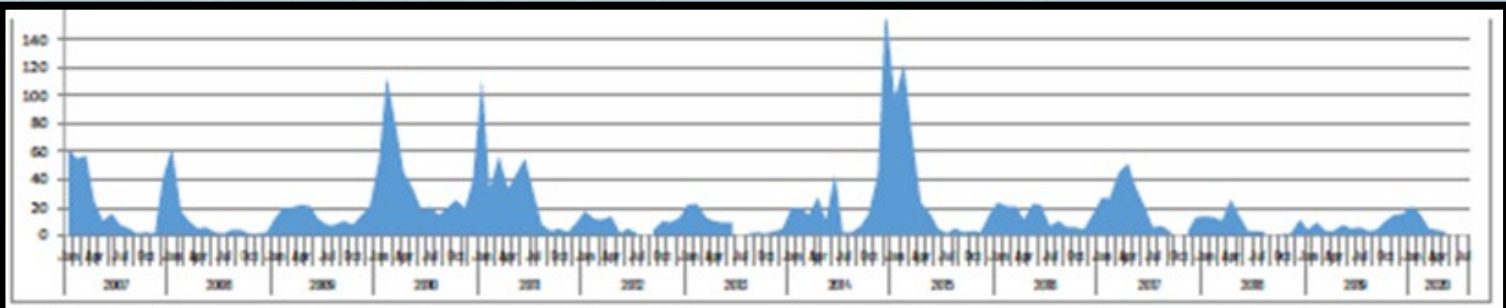
- Web-based database system for all Transboundary animal disease not only for HPAI activities evaluation (TAD-info)
- Establishment of 259 epidemiological units covering almost all districts and governorates.
- Promotion of feasible biosecurity messages supported
- Supporting the expansion and field operations of the Animal Health and Community Awareness Program (CAHO) in all districts of Egypt's governorates with a number of 250 teams
- National Laboratory for Quality Control of Poultry Production (NLQP) including five satellite laboratories have been supported to conduct the diagnosis and control of avian influenza
- Activation of rapid response teams in different districts in every governorates
- National capacity for AI vaccine evaluation process improved

Improve the animal health surveillance system in Egypt

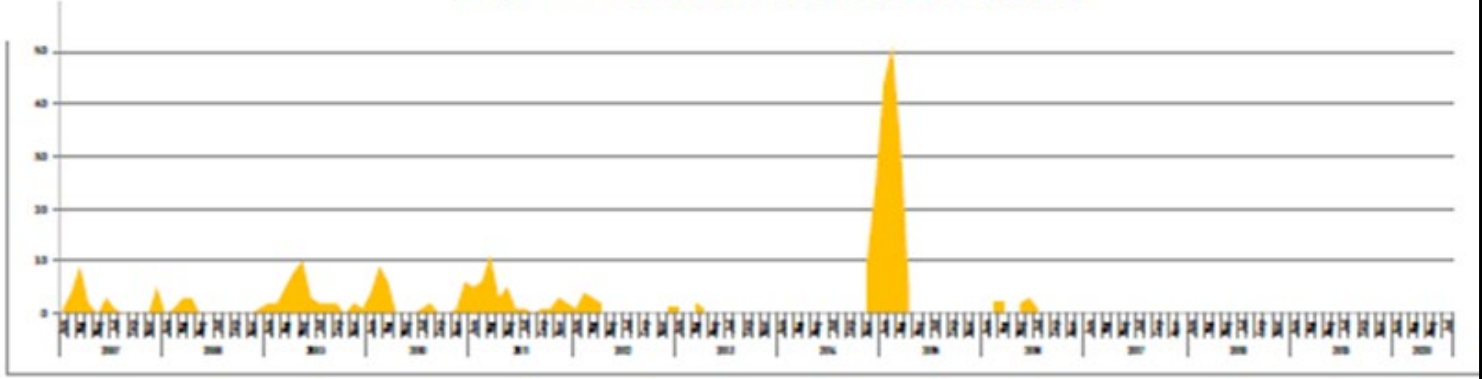
- There are approximately 1650 government veterinary clinics across Egypt at the village level, each serving 3-5 villages.
- These clinics are the first line to detect any disease or abnormal condition at the field level Any disease is reported based on a specific case definition and cases treated within the veterinary clinics are regularly recorded in a designed paper register and sent weekly to the veterinary services in the District related to it.
- All this data is entered by the epidemiology unit at the district level on the TAD information web-based database
- These units are monitored periodically by the Prevention Department and informed to veterinarian of any changes in disease case definitions
- Regular observation and comparison of data week by week is an important tool for detecting a sudden increase in any disease or clinical event in a given area.

The surveillance programme

Furthered understanding of the temporal trend of HPAI through monitoring the incidence AI cases in the poultry population

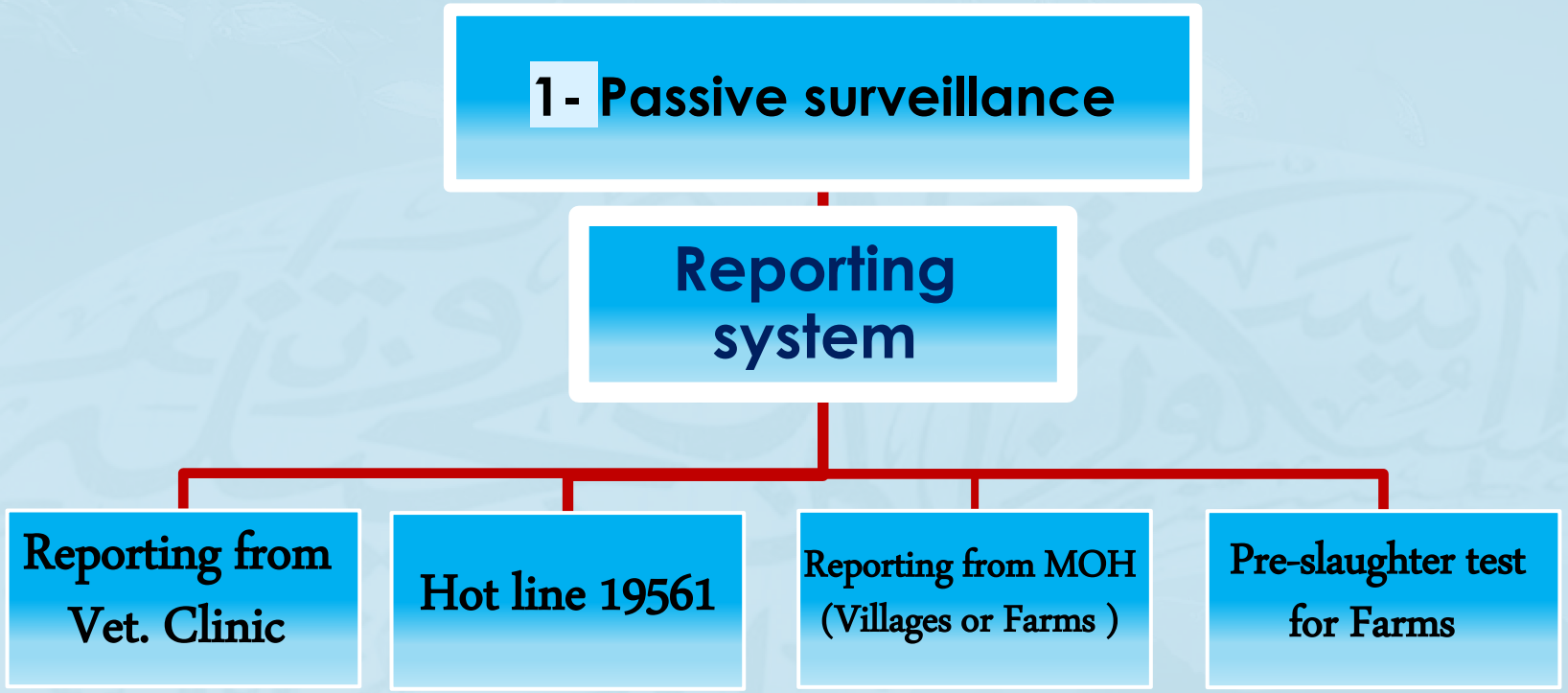


Monthly incidence of HPAI outbreaks in the poultry population based on the outputs of the AI surveillance programme from 2007 to 2020 (Source: GOVS)

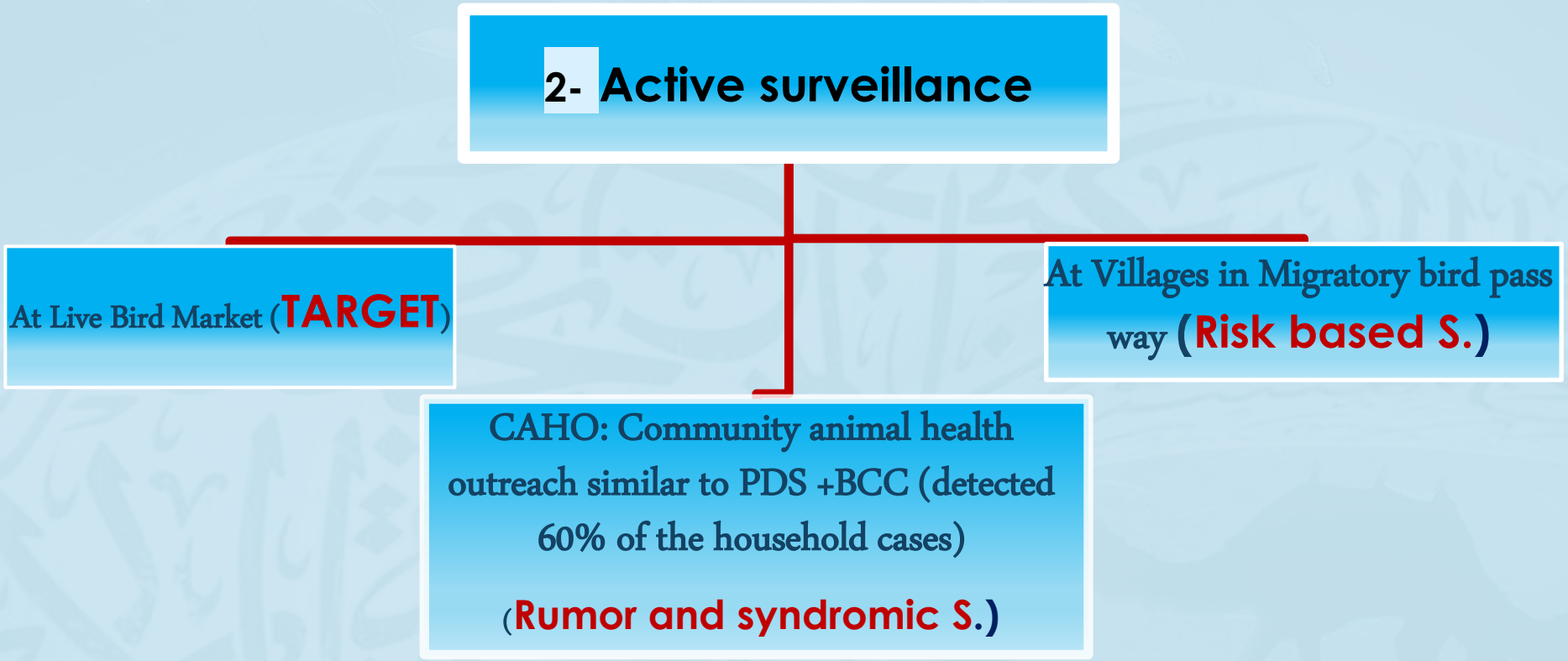


| Monthly incidence of human HPAI cases from 2007 to 2020 (Source: MOH)

Surveillance measures implementation in Egypt



Surveillance measures implementation in Egypt



"In Egypt HPAI is a social and economic problem more than a cultural issue"

Zuhair Hallaj, 2007

WHO representative for

the Eastern Mediterranean Regional Office region

Socio-economic impact on the livelihood of the Egyptian community

&

How did the Egyptian government overcome the bad Socioeconomic impact of the HPAI

Socio-economic impact on the livelihood of the Egyptian community

- Controlling highly pathogenic avian influenza infection in domestic birds has proven to be one of the biggest challenges that faced the Egyptian government
- Where Egypt is one of the most endemic countries for the highly pathogenic avian influenza virus in the world and has suffered great economic and human losses
- Since the outbreak of HPAI the generating additional income has been a challenge for rural families, especially those headed by women, where employment opportunities are limited.

Socio-economic impact on the livelihood of the Egyptian community

- The disease also took its toll on poultry production
- Poultry and eggs are the major or only animal protein sources for the poor family.
- In Egypt, between 5–7 million families raise poultry in their backyards, where raising and selling poultry is the main source of income for them and can account for up to 30 percent offer most Egyptian small-scale farmers and their earnings also. So, losing their animals is like losing their life savings.

Socio-economic impact on the livelihood of the Egyptian community

- In the year 2006 alone, more than 40 million birds were culled
- in 2007; The local poultry industry, which had previously produced 2·2–2·5 million chickens daily are estimated to have lost between US$2–3 billion to avian influenza and the Trade in poultry at the domestic levels has been severely affected
- Regarding human cases and from 2006-2018 a total of 359 human cases have been officially reported **42% of the global total**, with 120 (33%) **26 % of the global total** fatalities
- In 2006 Egypt's main approach to controlling avian influenza was the culling of all poultry suspected of harboring the virus and vaccinating birds.

Socio-economic impact on the livelihood of the Egyptian community

- However, this stamping out policy has its drawbacks because many non-infected birds have had to be killed.
- Despite spending around US$26 million on compensation schemes over 2006, there was ineffective.
- Over a quarter of a billion doses of vaccine were imported by the government and 13 commercial companies.
- However, reaching the backyard farms proved difficult and vaccination, although offered freely to these farms, was inconsistent.

How did the Egyptian government overcome the bad Socioeconomic impact of the HPAI

- The Egyptian government has sought to reduce the HPAI risk of human exposure by limiting infection in poultry.
- Despite the weak resources of veterinary services in Egypt, it was able to control HPAI , due to the many hard efforts that were made in cooperation with various partners.

The current results indicate that

- The successes achieved by the Egyptian government in the ability to control highly pathogenic avian influenza played a vital role in achieving development and reducing economic losses in social life for farmers and commercial alike

How did the Egyptian government overcome the bad Socioeconomic impact of the HPAI

This was done through:

Introducing the concept of one health for poultry farmers in villages and farms BECOUSE The Economic circumstances of traditional poultry-keepers have implications for how households respond and recover from HPAI and its control…..BY

- Consolidating the idea that, the health of animals, people, plants, and the environment are interconnected
- Explained to them that health threats such as HPAI need to change their behavior in buying and dealing with poultry to prevent disease
- Important to inform veterinary authorities about any suspected poultry cases of HPAI disease for early detection and rapid response to reduce From the risk of bird flu entering and spreading in poultry farms and exposing humans to the virus

How did the Egyptian government overcome the bad Socioeconomic impact of the HPAI

The veterinary government with the help of partners has improved biosecurity measures on farms BY

- Nearly 15,000 veterinarians have been trained in many aspects of disease outbreak management; epidemiology and community communication methods; rapid response to reported cases; establishment or strengthening of national laboratories
- More than 100 vaccination staff and more than 1,000 poultry farmers were trained on the correct steps of biosecurity implementation.

How did the Egyptian government overcome the bad Socioeconomic impact of the HPAI

- **Also there are special activities targeted the producer in villages Included :**
- Methods of safe breeding and slaughter practices that reached farmers and other groups in more than 800 villages
- Increase awareness in health, agricultural, youth and religious centers, schools, and veterinary clinics have helped communities better understand the importance of these practices and have contributed to limiting the spread of avian influenza and its spread to humans. (Extension and CAHO teams).

How did the Egyptian government overcome the bad Socioeconomic impact of the HPAI

To refine and easily share these messages

- More than one documentary film on good breeding practices and biosecurity measures has been produced in collaboration with partners - at a very high cost
- In addition, thousands of illustrated guidance leaflets were printed and distributed to poultry farmers in villages and farms. These leaflets included all health procedures in raising poultry, safe slaughter, and safe disposal of dead birds.

How did the Egyptian government overcome the bad Socioeconomic impact of the HPAI

As a result of this activity

- the veterinary authority was able to detect early and quickly respond to many strains of the emerging or re-emerging avian influenza virus.
- This was reflected in the significantly lower incidence and spread of bird flu in poultry flocks
- The number of HPAI cases, which pose the greatest risk to humans, decreased from 40 (with 16 fatalities) in 2011 to one cases (with no fatalities) in 2018
- Now in 2021 → No human infection with the influenza virus has been detected since 2018.

"Efforts must therefore continue to be made in order to preserve the gains that have been made and ultimately eradicate bird flu in the country."

Nasr El-Din Hagelamine, FAO Representative in Egypt.

Challenges

- Hurdles for implementation of a proper control strategy are still present WITH
- Still need for rapid response capacity
- Weak public-private partnerships
- Low levels of biosecurity in some poultry production sectors.
  - *Complicated* poultry production value chain
  - *High human and poultry population densities*

Lessons learned

- Long-term sustainable investments in agriculture, health, and rural communities are needed.
- To overcome the critical HPAI situation in the short, medium, and long terms we need the sustained high-level commitment of frontline ministries and effective coordination between these ministries
- Long-term restructuring of the poultry sector should be considered. That will be reflected by high levels of biosecurity and minimization of the risk of transmission of pathogens through the market chain.

Lessons learned

- Opportunities will arise from the definition of disease-free compartments with the prospects of developing export markets.
- There is a great need for public sector-private sector partnerships to address emerging disease preparedness, response, and recovery efforts and to address disease control strategies including biosecurity, vaccination, and surveillance

Egypt now

- **Enhanced Laboratory diagnostic capacity for surveillance by the provision of equipment, essential consumables, and reagents**
- (1) skilled manpower for HPAI diagnosis available both centrally and at governorate satellite laboratories("Laboratory personnel received various trainings (in-country and abroad)
- (2) time of confirmatory diagnosis reduced from several days to less than six hours
- (3) Five satellite laboratories in different governorates were established and supported to accredited according to international ISO 17025 following international protocols.
- (4)Effective laboratory networking established: Laboratory data and genetic material shared on time with all relevant national and international partners, published on GENE BANK.
- (5)Approximately 134,935 units (farm, village, LBM….etc.) from 2006 to October 2021 have been tested under active, passive, targeted surveillance activities, as well as for vaccine evaluation studies.
- (6)Research has been considerably enhanced and information/knowledge sharing

Egypt now

- The "Four-way Linking Taskforce" was established and operationalized. It involves key "One Health" stakeholders from animal (MOALR) and public health (MOHP)work with each other for monitoring the virus evolution.
- Increase Capacity for risk analysis and early warning systems developed
- Establishment and operationalization of district-level epidemiological networks in all Egyptian governorates for Early detection to face the dangers of newly emerging outbreaks,(Offices refurbished equipped and series of tailor-made hands-on training provided)
- Computerized TAD-info database management system customized and instituted,that receives reports registered in 1650 veterinary units
- Different risk-based surveillance study(and tools designed and their implementation supported

Egypt now

- Establishing and operationalizing the Community Animal Health Outreach (CAHO) programmeme in 250 district
- Strict implementation of control measures by poultry producers and maintain biosecurity practices to prevent virus introduction in their flock to reduce the risk of zoonotic transmission .
- Develop biosecurity guidelines and standards, and provide training to rapid response teams, field veterinarians, and commercial poultry producers on biosecurity procedures.
- Surveillance measures in poultry of LBMs, backyard, poultry farms, and wild birds according to OIE standards as well as in humans according to WHO.
- Vaccination strategies as emergency vaccination during outbreaks or as a routine measure in endemic area.
- Frequent & rigorous evaluation of the potency of locally prepared poultry vaccines with H5N1 Egyptian strains against local circulating field viruses annually.

Egypt now

- New slaughter houses established with changing the consumer preferences and this consider areal challenges. it depends on change the consumer's mentality and development of a marketing system to receive birds, prepare and sell them to the consumer at reasonable prices.
- Encourage poultry producers to immediately report any case of positive avian influenza, and encourage them to do so by offering compensation.
- Continuous public awareness programs about virus infection, particularly in heavily infected and rural areas taking account the backyard owners sector and their societal and economical needs.
- Ministry of Agriculture and General organization for veterinary services also launched a hotline to receive citizens complaints about avian influenza outbreaks on number 19561.

Egypt now

- Before 2006, Egypt exported poultry to more than 11 African and Asian countries, broiler chicks and mothers, as well as table eggs and hatcheries, before the important industry experienced a severe blow in the year 2006, after the outbreak of bird flu,

Now

- after 14 years, the poultry industry recovered and achieved self-sufficiency in protein.
- The World Organization for Animal Health (OIE) officially announced that Egypt is among the countries that adopt the system of compartmentalization free of bird flu, to allow these companies through this system the opportunity to export again of poultry (chicks of the day-old - table eggs - hatching eggs - Broiler broilers - frozen).
- after a 14-year ban ... The "OIE" approves **30** compartmentalization free from HPAI (14)at june 2020 and (16) compartmentalization at April 2021
- Lastly NLQP was endorsed by OIE as a **reference** lab.

The only guarantee for success

THANK YOU