FAO’s role in global HPAI control

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Food and Agriculture Organization (FAO) of the United Nations
Rome
Italy
Overview

• What is FAO?
• How livestock and diseases fit into FAO’s agenda?
• FAO’s role in HPAI since 2003/2004
  – lessons learnt and ‘not learned’
• West Africa – the ongoing crisis
• Increasing global importance of AI viruses?
  – Future directions
What is FAO?

1. Food and Agriculture Organization


1. A multi-disciplinary organization involving a range of sectors and stakeholders
FAO’s priorities

1. FOOD AND NUTRITION SECURITY

2. PRODUCTIVE AND SUSTAINABLE AGRICULTURE

1. RURAL POVERTY REDUCTION

1. AGRICULTURAL AND FOOD SYSTEMS INCLUSIVE AND EFFICIENT

2. RESILIENCE OF LIVELIHOODS FROM DISASTERS
Livestock sector

- It accounts for 40% of agriculture GDP (USA 59%; Finland 66%; Sudan and NZ 83%)

- Provides 30% of humanity’s protein intake and 15% of energy intake

- Employs 1.3 billion people and creates livelihoods for 1 billion of the world’s poorest

70% of the world’s livestock (18.5 billion head) are in developing countries and the share is growing.

One billion people earning <$2 a day depend on livestock:
- 600 million in South Asia
- 300 million in sub-Saharan Africa

FAO

Density of poor livestock

ILRI, 2012
<table>
<thead>
<tr>
<th>Rank</th>
<th>Commodity</th>
<th>Production value ($ billion)</th>
<th>Total value ($ billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cow milk, whole, fresh</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Indigenous Cattle Meat</td>
<td>172</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Indigenous Pig meat</td>
<td>168</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Indigenous Chicken Meat</td>
<td>122</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Rice, paddy</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Wheat</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Soybeans</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Tomatoes</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Sugar Cane</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Maize</td>
<td>54</td>
<td></td>
</tr>
</tbody>
</table>

Source: FAOSTAT
Consumption of livestock products is growing rapidly...

Per caput consumption of major food items in developing countries – kg per caput per year (index numbers 1961=100)

Source: FAO-SOFA 2009
Where is the demand (2000 - 2030)

Poultry Meat

<table>
<thead>
<tr>
<th>Region</th>
<th>Demand Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA</td>
<td>700%</td>
</tr>
<tr>
<td>SSA</td>
<td>170%</td>
</tr>
<tr>
<td>China</td>
<td>100%</td>
</tr>
</tbody>
</table>

Egg

<table>
<thead>
<tr>
<th>Region</th>
<th>Demand Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA</td>
<td>130%</td>
</tr>
<tr>
<td>SSA</td>
<td>100%</td>
</tr>
<tr>
<td>China</td>
<td>140%</td>
</tr>
</tbody>
</table>

Dairy

Source: Robinson and Pozzi (2011)
Meat markets: business opportunities

**Absolute increase in consumption, mio tons**

- **Dev.ed**: 16.8 (2005-07 to 2030), 6.6 (2030 to 2050)
- **Africa**: 10.3 (2005-07 to 2030), 14.0 (2030 to 2050)
- **Near East**: 7.0 (2005-07 to 2030), 6.1 (2030 to 2050)
- **Latin America**: 17.1 (2005-07 to 2030), 9.7 (2030 to 2050)
- **S Asia**: 12.8 (2005-07 to 2030), 20.9 (2030 to 2050)
- **ES Asia**: 50.8 (2005-07 to 2030), 22.9 (2030 to 2050)

**Annual growth rate 2005/07 to 2050**

- **Dev.ed**: 0.4%
- **Africa**: 2.8%
- **Near East**: 2.4%
- **Latin America**: 1.3%
- **S Asia**: 4.1%
- **ES Asia**: 1.4%
Challenges of high impact rEID

• In Asia:
  – FMD, AI, CSF
  – PPR
  – PRRS, ASF

• In Africa
  – FMD, PPR, ASF, AI
  – RVF, CBPP, CCPP
  – TBD (ECF), Tryps

Significant impacts:

• Food and nutrition security
• Food safety
• Public health
• Livelihoods and poverty
• Economic impacts

(All these diseases identified for regional control and for some global control)
2004 – Into SEA

Source: EMPRES-i
2005: Out of Asia & human cases

Source: EMPRES-i
2006: into Europe and Africa

Source: EMPRES-i
2007-2008: into South Asia

Source: EMPRES-i
Unprecedented global response

- Potential for a global HPAI crisis with impacts on poultry production and trade, economic losses, food security, and livelihoods
- Increasing human deaths and food safety issues
- Potential for emergence of pandemic influenza
Key international conferences

• International Ministerial Conferences on Avian and Pandemic Influenza (IMCAPIs)
  – Beijing, New Delhi, Sharm-el-Sheikh, Hanoi
  – International agencies WHO, FAO, OIE, UNICEF, UNSIC
  – Multi-lateral development partners (WB, ADB, EU)
  – Bilateral development partners
  – Mobilisation of financial resources
Why FAO?

- FAO identified a lead UN technical agency to support implementation of HPAI control recognizing:
  - Predominantly an animal disease
  - Significant presence in member states
  - Experience in implementation of field programmes
    - E.g. rinderpest eradication programme
  - Recognized role in coordination and convener of partners
• ECTAD-RAP established in December 2005 in FAORAP, Bangkok

• Sub-regional ECTAD in September 2007 in FAOR – Kathmandu, Nepal

• 11 countries in Asia
  – 9 countries in 2012

• Focus on HPAI
FAO-OIE: vision for HPAI control

- Progressive elimination, reduce the threat for public health
- Securing national, regional and global markets and trade
- Protecting livelihoods of poor farmers and conservation of biodiversity

- Preventing incursion in uninfected countries
- Stamping out new incursions
- Eradicating H5N1 HPAI in newly infected countries
Several levels of interventions

- Nationally early detection, reporting and response
  - Surveillance, outbreak investigation, laboratory capacity

- Regional Networks
  - Diagnostic laboratory networks
  - Surveillance networks

- Training and capacity building
  - Policy, legislation, communication, partnerships
## Evolution of ‘platforms’ for HPAI and TADs

<table>
<thead>
<tr>
<th>Platform</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPRES (Emergency Prevention System)</td>
<td>1990s</td>
</tr>
<tr>
<td>GF-TADs (Global Foot-and-Mouth Disease Technical Advisory Group)</td>
<td>2003/4</td>
</tr>
<tr>
<td>GLEWS (Global Livestock Emergency Warning System)</td>
<td>2004</td>
</tr>
<tr>
<td>ECTAD (Emergency Committee for Transboundary Animal Diseases)</td>
<td>2004</td>
</tr>
<tr>
<td>ECTAD-RAP (Emergency Committee for Transboundary Animal Diseases - Rapid Assessment Procedure)</td>
<td>2005</td>
</tr>
<tr>
<td>CMC-AH (Crisis Management Centre - Animal Health)</td>
<td>2007</td>
</tr>
<tr>
<td>OIE/FAO (Organisation de l'Union Vétérinaire Internationale/Food and Agriculture Organization of the United Nations)</td>
<td>2008</td>
</tr>
</tbody>
</table>
H5N1 HPAI – what has been achieved

• Most of the the 60 ++ countries infected with H5N1 since 2003 are now free of the disease

• Control and/or eradication measures have been largely effective in most countries

• Significant improvement of technical capacity present in most of the countries
  – Manpower, lab skills, surveillance, reporting, culling, information sharing

• However H5N1 HPAI is still present in several countries in Asia and Egypt
2009 to 2015: HPAI entrenched

Source: EMPRES-i
From emergency to long-term

- Generic capacity strengthening
- Continue to mitigate risks
  - Improved biosecurity along the value chains
  - Supporting vaccination as a tool to reduce economic impacts and reduce risk of human infection
- Field research to better understand
  - Farming systems, value chains
  - Infection and transmission dynamics
  - Socio-economic drivers of disease endemicity
Lessons learned (Asia)

- Policy
- Coordination
- Surveillance
- Epidemiology
- Laboratory capacity
- Biosecurity
- Socio-economics
- Communication

Also about

- Vaccination
- Wildlife

with

- References

- Situation in 2005
- Situation in 2011
- Outputs & Outcomes
- Successful practices
- Lessons learned
- Sustainability
- The future
HPAI spreads mostly through the actions of PEOPLE

BIOSECURITY is a priority

Good farm management practices
Key insights

• Why is disease ‘entrenched’ in some countries
  – Disease and socio-economics are intimately linked
  – Poorer countries are less able to deal with disease incursions
  – Economically advanced countries stamp out repeated incursions (Japan, RoK, Malaysia and Thailand)
  – A range of farming systems, VCs co-exist
Key insights


Production

Processing

Retail
Key insights:

• Infection and transmission dynamics
  – Wild birds as primary source, significant secondary transmission from farm to farm
  – Complex and dynamic in-country cross border chains
    • H5N1, H5N6 are exchanged by cross-border trade in poultry and poultry products
  – High density of poultry and mixed spp
  – LBM are a major sink of viruses
  – Management of LBM is a constraint – economic issues
Key insights:

- Risk mitigation efforts
  - Vaccination as a tool
    - Economic decision (Bangladesh, Nepal)
    - Public health concerns and economic decision (Viet Nam, Indonesia, China)
  - Significant challenge in delivery in small-holder sector
  - Fatigue in delivery, breakdowns
  - Often used to replace good farm management practices
  - Post-vaccination monitoring essential but expensive
Key insights:

• Varied epi in different countries
  – No one magic bullet

• Surveillance
  – Grass roots capacity – CAHWs
  – PDSR although ‘R’ is a bit difficult
  – Under-reporting
Key insights:

• National vet services require support
  – Competing priorities
  – poverty and economic development which are beyond line ministries
  – Conflicts, natural disasters, etc

• Communication and advocacy
  – Awareness of HPAI is high but perception risk is low
  – Socio-economic, and public health impacts need to be defined for political support

• Policy and regulations
  – Still difficulties in implementation
Some insights and challenges

- **Livestock revolution**
  - Population growth, demand for meat, urbanization,
  - Rapid intensification
  - Poor biosecurity
  - Movement of animals (Asia is highly linked)

**Global Population: 1950-2015**

<table>
<thead>
<tr>
<th>Total</th>
<th>Less developed nations</th>
<th>More developed nations</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td></td>
<td></td>
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<tr>
<td>4</td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>2</td>
<td></td>
<td></td>
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<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: US Bureau of the Census

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USDA  United Egg Producers  NATIONAL Turkey Federation  USA Poultry & Egg Export Council

USPOULTRY  NATIONAL CHICKEN COUNCIL
Some insights and challenges

• Regional Coordination and collaboration key to addressing transboundary issues
  – Regional networks, surveillance, diagnosis
  – Collaboration with a broad range of sectors
    • 4-way linking

• International problem
  – Regional and international public good
  – Significant financial support
H5N1 HPAI in West Africa

Key FAO actions (EMPRES/CMC-AH/ECTAD):

- EMPRES/CMC-AH, ECTAD missions to Nigeria, Burkina Faso, Togo, Benin, Cameroon, Mali and Côte D’ivore, Ghana
- A regional emergency consultation (15-16 June (Abuja, Nigeria), ECOWAS, OIE, AU IBAR, etc
- GEMP training in Benin
- Resource mobilization (FAO, USAID, WB)
Brief analysis of countries affected

- Nigeria: 448 outbreaks - 18/36 (States)
- Burkina Faso: 26 outbreaks - 9/13 (Regions)
- Ghana: 9 outbreaks - 2/10 (Regions)
- Niger: 1 outbreak - 1/8 (Regions)
- Côte d’Ivoire: 1 outbreak - 1/14 (Regions)
- No human infection reported

Countries highlighted in yellow are the ones where FAO had conducted a field mission.
Weekly outbreaks H5N1 HPAI:
Dec 2014 – June 2015
Spatial distribution of the two epidemics
What is the role of wild birds in entry?

• Paucity of information but role cannot be ignored:
• Nigeria is a critical wintering area for long-distance migratory birds between Europe - Africa along the western Siberian-Mediterranean-West Africa flyway
What is the role of wild birds?

Large number of lakes in West Africa including Nigeria: first outbreaks in Nigeria in an area with a high density of lakes

Nigeria virus strain belongs to Clade 2.3.2.1c and similar to:
- H5 viruses collected in China in 2013
- H5N1 virus (A/Alberta/01/2014) from a Canada resident returning from China
- Viruses isolated from Wild birds and poultry in Bulgaria and Romania in early 2015

Source: Liang et al. 2010
Poultry Imports into Nigeria

Chicken

Ducks

Duck meat
Nigeria: Internal movements

Guinea fowl trade

Day old chicks
Agro-ecological niches and H5N1 outbreaks
Map of 10 agro-ecological niches

<table>
<thead>
<tr>
<th>Niche #</th>
<th>Backyard density</th>
<th>Commercial density</th>
<th>Duck density</th>
<th>GDP Per cap.</th>
<th>Human Pop density</th>
<th>Distance to wetlands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>high</td>
<td>highest</td>
<td>highest</td>
<td>medium</td>
<td>highest</td>
<td>medium/high</td>
</tr>
<tr>
<td>Yellow</td>
<td>highest</td>
<td>low</td>
<td>medium</td>
<td>highest</td>
<td>low</td>
<td>high</td>
</tr>
<tr>
<td>Blue</td>
<td>low</td>
<td>low</td>
<td>low</td>
<td>low</td>
<td>medium/high</td>
<td>medium/low</td>
</tr>
<tr>
<td>Green</td>
<td>low</td>
<td>medium</td>
<td>low</td>
<td>high</td>
<td>low</td>
<td>medium/high</td>
</tr>
</tbody>
</table>
Legend
- H5N1_dec2014_Jan2015

Box plots for Backyard, Commercial, Duck, Human population, and Proximity to wetlands.
Comparison with 2006

- January 2006
- February 2006
- March 2006
- April 2006
- May 2006
- June 2006
- July 2006

- December 2014
- January 2015
- February 2015
- March 2015
- April 2015
- May 2015
- June 2015

2006

2015

2015 (poultry density)
Major drivers?

- Poultry sector sector rapid growth

Chicken Production in West Africa 2005 - 2013

Chickens measured in 1000 Head

250000
200000
150000
100000
50000
0

2005 2006 2007 2008 2009 2010 2011 2012 2013

Nigeria
Ghana
Cote D'Ivoire
Burkina Faso
Niger
At stake

- Increase in poultry consumption in the region following Ebola epidemic and ban of bush-meat
- Poultry industry is a crucial economic component (e.g. 240 billion CFCA (US$ 0.5 billion) in Côte d’Ivoire = 1% GDP 2013)
- Poultry farming plays an important role in social structure
- Livelihoods in rural areas
Challenges

- Poultry value chain
- Weak veterinary services
- Surveillance
- Laboratory
- Communication
- Contingency plans
- Political buy-in and PPP
<table>
<thead>
<tr>
<th>Sub-type</th>
<th>Species affected</th>
<th>Comments</th>
</tr>
</thead>
</table>
| **H5N1** (2003) « Classic bird flu » | The ‘classic bird flu’, a highly pathogenic AI virus that can occasionally infect humans | -In late 2014/early 2015 rapid spread over long distances, affecting countries in 4 continents  
-Endemic in: Egypt, Indonesia, Viet Nam, Bangladesh, Cambodia, China  
-Huge losses for the poultry industry |
| **H5N8** (2014) | A newly emerged highly pathogenic AI virus, behaving similar to H5N1, a competitor to H5N1 | -Recently spread from the Far East to Western Europe  
-No human cases reported so far |
| **H5N6** (2014) | Another newly emerged highly pathogenic AI virus in Southeast Asia | -Spread rapidly from China to Lao PDR and Viet Nam  
-3 human cases reported so far, all in China |
| **H7N9** (2013) | A low pathogenic AI virus in China that causes disease and mortalities in humans | -Only in China  
-Most human cases exposed in live bird markets |
| **H9N2** | A widespread low pathogenic AI virus that sporadically infects humans | -Immunosuppressive in poultry  
-Acts as an internal gene donor for other viruses (H7N9, H5N1, H5N8...) |
Fight at the source
- Lower prevalence
- Lower risk of virus spreading outside
- Lower risk of new reassortments

Fight at the sink
- Make environment less conducive for the virus
- Increase preparedness
- Increase resilience
• Value ‘web’ vs. value ‘chain’
• All hazards vs. single hazard RA
• GMP vs. biosecurity
• Economic progress through farming
• Broader stakeholder engagement vs. medical professions only
• Global problem and global intitiatives
• Foresight vs. hindsight
Key partners

- USA (USAID and the strong multiyear partnership
- USDA – regular collaboration (exchange of experts, CMC-AH)
- FAO Reference Centres
  - Plum Island
  - NVSL/Ames
  - CEAH/Fort Collins
- The IPC (International Poultry Council) for their collaboration and support
- A range of bilateral and multi-lateral donors
Partners

• Governments

• Regional Organizations
  – ASEAN, SAARC, AU/IBAR, ECOWAS

• International agencies
  – OIE, WHO, UNICEF, UNSIC

• Multi-lateral and bilateral donor Agencies
  – USAID, USDA, Japan, Germany, Netherlands, Sweden, Canada, Australia, New Zealand, China,
  – ADB, EC, WB