FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
for a world without hunger

Working in the United Nations – A veterinary epidemiologist's perspective

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FAO GLEWS, Animal health service
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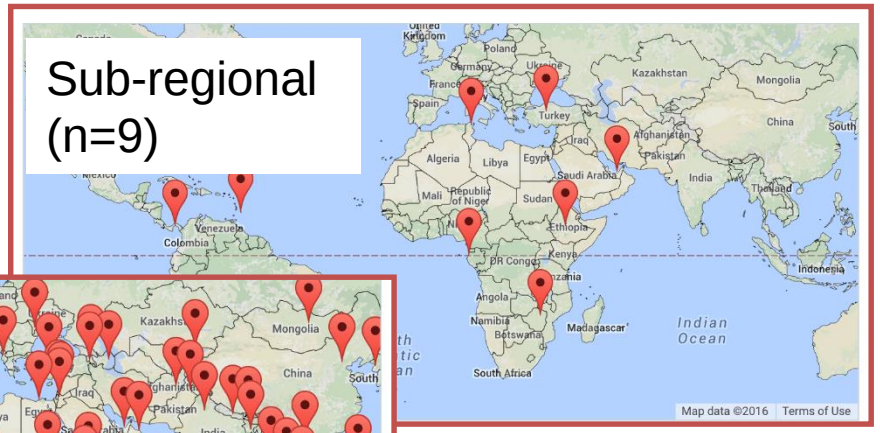
Outline

- What is the FAO?
  - Structure
  - Departments
  - Main goals
  - Activity areas

- FAO and animal health
  - Main issues addressed
  - Main progammes at HQ and decentralized offices
  - GLEWS
- Opportunities

Food and Agriculture Organization(FAO) of the United Nations (UN)

- Agency founded in 1943 – 194 members globally
- Structure:
  - HQ – Rome, Italy
  - Decentralized Offices:



Food and Agriculture Organization(FAO) of the United Nations (UN)

- Departments:
  - **Agriculture and Consumer Protection**
  - Economic and Social Development
  - Fisheries and Aquaculture
  - Forestry
  - Corporate Services
  - Technical Cooperation and Programme Management

- Staffing:
  - 1738 professional staff
  - 1510 support staff
  - ~ 3000 others (consultants, etc.)

More information: http://www.fao.org/about/who-we-are/worldwide-offices/en/

Food and Agriculture Organization(FAO) of the United Nations (UN)

- Main Goals:
  - the eradication of hunger, food insecurity and malnutrition;
  - the elimination of poverty and the driving forward of economic and social progress for all;
  - and, the sustainable management and utilization of natural resources, including land, water, air, climate and genetic resources for the benefit of present and future generations.

Food and Agriculture Organization(FAO) of the United Nations (UN)

- Five activity areas:
  - Putting information within reach and supporting the transition to sustainable agriculture (data collection, analyses and dissemination)
  - Bolstering public-private collaboration to improve smallholder agriculture- (collaborations with Universities, research organizations, NGO's, etc)
  - Bringing knowledge to the field (Operational research).
  - Supporting countries prevent and mitigate risks (Capacity building, training workshops, meetings, guidance documents, etc).

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FAO and Animal Health

- Main issues addressed:
  - Zoonotic diseases (Anthrax, Mers-Cov, ebola, etc)
  - Transboundary animal diseases (FMD, PPR, Avian Influenza, etc)
  - Insect-borne diseases
  - Diseases of production and hygiene
  - Veterinary public health (Rabies, etc)
  - One Health
  - Food safety
  - Strengthening of veterinary systems
  - Antimicrobial resistance

Animal Health Service (AGAH)

- Main programmes/Units at FAO HQ:
  - FAO Emergency Prevention System (EMPRES)
  - Global Early Warning System for Major Animal Diseases including Zoonoses (GLEWS)
  - The Crisis Management Centre for Animal Health (CMC) is FAO's rapid response unit which works alongside governments to prevent or limit the spread of high-impact animal diseases.
  - Veterinary Public Health and Food safety
  - EUFMD :The European Commission for the Control of Foot-and-Mouth disease (EuFMD)

Animal Health Service (AGAH)

- Main operational frame at field level – technical assistance to countries
  - Emergency Centre for Transboundary Animal Disease Operations (ECTAD):
    - A combined effort of FAO's Animal Production and Health (AGA) and Emergency Operations and Rehabilitation (TCE) Divisions; under the operational responsibility of the CVO-FAO
    - Unites technical expertise and operational capacity within a holistic approach to animal health
    - Operating since 2004, responding to transboundary animal health crises
    - Plan, strengthen and streamline veterinary assistance to FAO member countries and regions, in association with Sister International Organizations and Donors

FAO Emergency Prevention System (EMPRES)

- A priority programme within the Animal Health Service of FAO that was initiated in 1994:
- Key elements: early warning, early detection, early reaction, research, coordination and communication
- Assists member countries in the effective containment and control of the most serious epidemic livestock diseases and TADs as well as newly emerging diseases through mid- to long term projects
- Promotes progressive control or elimination of TADs on a regional and global basis
- Enhancing international cooperation

Website: http://www.fao.org/ag/againfo/programmes/en/empres/home.asp

Constraints

- Weakness of communication / information sharing
- TADs with pandemic potential
- Insufficient preparedness and inappropriate response to disease epidemics

The Global Early Warning System for Major Animal Diseases including Zoonoses (GLEWS)

- A joint FAO, OIE and WHO initiative which combines the strengths of the three organizations to achieve common objectives.
- An early warning system that formally brings together human and veterinary public health systems
  - to **share** zoonotic disease outbreak **information**
  - to **share** epidemiological and risk **analysis**
  - to **deliver** early warning **messages** to the international community on areas at risk of TAD and zoonosis.
- Underpinned by a series of Regional/National networks:
  - UN Member states (OIE,FAO,WHO); Reference Laboratories
  - Unofficial surveillance programs (PROMED,GPHIN) ; others

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Objectives of GLEWS

- Identify unusual disease events in time and space
- Identify factors (if any) that may be involved
  - Monitor global disease and drivers situation
- Conduct risk assessment to determine:
  - Severity; geographic distribution of events; possibility of spread
  - What actions (if any) to be taken
    - Alert messages, official missions to provide assistance etc..
- Provide overview of disease situation (global and regional)
  - Daily, weekly, monthly, quarterly and annually

Objectives of GLEWS (Con't)

- Share information with countries and partners
- Capacity building:
  - Strengthening outbreak investigations and reporting
  - Surveillance
  - Information systems development
  - Risk assessment and data analyses
  - Guidance development

GLEWS priority diseases

New World Screwworm	Nipah
Old World Screwworm	Peste des Petits Ruminants
Q Fever*	Rabies*
Rift Valley Fever*	Rinderpest - Stomatitis/Enteritis
Sheep Pox/Goat Pox	Tularemia*
Venezuelan Equine Encephalomyelitis*	West Nile Virus*
African Swine Fever	Anthrax*
Bovine Spongiform Encephalopathy*	Brucellosis*
Classical Swine Fever	Foot and Mouth Disease
Contagious Bovine Pleuropneumonia	Crimean Congo Hemorrhagic Fever
Ebola Virus* Food borne diseases*	Highly Pathogenic Avian Influenza
Japanese Encephalitis*	Marburg Hemorrhagic Fever*

* Zoonotic disease

FAO GLEWS Team

- Coordinator
- Disease intelligence officer
- Data entry officer
- IT officer
- Veterinary Epidemiologists
- Disease ecologist

  - Volunteers and interns
    - Universities (US, Europe, Asia, Americas)

Data sources for GLEWS

- Disease events data:
  - EMPRES-i – Information system of the FAO
  - FAO country offices/projects (PDSR, SMS gateway) - ECTAD
  - Reference Laboratories (FMD – Pirbright in the UK, etc)
  - OIE/WHO – Official and unofficial reporting systems
  - Non-official sources – media (Promed, GPHN, media, etc)

Data sources for GLEWS

- Risk factor data:
  - FAO Statistics (FAOSTAT):
    - Livestock and human population numbers
    - Global livestock trade matrices
    - Human population numbers
    - Poverty indicators
  - Geonetwork :
    - Spatial layers of population density
  - FAO GIEWS
    - data on prices of livestock and products within and between countries
  - Climate agencies (International Research Institute for Climate and Society):
    - International Research Institute for Climate and Society
    - NASA

EMPRES-i -

- A Global animal disease information system:

– Released in 2003 – response to emergence of H5N1 HPAI in Asia

– Source of data for FAO priority diseases

– Web-based and password protected

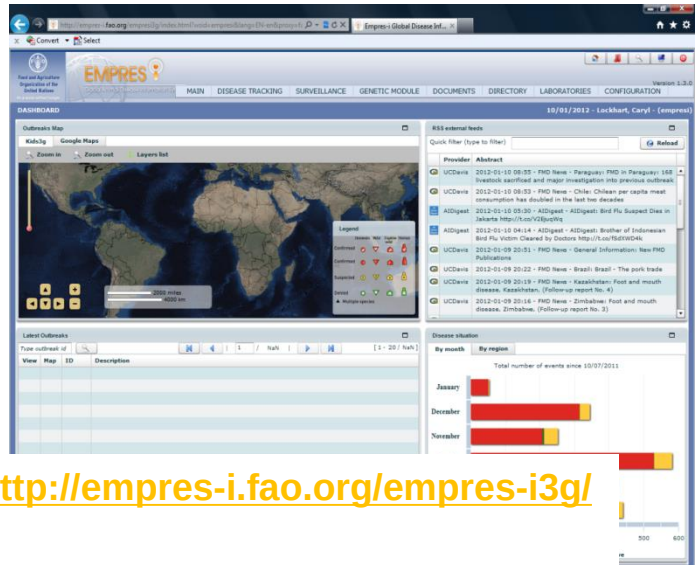
– Access granted to FAO officers, epidemiologists, researchers, modeling experts and, decision makers;

– Linked to other databases
  - Animal population density layers
  - Other environmental layers (Geonetwork/FAO)
  - Genetic information (Openflu database)

Public website

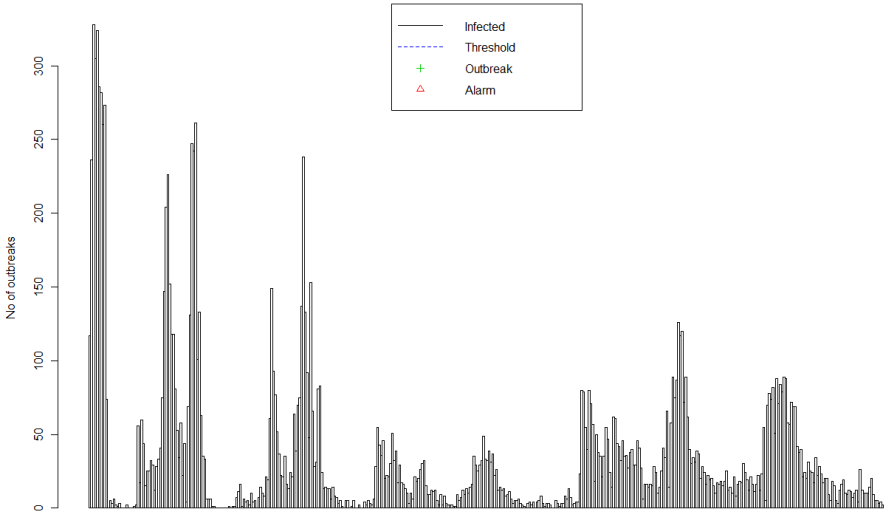
http://empres-i.fao.org

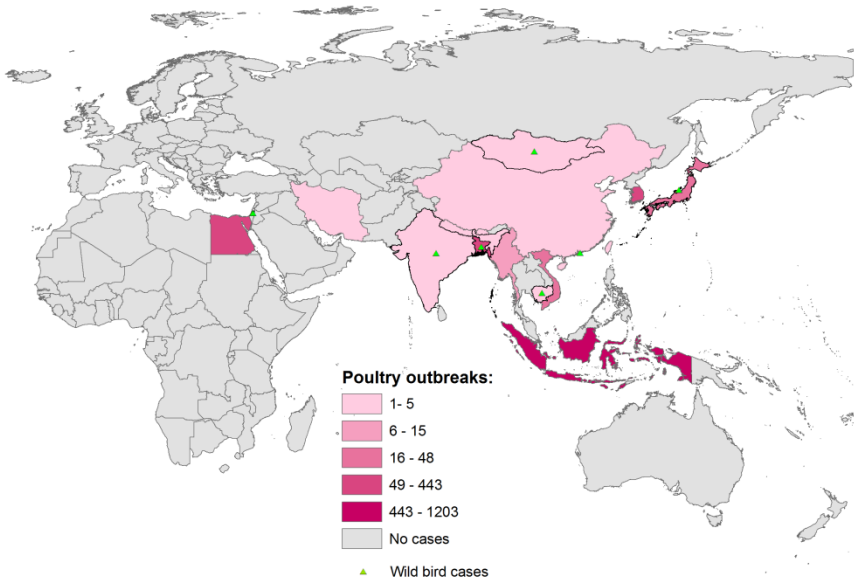
Internal website

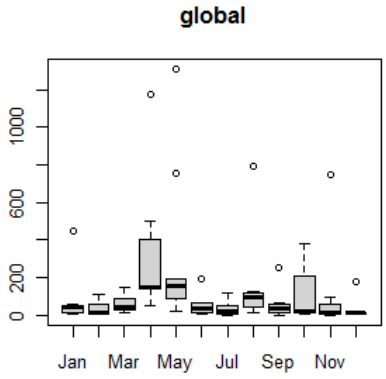


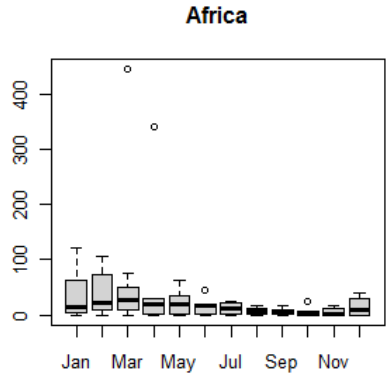
http://empres-i.fao.org/empres-i3g/

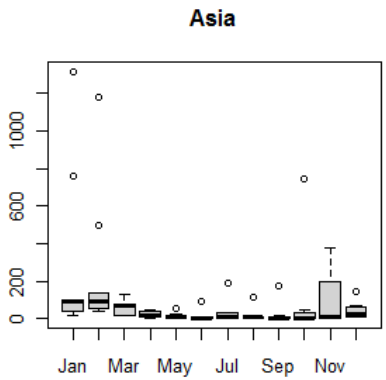
Descriptive analyses – Global disease situation

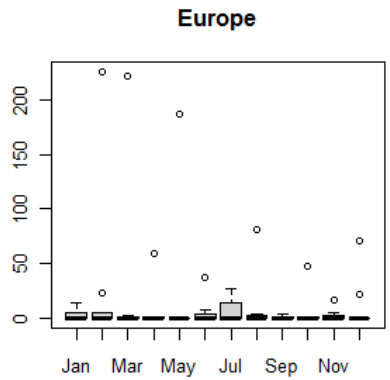










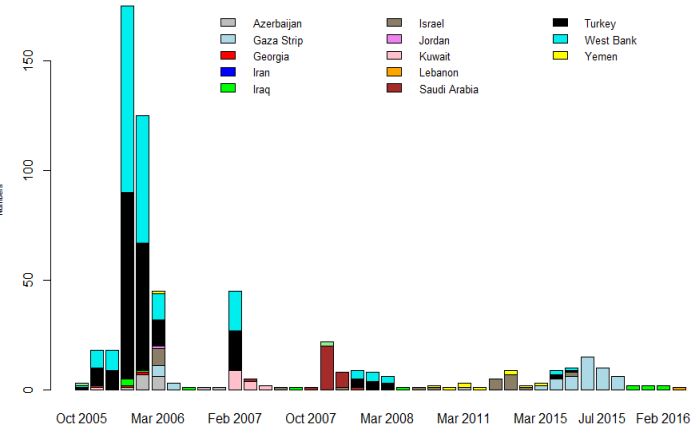


H5N1 HPAI (2005 - 2012)

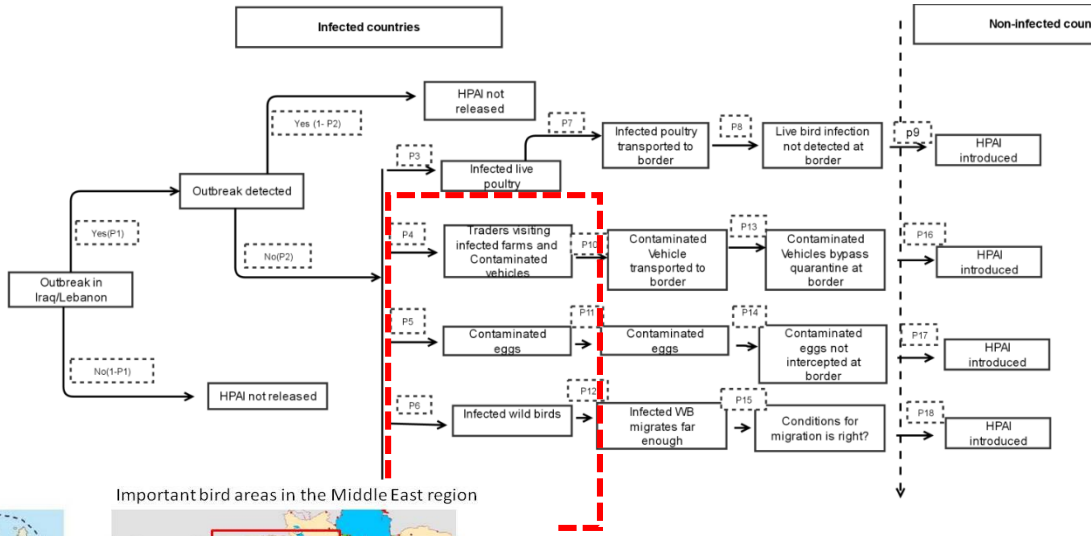
Risk assessment – identification of countries at risk of spread

Hazard HPAI H5N1 - spread in the Middle East – following reports of outbreaks in Lebanon and Iraq this year:

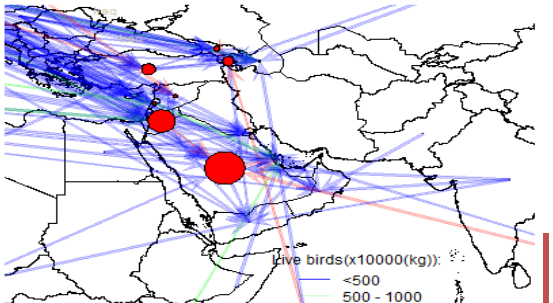
HPAI H5N1 outbreaks in the middle east (2006 – 2016)



Scenario tree of pathways for introduction of HPAI from currently infected countries to uninfected countries in the Middle east.

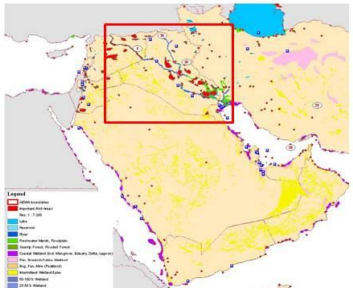


Trade



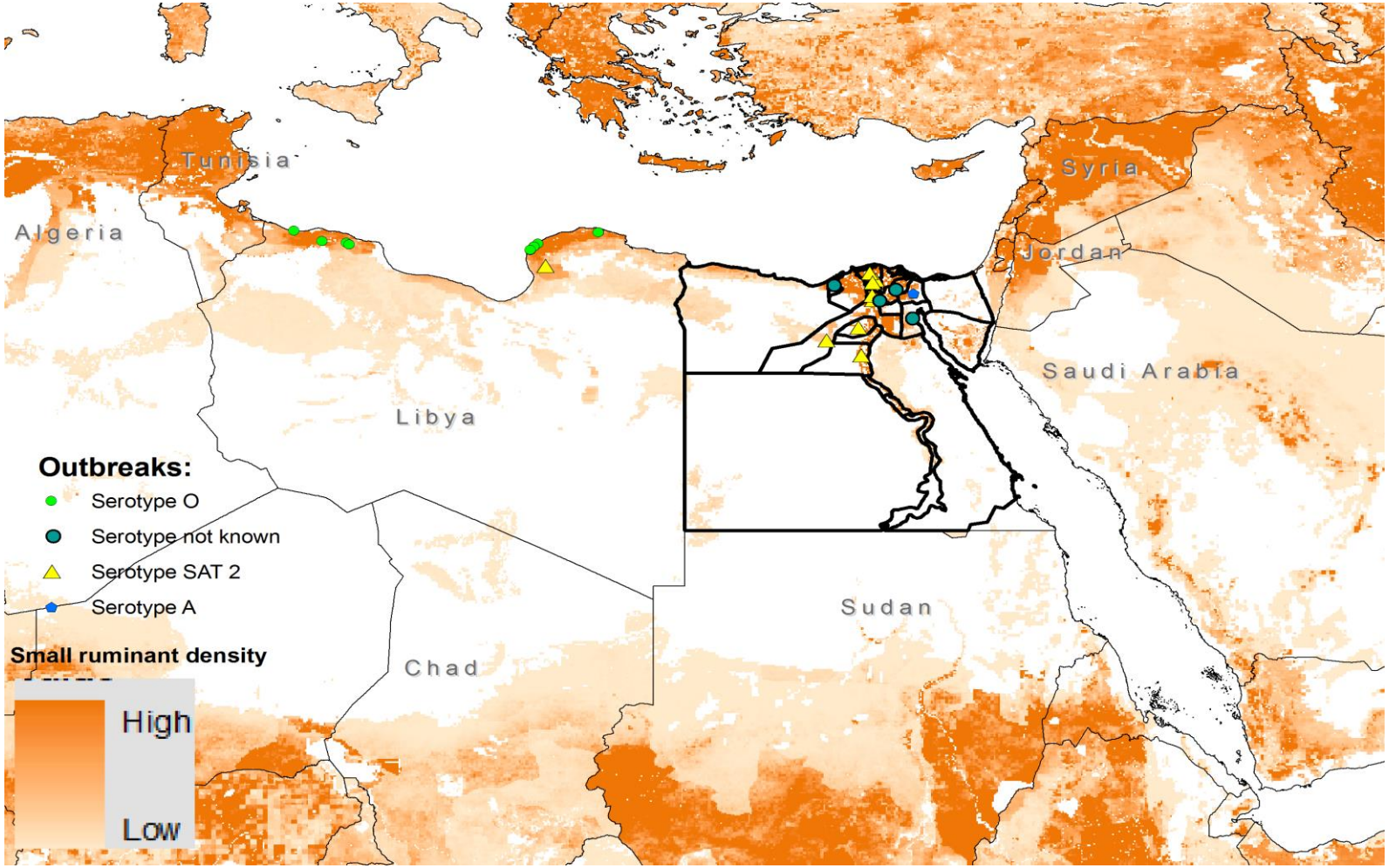
Main flyways

Important bird areas in the Middle East region



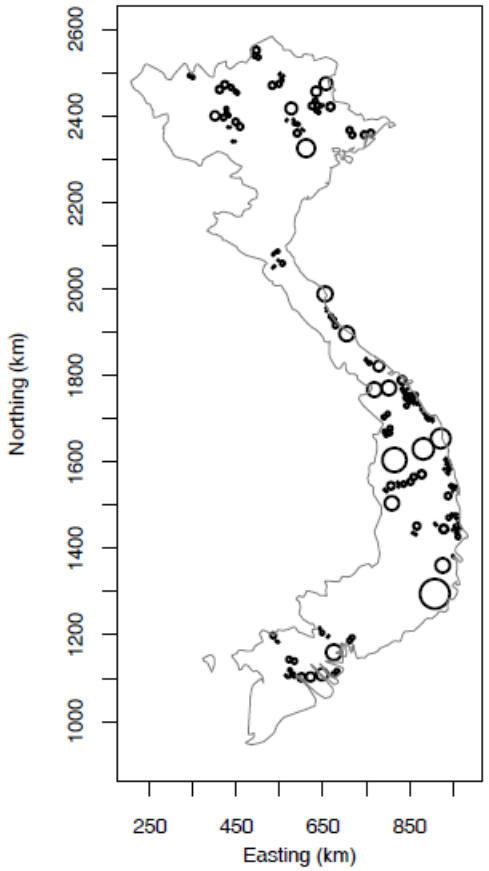
Risk assessment – identification of risk factors

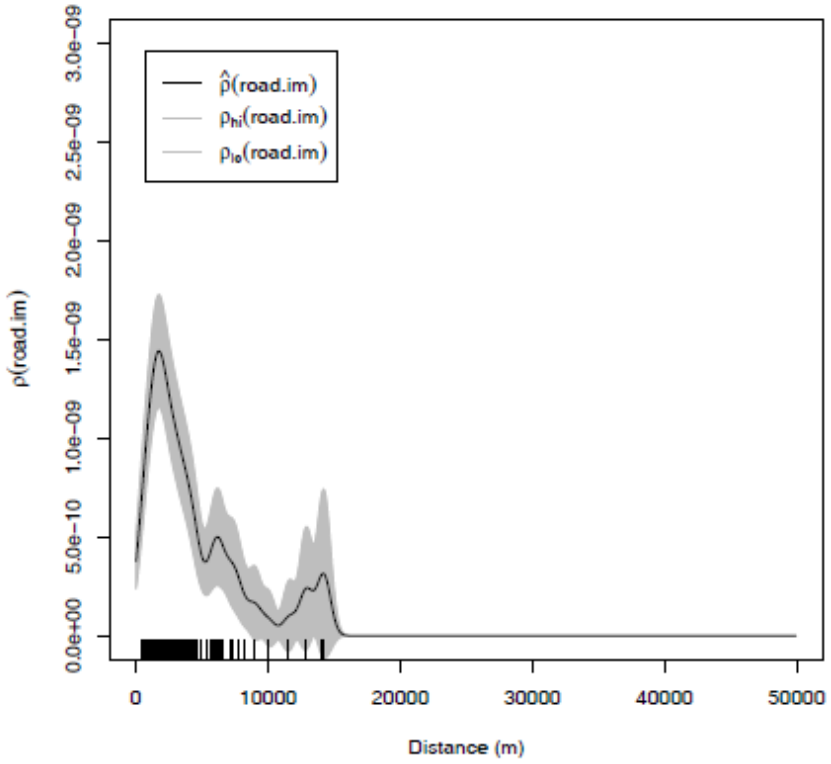
FMD serotype SAT2 in Egypt – (Emergence of SAT 2)



Risk assessment: Identification of risk factors

FMD in Viet Nam

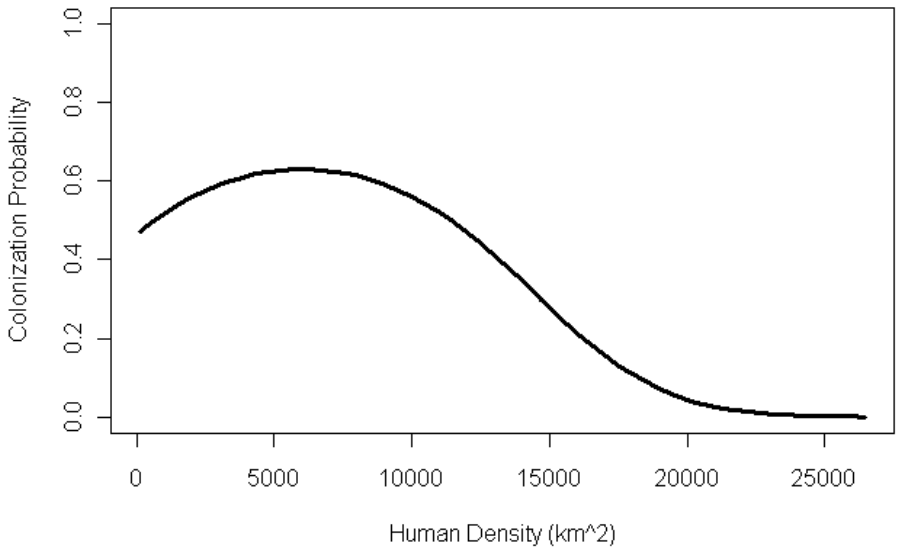


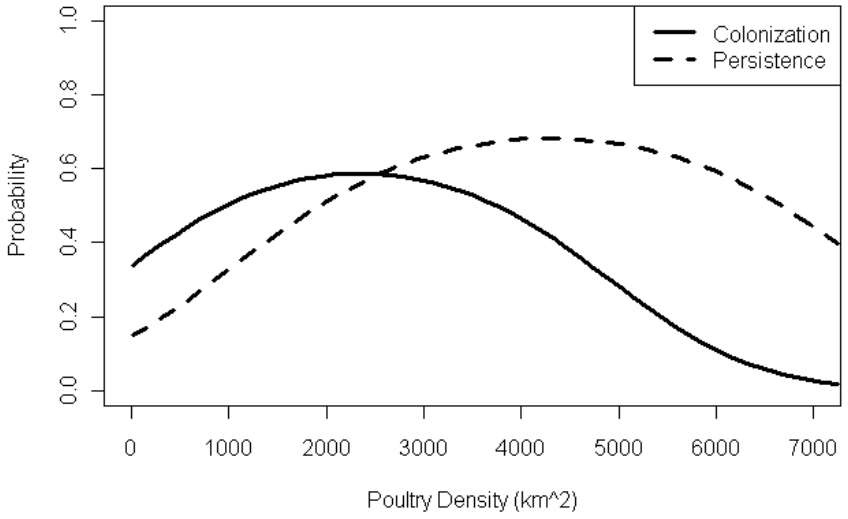


(b) Distance to nearest main road

Risk assessment: Identification of risk factors

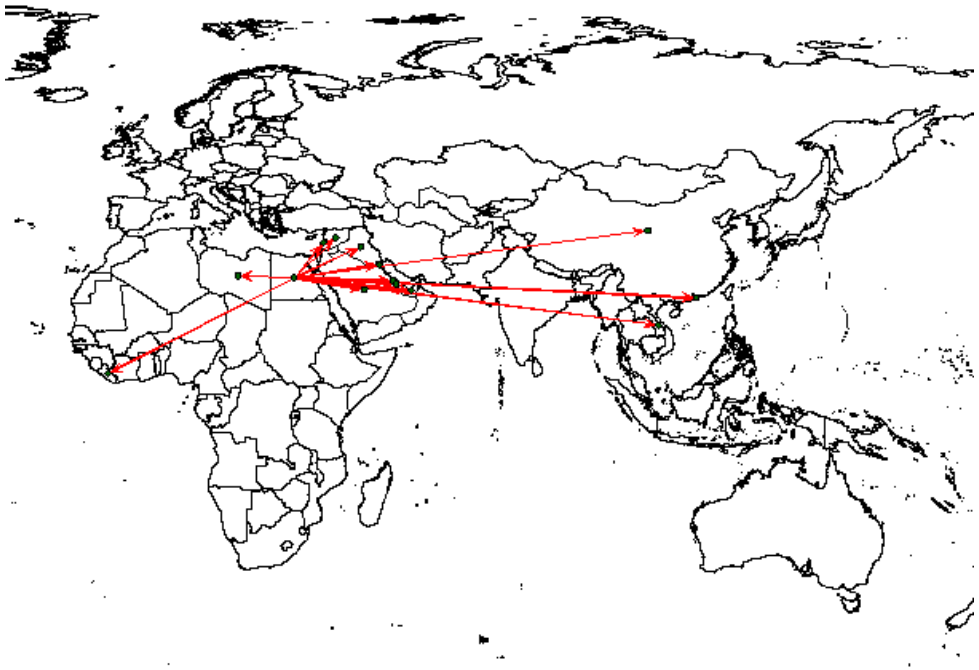
H5N1 HPAI in Indonesia



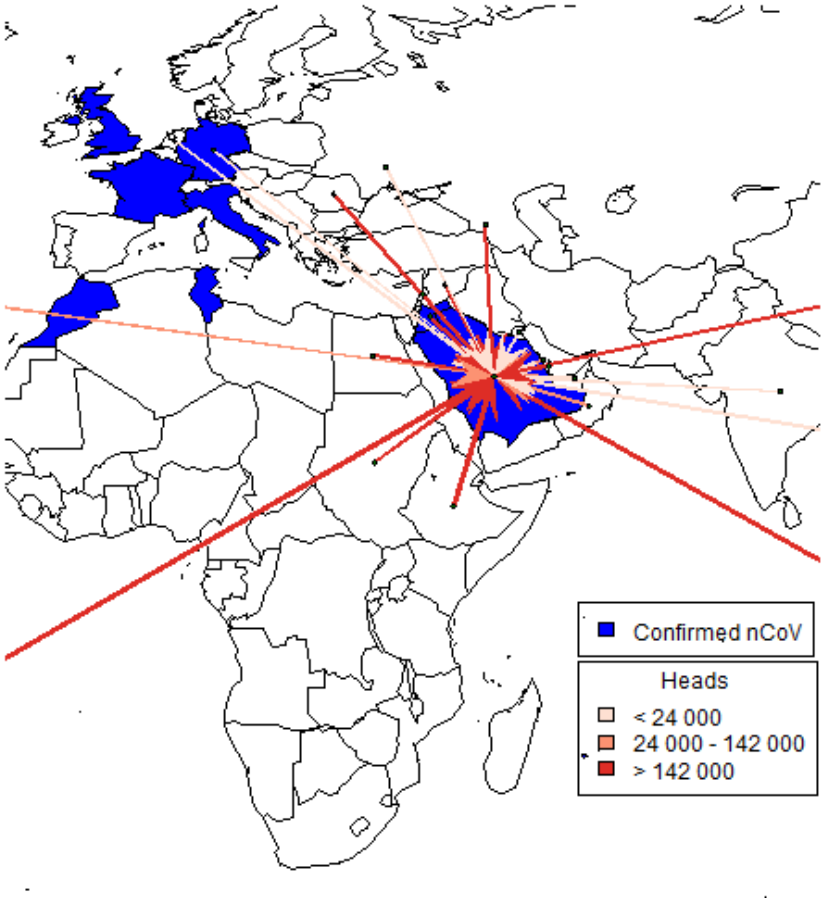


Risk assessment: Identification of risk pathways

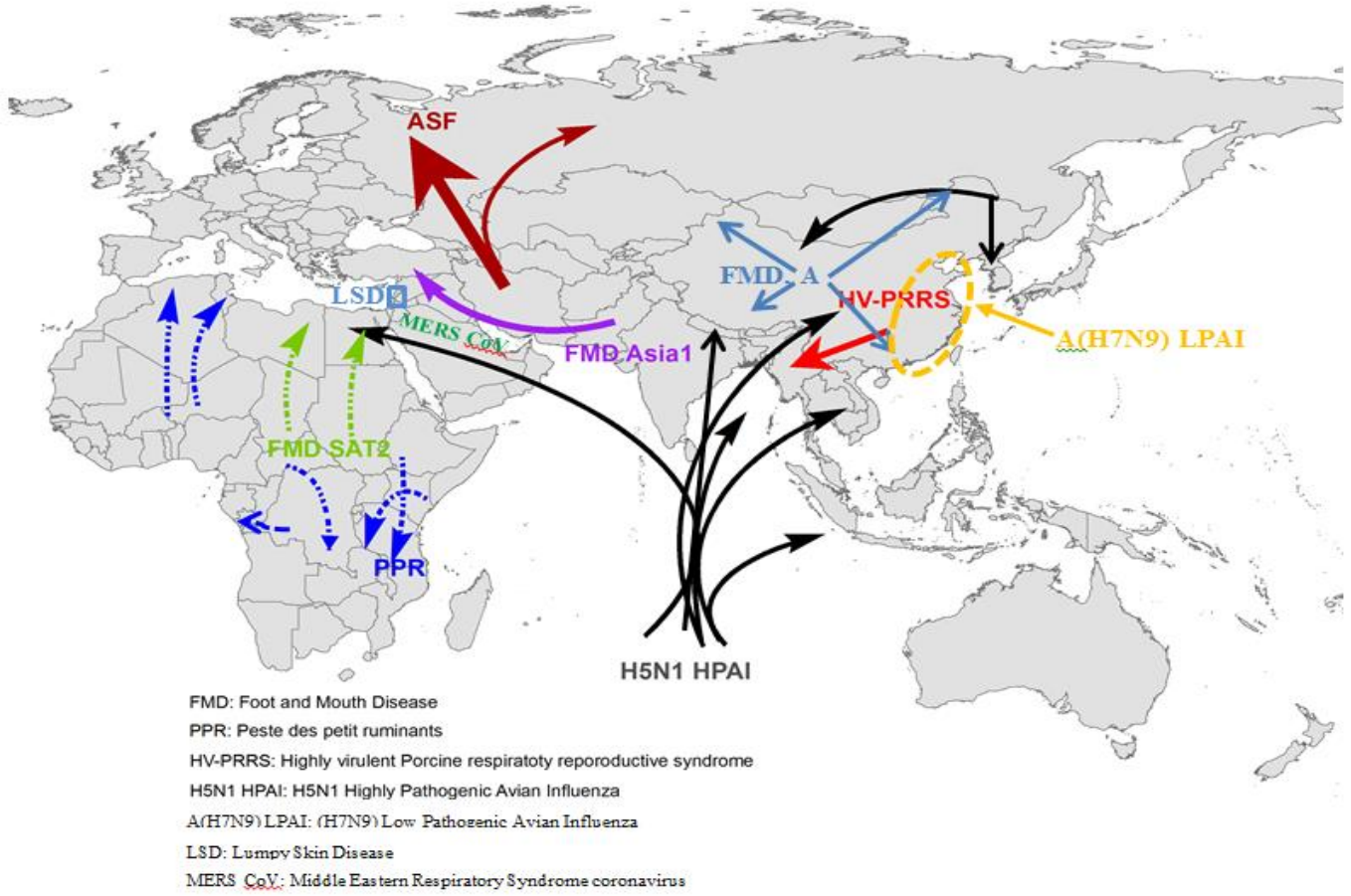
Assessing destination of livestock from Egypt to the MENA region



Assessing source of livestock imports into Saudi Arabia

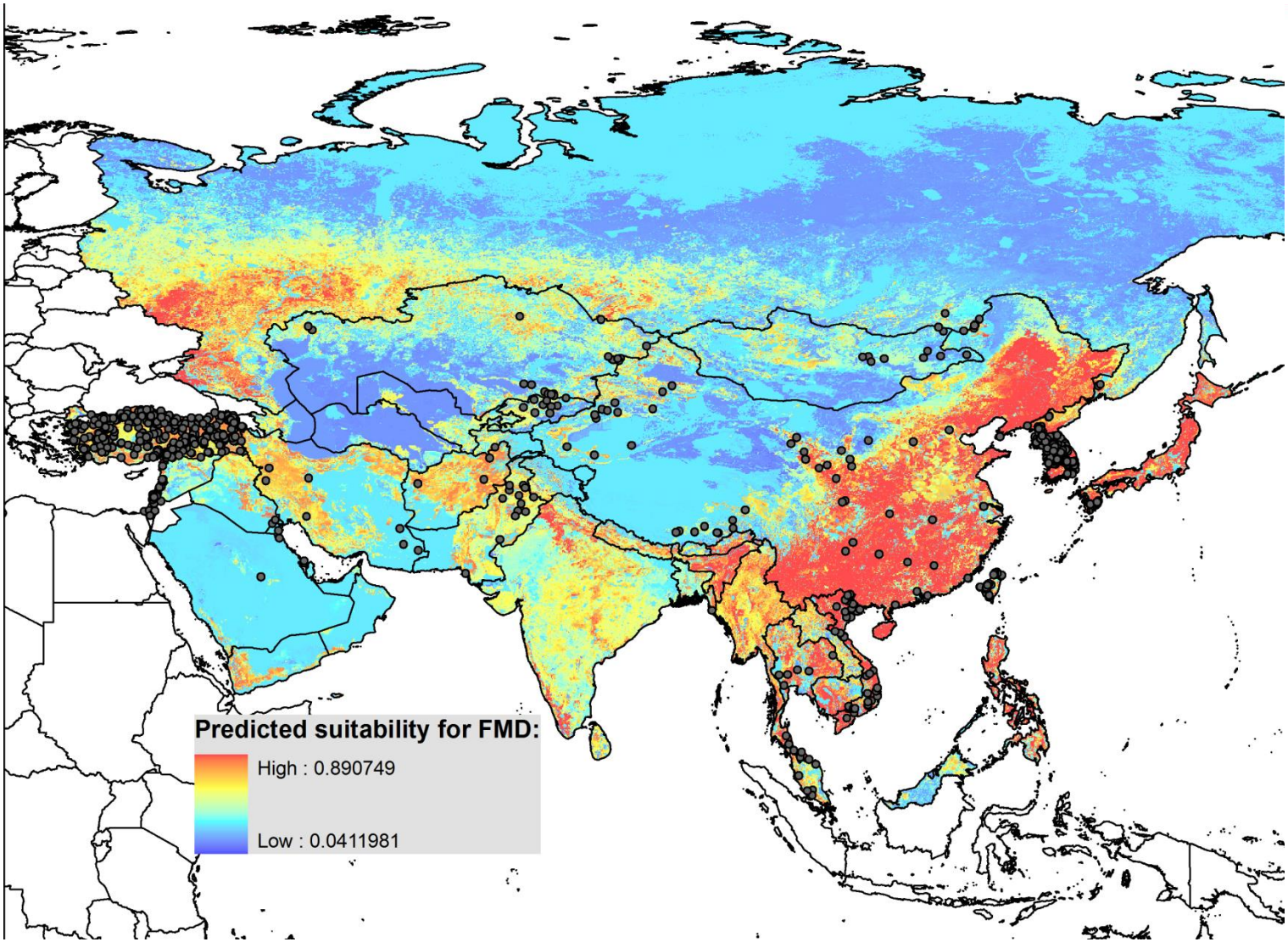


Risk assessment: Identification of risk pathways



Spread of diseases (2011- 2013)

Risk assessment: modelling and mapping



Risk assessment: Niche modelling

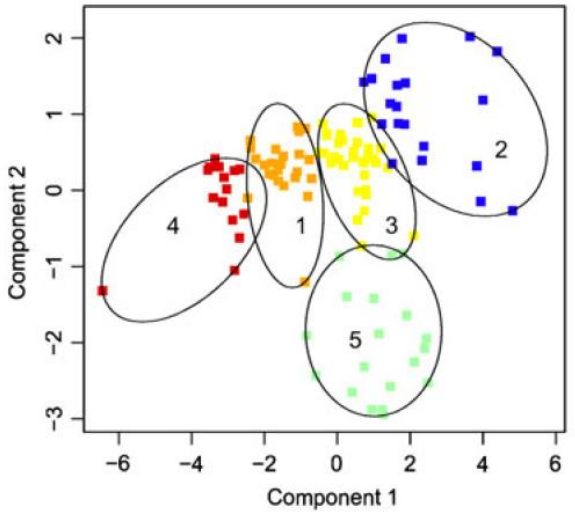
Define and map spatial risk factors
- Poultry population density
- Backyard chicken density
- Intensive chicken density
- Free-grazing duck /farmed wild bird density
- Per capita GDP (linked to levels of biosecurity?)
- Human population density

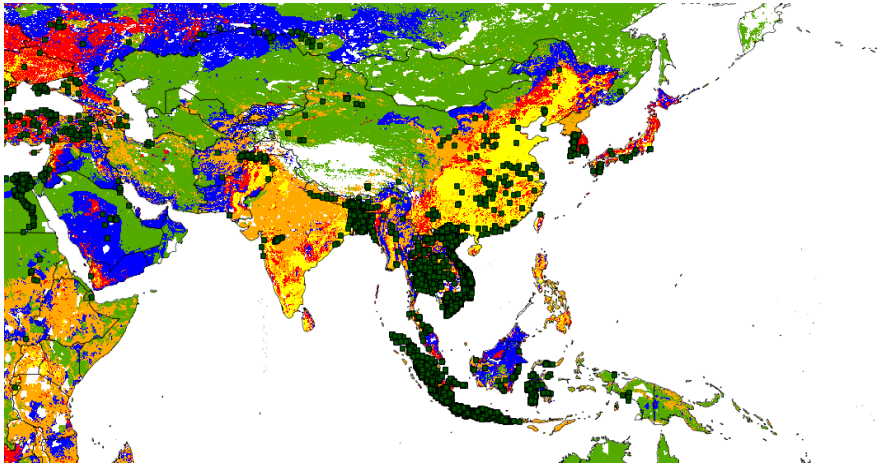
Derive principal components

Statistical clustering of principal components

Spatial representation of clusters (niches)

Characterise niches based on:
- influenza virus clades
- viral diversity
- evolutionary rates
- recombination events





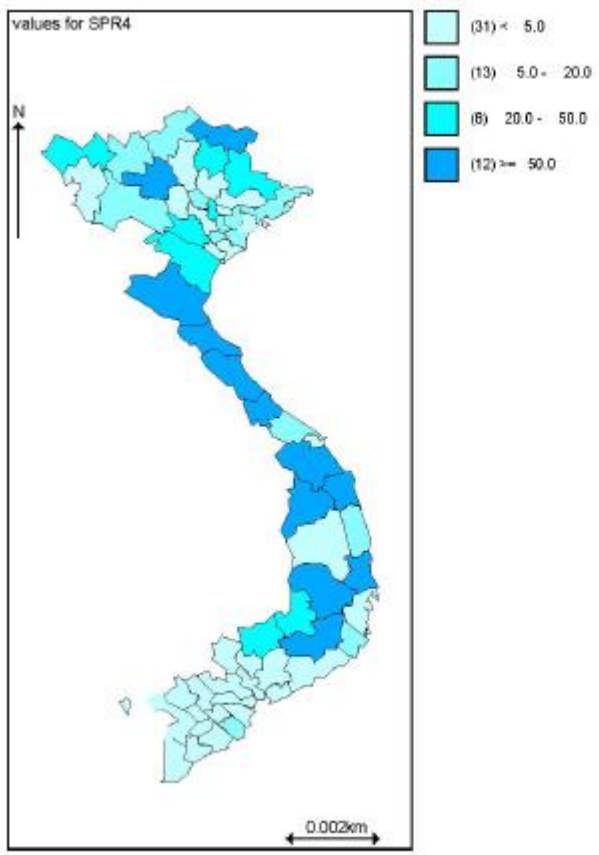
Source: Gilbert et al. (2013) –letter of agreement with University

Assessing data/surveillance quality

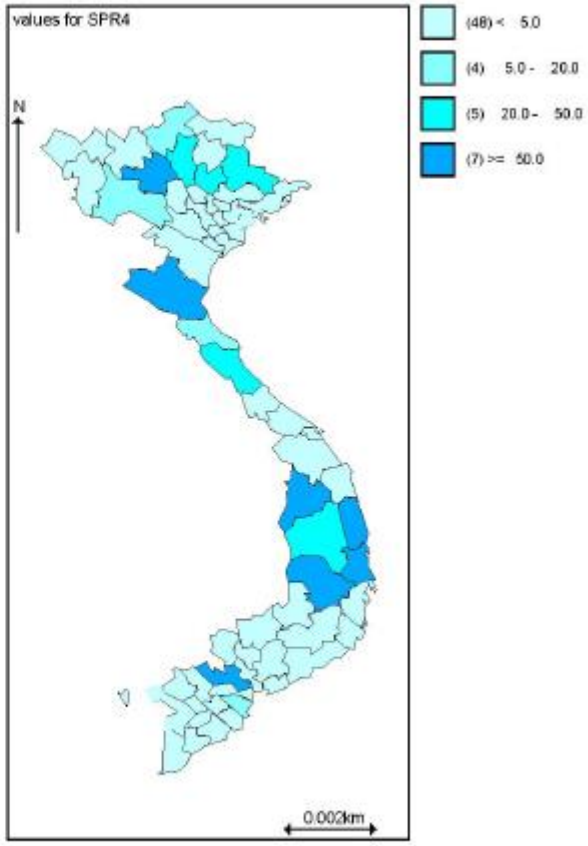
- Assessing underreporting

Assessing residuals of best fit model

Explicitly model underreporting



(a) Poisson model



(b) Zero inflated Poisson model

Sharing information - reports and alert messages

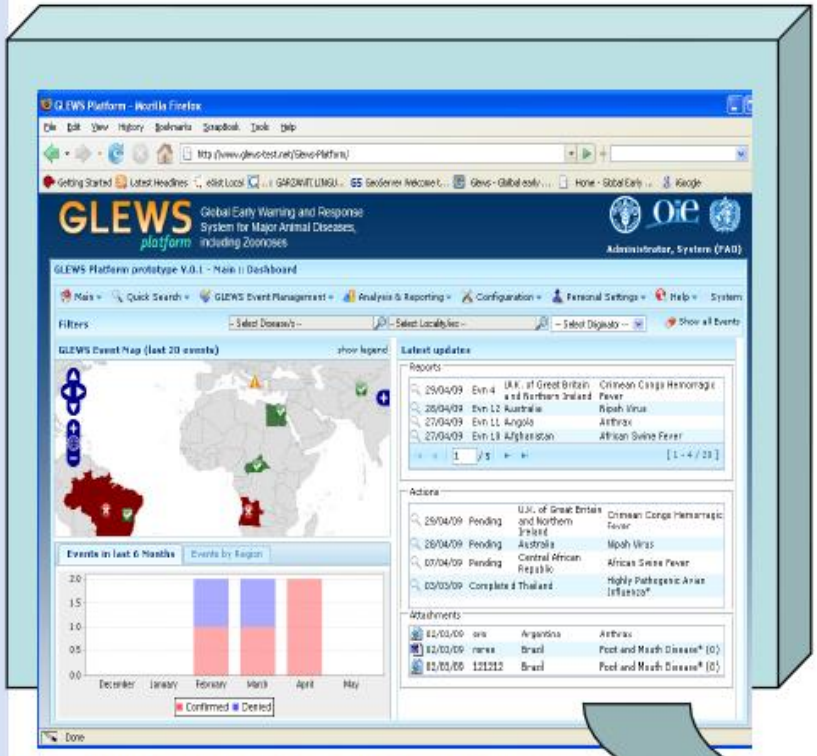
Global overviews

Regional overviews

http://www.glews.net/

Information sharing – across organizations (FAO-OIE-WHO)

GLEWS platform



- Restricted to the GLEWS Taskforce Members
- Event Management
- Analysis & Reporting functionalities
- Automatic Notifications
- e-Mail registry
- Performance & Metrics module
- Administration and Configuration

GLEWS Public Events

GLEWS Website

http://www.glews.net

- Publicly accessible
- Content Management System (restricted users)
- Public Maps and Event List (only officialy confirmed/denied cases
- Simple Analysis functionalities
- Public Documents

Tool development- EMPRES-i Event Mobile application

EMPRES-i EMA allows:

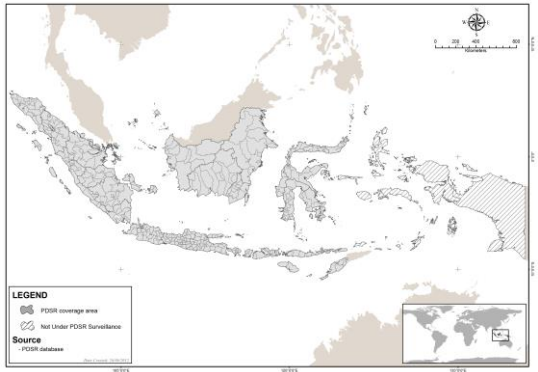
- **To collect** epidemiological data from the field,.
- **To transmit** a disease report to EMPRES-i platform.
- **To visualize** from the field on a map geo referenced data of outbreaks available in the EMPRES-i database (“Near me”).
- **To safely store** epidemiological data in one database – EMPRES-i platform

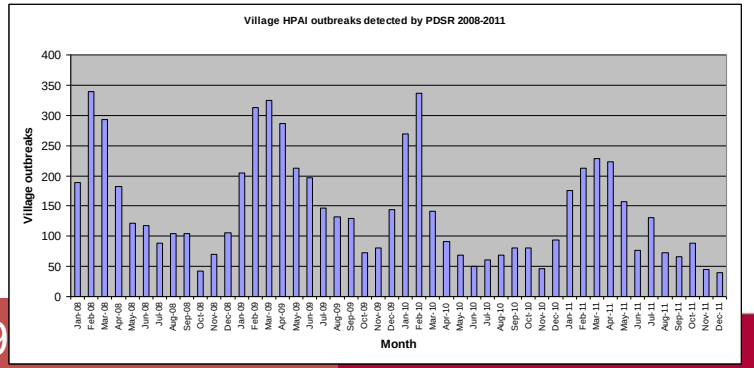
Implementation of reporting systems in country

Egypt- Community animal health Outreach (CAHO)

- 108 CAHO in 15 Governorates
- Participatory surveillance, extension and communication
- During crisis: maintainance of animal health activities

Indonesia – Participatory disease surveillance and response (PDSR)

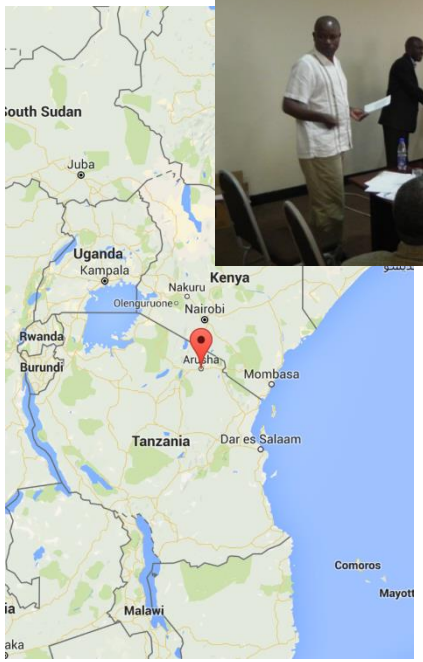




Capacity building – Field epidemiology training

West Africa training in Lome, Togo – April 2016:

- 9 countries
- 22 participants:
- Laboratory specialist
- Surveillance and disease control
- Rinderpest awareness



East Africa Training in Arusha, Tanzania – July 2015:

-4 countries and 30 participants

-Participants – epidemiologist and laboratory specialists

Country support - Surveillance for Swine influenza in Asia - Understanding Influenza at the Interface

EPT+ is focused on improving our understanding the role livestock play in serving as reservoirs for potential pandemic influenza threats with a specific focus on influenza viruses

Country support – Understanding factors associated with H5N1 endemicity in Indonesia

Study Period: March to September, 2016
Design – repeated cross-sectional
Target location: Purbalinga, West Java

Target systems:
-Farms - Backyard and commercial
-Trading enterprises- LBM, CY

Funded by the USAID – Emerging Pandemic Threats - EPT2

FAO GLEW Collaborations - current

- Analysis – Letters of agreement
  - UC Davis
  - Massey University
  - Yale University
- Data sharing – data sharing agreements
  - UC Davis
  - FAO National programmes
- Preparation of risk assessment reports
  - Department of Agriculture and Forestry (DAFF), Australia

Opportunities in FAO

- Students:
  - FAO Volunteer programme: at least 18 years
  - FAO internship programme – no more than 30 years
  - Other criteria:
    - be a citizen of a Member Nation;
    - be certified as medically fit to work;
    - provide FAO with a letter of motivation
    - Volunteers do not not receive any remuneration/ Interns are paid 700 monthly
  - Application via the FAO irecruit website: (http://www.fao.org/employment/opportunities-for-young-talents/en/)
  - MOU with some universities for internships
    - Funded either by FAO or the University of interest
  - Duration : 3 – 6 months

Opportunities in FAO

- Junior professional Programme :
  - University graduates up to 32 years of age
  - Other criteria:
    - be a citizen of a Member Nation;
    - be certified as medically fit to work;
    - provide FAO with a letter of motivation
    - have fluency in at least one of the five official languages of FAO: Arabic, Chinese, English, French, Spanish.
    - Volunteers do not not receive any remuneration/ Interns are paid 700 monthly
  - Application via the FAO irecruit website: ()
  - MOU with some universities for internshipS
    - Funded either by FAO or the University of interest

Opportunities for collaboration

- MOU on student internships
- Become a reference center for FAO:
  - Subject matter areas (Epidemiology, AMR)
    - Risk assessment and modelling
    - Tool development for developing countries
    - Assistance with guidance development
    - Data collection - Field study design and implementation
    - Economic analyses
    - Training courses for developing countries
    - Reviews, etc..
  - Instruments
    - MOUs
    - Letters of agreements
    - Short term contracts/consultancies

- Questions?

Thank you!

http://www.fao.org/animal-health