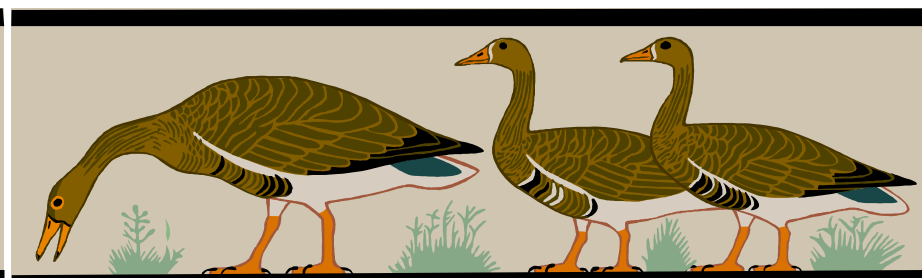
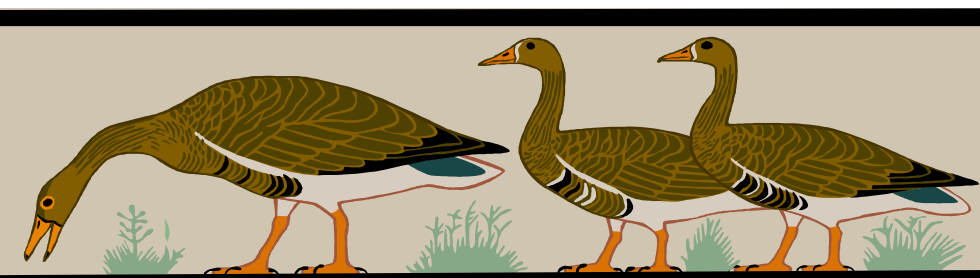
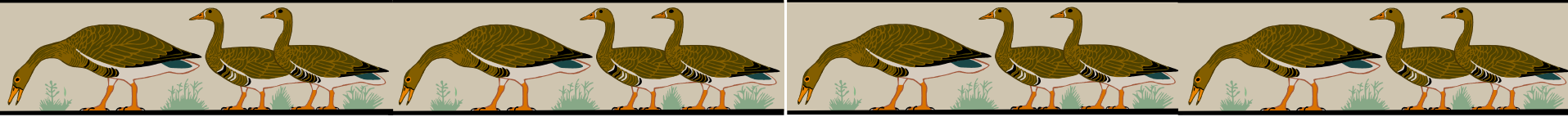
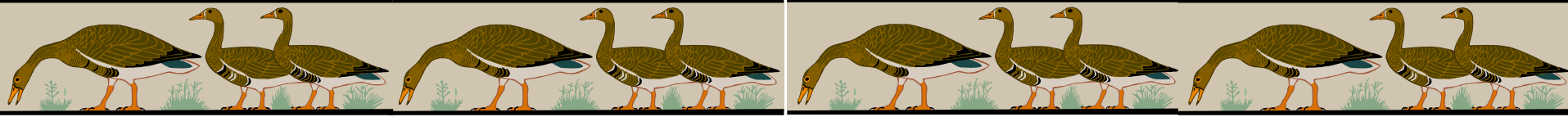


The AVIAN INFLUENZA Crisis, Response, and The Unknowns

J. Lubroth, V. Martin, and J Slingenbergh
FAO Animal Health Service





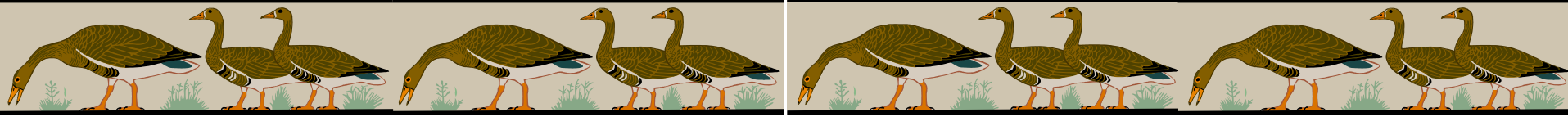


Highly Pathogenic Avian Influenza

The crisis

Why ?

- Evolution of virus
- Insufficient overall capacity (Veterinary Services, Information Systems, Diagnostic Tools, Human resources)
- Lack of legislation and countries not meeting **their international obligations to report**
- Lack of biosecurity at the farm, market, international borders ... level.

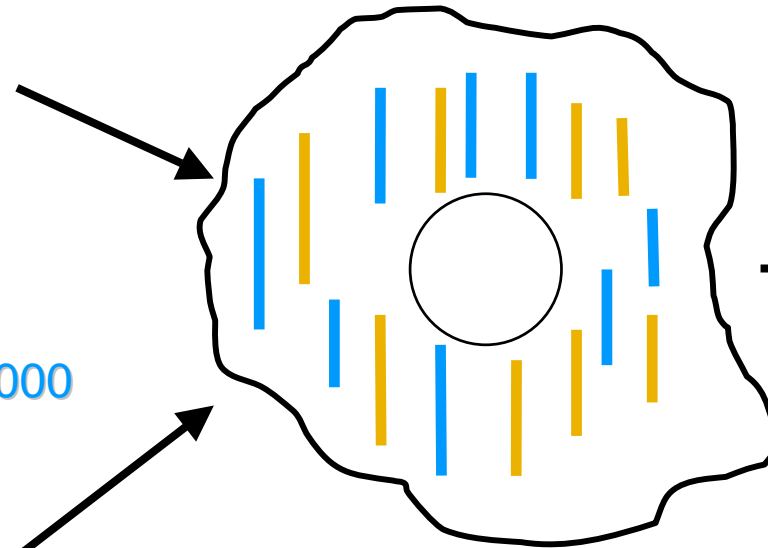
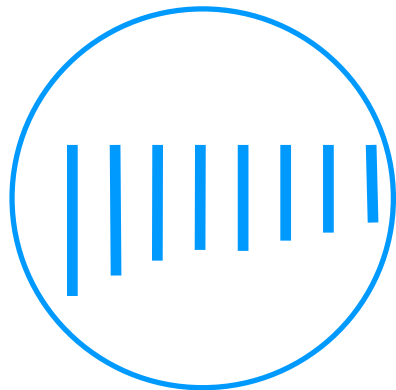


GENETIC REASSORTMENT

$H_{10}N_7$ isolated from mallard (*Anas platyrhynchos*) in 1999

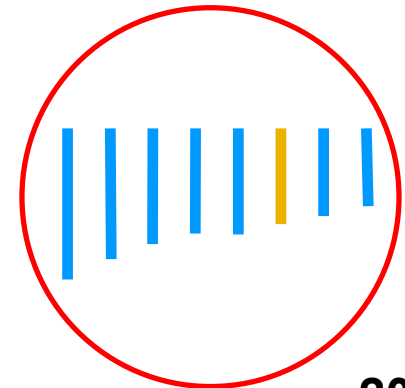


$H_7 N_3$ isolated in 2000

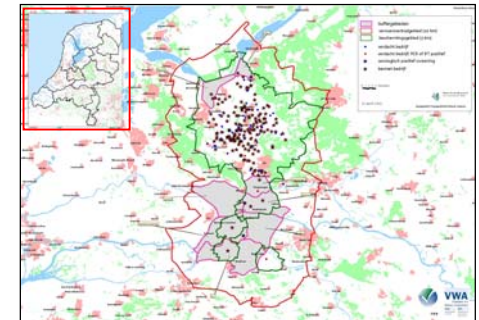


Cell

H7N7



2003

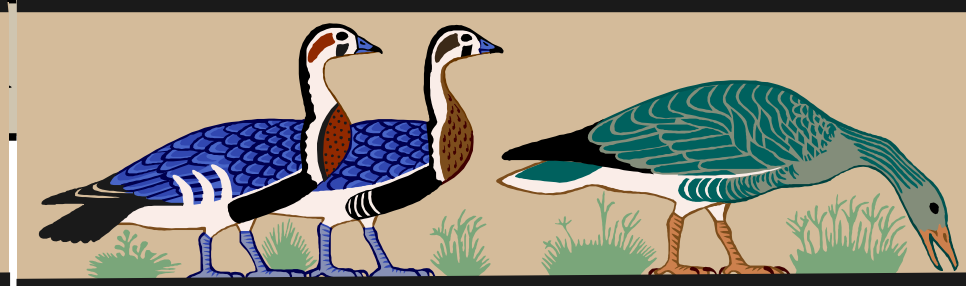
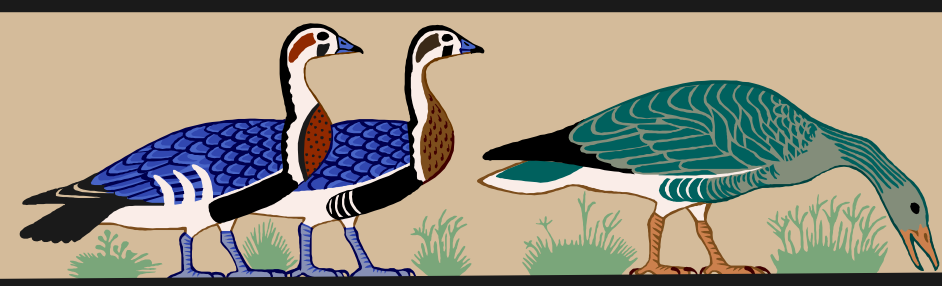


New Influenza virus:

256 possible combinations

Adapted from G Koch, Central Institute Animal Disease Control (CIDC – Lelystad)





In perspective

- **Highly Pathogenic Avian Influenza vs. Low Pathogenic Influenza**
- Influenza in Humans

Type A H1N1, H3N2 or Type B, and now ... H5N1

Since 1996 H7N7, H5N1, H9N2 from birds to humans

What is the danger?

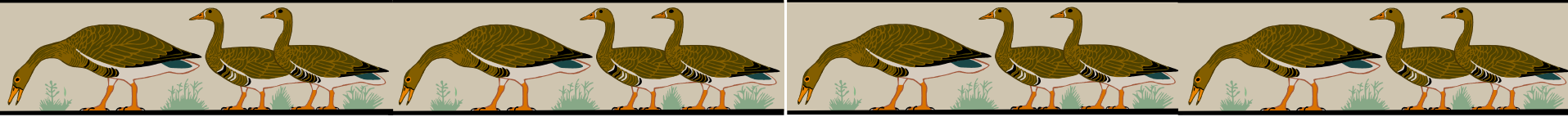
- **75-100% mortality in chickens, turkeys slightly less**

Low in waterfowl, sometimes none

Other shorebirds and wildlife – varies

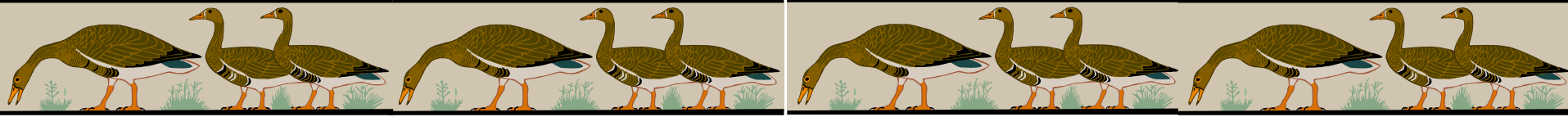
- **Livelihoods**
- **Commercial Industries and Export**
- **Genetic diversity and Conservation**





FAO's RESPONSE





Under implementation Six National TCPs

- WHERE?

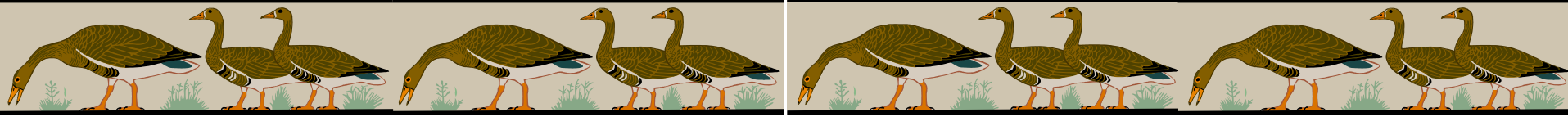
Vietnam, Cambodia, Laos DPR, Pakistan,
China, Indonesia

- TO DO WHAT?

Control the Avian Flu by technical advice, training

→ US\$ 2.3 million + 20 million (WB, Japan)





Under implementation Five sub-Regional TCPs

- WHERE?

East Asia, Southeast Asia, South Asia

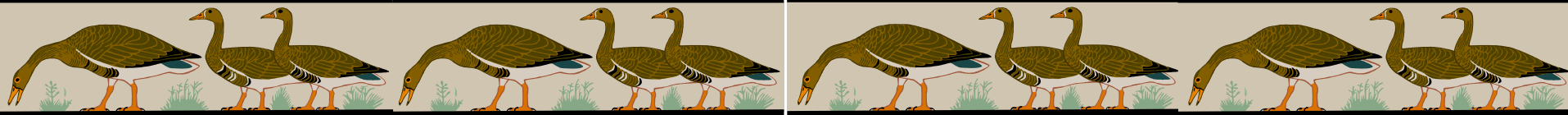
- HOW?

Network of surveillance teams
Network of diagnostic laboratories
Policy and rehabilitation

- TO DO WHAT?

Surveillance, early detection, early reaction
Identification of risk factors
International coordination
Training and education





Inform and communicate

AGA and EMPRES Web sites

Avian Influenza - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.fao.org/ag/agah/subjects/en/health/diseases-cards/avian.html

Organizations Agriculture Greenhouses Horticulture Environment Hydroponics

Search Web Radio Music Games Sports News Movies Hobby TV/Video

Agriculture Department
Animal Production and Health Division

home programmes projects resources subjects commissions SEARCH

ANIMAL HEALTH SPECIAL REPORT
Avian Influenza - Disease Card

EMPRES Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases

Livestock component

EMPRES FAO AGA Publications Maps News Links Site Map Contact Us

WELCOME TO THE FAO EMPRES-LIVESTOCK WEB SITE

EMPRES Alerts

Avian Influenza Latest
Avian Influenza situation in South East Asia

Early Warning messages

- Avian Influenza Disease Emergency issue No. 13 (27/04/2004)
- EMPRES Early Warning message: Contagious bovine pleuropneumonia in Zambia - Update (March 2004)
- Avian Influenza Disease Emergency issue No. 12 (16/04/2004)
- Avian Influenza Disease Emergency issue No. 11 (08/04/2004)
- Avian Influenza Disease Emergency issue No. 10 (01/04/2004)

Emergencies

- Suspicion of foot-and-mouth disease / Peste des petits ruminants in Afghanistan (09/05/2003)
- Animal disease emergency preparedness plans (manual)

More Information

EMPRES Vision and Mandate

List of:
FAO Reference Laboratories and Collaborating Centres

NEWS FLASH

How to subscribe to EMPRES discussion list?

Modelling disease outbreaks.
TADSimulator, a new programme developed by EMPRES

Related Websites

Office International

Subjects

- Animal Health
- Special Report
- Avian Influenza
 - FAO/OIE/WHO Recommendation
 - Background
 - Situation Update
 - FAO Response
 - Outbreak News
 - Questions & Answers
 - Disease Card
 - Safety Measures
 - Information for Travellers
 - Related Topics

EMPRES Livestock Vision

- Early Warning
- Early Reaction
- Enabling Research Coordination

The Global Rinderpest Eradication Programme (GREP)

- What is GREP
- GREP Country Profile
- PACE
- OIE Pathway

EMPRES-i

- Animal Disease Information Systems
- Disease Recognition module
- Disease Mapping
- Disease Alerts
- Tools

TADinfo

Avian Influenza technical Task Force, FAO - Rome & Bangkok 27/04/2004

FAO AIDEnews
Avian Influenza Disease Emergency

The information summarized below is gathered from official and non official sources, which are quoted in the text. AIDEnews is prepared by the FAO Technical Task Force on Avian Influenza.

1. Summary of the situation

- Cambodia: Two new outbreaks reported in Takeo province (south) and Kampong Cham province (east). (20/04/04 source: newspaper website, gphn)
- Indonesia: Three formerly free provinces were affected during last month, and seven additional districts found to be infected within declared infected provinces. (16/04/04. source - 4th AI Donor Coordination Meeting, Indonesia. See page 4)
- Thailand: One outbreak in Uttaradit province and two outbreaks in Petchaboon Province were identified. (19/04/04 - OIE website)

2. Field investigations - results and analysis

As you are likely aware from previous FAO AIDEnews issues, epidemiologists and other experts have been travelling to HPAI affected countries under the umbrella of FAO technical cooperation projects. Results and epidemiological findings of these missions will be brought to our readers' attention under this new heading and will progressively enhance our understanding of the 2004 avian influenza epidemic. This analysis should lead to improved surveillance and management of this and other potential emerging diseases.

HPAI in Cambodia /FAO field mission report - TCP/BA6/3004 21 Feb.-12 Mar. 04

Seventy five percent of poultry production in Cambodia is owned by subsistence farmers who own an average of a dozen birds mainly for personal consumption but manage to sell 10-15 chickens per year to generate US\$ 15-20 income which can secure food stuffs for 6-8 weeks for a household of five.

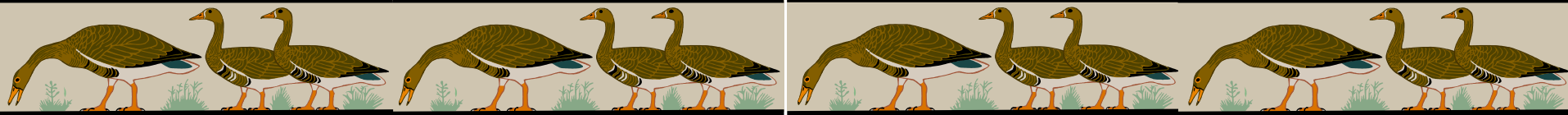
Cambodia and local poultry densities

Cleaning out the last rinderpest last reserves (27/11/2004)

moderators (EUFMD)

www.fao.org/ag/agah/agah





Consolidate available data EMPRES-i information system

Data storage, validation, analysis in EMPRES-i



Empres-i
Intelligence - Information - Intervention

Home

**Disease Tracking**

- Add New
- View & Update
- Analysis
- Configuration

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- View & Update
- Configuration

**Information Library**

- Publications
- Photos

**Contacts**

- Add New
- View & Update
- Configuration

**Institutes**

- Add New
- View & Update
- Configuration

Logout vincent

Latest Disease Tracking Observations

Highly pathogenic avian influenza in Viet Nam (Confirmed)
Observed: 06/05/04 Director of the Agriculture Ministry's Animal Health Department
Entered: 11/05/04 Larfaoui, Fairouz (Animal Health Officer)
AI case in Dong Thap, Viet Nam

Highly pathogenic avian influenza in Japan (Confirmed)
Observed: 05/03/04
Entered: 10/05/04 Larfaoui, Fairouz (Animal Health Officer)
Confirmed AI crow case in Sonobe town, Kyoto province

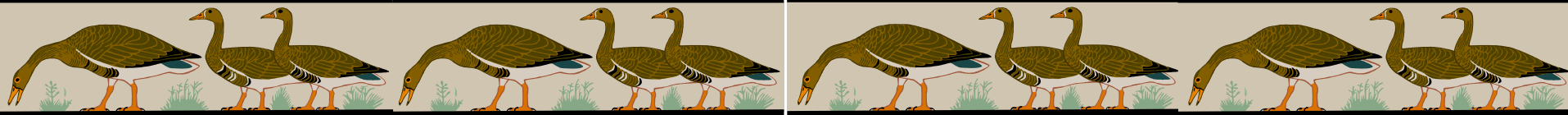
Highly pathogenic avian influenza in Japan (Confirmed)
Observed: 02/04/04 Government
Entered: 10/05/04 Larfaoui, Fairouz (Animal Health Officer)
Confirmed AI crow case in Kameoka city, Kyoto province

Highly pathogenic avian influenza in Japan (Confirmed)
Observed: 14/03/04 Government
Entered: 10/05/04 Larfaoui, Fairouz (Animal Health Officer)
Confirmed AI crow case in Kameoka city, Kyoto Province

African swine fever in Tanzania, United Rep of (Suspicion)
Observed: 18/08/03 Veterinary Service, Ministry of Water and Livestock Development
Entered: 06/05/04 Kamata, Akiko (Animal Health Officer)
Location(outbreaks/susceptible/cases/deaths/destroyed): Ngarenaro, Arusha district(1/254/53/10/...); Olerian, Arusha district (1/250/25/25/...); Sombetini, Arusha district (1/200/2/2/...). Neighbouring countries are notified//Affected pig producers are asked to depopulate & disinfect their premises//Intensive active surveillance//The quarantine notice proclaimed on 12 September 2001, all swine and swine products' movement into or out of the affected area was banned//Public awareness campaigns were started//Veterinary staff and Government administrators throughout the country are on the alert to look out for clinical signs.

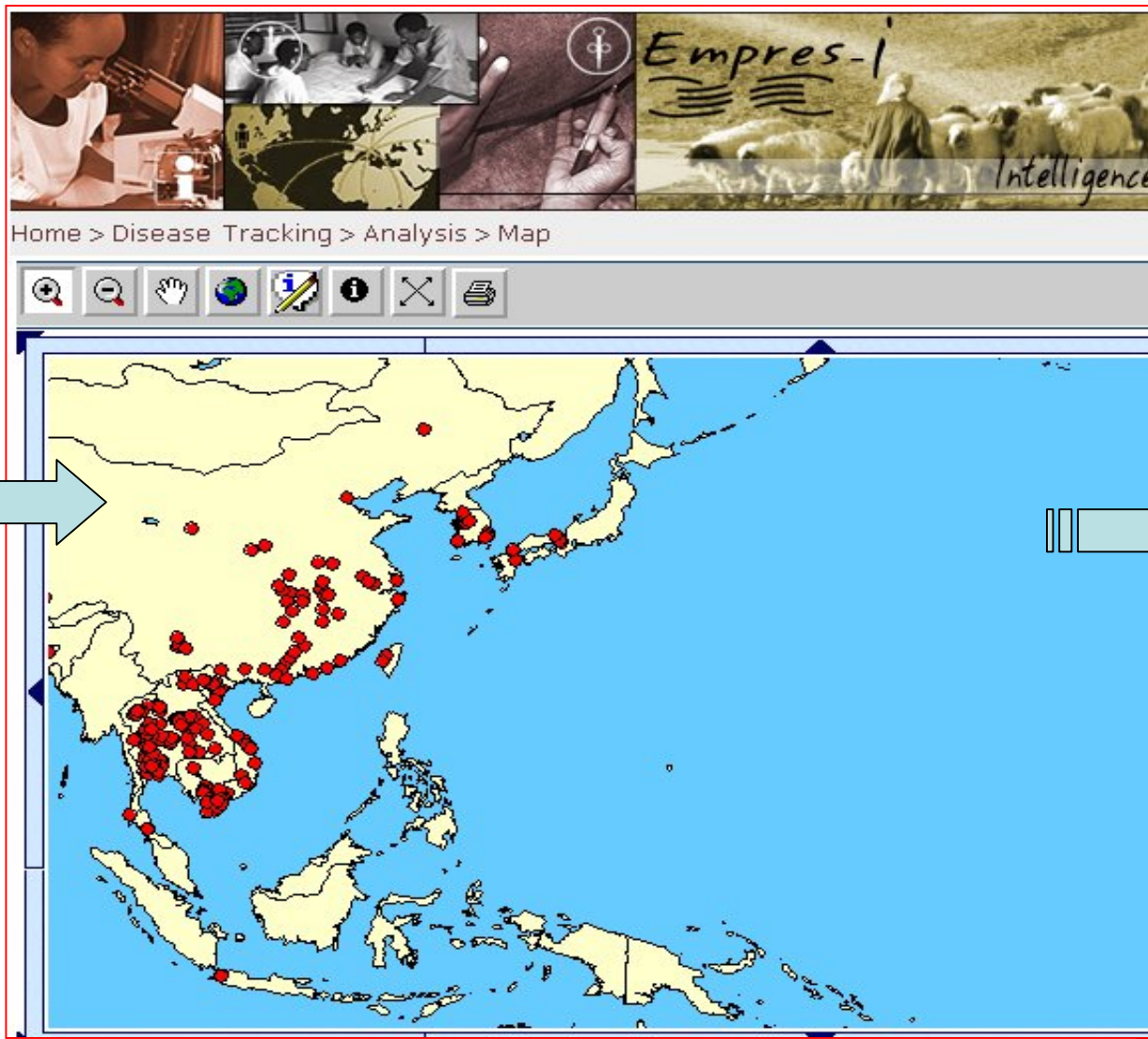
African swine fever in Tanzania, United Rep of (Suspicion)
Observed: 09/02/04 Veterinary Service, Ministry of Water and Livestock Development
Entered: 06/05/04 Kamata, Akiko (Animal Health Officer)

African swine fever in Tanzania, United Rep of (Suspicion)
Observed: 09/02/04 Veterinary Service, Ministry of Water and Livestock Development
Entered: 06/05/04 Kamata, Akiko (Animal Health Officer)



Consolidate available data

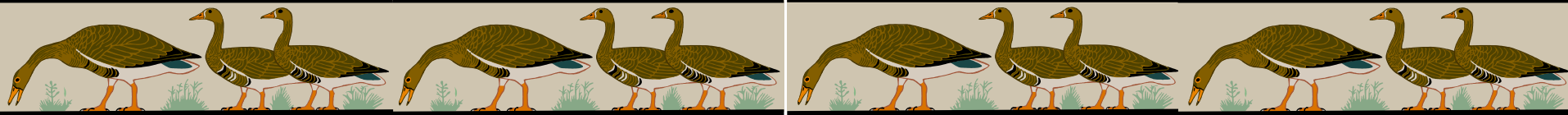
EMPRES-i information system



Data storage, validation,
analysis in EMPRES-i

HPAI in South-East Asia





Layers (I) Outbreaks and poultry density

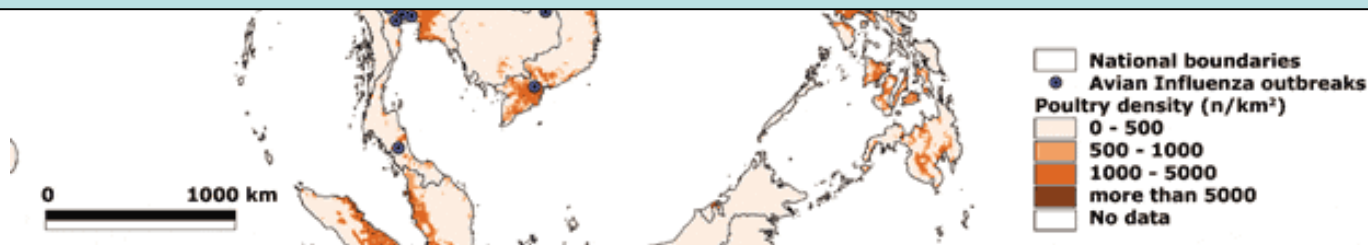


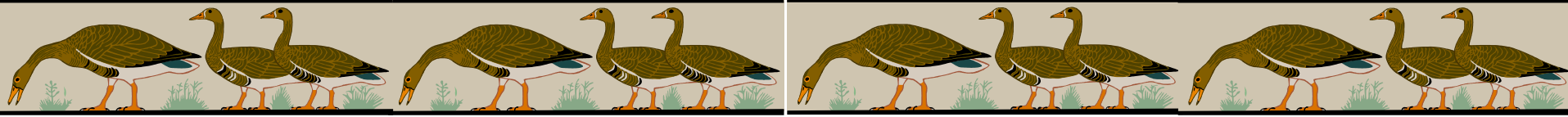
Asian region is affected by the spread of the avian flu [1] is estimated to house approximately **7 billion chickens**[2], approximately **40 percent of global totals**..

China and Thailand account for ~ 82 %, of the region's estimated production of 20 million tonnes.

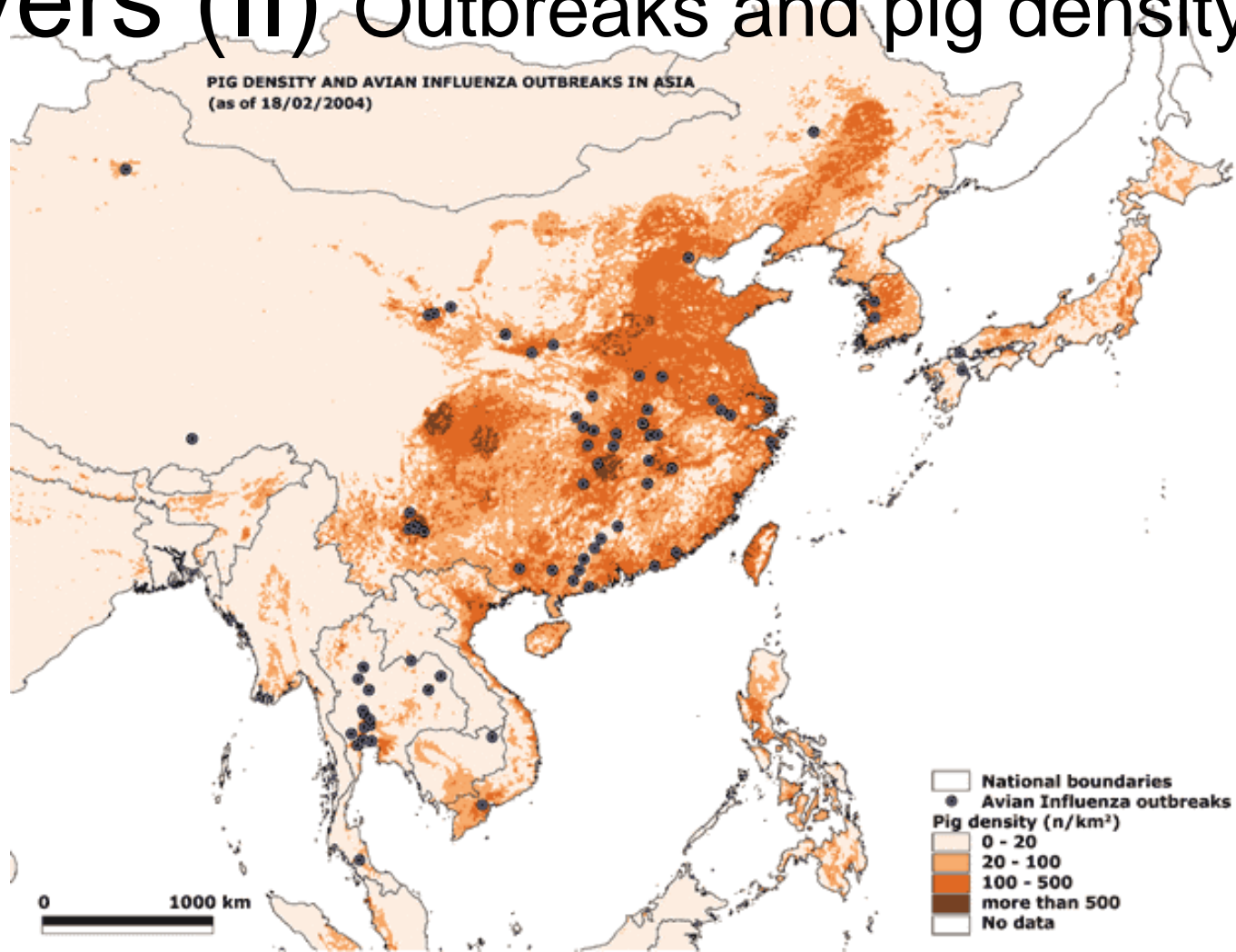
[1] South East Asia and Pakistan

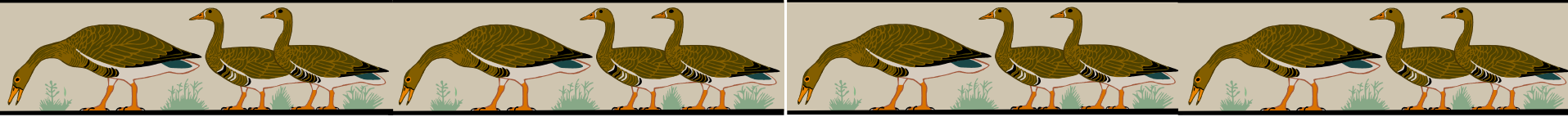
[2] Excluding mainland China, this number totals only 2 billion.



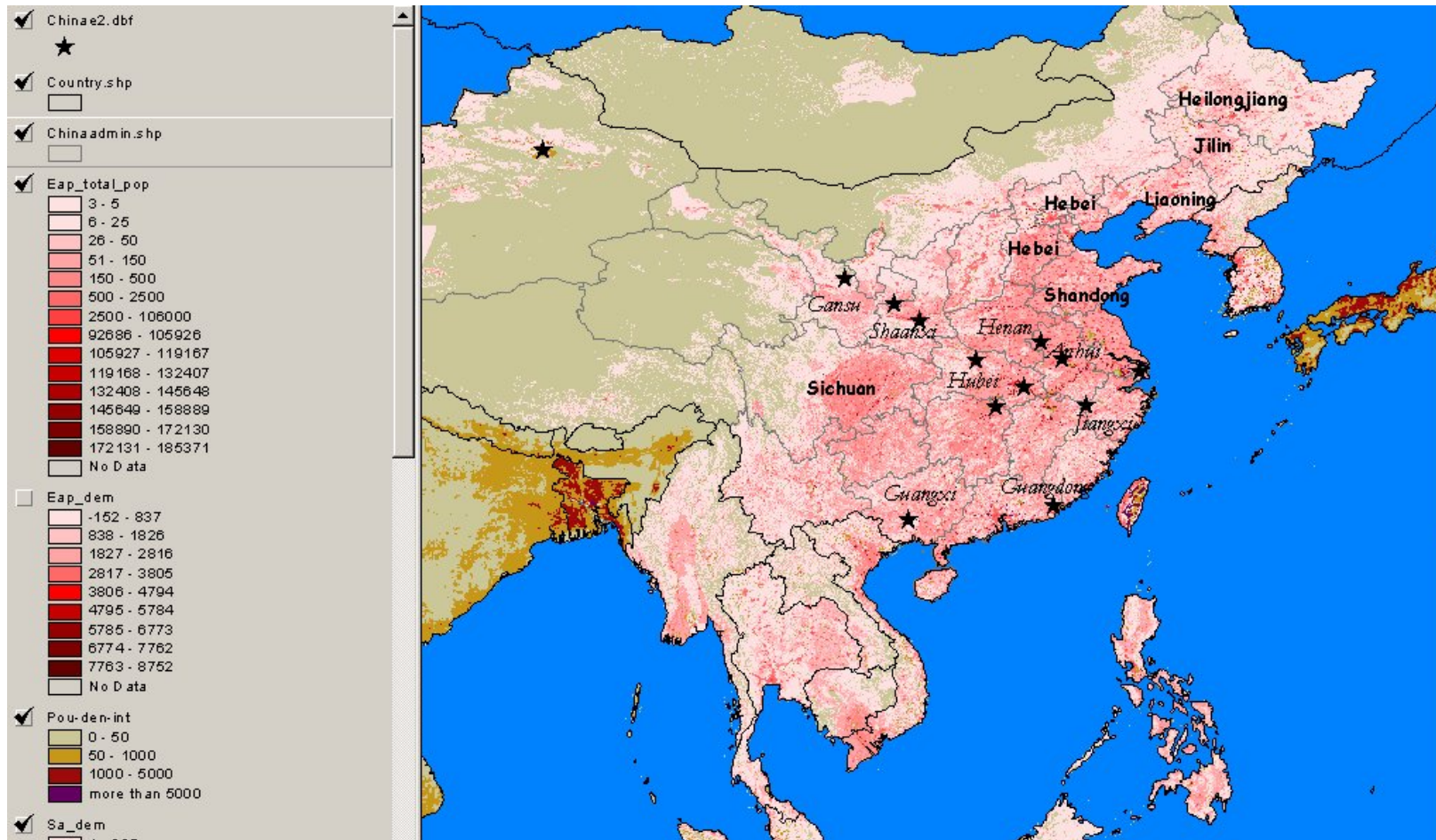


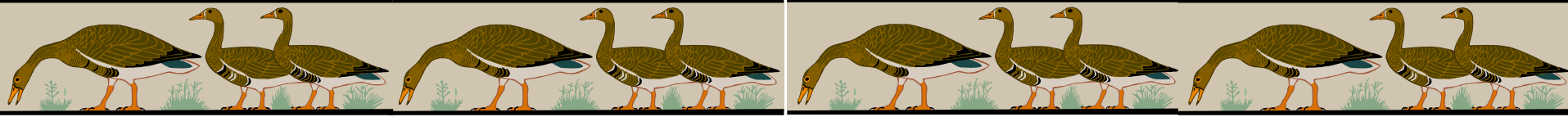
Layers (II) Outbreaks and pig density



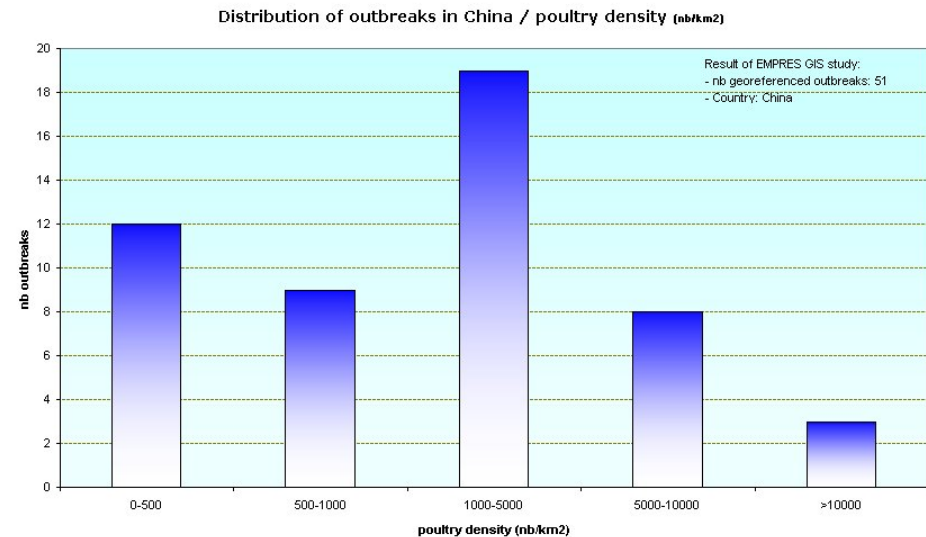
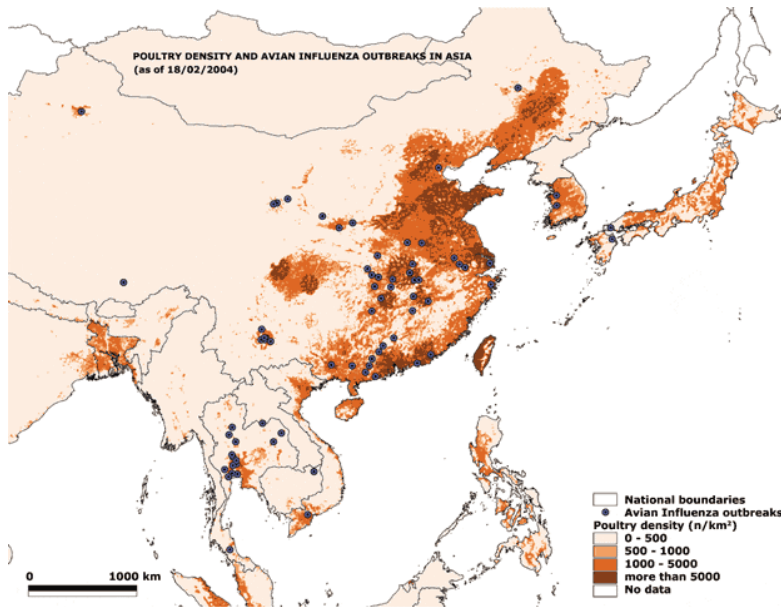


Layers (III) - Outbreaks and human density



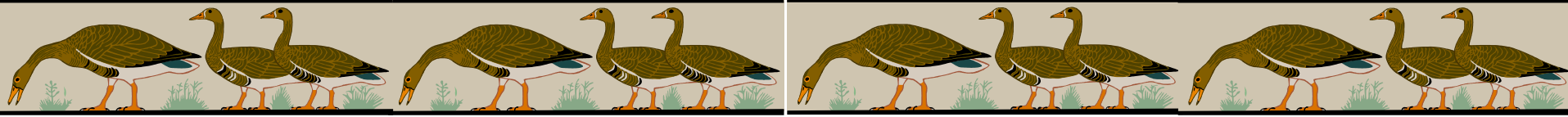


Results (I): Outbreaks and poultry density

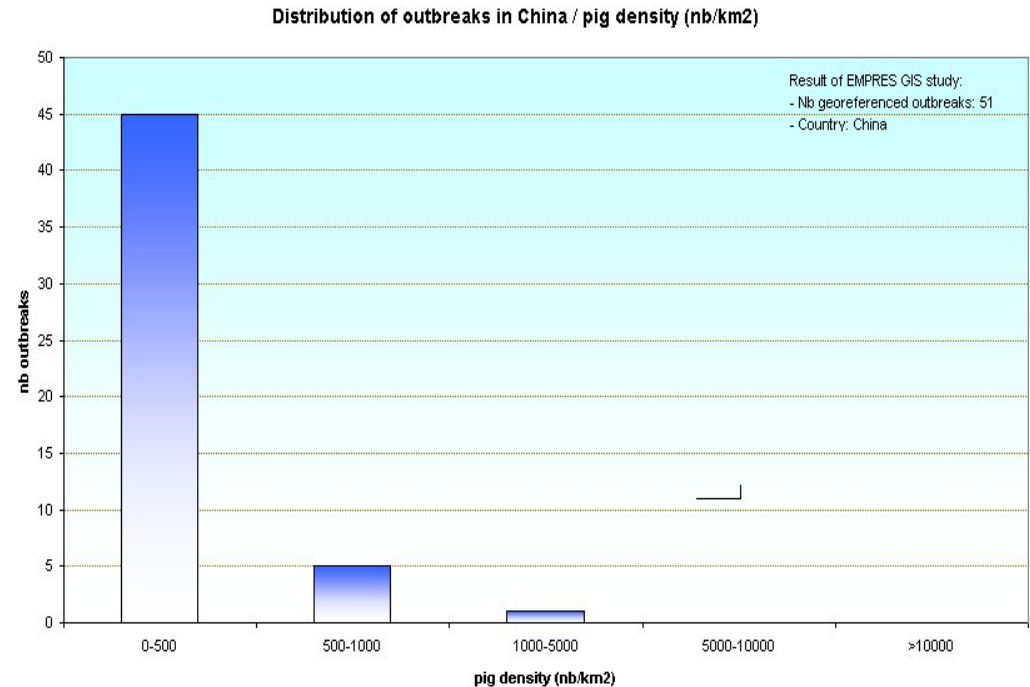
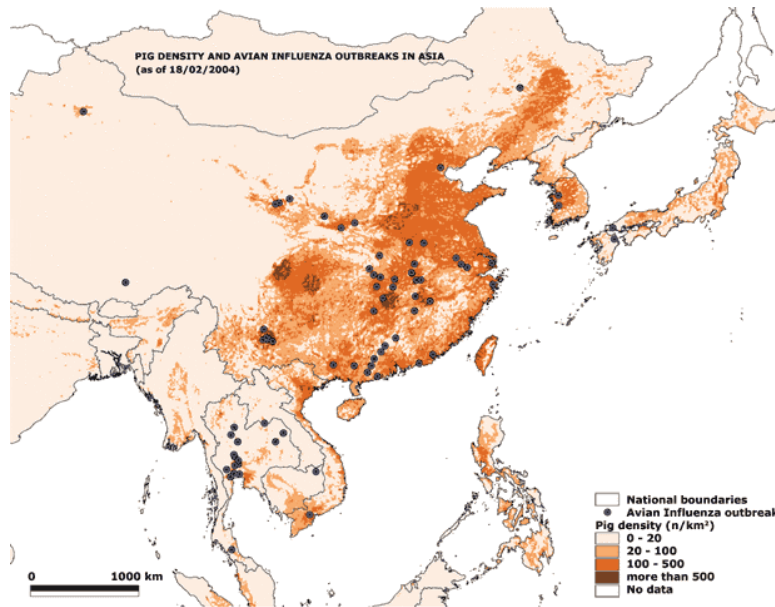


- 80 % outbreaks in areas where density <5000
- 23 % <500
- 54 % between 500-5000
- Average density : 3288

Sample: 51 outbreaks

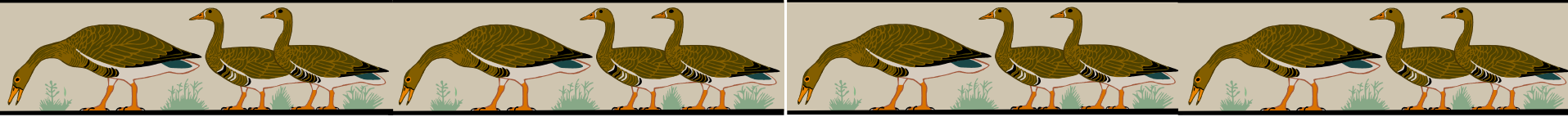


Results (II): : Outbreaks and pig density

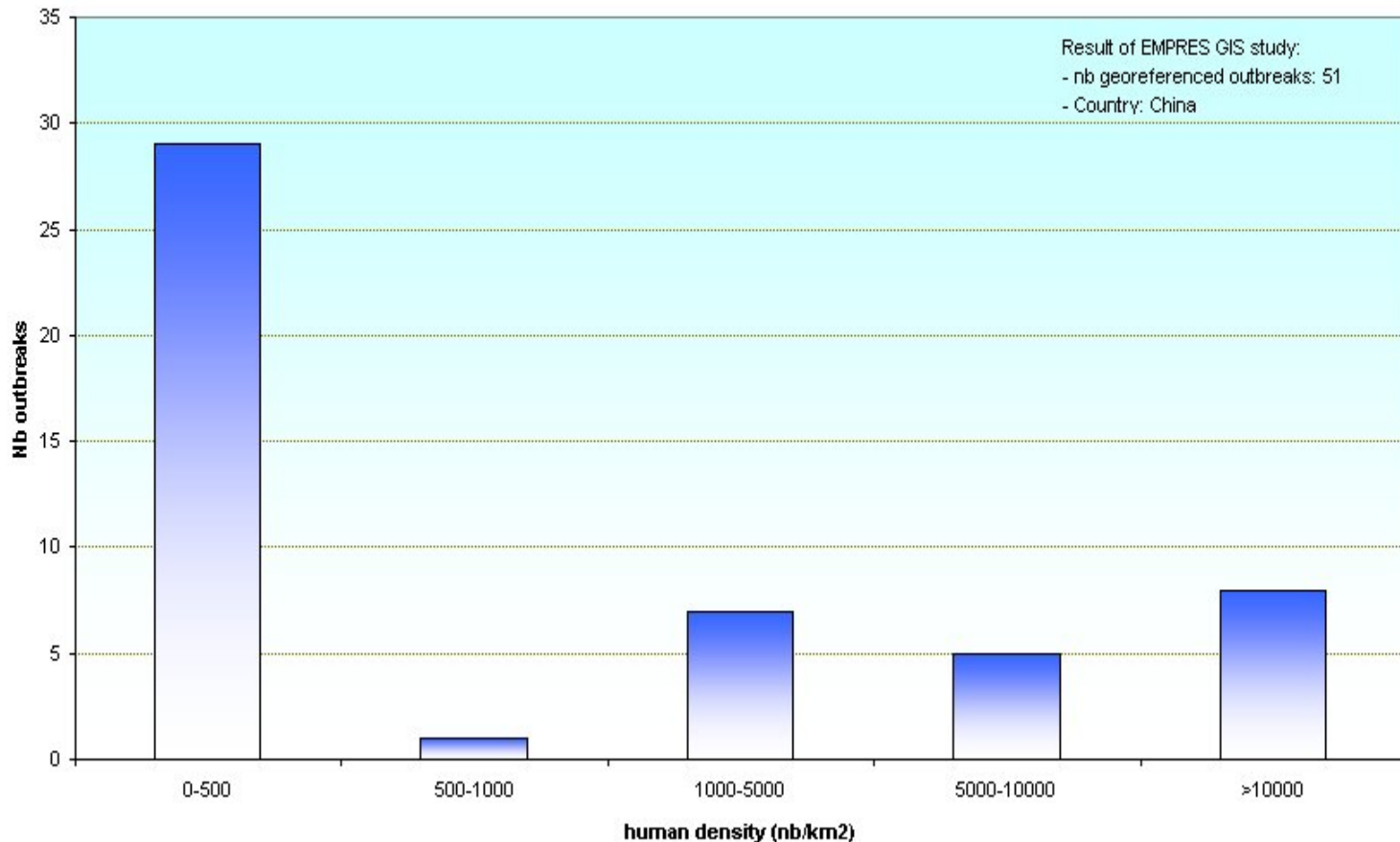


Sample: 51 outbreaks

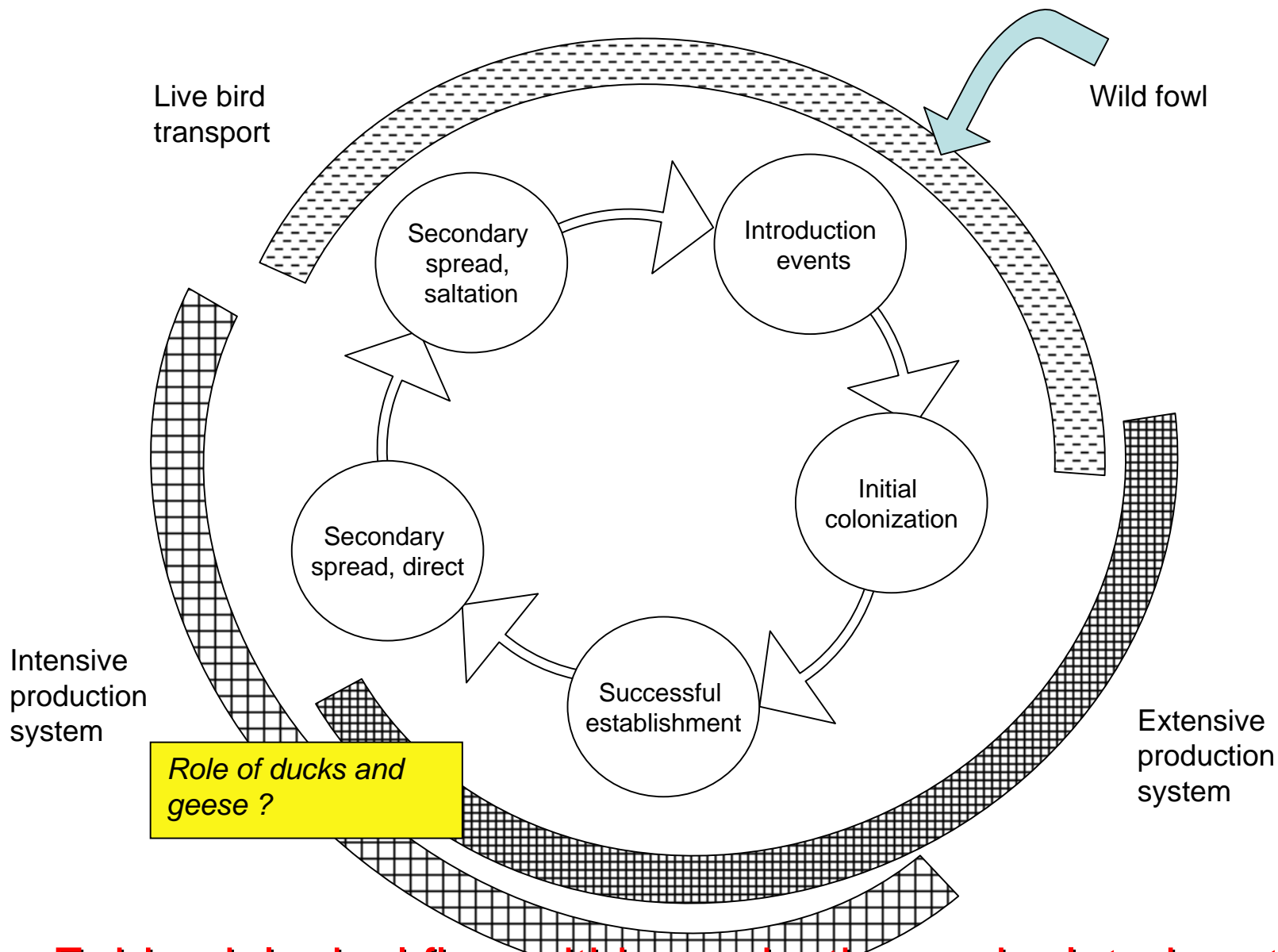
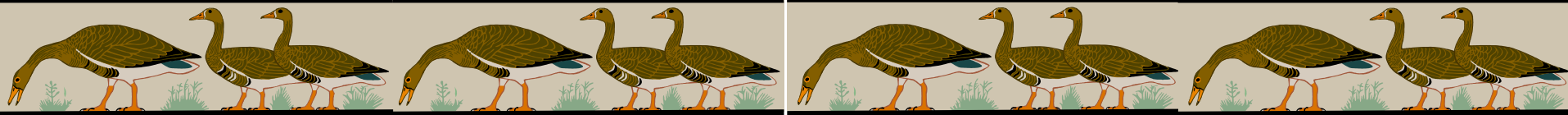
- 90 % outbreaks in areas where density <500
- 98 % <1000
- Average density : 223



Results (III): Outbreaks and human density

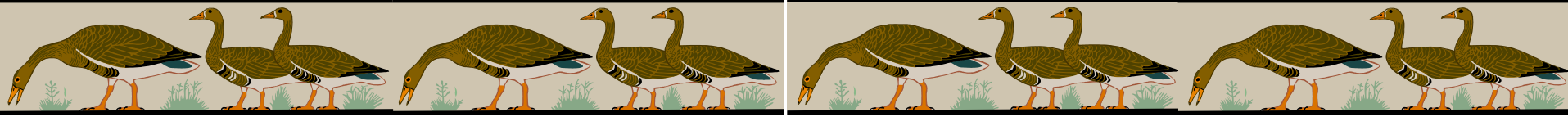


- 58 % outbreaks in areas where density <500
- 60% outbreaks in areas where density <1000
- Average density (popdens/km2) : 4389



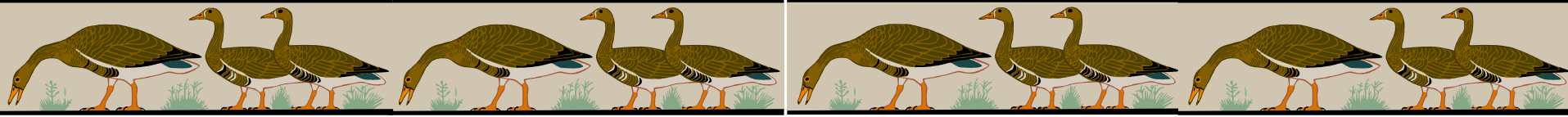
Epidemiological flow within production and related systems





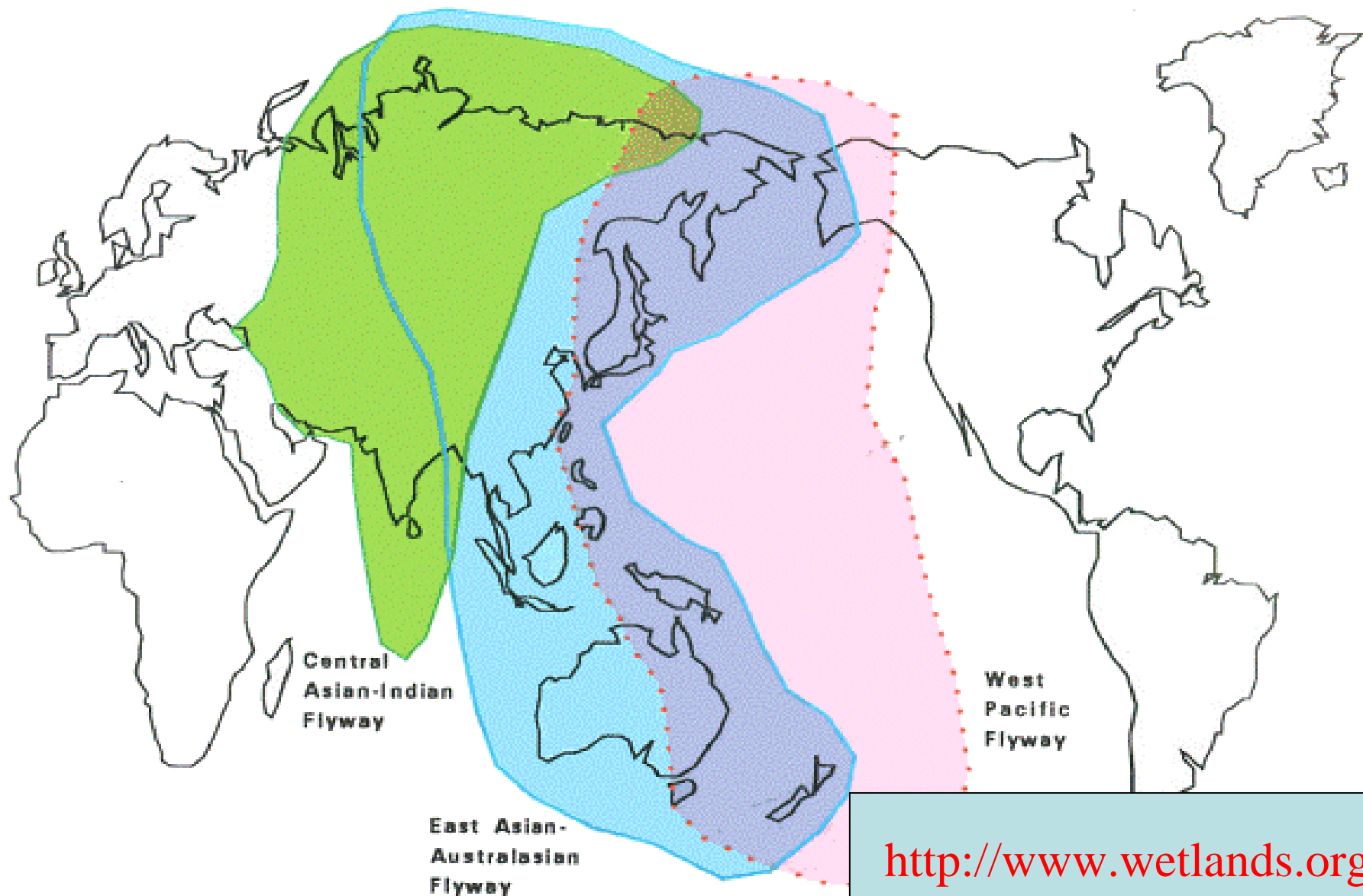
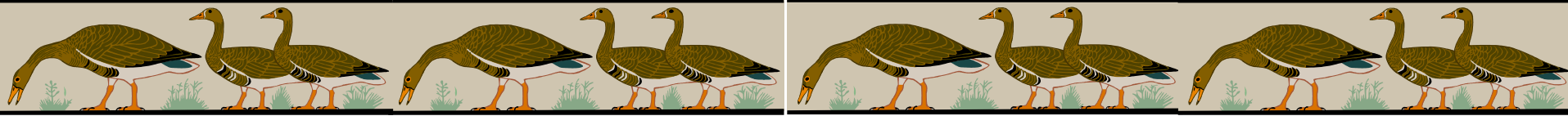
GIS preliminary analysis - *potential bias*

- Preliminary description of the whole population sample should be done before drawing any conclusion (pig, human and poultry density in China)
- GIS study based on extrapolated data (population density for pigs, poultry and human)
- Analysis on data reported (problem of under reporting)
- Statistics derived from geographical estimates obtained through EMPRES-*i* (source of geographical coordinates NIMA database)
- The precision of the statistics depends on the quality and the accuracy of the geographical coordinates used (further validation required)

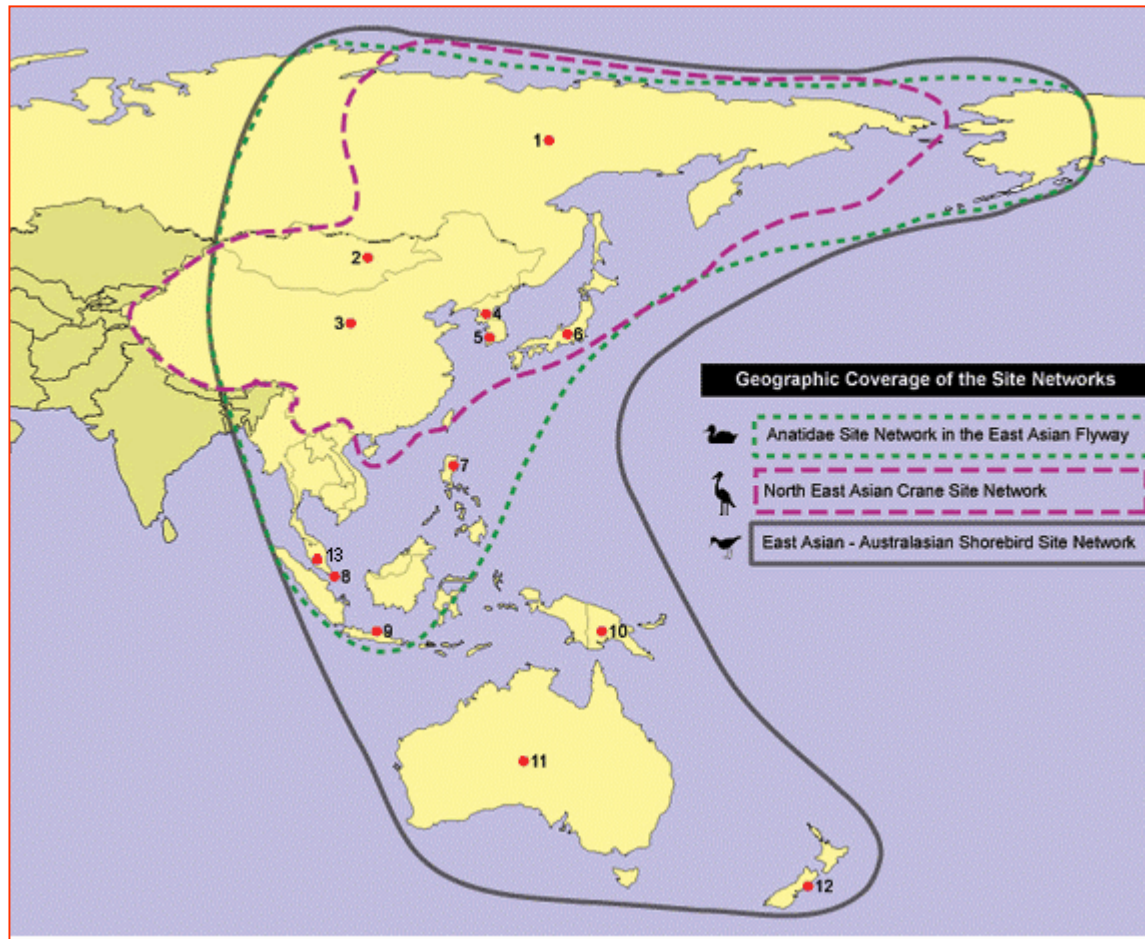
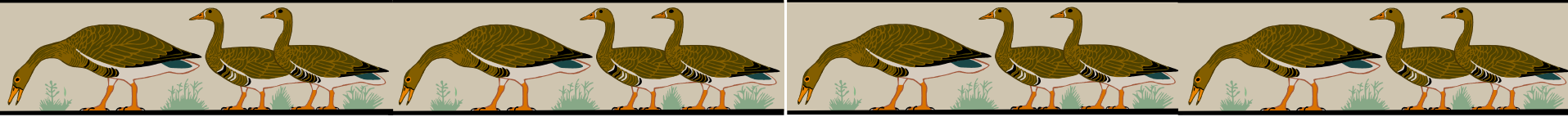


What next

- Cluster analysis (spatial relationship between outbreaks)
- Analysis of additional potential risk factors (distance to roads, water bodies and rivers/migration, farming systems)
- Intervention and rehabilitation. Restructuring of the poultry sector. Participation of the private sector.
- Significance of swine in H5N1 epidemiology
- Coordination of active AIV surveillance among migratory bird and aquatic fowl sanctuaries and habitats.
- Studies on virulence genes and AIV and “rules” of re-assortment events.
- Vaccination efficacy studies in farmed water fowl.

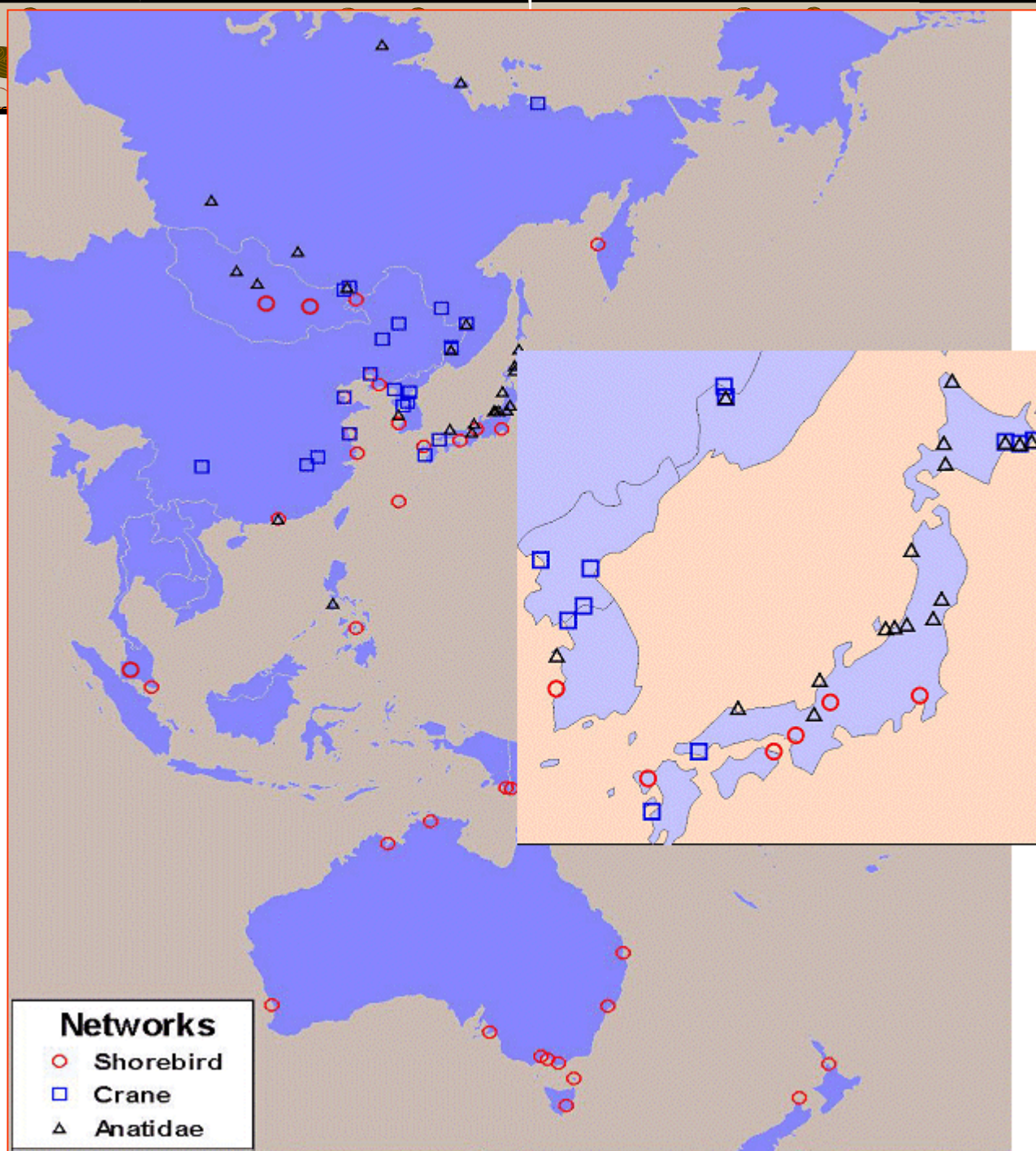
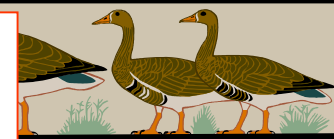
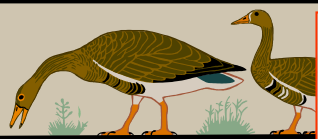


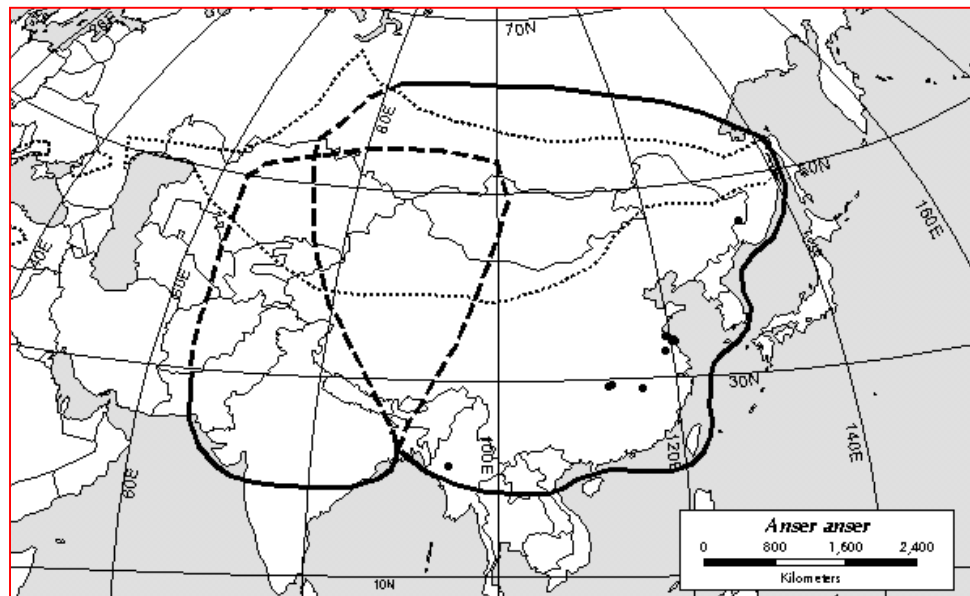
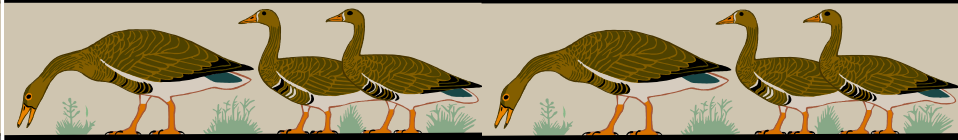
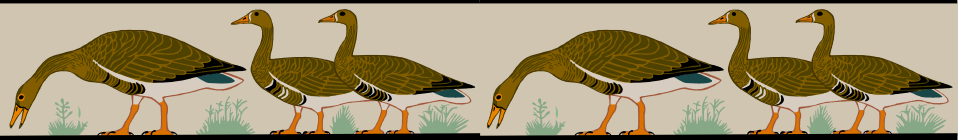
<http://www.wetlands.org>



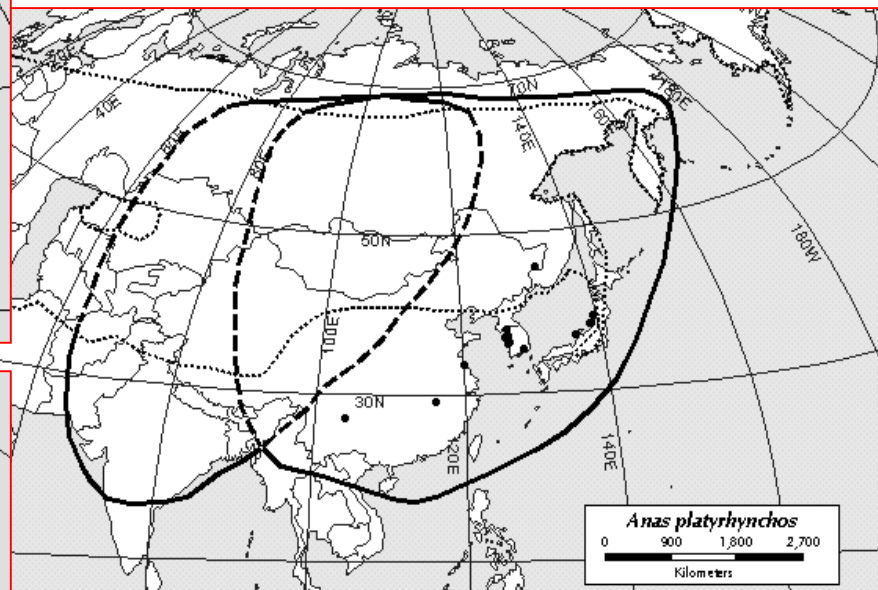
International Site Networks for migratory waterbirds in the East Asian-Australasian region
 ~ Asia-Pacific Migratory Waterbird Conservation Strategy ~



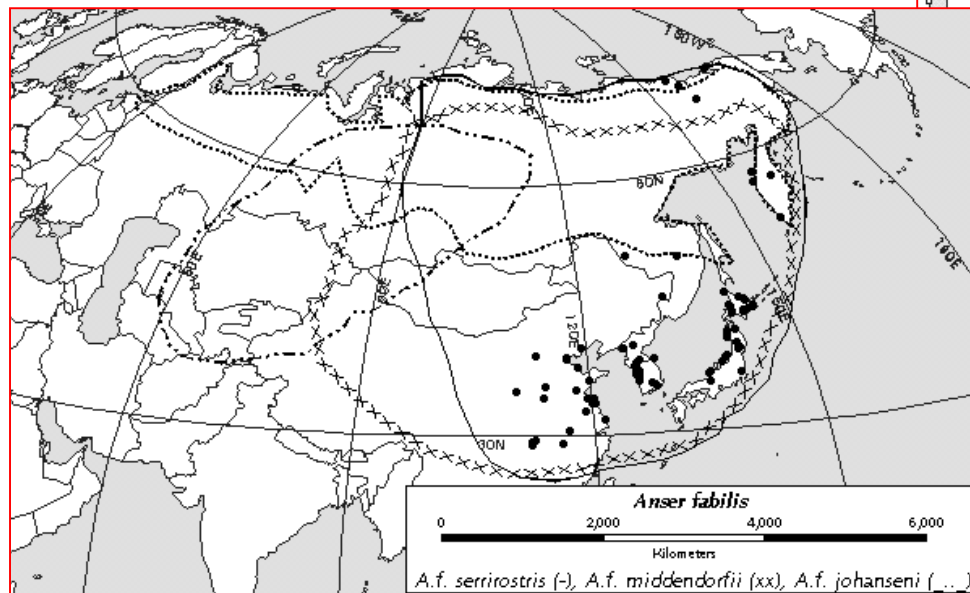




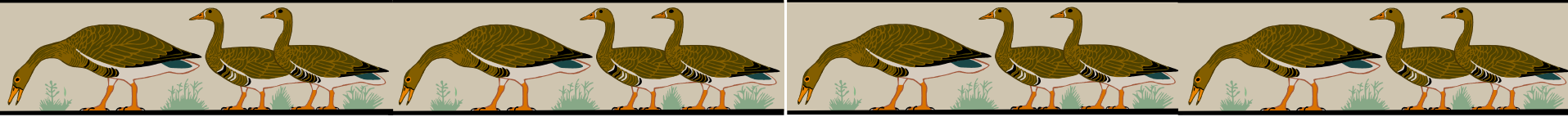
Greylag goose



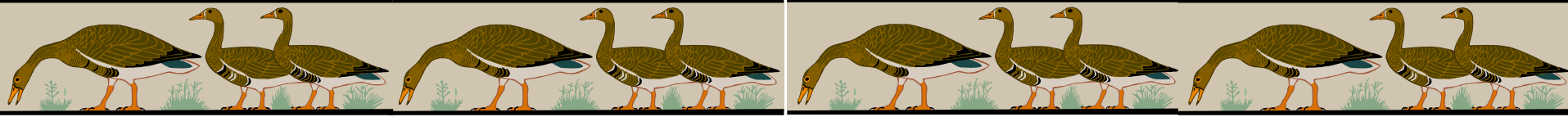
Mallard Duck



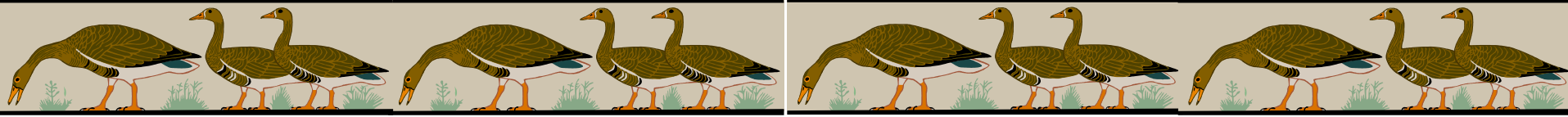
Bean Goose

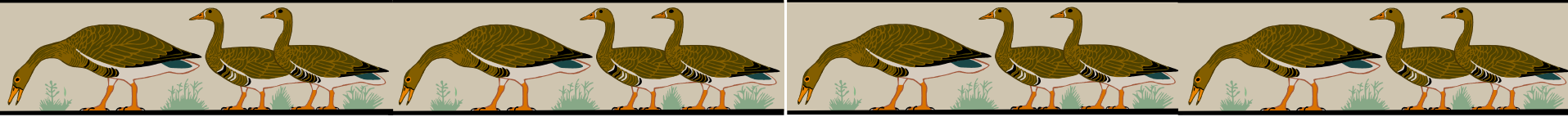


Dhanin Chearavanont TIME 2004



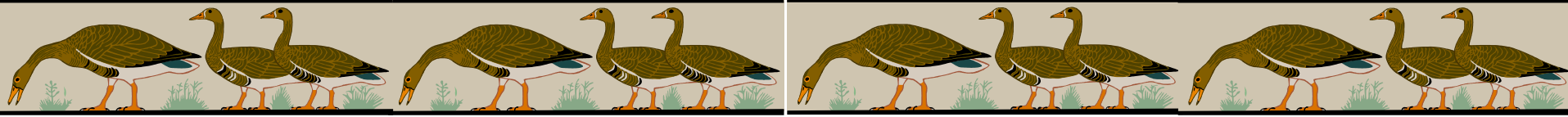
- To date we do not have indications that swine play a role in maintenance or spread of HPAI
- To date we don not have indications that wildlife (free flying aquatic birds) are mayor players in constant introductions of HPAI, although new genetic material is always a possibility.
- Separation of species in village livelihoods or commercial operations





Rehabilitation and Recovery

- This is the **end goal**
- *Cannot be done until everything is done*
- Prior to commencing, it must be based on disease/infection search in areas of high risk, disease occurrence, and identification for viral persistence in areas cleaned and disinfected (sentinelisation)
- Biosecurity – simplistic to complex
- Restructure of Poultry Sector – mid/long range planning
- Compartmentalisation

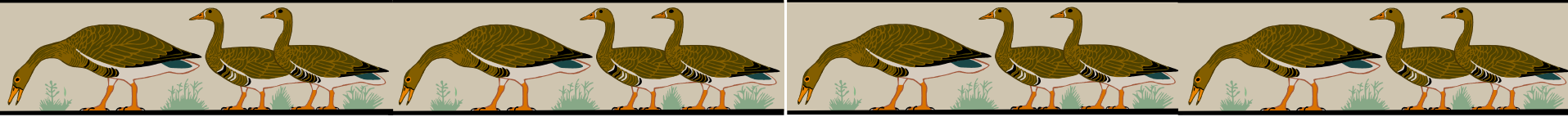


Highly Pathogenic Avian Influenza Ending the crisis

What to do in **immediately** and prepare for the next uncertainty

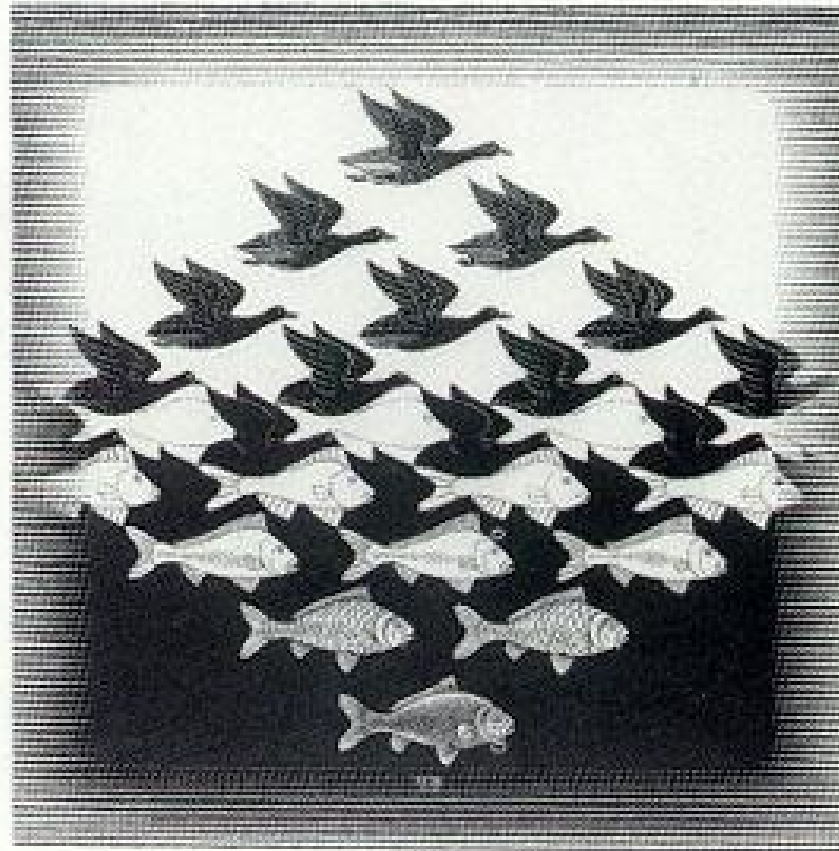
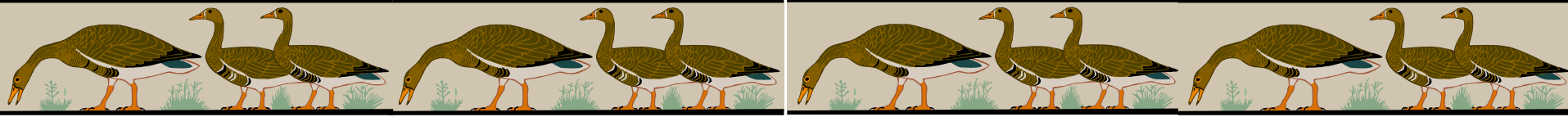
- Capacity at the **veterinary laboratories** to conduct differential diagnostic testing
- Establish **contingency and emergency plans** for HP Avian Influenza
- Establish **links with other Ministerial forces** to apply the necessary counter-epizootic measures
- Establish cooperation and participation of the **private sector**
- Periodic reviews of **national legislation** to enable official services to intervene in the event of animal health emergencies
- Establish systems to penalise countries that do not meet their international reporting obligations [how?]
- Institute **basic biosecurity** concepts at the farm, market, and official service levels.
- Establish **laboratory networks** that collaborate with national and regional epidemiology units





Opportunities for Active Surveillance

- Natural reserves- Collection/Analysis
- Reservoirs, Lakes vicinity to Poultry Production Areas - Collection/Analysis
- Abattoir Routine Sample - Collection/Analysis
- Network of Laboratories
- Collaboration with WHO diagnostic systems and OIE/FAO Laboratories



www.fao.org/ag/aga/agah

