LinkTADs

LinkTADs and beyond

Cirad research activities in China

1 - LinkTADs WP3

- Main outputs
- Next?
  - ASF
  - JE
  - AMR

LinkTADs

Linking Epidemiology and Laboratory Research on Transboundary Animal Diseases and Zoonoses in EU and China

2- Since 2005 :

- OIE and FAO workshops
  - D-learning and Epi courses
  - FETPv
- Expertise: FAO, OIE, WHO
- Avian and swine flu
  - Poyang Studies (H5N1)
  - Hong-Kong University & Pasteur Research Centre
    - Coronavirus (MERS-CoV)

cirad

Animal and Integrated Risk Management

3 - Regional Network & Programmes?

- GREASE (SE Asia)
- SEA-EU-NET (MasterClass & Workshops)
- InterRisk Master

GREASE

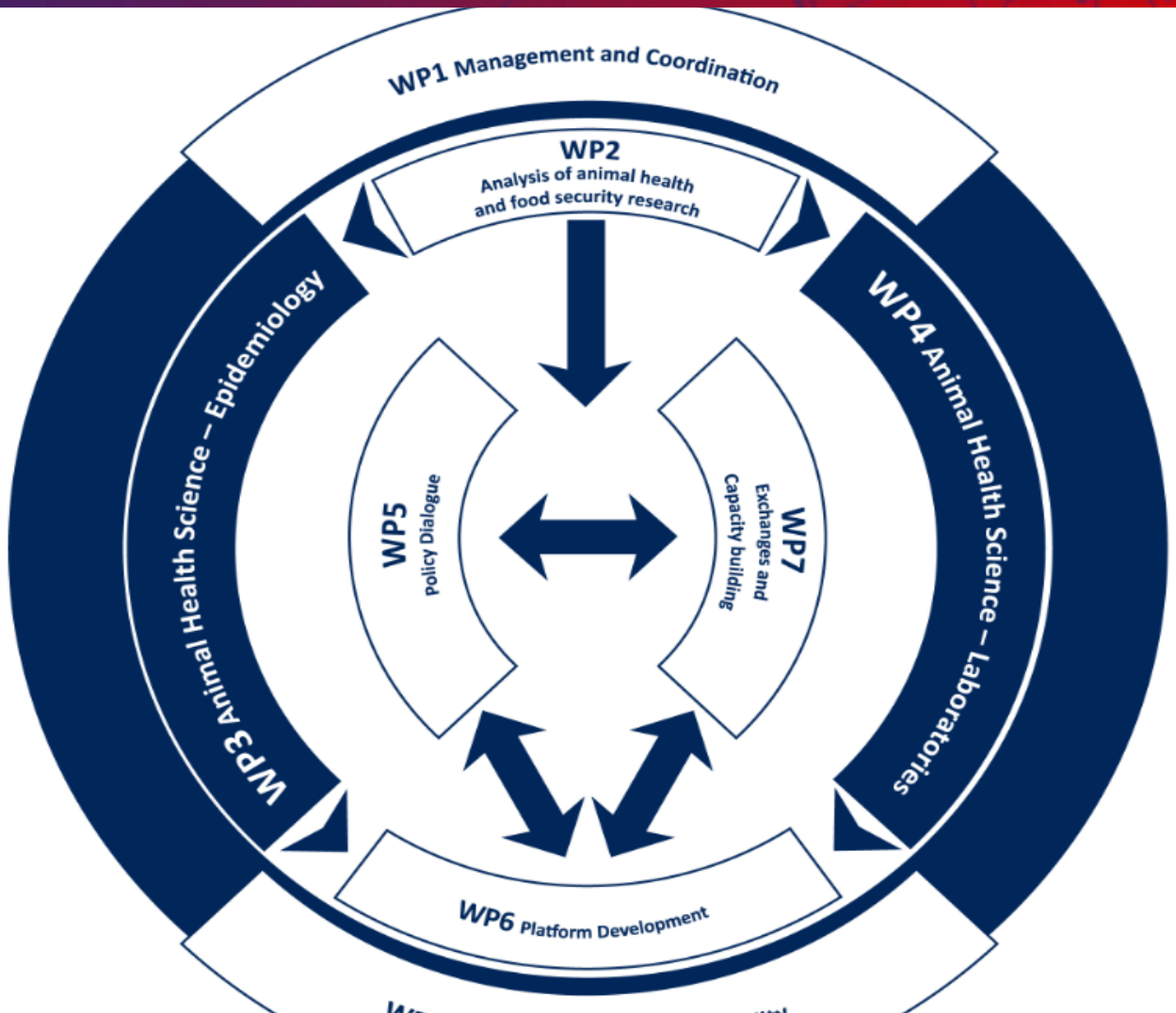
GREASE

"Research network for the management of emerging risks"

http://www.grease-network.org

LinkTADs

Linking Epidemiology and Laboratory Research on Transboundary Animal Diseases and Zoonoses in EU and China



LinkTADs : WP3 General objectives

Improving epidemiology that would eventually strengthen the emergence response capacity for emerging infectious diseases

- **risk-based surveillance programmes**
- **cost-effective and targeted control**
- **Identify and fill knowledge gaps** in the epidemiology/ecology/economy of priority transboundary animal diseases (TADs) and emerging infectious diseases (EIDs), in the context of twinned European/Chinese research projects.

WP3 - Tasks and results

WP3 events summary

Task	Event	Title	Location	Date
3.1.1	**Meeting**	**Follow-up on the FETPV program**	**Beijing**	**31 July 2014**
3.1.2	**Meeting**	**Eco-epidemiology of Avian Influenza and other EIDs**	**Shanghai**	**14 April 2014**
3.2.1	**Workshop**	**Risk-based surveillance and Evaluation of surveillance systems**	**Qingdao**	**13-14 July 2015**
3.2.2	**Workshop**	**Workshop on Eco-epidemiology of TADs and EIDs**	**Qingdao**	**8-9 April 2015**
3.3	**Training**	**Field Epidemiology Training , training of trainer**	**Qingdao**	**April and July 2015**
3.4	Training	Analytical epidemiology training	To be determined	To be determined - 2016

WP3 Tasks and results

Task 3.1 Coordination meetings in EU and China

3.1.1 Follow-up on the FETPV program

This meeting was held in July 2014 resulting the following recommendations:

- **A training session of training of trainers in field epidemiology will be organised in Qingdao China for the selected students of the previous FETPV cohort (done mid-2015)**

- **Exchanges** could be organised with CIRAD and the Veterinary faculty of Kasetsart University (KU) in Bangkok, Thailand.
  - CIRAD, the national veterinary school of Toulouse (ENVT) in France and KU are developing an **International Master to train OH risk managers**
  - Will start end of 2015.

  - ➔ **Chinese trainers** to participate to the teaching committee of the Master and to have the possibility to propose some course in collaboration with other trainers involved in the master.

WP3 Tasks and results

Task 3.1 Coordination meetings in EU and China

3.1.2 Eco-epidemiology of Avian Influenza and other EIDs

- This meeting was organized in Shanghai in April 2014.
- Thanks to the co-organisation of the avian influenza meeting by LinkTADs and the NIH project (USA)

- A subsequent online questionnaire helped to **identify the diseases for which LinkTADs could set up EU-China and epidemiology-laboratory sciences collaborations partners in the future.**
- **According to these results 10 diseases were selected:**

African swine fever
Avian Influenza
Classical swine fever
Japanese Encephalitis
Porcine Respiratory Reproductive Syndrome
Antimicrobal resistance
Bovine tuberculosis
Foot and mouth disease
Porcine Epidemic Diarrhea
Rabies

WP3 Tasks and results

Task 3.2 Workshops enhancing EU-China networking in epidemiology

3.2.1 Workshop on Risk-based surveillance and Evaluation of surveillance systems

(Task leader: RVC, Partners involved: CIRAD, CAHEC, FAO, HVRI, SHVRI)

This would be a joint event with FP7 European projects RiskSur and ASFORCE

Objectives:

- Identification of the relevant possible surveillance strategies for the diseases identified as priorities during previous meetings.

- To apply the results of on-going research projects to determine the most relevant methods for the surveillance of diseases prioritized in this project.

Organized in Qingdao in July 2015

WP3 Tasks and results

Task 3.5 Twining of European and Chinese Research projects

Twining with RiskSur project:

Joint event (Workshop 3.2.1)

Implementation of a Chinese RiskSur case study thanks to LinkTADs

Twining with ASForce project

Twining with H5N1 and H7N9 transmission ecology project (NIH):

Joint event (Meeting 3.1.2)

JE collaboration (SHVRI – CIRAD - SVA)

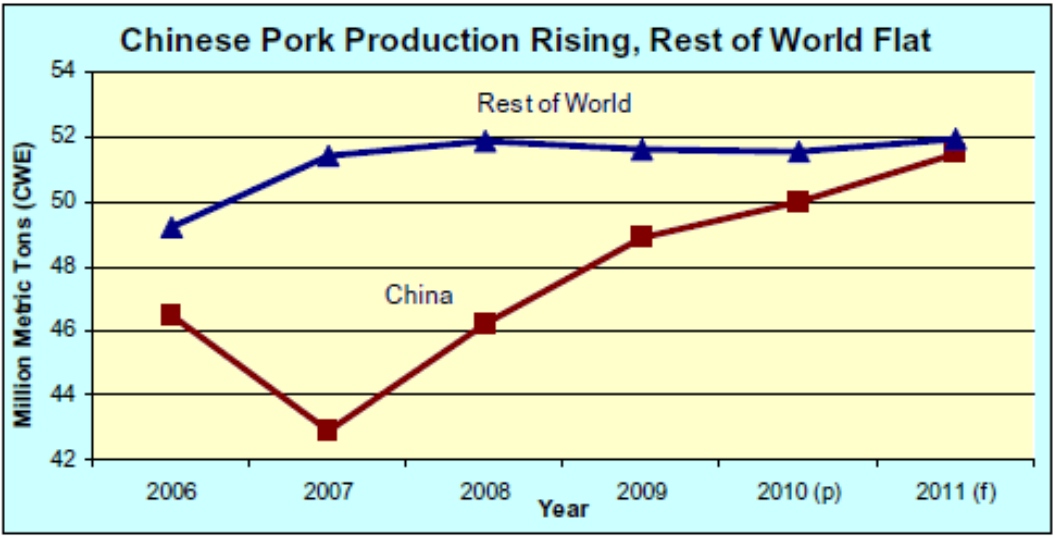
New project funded by the Chinese Ministry of Science and Technology

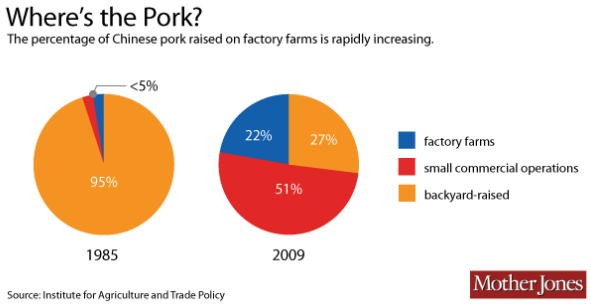
Future projects EU-China / Epi-Lab

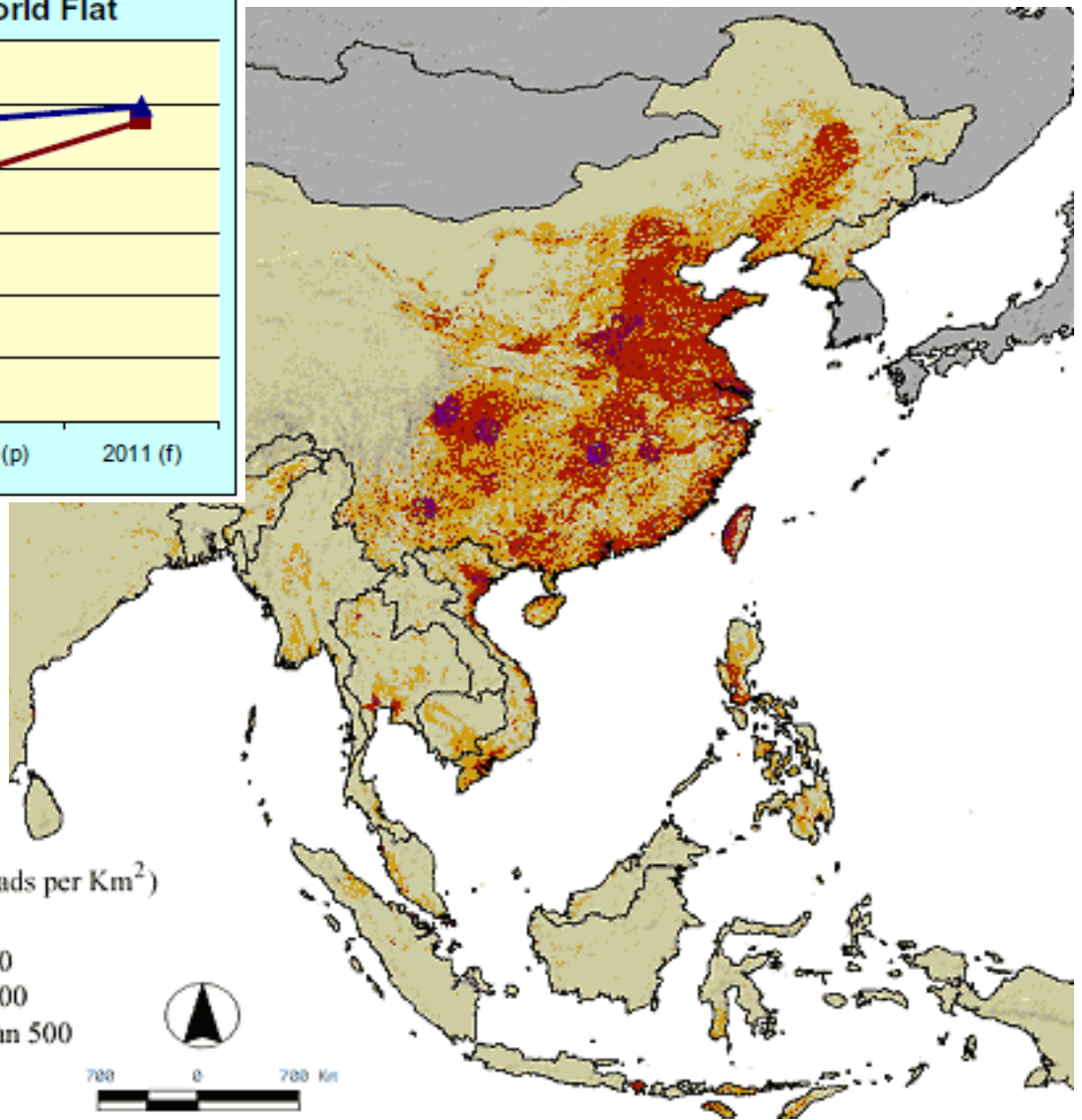
Concept notes from Workshop 3.2.2

Propositions for exchanges and short visits (cf WP7)

African swine fever – Risks for China and SE Asia?

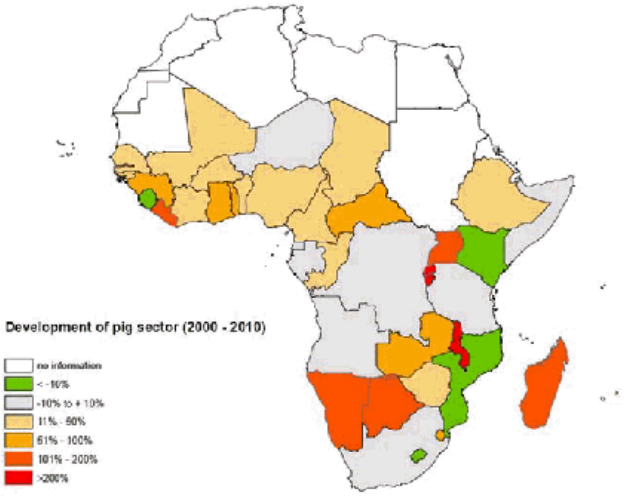




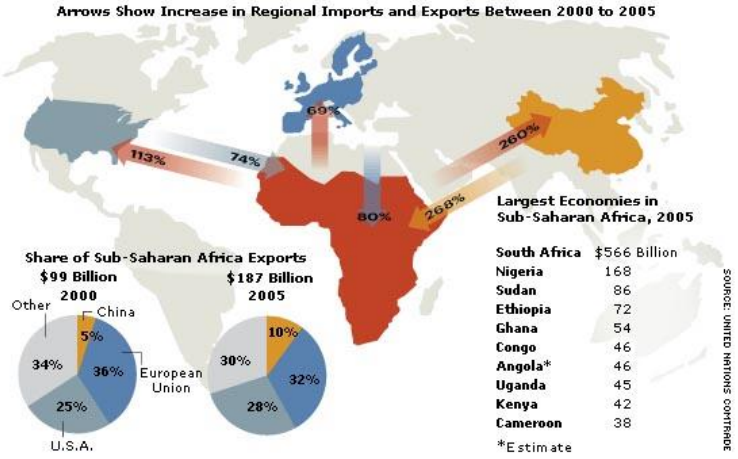


Pathways

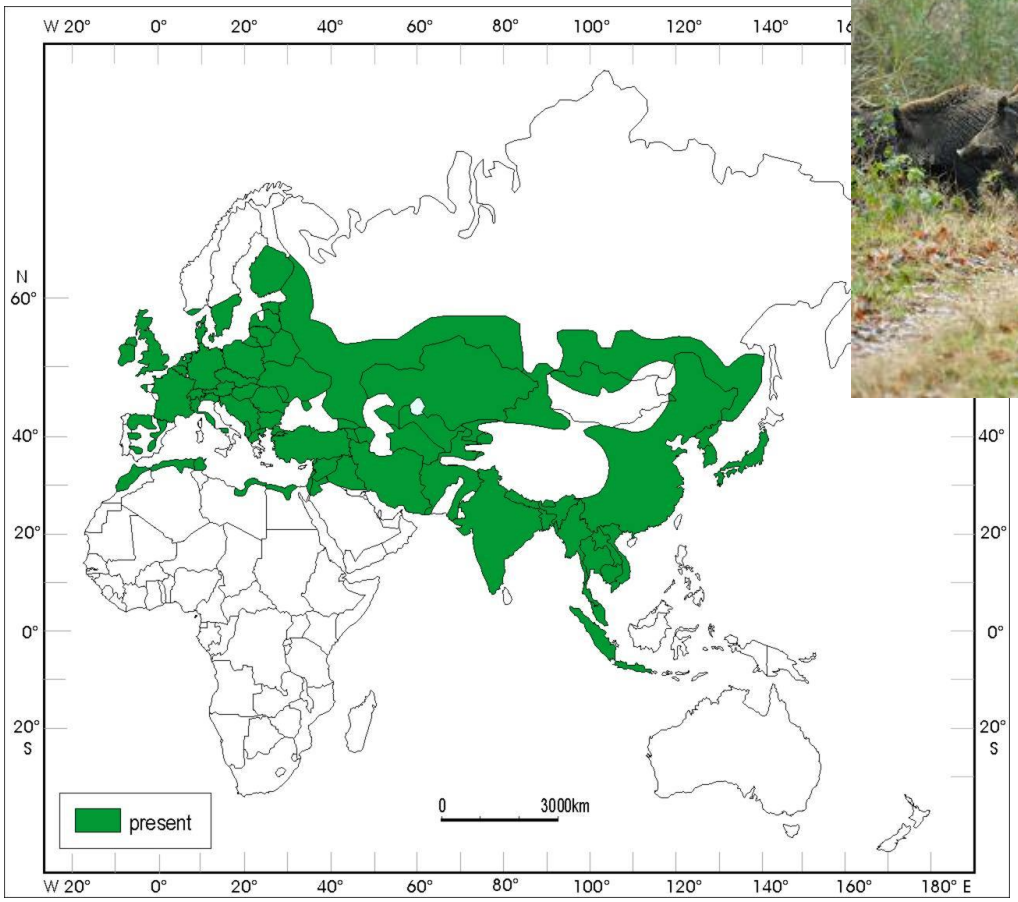
- Long distances
  - Legal and illegal trade
    - Russia
    - Africa & Madagascar
      - Trade China/Africa +++
- Medium and short distances
  - Wild suids populations
  - Local & National Trade



FAOSTAT: development of pig sector in Africa 2000-2010



Wild boars


W 20°
0°
20°
40°
60°
80°
100°
120°
140°
160°
180° E
N
60°
40°
20°
0°
20°
S
present
0
3000km

ASF Risk analysis for China ?

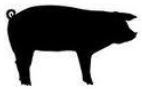
- « Perspective » Paper joining Chinese and European researchers (e.g. EID)
- LinkTADs case-study on risk analysis?

- Introduction
  - RA, QRA
  - SNA
  - MCDA

- Spreading
  - SNA
  - SIR-SNA
  - MCDA

- Endemicity
  - MCDA

Japanese Encephalitis
(and existing control measures)



Russia
Mongolia
China
North Korea
South Korea
Japan
Afghanistan
Pakistan
Nepal
Bhutan
India
Bangladesh
Burma
Laos
Thailand
Vietnam
Taiwan
Philippine Sea
Saipan
Guam
Philippines
South China Sea
Cambodia
Brunei
Malaysia
Singapore
Sri Lanka
Bay of Bengal
Arabian Sea
Indian Ocean
Indonesia
Papua New Guinea
Timor-Leste
Australia
Japanese Encephalitis Risk Areas
Areas with No Known Japanese Encephalitis Risk

South-East Asia Encephalitis project

- Multidisciplinary research program aiming to reduce morbidity and mortality associated with infectious encephalitis
- Document and analyse factors related to clusters of encephalitis cases integrating human health, animal health and environment.

SEAE PROJECT NEWSLETTER

SEPTEMBER 2012

OVERVIEW INFORMATION

Project context

In Asia, acute encephalitis is among the most frequent and severe causes of pediatric hospitalization. Moreover encephalitis etiologies remain unknown in more than 60% of patients. Because the epidemiological situation in developing Southeast Asian countries is particularly appropriate to reveal the circulation of emerging infectious ag
gation of acute encephalitis s
importance, both locally and

SEAE SOUTH EAST ASIA ENCEPHALITIS PROJECT

OPEN ACCESS Freely available online

PLOS | NEGLECTED TROPICAL DISEASES

Review

Estimating the Burden of Japanese Encephalitis Virus and Other Encephalitides in Countries of the Mekong Region

Arnaud Tarantola[1]*, Flavie Goutard[1,2], Paul Newton[3], Xavier de Lamballerie[4], Olivier Lortholary[5], Julien Cappelle[1,2], Philippe Buchy[1]

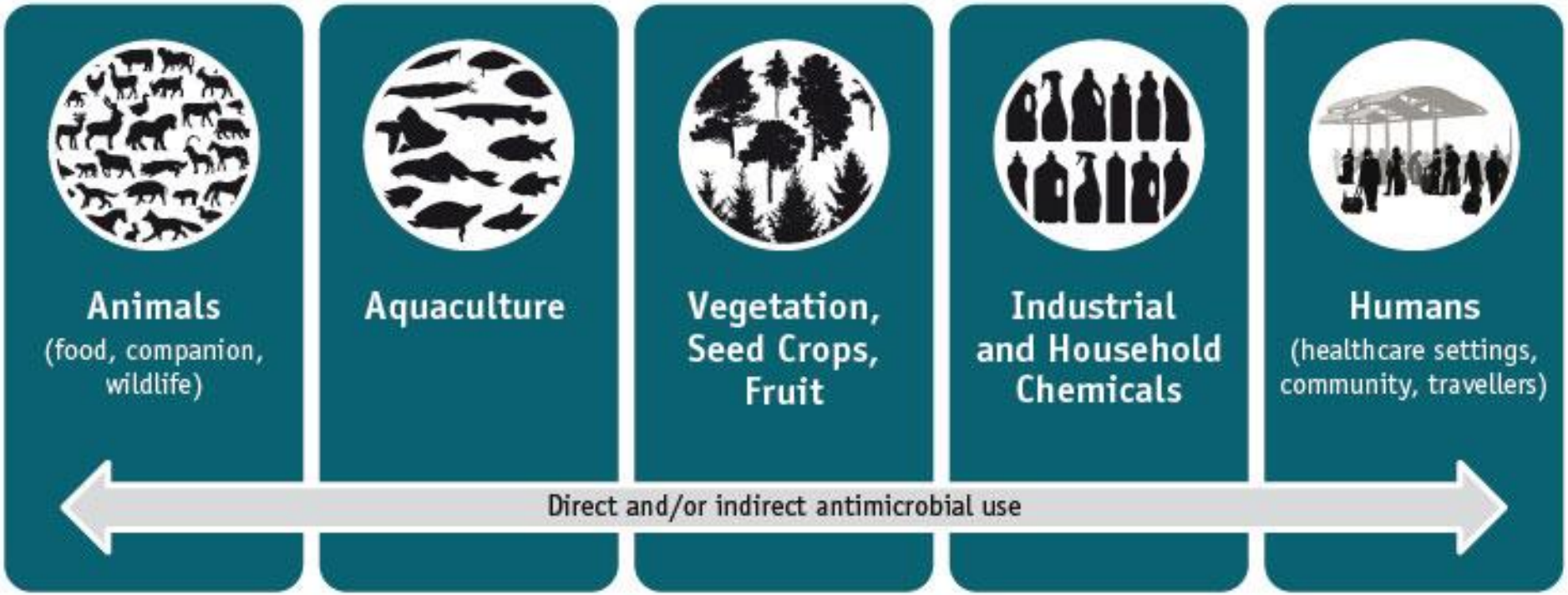
JE Research Project with SHRVI (Shanghai) and Sweden Lab.

- **Genotypes shift?**
  (GIII / GI)
  - **Virology, Entomology**
  - **Epidemiology**
  - **Eco-Epidemiology**
- **Fields: North/Centre/South China**
- **Cirad preliminary mission in Sept 2015, Shanghai**

- *Isolate JEV from pigs and mosquitos in pig farms with different climate and identify genotype of JEV isolates.*
- *Detect the seroprevalence of JEV genotype I and III in pig farms located at different climatic zones.*
- *Collect data necessary for eco-epidemiological analysis, such as pig density, vaccination, mosquito species, geographical distribution, climate, paddy fields, etc.*
- *Analyze the ecological and epidemiological factors associated with JEV genotype shift and distribution.*

➔ ***Analyze the effect of JEV genotype shift on pig farms and the risk on JEV control.***

AMR



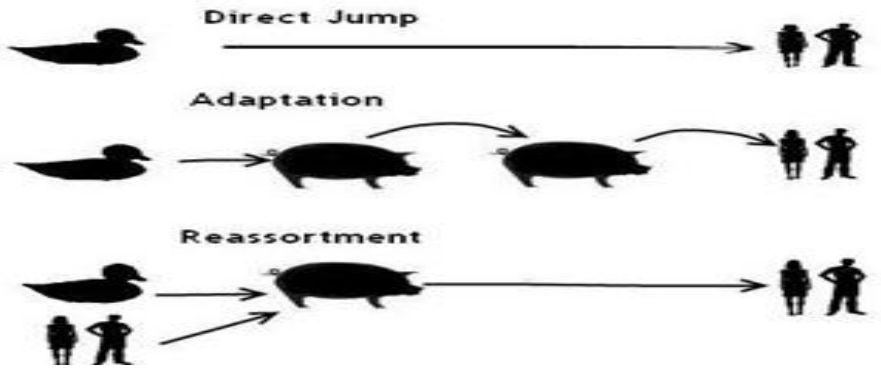
- AMR = Main Topic proposed by LinkTADs meetings
  - Surveillance and drivers of AB use
  - Surveillance of AMR in animals, humans and environment
  - Control
- French Cooperation in China: expertise and projects
- Regional approach ?

FROM 2005

OTHER ACTIVITIES

China (1) : Hong-Kong

- Pasteur (PRC-HKU)
  - MoU Cirad-PRC
- University (HKU)
  - Influenza
    - PhD students
      - Avian flu
      - Swine flu
        - » Surveillance systems
        - » Epidemiology
        - » Risk analysis



China (2): Mainland

- Regional & international trainings (2009-2012/13) :
  - OIE, FAO (surveillance, risk analysis)
  - FETPv: Field Epi Training Programme (FAO, RVC etc.)
  - WHO

Workshop on disease outbreak investigations and Training of Trainers in Beihai, Guangxi

Workshop on disease outbreak investigations and Training of Trainers in Beihai, Guangxi

The workshop on disease outbreak investigations and training of trainers to provincial/county veterinarians was held from 4th to 13th May in Beihai, Guangxi Province. Two international experts Dr Flavie Goutard and François Roger from International Research Center for Agriculture and Development (CIRAD) conducted the training in joint collaboration with the ECTAD China national epidemiologist. 31 participants attended the training.

China (3): Mainland

- Expertises
  - Vaccination (H5N1) : Marisa Peyre (FAO)
  - Risk Analysis : Flavie Goutard (WHO)

EPIX ANALYTICS

cirad

World Health Organization

Risk Assessment Training & Expertise

A TRANSDISCIPLINARY STUDY OF THE RISK OF TRANSMISSION AND SPREAD OF HPAIV H5N1 IN ASIAN INTENSIVE AGRO-ECOSYSTEMS

Julien Cappelle,[1,2] Delong Zhao,[2] Martha I. Nelson,[3] John Takekawa,[4] Scott Newman,[5] Nicolas Gaidet,[2] Ying Liu,[6] Peng Li,[6,7] Marius Gilbert,[8,9] and Xiangming Xiao[2]

[1] **CIRAD**-ES, UR AGIRs, F34398 Montpellier, France
[2] **Oklahoma University**, Center for Spatial Analysis, Norman OK, USA
[3] Division of International Epidemiology and Population Studies, Fogarty International Center, **National Institutes** of Health, Bethesda, MD 20892.
[4] **US Geological Survey**, Western Ecological Research Center, Vallejo CA, USA
[5] **FAO**, EMPRES Wildlife Unit, Infectious Disease Group Animal Health Service, Animal Production and Health Division, Rome, Italy
[6] Department of Geography, **Jiangxi Normal University**, Nanchang, China
[7] Institute of Geographical Science and Natural Resource Research, **Chinese Academy of Sciences**, Beijing, China
[8] Biological Control and Spatial Ecology, **Université Libre de Bruxelles**, av FD Roosevelt, 50, B-1050 Brussels, Belgium
[9] **Fonds National de la Recherche Scientifiques**, rue d'Egmont 5, B-1000 Brussels, Belgium.

cirad
LA RECHERCHE AGRONOMIQUE POUR LE DÉVELOPPEMENT

OKLAHOMA

USGS
science for a changing world

ULB

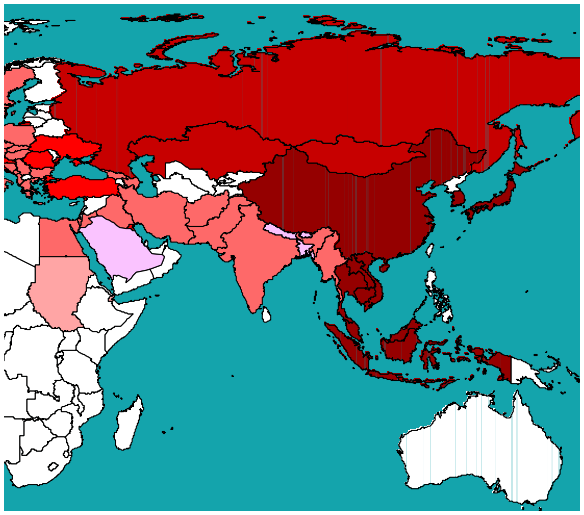
FAO
FIAT PANIS

JIANGXI NORMAL UNIVERSITY
1940

NATIONAL INSTITUTES OF HEALTH

H5N1 Long-Distance Spread Introduction

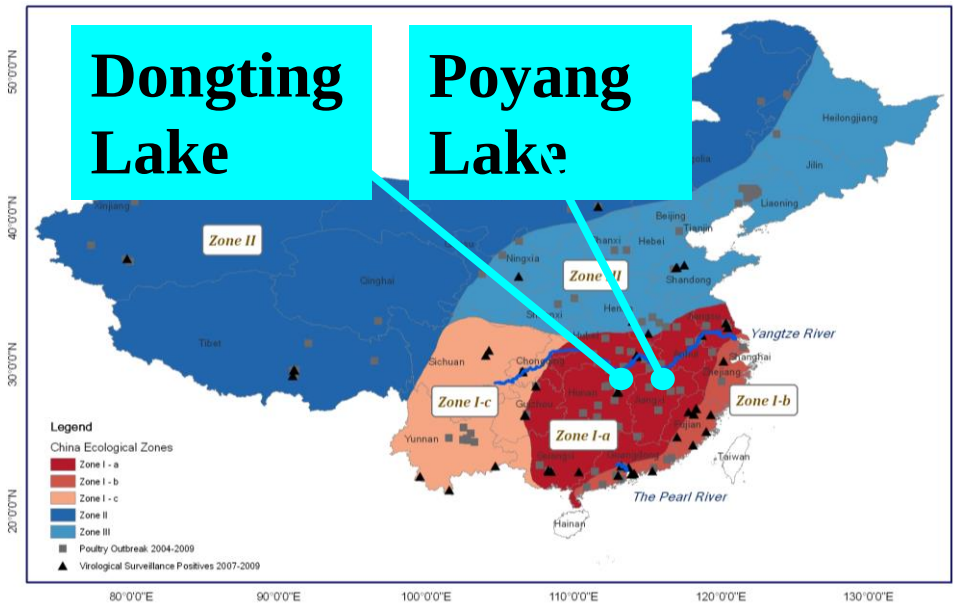
Asia and South China = origin of H5N1



1st Report of H5N1 HP:

- Before 2005
- Summer 2005
- Fall 2005
- Winter 2005/06
- Spring and Summer 2006
- 2007 - 2010

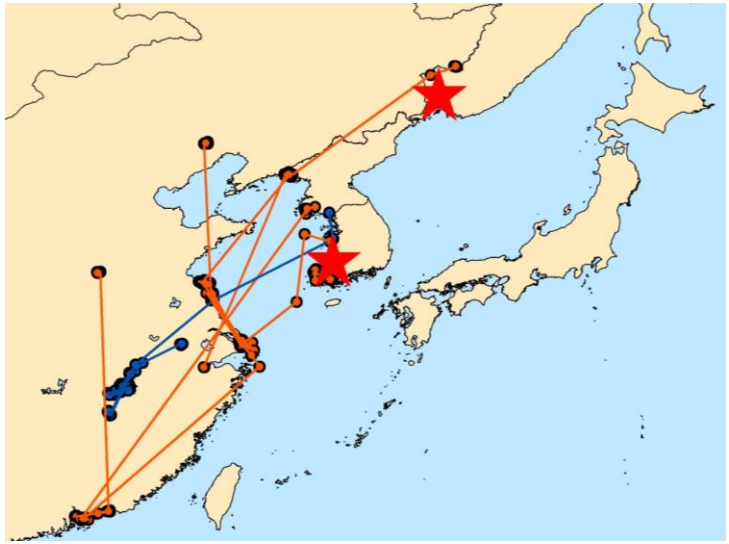
Long-distance Spread - Clade 2.2



H5N1 HPAIV spread by wild ducks from South China ?

Cappelle et al – EcoHealth 2014

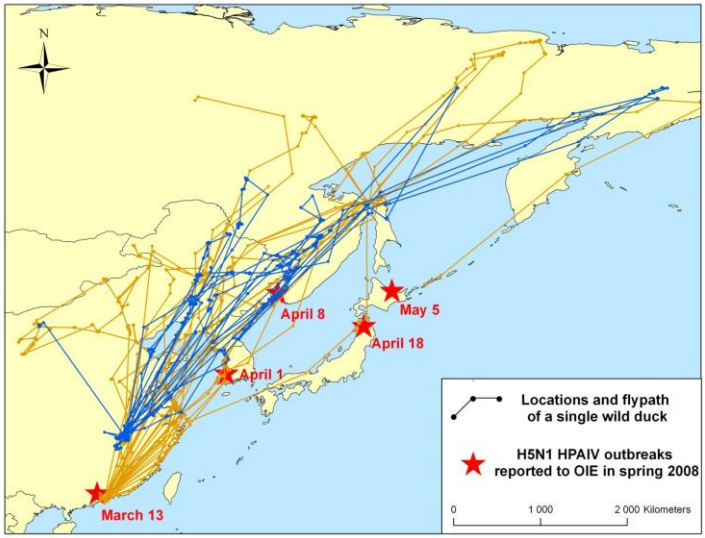
H5N1 Long-Distance Spread



•Satellite Telemetry **Ecology**

•H5N1 HPAIV Outbreaks Reporting (OIE) **Epidemiology**

•H5N1 HPAIV phylogeny **Virology**



Cappelle et al – EcoHealth 2014

H5N1 Long-Distance Spread

- Farming of free-grazing domestic ducks is intensive in this area and synchronized with wild duck migration

- We provide evidence associating wild ducks migration with the spread of H5N1 in the spring of 2008 from southern China to South Korea, Russia, and Japan
    - **supported by documented wild duck movements and phylogenetic analyses of highly pathogenic avian influenza H5N1 sequences**

- We suggest that prevention measures based on a modification of agricultural practices may be implemented in these areas to reduce the intensity of AIV transmission between wild and domestic ducks
    - This would require involving all local stakeholders to discuss feasible and acceptable solutions.

Cappelle et al – EcoHealth 2014

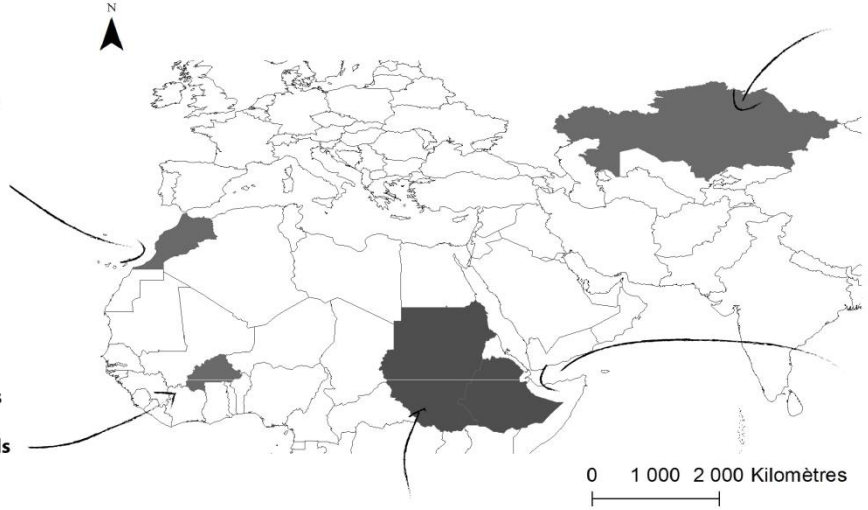
MERS-CoV with Hong Kong
Role of camels, bats…?

MOROCCO

961 specimens - dromedary camels
-380 serum from sampling in 2015
-200 serum from sampling in 1990
-381 swabs from sampling in 2015

BURKINA FASO - dromedary camels

1143 specimens - dromedary camels
- 530 serum from sampling in 2015
- 86 serum from sampling in 2012
- 530 swabs from sampling in 2015



SUDAN - dromedary camels

- 172 serum from sampling in ?

KAZAKHSTAN

1110 specimens - dromedary & bactrian camels
- 550 serum from sampling in 2015
- 550 swabs from sampling in 2015

ETHIOPIA

1800 specimens - dromedary camels
- 600 serum from sampling in 2015
- 600 serum from sampling in 2014 in abattoir
- 600 swabs from sampling in 2015

MERS-CoV Project

cirad
LA RECHERCHE AGRONOMIQUE POUR LE DÉVELOPPEMENT

NIH

香 港 大 學
THE UNIVERSITY OF HONG KONG

SE ASIA and CHINA

REGIONAL NETWORKS AND PROGRAMMES

Transboundary and Emerging Diseases

Transboundary and Emerging Diseases

ORIGINAL ARTICLE

Risk of Introduction in Northern Vietnam of HPAI Viruses from China: Description, Patterns and Drivers of Illegal Poultry Trade

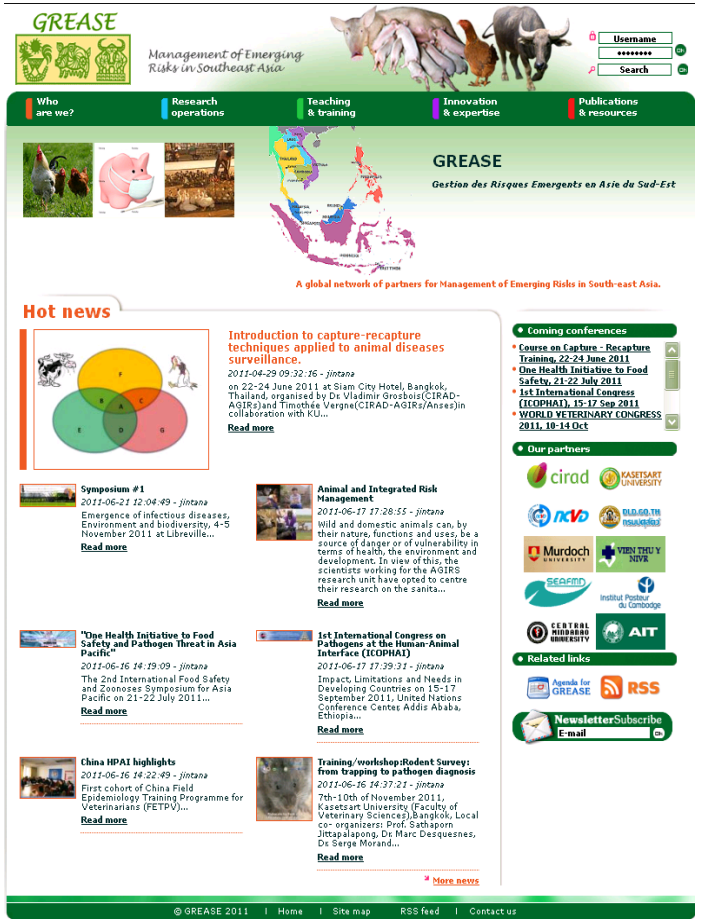
S. Desvaux[1,2], C. O. Nguyen[3], D. T. Vu[3], C. Henriquez[1], V. D. Ky[4], F. Roger[1], S. Fenwick[2] and F. Goutard[1]

[1] CIRAD, Animal et gestion intégrée des risques (AGIRs), Montpellier, France
[2] School of Veterinary & Biomedical Sciences, Murdoch University, Perth, WA, Australia
[3] CEIDR, Centre for Interdisciplinary Research on Rural Development, Hanoi Agriculture University, Hanoi, Vietnam
[4] Department of Animal Health, Ministry of Agriculture and Rural Development, Hanoi, Vietnam

Management of Emerging Risks in SEA

- A regional network with the objective to support research activities for a better management of transboundary and emerging diseases in South-east Asia.
- http://grease-network.com/

- CIRAD presents in Cambodia, Lao PDR, Thailand, Vietnam
- Other members: Philippines and Indonesia



GREASE: an adaptive process...

Research Projects

GREASE

Training & Education

E-learning

Trainings: participatory epidemiology, biostat R

Master degree/PhD (InterRisk)

Partners' Needs

SEA-EU-NET
partners in science

"One Health Master Class" Fellowship grants

The SEA-EU-NET II project is launching a call for candidates in order to emphasize high level scientific exchanges between Europe and Southeast Asia on the scope identified. This call is directed to young European and Southeast Asian Doctorates and/or Master students, who intend to carry on as research carriers in the scope of EU/SEA technical and scientific collaboration.

- 12 students from Asia (including China) and Europe
- Trainers from: UK, OIE, OMS, FAO, ECDC et CIRAD
- 2014-2015 : 10 days in Montpellier & 10 days in Thailand
- Opinion paper *in prep* (Ecohealth)

Flavie Goutard/AGIRs – Valo Cirad

« Inter-Risk »
Master Program

- One Health framework

- Training for better assessment and management of health risks at the human, animal and ecosystem interface

Kasetsart University

Framework

- Double-diploma French-Thai
- International program : Asian and European students
- Institutional framework: 3 partners
  - CIRAD
  - ENVT (National Veterinary College of Toulouse, France)
  - Kasetsart University (Thailand)

Thank you !

Project Manager:
Food and Agriculture Organization of the United Nations (FAO)

Mr. Daniel Beltran-Alcrudo
E-mail: Daniel.BeltranAlcrudo@fao.org
Phone: + 3906 5705 3823
Fax: + 3906 5705 3057

LinkTADs

Linking Epidemiology and Laboratory Research on Transboundary Animal Diseases and Zoonoses in EU and China