



# One World, One Health:

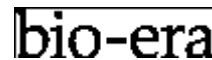
one world • one health

Healthy Ecosystems, Livestock and Human Livelihoods: An Innovative Public-Private Partnership

*Ecosistemas, Animais Silvestres E Meio De Vida*

*Humano Saudáveis: Uma Parceria Pública-Privada Inovadora*

**October 2-4, 2007 – Brazil**



**Organización Panamericana de la Salud**  
Oficina Regional de la Organización Mundial de la Salud



The Bay and Paul Foundations

Food and Agriculture Organization of the United Nations

**Animal Production and Health Division**



# Why do these diseases matter? ... and what are we doing about it ?

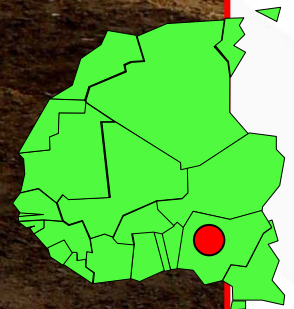
**Juan Lubroth**

Animal Health Service  
Food and Agriculture Organization

October 2007, Brasilia









# Livelihoods



**one world • one health**





# Food Security





# Conservation, Sustainable Development and Balance





# The importance of livestock in Developing Countries

Ploughing /  
transportation



Social / religious



Food

e.g.  
milk  
meat



Wealth & welfare



Hides



Manure/ fuel

Trade



# Food and Agriculture Organization



- Founded in 1945 in the United States
- Raise nutrition standards around the world
- Increase agricultural productivity
- Improve the living conditions of the rural population

FAO is one of the largest specialised organisations of the UN system, and the one dedicated to –

- Agriculture and Livestock
- Forestry
- Fisheries
- Rural development

– 199 Member States + EC

# Mission



- **Alleviate Poverty**
  - Reduce hunger through **agricultural development**
  - Promote better **nutrition**
- **Food Security** ... is defined for an entire population at any given time, access to all the nutrition required to lead an active and healthy life.
  - The production of food has increased at an unprecedented since FAO was founded in 1945, surpassing the doubling of the worlds population during the same period rate.
  - Since the early 1960's, the proportion of hungry people in the developing world has decreased from 50% to less than 20%.
  - Yet, this translates to 790 million hungry people in the developing world.



# The potential of livestock to support people is threatened by Transboundary Animal Diseases

Transboundary Animal Diseases are diseases of significant economic, trade and food security importance; they spread easily and reach epidemic proportions; control and management (including exclusion) requires international co-operation.





## Why do we bother with Transboundary Diseases?

Because they:

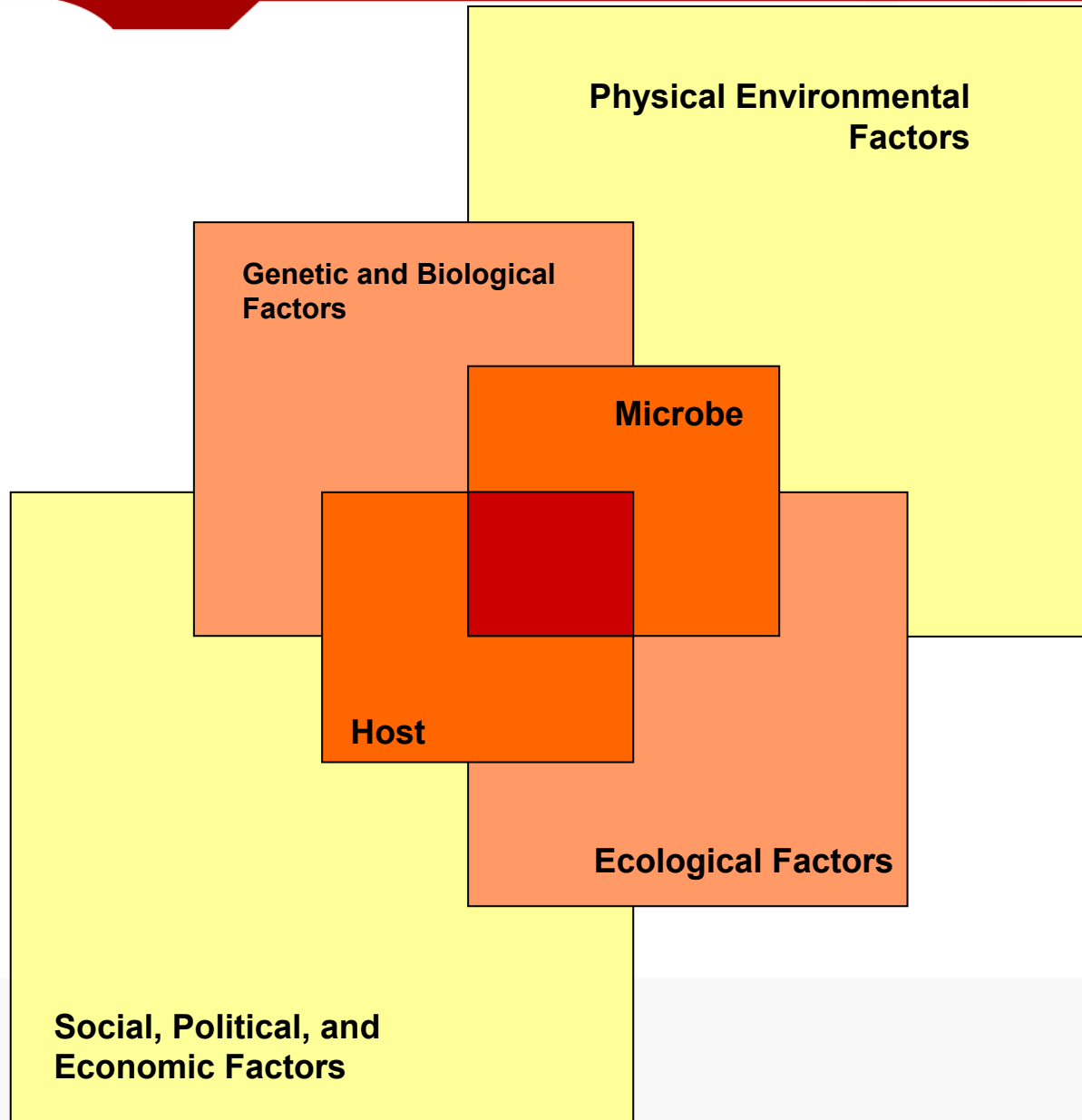
- Compromise food security (loss of protein/draught power)
- Cause production losses (meat/milk/wool/eggs etc)
- Loss of genetic potential and biodiversity
- Bring about costly control measures
- Disrupt or inhibit trade
- Discourage investment in the livestock sector
- Impact on wildlife species
- ... some directly affect human health

# Holistic Approach



- Disease Ecology and Environment
- Aetiological Agents
- Farming Systems
- Husbandry Practices and Biosecurity
- Commerce, Movement, and Trends





Microbial Threats to Health.  
Institute of Medicine (2003)

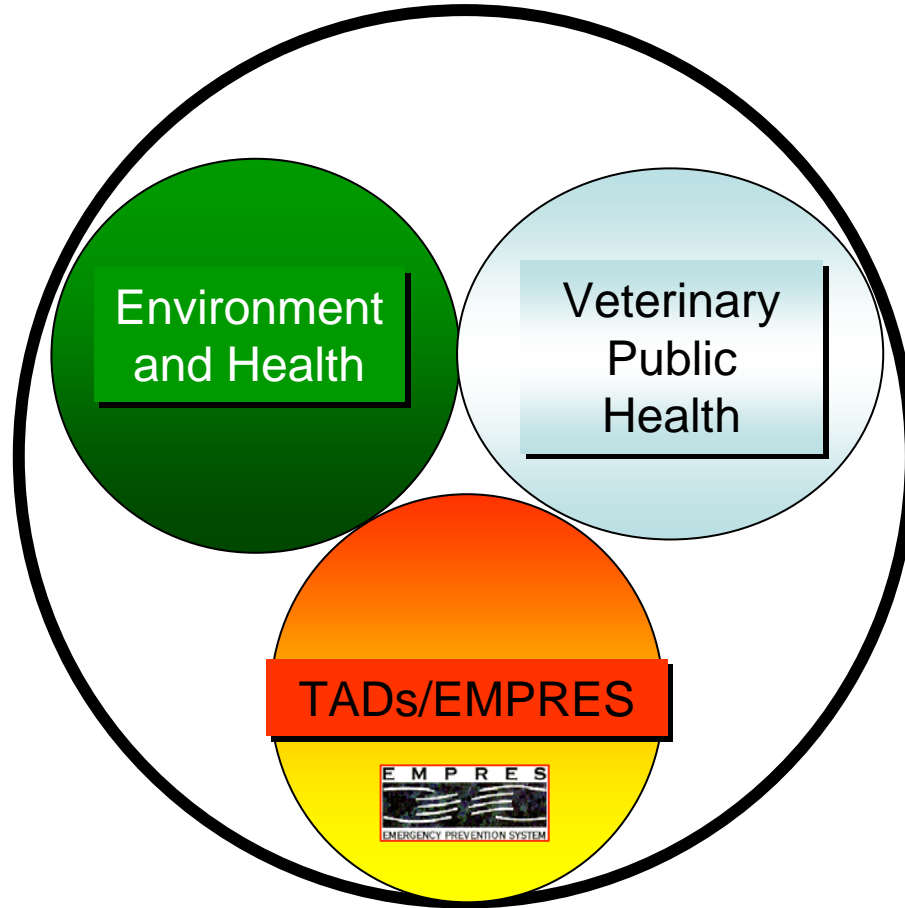


# Successful Intervention

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- However ... successful intervention against these diseases also poses other problems that must be addressed coherently, comprehensively, and quickly.
- Encroachment in delicate environments
- Land degradation and desertification
- Water use
- Waste and climate change



# Animal Health Service



# Animal Production and Health Division

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- **Animal Production**
  - Milk and Dairying
  - Animal Genetic Resources
  - Small-scale producers
  - Meat and Food Safety
  - Feed Safety
- **Animal Health**
  - EMPRES
  - Veterinary Public Health
  - Veterinary Services
  - Environment / Vector-borne
  - EU FMD Commission
- **Policies and Legislation**
  - Environment
  - Socio-economic
  - “Pro-poor”

# Transboundary Animal Diseases



- Foot-and-Mouth Disease
- Rinderpest
- Peste des Petits Ruminants
- African Swine Fever
- Rift Valley Fever
- Bluetongue
- Brucellosis
- Venezuelan EE
- Avian Influenza
- Newcastle Disease
- Contagious Bovine Pleuropneumonia
- Sheep/Goat pox
- African Horsesickness
- Lumpy Skin Disease
- Rabies
- Other EEs
- ... Emerging or re-emerging diseases





# Transboundary Animal Diseases



- Foot-and-Mouth Disease
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# Zoonoses

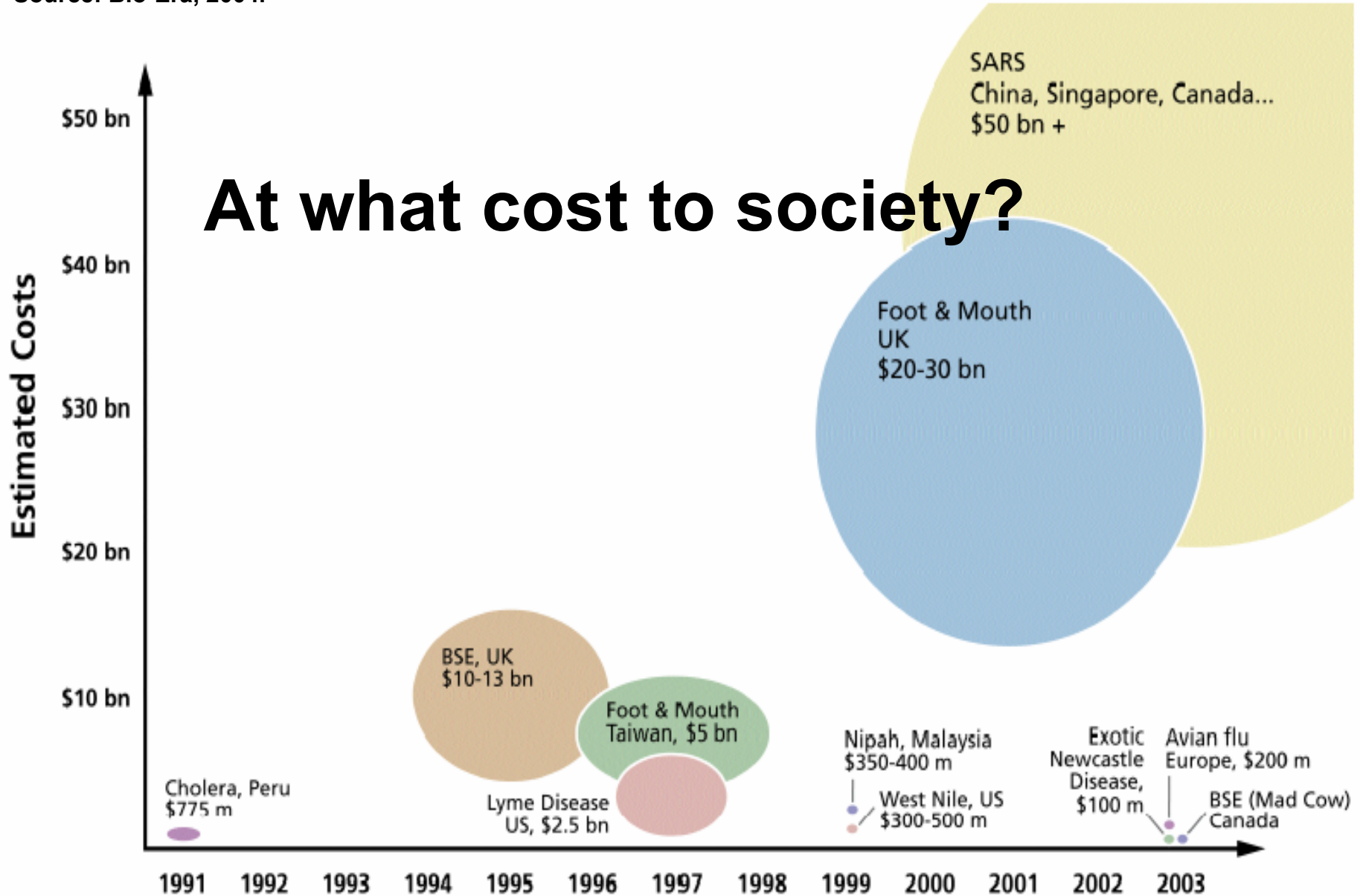


- Rift Valley Fever
- Brucellosis
- Venezuelan EE
- Avian Influenza
- Newcastle Disease
- Rabies
- Nipah
- Tuberculosis
- Cystercercosis
- Anthrax
- CCHF
- *Strep suis*
- BSE
- Hendra
- Ebola
- SARS



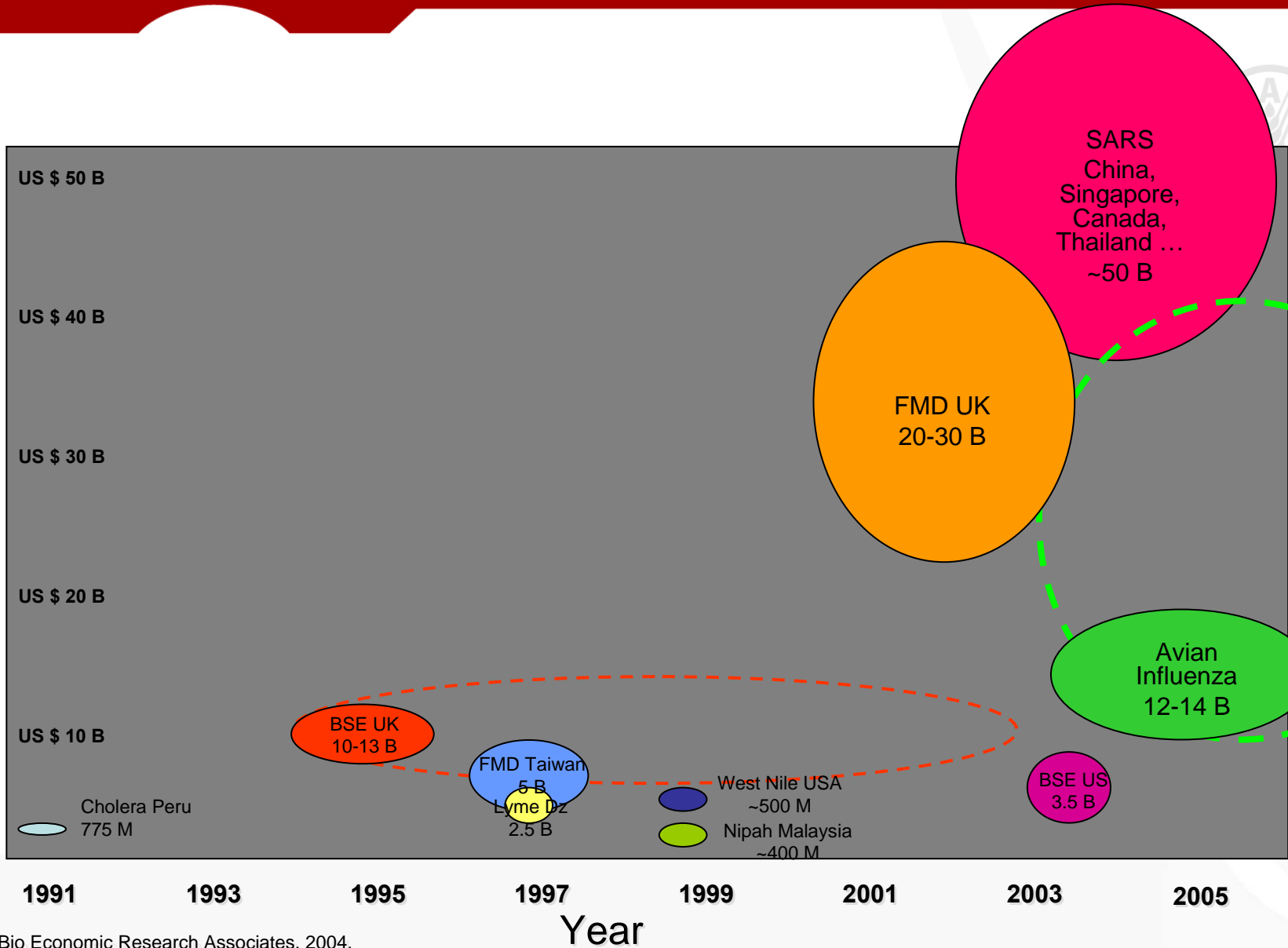
**Figure 1: Economic Impacts of Selected Emerging Infectious Diseases**

Source: Bio-Era, 2004.



Figures are estimates and are presented as relative size. See Table 1 for more details.

Cost



Adapted from Bio Economic Research Associates, 2004.  
www.bio-era.net



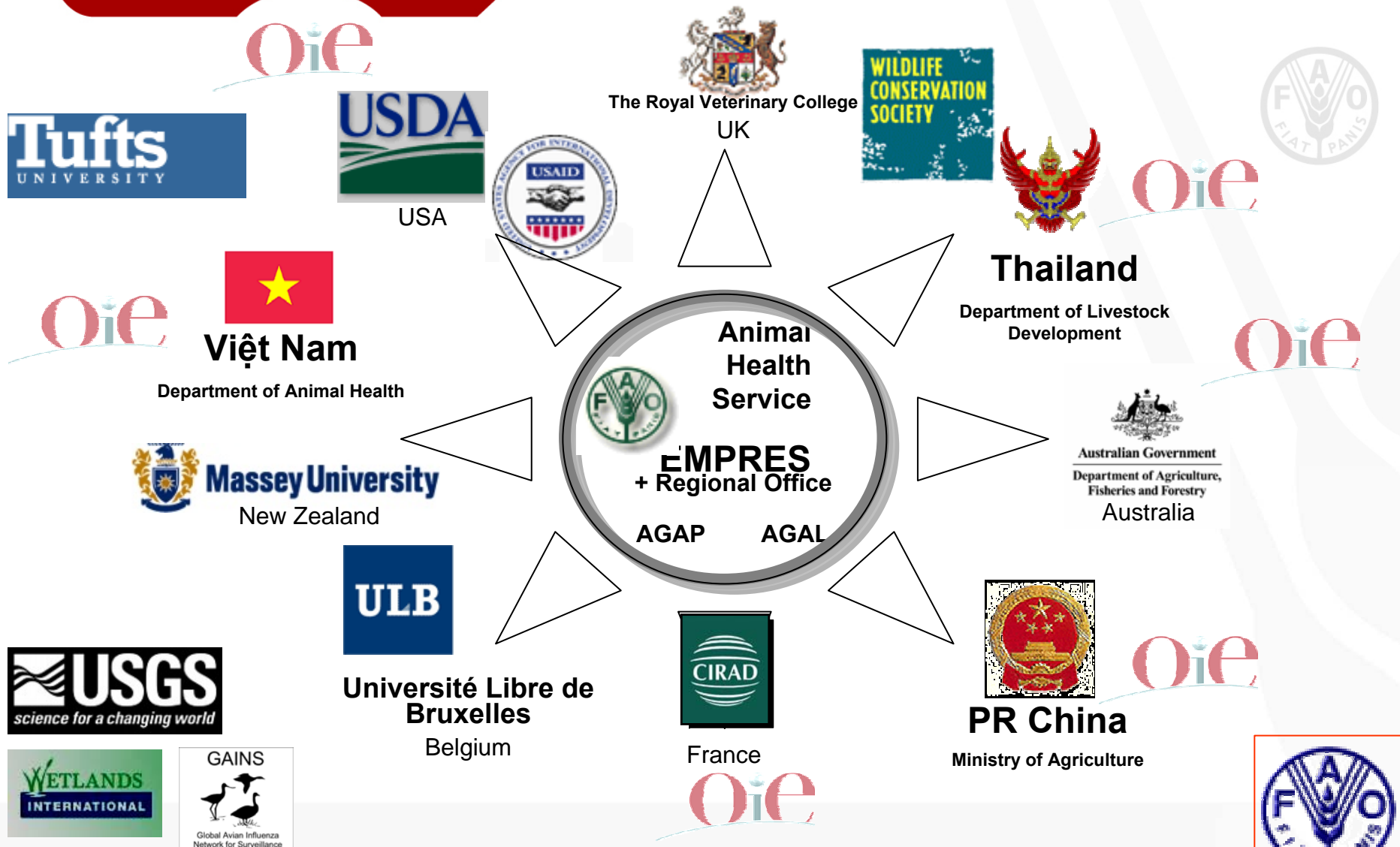
Early Warning

Early Reaction



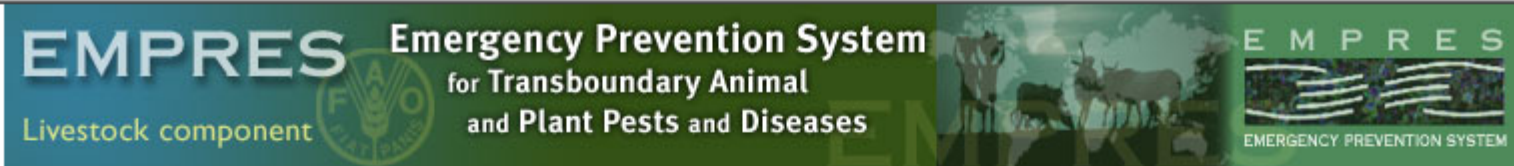
Enabling Research

Coordination



**FAO Collaborators: Asian Focus**





- EMPRES
- FAO
- AGA
- Publications
- Maps
- News
- Links
- Site Map
- Contact Us



- **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

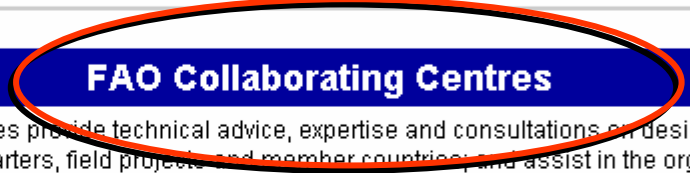
- **EMPRES-i**
  - Animal Disease Information Systems
  - Disease Recognition module
  - Disease Mapping
  - Disease Alerts

- Tools
- **TAD**
  - About TAD info
  - Technical details & costs
  - Resource centre &

## EMPRES Livestock Vision

### FAO Reference Laboratories and Collaborating Centres

▶ [FAO Reference Laboratories](#)



## FAO Collaborating Centres

FAO Collaborating Centres provide technical advice, expertise and consultations on designated subjects pertinent to FAO headquarters, field projects and member countries; and assist in the organization and implementation of training activities.

Institute	Geographical coverage	Theme
<b>Agriculture Research Council (ARC) Onderstepoort Complex</b> Onderstepoort Veterinary Institute (OVI) Private Bag X05 Onderstepoort - 0110 SOUTH AFRICA Tel.: +27 012 529 9101 Fax: +27 012 565 4667 E-mail: <a href="mailto:gavin@moon.ovi.ac.za">gavin@moon.ovi.ac.za</a> <a href="http://www.saturn.ac.za">www.saturn.ac.za</a>	Africa	Emergency preparedness for transboundary animal diseases
<b>Department of Veterinary Tropical Diseases</b> Onderstepoort - 0110 SOUTH AFRICA Tel.: +27 012 529 8268 Fax: +27 012 529 8312 E-mail: <a href="mailto:infek5@unn1.un.ac.za">infek5@unn1.un.ac.za</a>	Africa	Emergency preparedness for

[http://www.fao.org/ag/AGA/AGAH/EMPRES/live\\_vis/centres2.htm](http://www.fao.org/ag/AGA/AGAH/EMPRES/live_vis/centres2.htm)

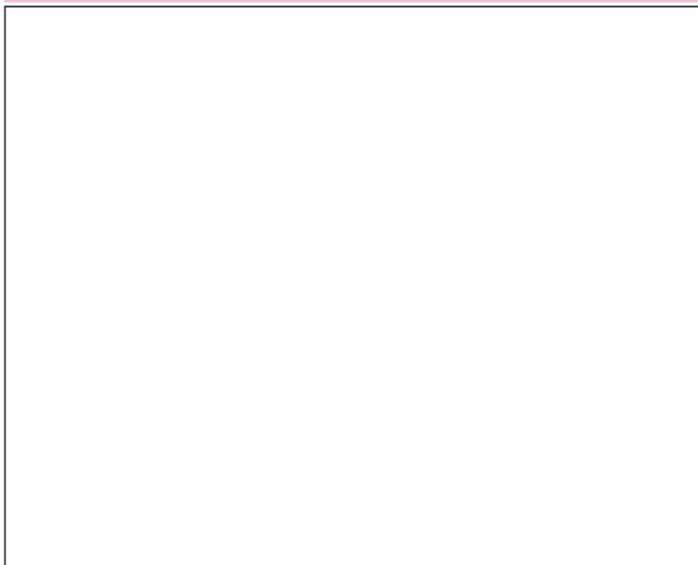
*Improved animal health for  
poverty reduction and  
sustainable livelihoods*

ISSN XXXXXXX

ANIMAL  
PRODUCTION  
AND HEALTH  
SERIES

XX

Health Service AGAH



Food  
and  
Agriculture  
Organization  
of  
the  
United  
Nations



Food and Ag

Animal Prod





# GF-TADs

GLOBAL FRAMEWORK FOR THE  
PROGRESSIVE CONTROL OF  
TRANSBOUNDARY ANIMAL DISEASES



# GLEWS

GLOBAL EARLY WARNING SYSTEM

# The Need for Global Information on *Livestock* Epidemics

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- Mandated by World Food Summit (1996; Objective 5.2)
- Further endorsed by EMPRES Expert Consultation (1999)
- Management must be based on reliable information
- Information boosts confidence between trading partners
- **Inclusion of Wildlife; and human health alerts**



FAO/OIE/WHO

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**GLEWS**

GLOBAL EARLY WARNING SYSTEM



**EMPRES**  
EMERGENCY PREVENTION SYSTEM



- ⚙ Disease Tracking
- ⚙ Early Warning
- ⚙ Response to Emergencies
- ⚙ Information Library
- ⚙ Institutes
- ⚙ Configuration
- ⚙ User & Privileges

#### EMPRES-i Restricted Area

You are logged as  
**Administrator**

[logout](#)  
[change password](#)

### Disease Tracking



#### Suspected

10 cases of Avian infectious bronchitis are suspected in Africa - Angola - Huambo - Caala on 20/09/2007

2 cases of Avian chlamydiosis are suspected in Africa - Algeria - Adrar - Adrar - Wilaya d' Adrar on 12/09/2007

cases of Foot and mouth disease are suspected in Europe - U.K. of Great Britain and Northern Ireland - England - Surrey on 12/09/2007

cases of Avian mycoplasmosis (M. gallisepticum) are suspected in Africa - Burundi - Bubanza - Not Available - Bubanza (Centroid) on 11/09/2007

20 cases of Avian infectious laryngotracheitis are suspected in Oceania - Australia - Australian Capital Territory - Australian Capital Territory (Centroid) on 10/09/2007

#### Confirmed

1 cases of Avian infectious bronchitis are confirmed in Africa - Burundi - Bubanza - Not Available - Bubanza (Centroid) on 12/09/2007

100 cases of Foot and mouth disease are confirmed in Americas - Ecuador - Manabi - Chone - Sitio Baren on 12/09/2007

50 cases of Avian infectious bronchitis are confirmed in Africa - Libyan Arab Jamahiriya - Al Aziziyah - Not Available on 10/09/2007

30 cases of Foot and mouth disease are confirmed in Africa - South Africa - Western Cape - South Cape District Council - Table Mountain on 07/09/2007

The province of Quang Ninh and the city of Can Tho count Among 12 sites where homes(foyers) of aviaire flu were Indicated to poultry this month, unusual fact because Virus prefers generally lower temperatures.

### Early Warning

#### Empres Watch

- Uganda and neighbouring countries under serious threat of African Swine fever (ASF) - (13/11/2002) - 2002

#### Empres Watch

- 2004

#### Empres Watch

- African Swine fever (ASF) threatens again Ghana's pig industry (25/10/2002)

[add new info source](#)

### Response Emergency

#### Empres Watch

- Uganda and neighbouring countries under serious threat of African Swine fever (ASF) - (13/11/2002) - 2002

#### Empres Watch

- 2004

#### Empres Watch

- African Swine fever (ASF) threatens again Ghana's pig industry (25/10/2002)

[archive](#)

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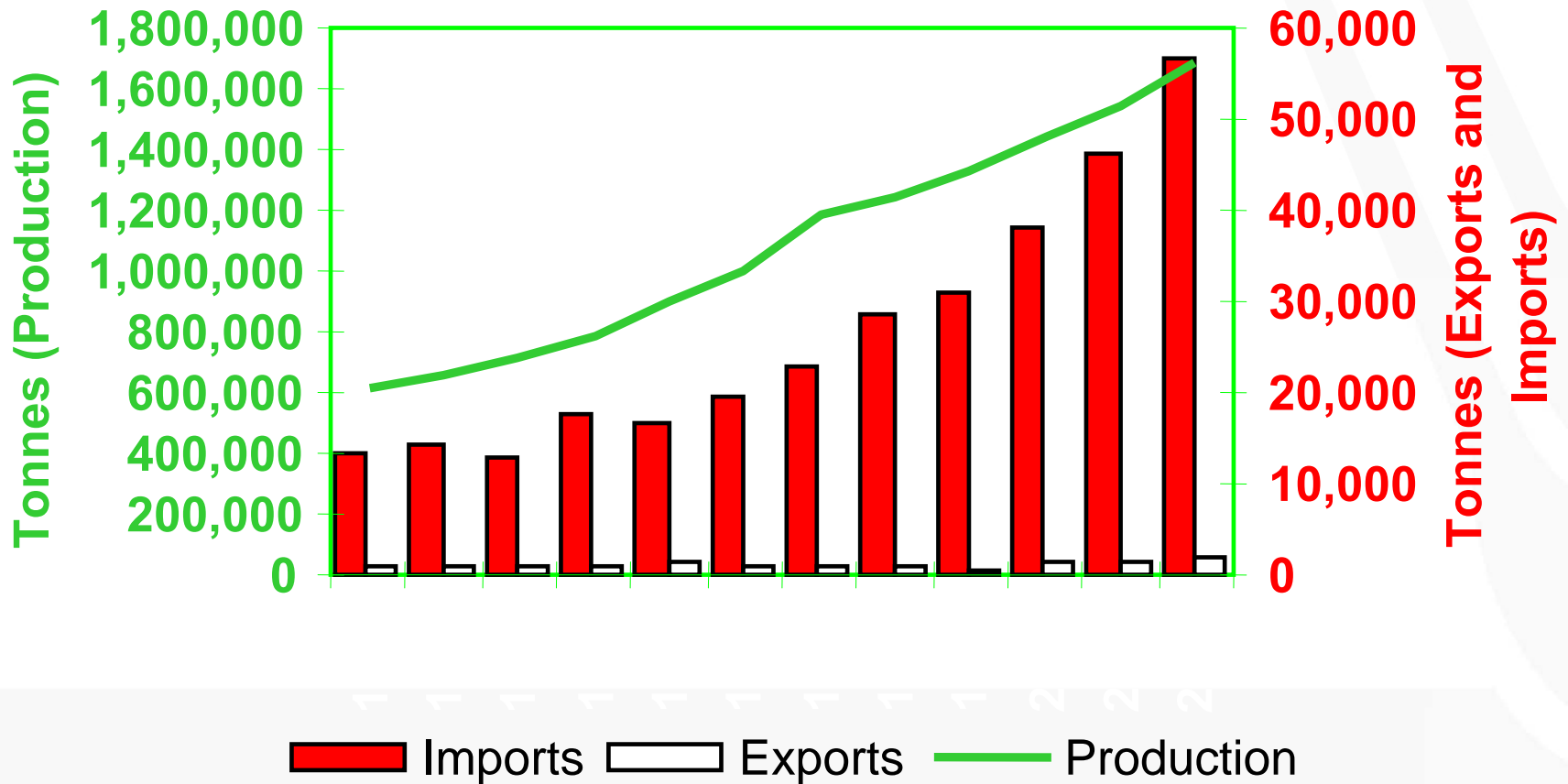
- African Swine fever (ASF) threatens again Ghana's pig industry (25/10/2002)

[archive](#)





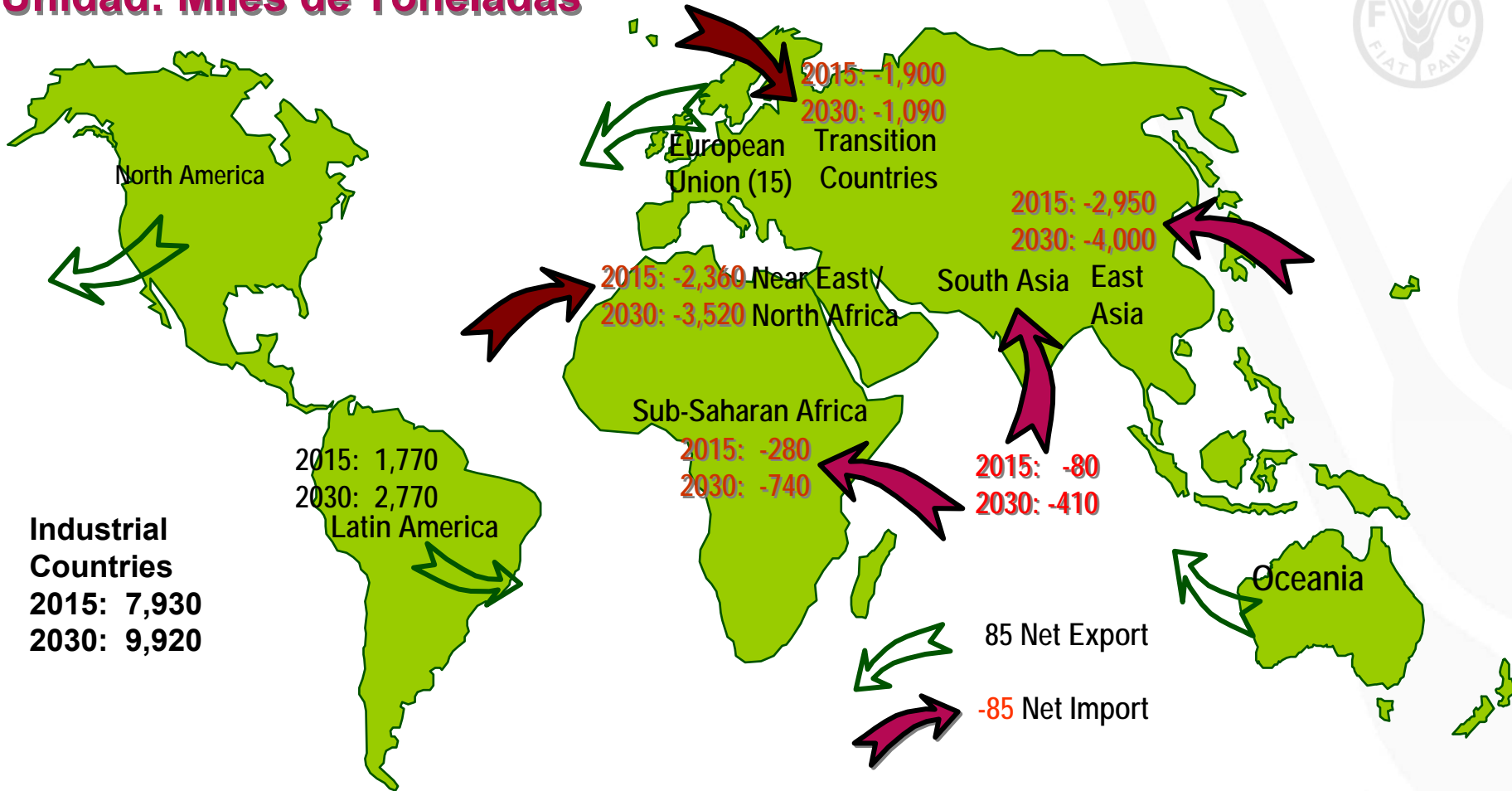
# China



Source: FAO 2002



**Unidad: Miles de Toneladas**

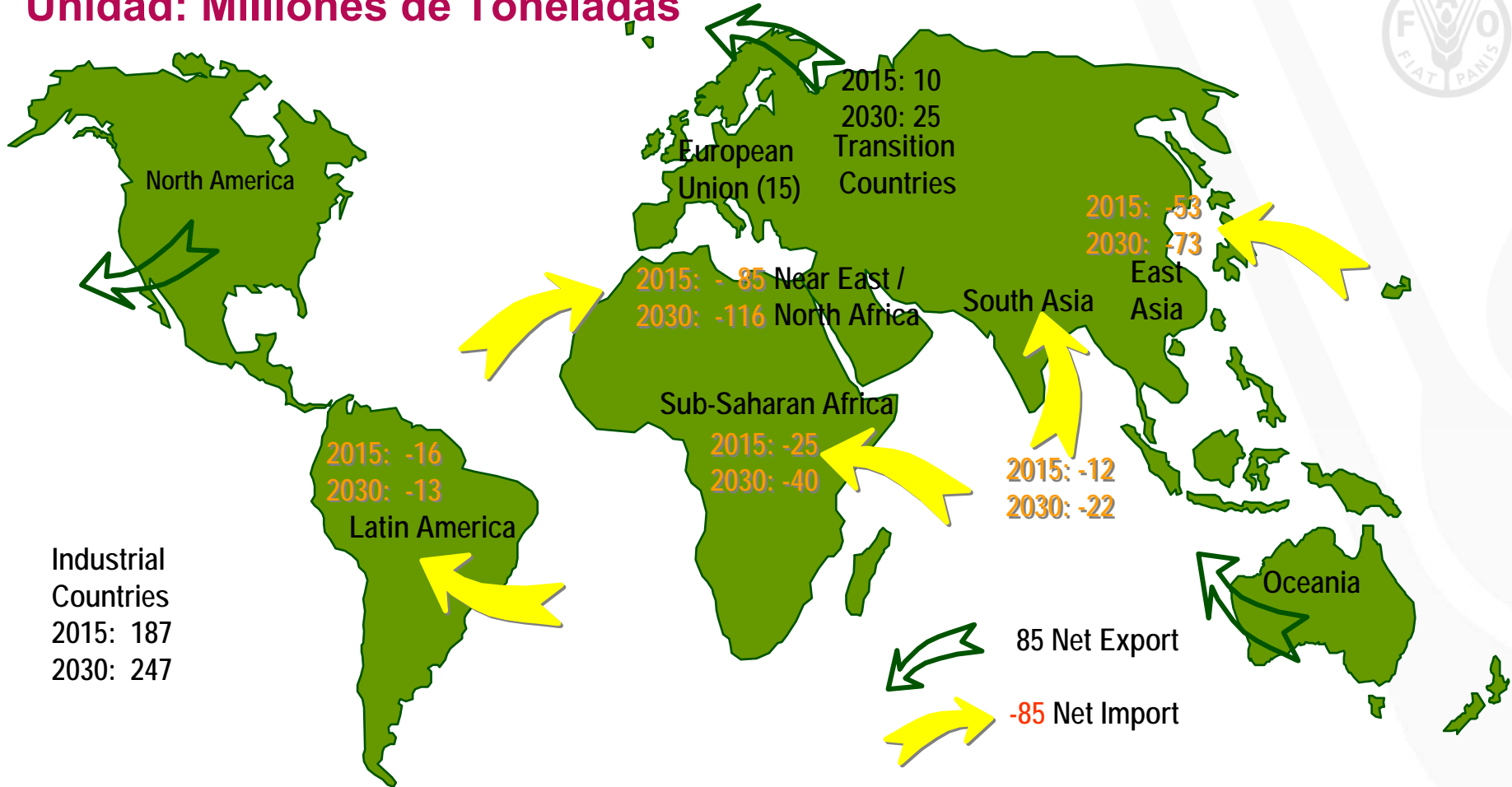


# Proyección del Comercio Neto en Carnes

Source: FAO 2002

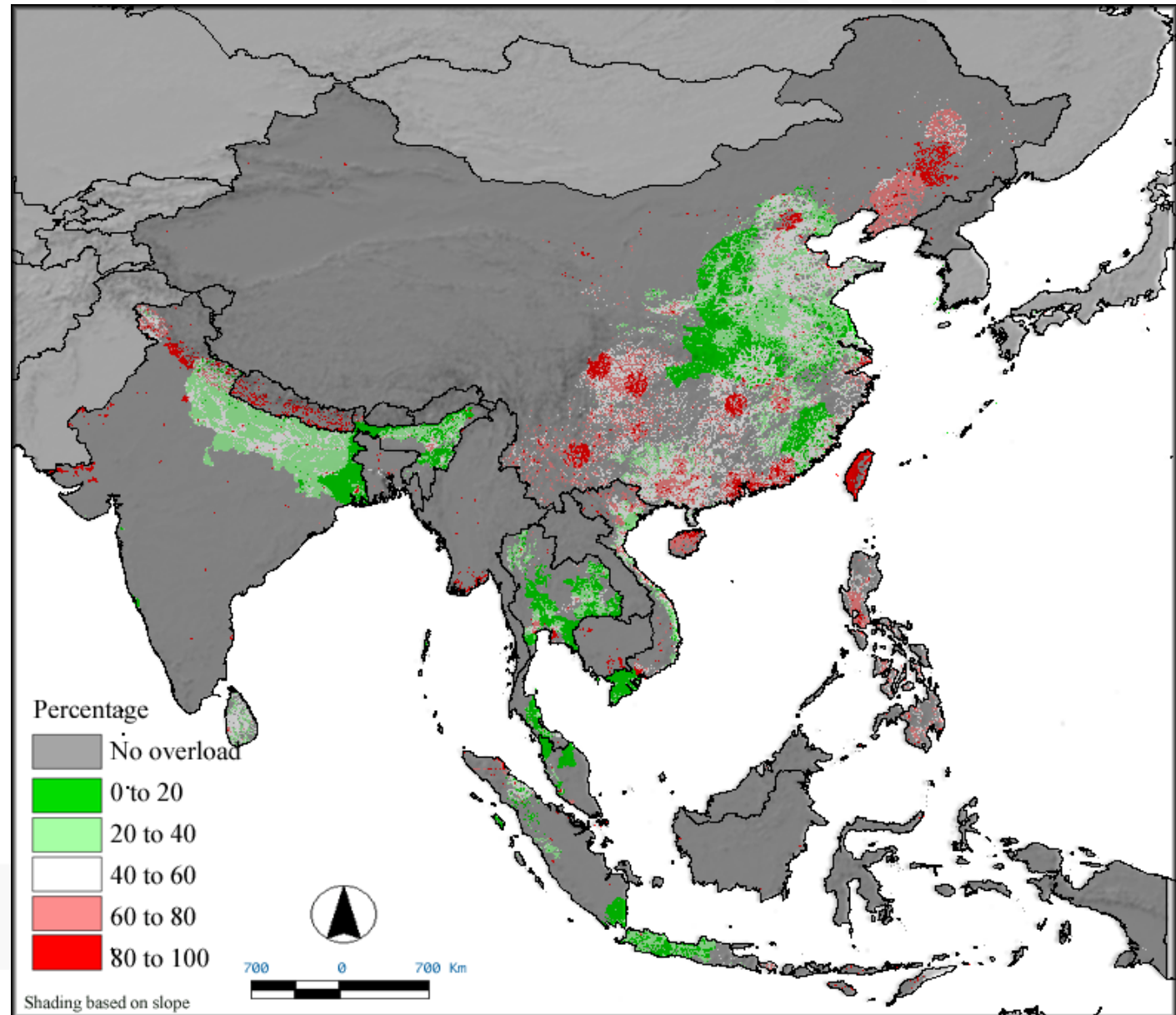


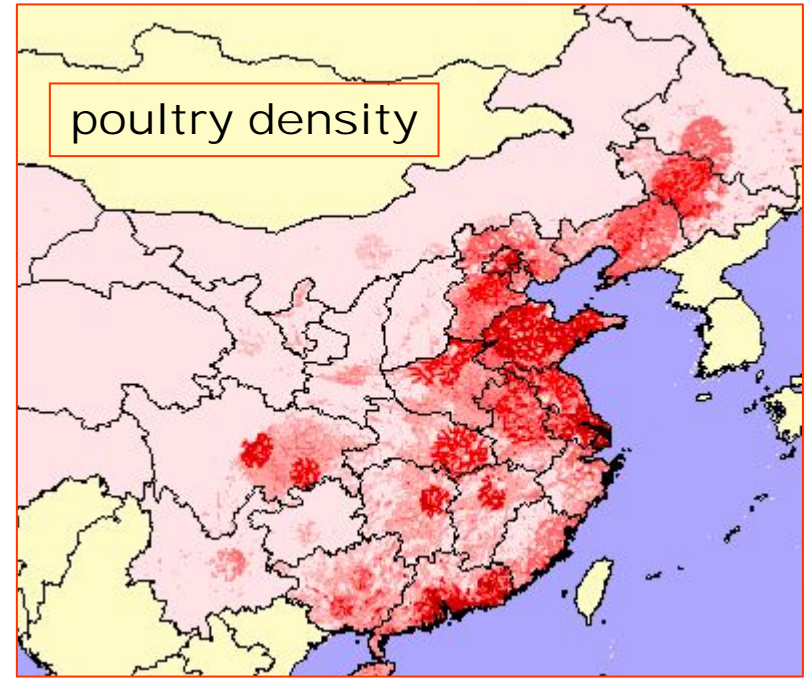
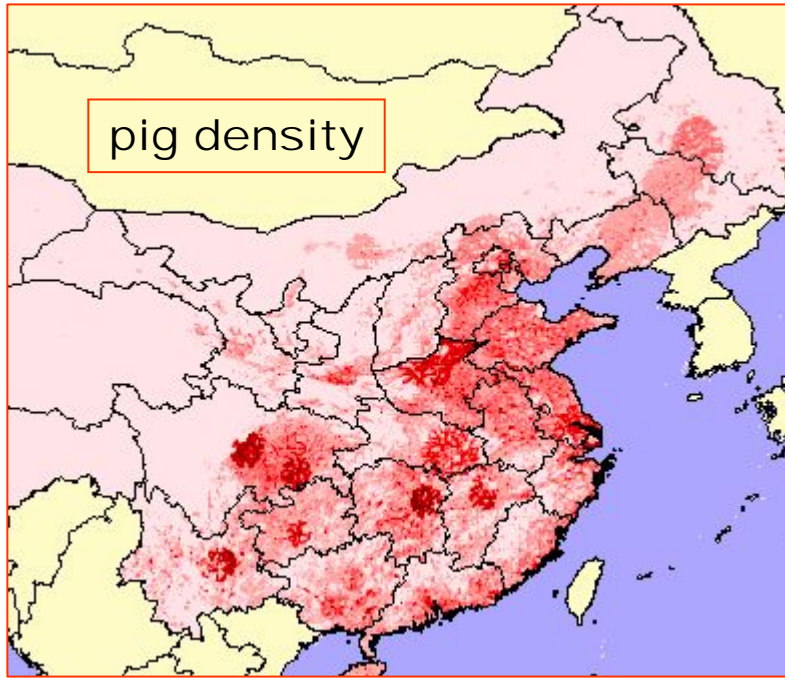
Unidad: Millones de Toneladas



# Proyección del Comercio Neto de Granos

Estimated contribution of livestock to total  $P_2O_5$  supply on agricultural land, in area presenting a  $P_2O_5$  mass balance of more than 10 kg per hectare. 1998 to 2000.









# Technical Factors



## *Knowledge*

- Education – professional and technical, expert managing system, competency of staff
- Assumptions
- Strategic thinkers – planning, cooperation
- Merging epidemiology with diagnostic competence.
- Communication
- Inappropriate technologies employed
- Statistical and strategic planning
- Time bound strategy (objective with performance indicators – short, mid, long – gated management)
- Timing of intervention
- Understanding of the dynamic (formal and informal) marketing systems that occur at the local and regional level.

# Technical Factors



## **Infrastructure**

- Diagnostic sensitivity and specificity – understanding positive predictive values, quality assurance/control.
- Reagents, equipment – maintenance
- No vaccine
- Vaccine quality – potency and efficiency, independent evaluation, improper use of vaccines, drugs,
  - Under or over dosing
  - freezing vaccines,
- Inappropriate use of vaccine assays (false sense of security)
- Surveillance system – data availability, data retrieval, information, analysis ...
  - Limited knowledge of own problem, and use of others data
- Lack of ability of temporal and spatial – continuous monitoring of baseline,
- Availability and maintenance of equipment.
  - Laboratory, vehicles, protective wear
- Traceability and Animal identification
- Wildlife - role
- Technology that is *fit for purpose*



# Political Constraints



- **Competing interests**
  - Ministry of Agriculture vs. Ministry of Health
  - Appointments vs. Career Professionals
  - International interventions
- **Override technical reality**
  - Interpretation of results
- **Corruption**
- **Regional approaches not considered / border problems**
- **Establishment of Private/Public partnerships**
- **Cooperative planning with stakeholders**
- **Election year?**
- **Identification and selection of adequate managers**
  - Technical ability does not translate to management ability

# Political Constraints

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- Rapid turn-over of personnel
- Changes in decision makers
- Changing budget lines
- Legislation, Regulations, and Laws
- Identification and buy-in from stakeholders
- Pressure to succeed without sufficient knowledge *how to* ...
- Lack of transparency of information and information sharing
- Tourism



# Economic Constraints

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- Conditionality imposed on loans to governments
- National restructural programmes
- Investment in infrastructure
- Exchange rates
- Low salaries
- Price differentials
- Cost of corruption
- Trade opportunities
- Competing financial interventions – miss-spent monies
- Supplies, gasoline, vehicles, response
- Communications
- Tourism

# Environmental Factors

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- Geographical location and access
- Island vs. land locked surrounded by disease
- Environmental safety (air, water, soil/type).
- Earthquakes, droughts, floods, ...
- Role of wildlife

# Social Constraints

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- Stamping-out
- Tolerance and imagery
- Religious and traditions
- Corruption and poor governance
- Competition of traditional practices for treatment and vaccines
- Veterinary education
- Conflicting advise from international orgs, inappropriate expertise
- Impositions on the established order
- Civil instability, civil unrest, war, and refugees

# Public Health

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- Malnutrition
- HIV/AIDS
- Zoonotic disease – chronic and debilitating pathogens
- Zoonotic disease – limitations for protective equipment
- Links between Public Health and VPH officials

# Other

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- Smuggling
- Feed back systems and ability (political and professional) to redirect



# Contingen





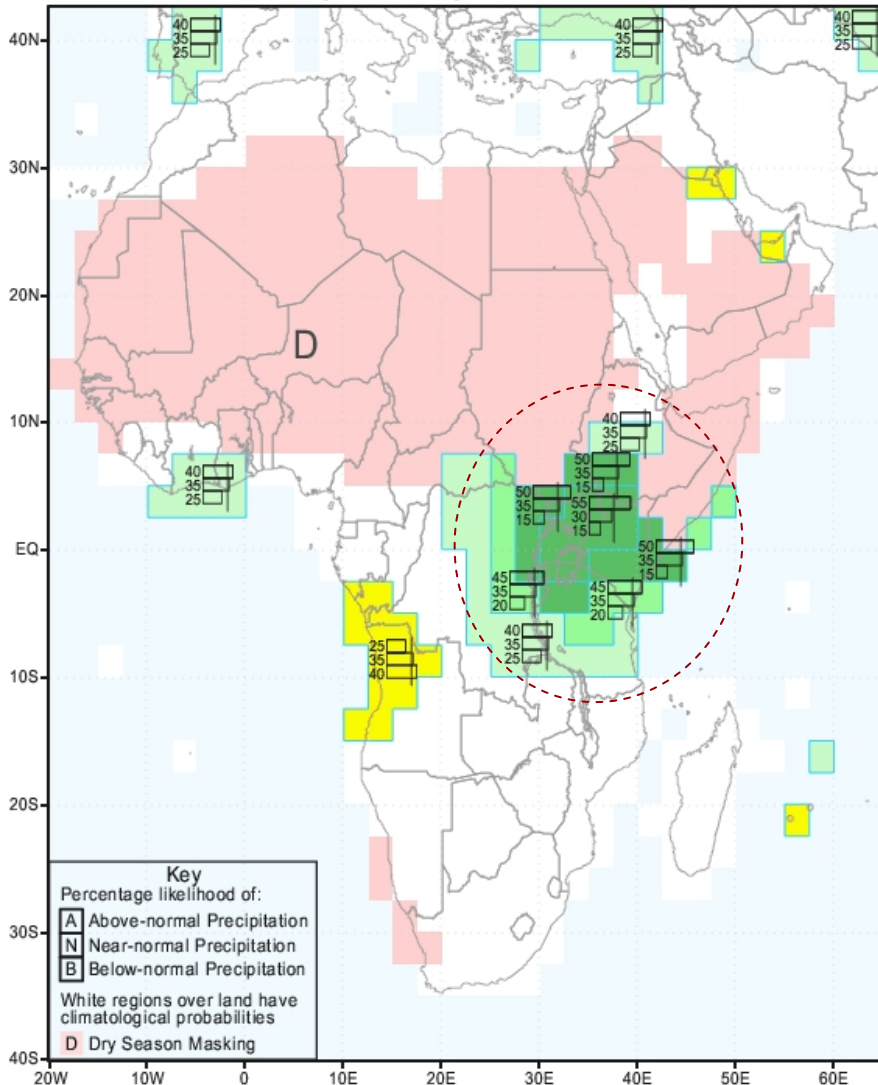
**Capacity Building - Developmental**  
**process - training > proficiency >**  
**certification 17025 > reference**







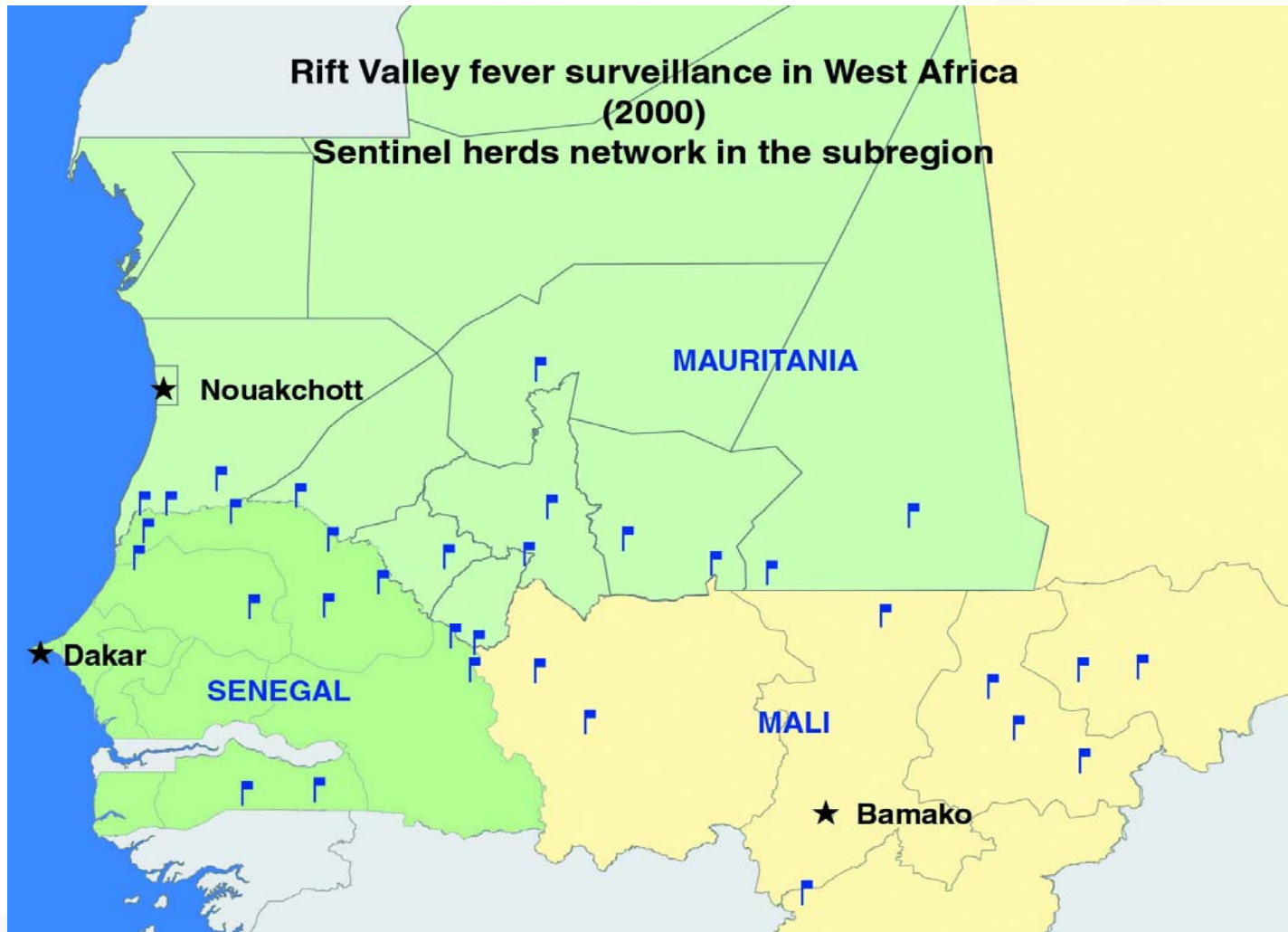
IRI Multi-Model Probability Forecast for Precipitation for December-January-February 2007, Issued November 2006



## Forecasting

**December – January - February**

NDVI anomalies (difference between a given month and the average calculated from 8 years time series)



# Sentinel herd network



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# Factors Resulting in Increased Wildlife:Agriculture Interactions

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- Increasing human population and resource consumption
- Changes in land-use patterns
- Decreasing wildlife habitat
- Competition for water and food resources
- Ranching and nomadic pastoralism which result in domestic livestock and wildlife sharing the same ranges/habitats/resources



# Disease Emergence Is An Ecological Process

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- Emergence driven by anthropogenic environmental changes
- Anthropogenic environmental changes increase transmission rates within or between populations
- Selection pressure for dominance of those strains adapted to survive in modified environment
- In the last 25 years, approximately 75% of all human diseases have come from animals





Rinderpest Oie



The World Without

Rinderpest

2010

Eradication

Program





**Diseases transmitted between wildlife and livestock in Kenya  
that have national and international importance** (Kenya Wildlife Service )

Disease and causative agent	Domestic/wildlife association	Status
Rinderpest Morbillivirus	Wide domestic and wild host range in ruminants and suids. Wildlife species are poor maintenance hosts; those most affected are buffalo, kudu, eland, and warthog. Acute disease seen in cattle, wild ruminants, and pigs.	Currently restricted to Somali ecosystem at Kenya/Somali border with occasional epidemics.
Peste des petits ruminants Morbillivirus	Wild/domestic small ruminants are the hosts. Disease cycles endemically in nomadic herds, and transhumance introduces it to native populations.	Serological evidence in sheep and goats in Kenya, 2001. Significant due to importance of sheep and goats for food security.
Rift Valley fever Phlebovirus	Many species of <i>Culex</i> and <i>Aedes</i> mosquitoes can transmit the disease. No vertebrate reservoir host identified. Reservoir is drought-resistant eggs of <i>Aedes</i> .	Disease agent endemic in East Africa and causes sporadic epidemics after long inter-epidemic periods. A pathogenic zoonosis.
Foot and mouth disease Aphthovirus	Wildlife species are not reservoirs except buffalo, which are persistent carriers of SAT1 and SAT2 serotypes. Highly contagious and spreads rapidly. Cattle, pigs, sheep, goats and wildlife (e.g., wildebeest in Serengeti) affected. Types A, O, C, SAT1, and SAT2 have been isolated in Kenya.	Widespread and endemic in cattle and wildlife. Major epizootic potential. Livestock movement control and vaccination are priorities for control.
African swine fever African swine fever virus	Disease of domestic and wild pigs. Maintenance hosts are argasid ticks ( <i>Ornithodoros</i> spp); secondary role played by free-ranging porcine hosts (warthogs are asymptomatic carriers of the virus).	Has major epizootic potential. First reported in 1921. Reappeared after 30 years and involved movement of pigs.
Contagious bovine pleuropneumonia <i>Mycoplasma mycoides mycoides</i> S.c.	Closely associated with livestock movement and not dependent on a wildlife reservoir. Sources of new outbreaks are chronic livestock carriers.	Endemic in northeastern Kenya, newly infected districts in central Kenya. Rest of the country at risk of infection through uncontrolled movement of livestock. Vaccination critical to control spread.



