More disease .. old and new

Juan Lubroth
Chief Veterinary Officer
Animal Health Service

Addressing Health

- Intergovernmental Panel on Climate Change (IPCC) - Chapter 8 (2007) of the Working Group II
- Associations between weather/climatic factors and public health.
- Direct exposure - increasing temperatures, more precipitation, rising sea-level, and more frequent extreme events.
- Indirect exposure - changes in water, air and food quality, vector ecology and changes in ecosystems, agriculture, industry, and settlements.

Public and Public Health

- … social and economic disruption.
- Adaptation extends to concurrent direct-acting and modifying (conditioning) influences
  - environmental,
  - social, and health systems
- water shortage, flooding
- Malaria, diarrhea

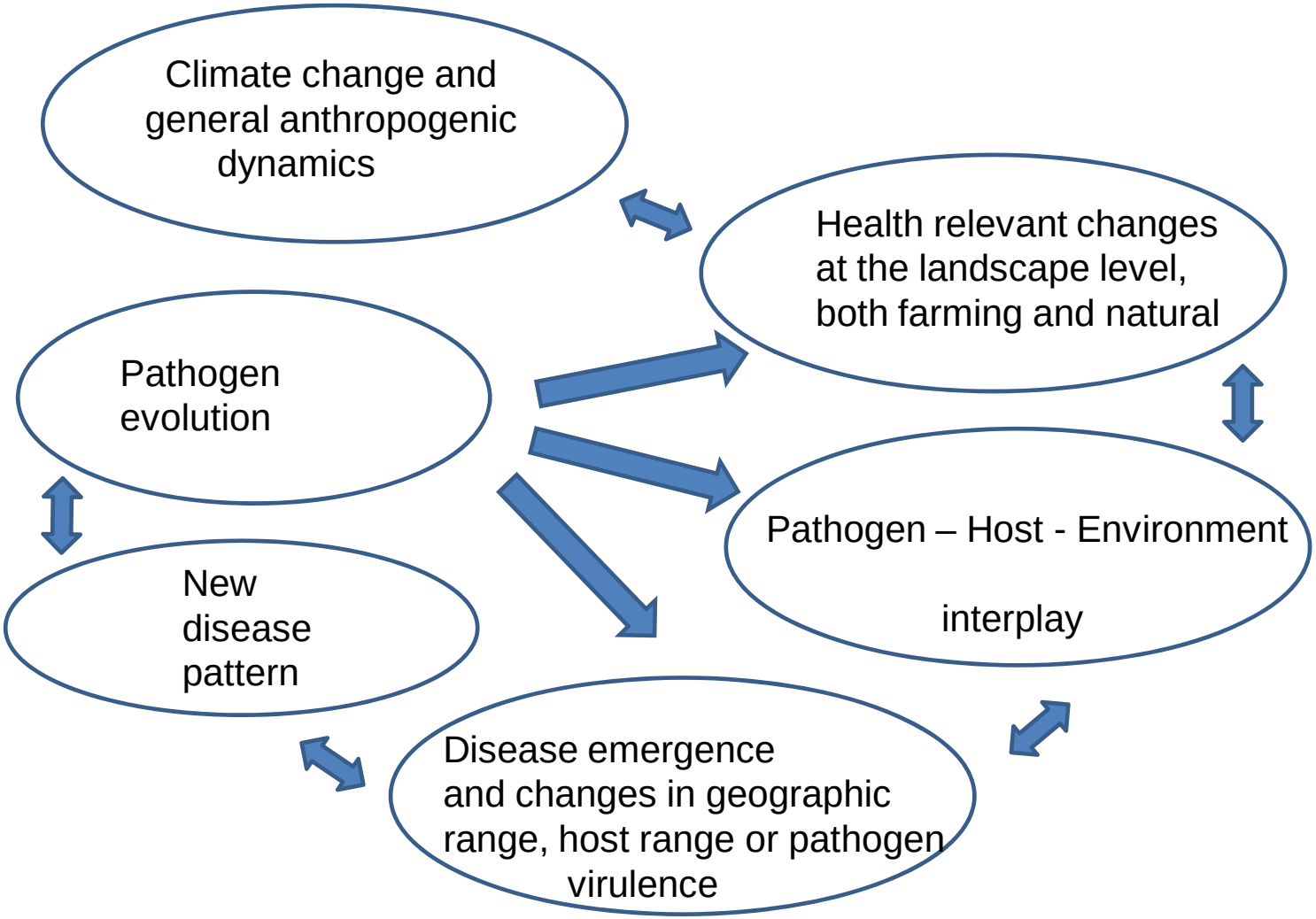
Animal health realm

- Not well documented …
- Anticipated:
  - changes in host distribution, density and exposure to circulating pathogens
  - disease emergence in animals and at the animal-human interface.
- A pathogen may:
    - new territories and hosts
    - turn more aggressive
    - host species jump

Animal Host-Ecosystem-Pathogen interplay

- Stable environments
  - evolutionary stasis,
  - Entrenched host-pathogen-environment complexes
- Dynamic or influx
  - pathogen opportunism prevails

The effects of climate change on disease emergence



Agents of Disease

- Pathogen / Parasite
- Opportunistic or obligate?
  - Respiratory diseases
  - fecal-oral transmission
  - water borne diseases
- Survival and reservoirs
  - Influenza viruses in water fowl
  - Bacterial spores
  - Arboviruses in eggs or in immature stages of the vector (RVF, BT, ASF and other TBD ...)

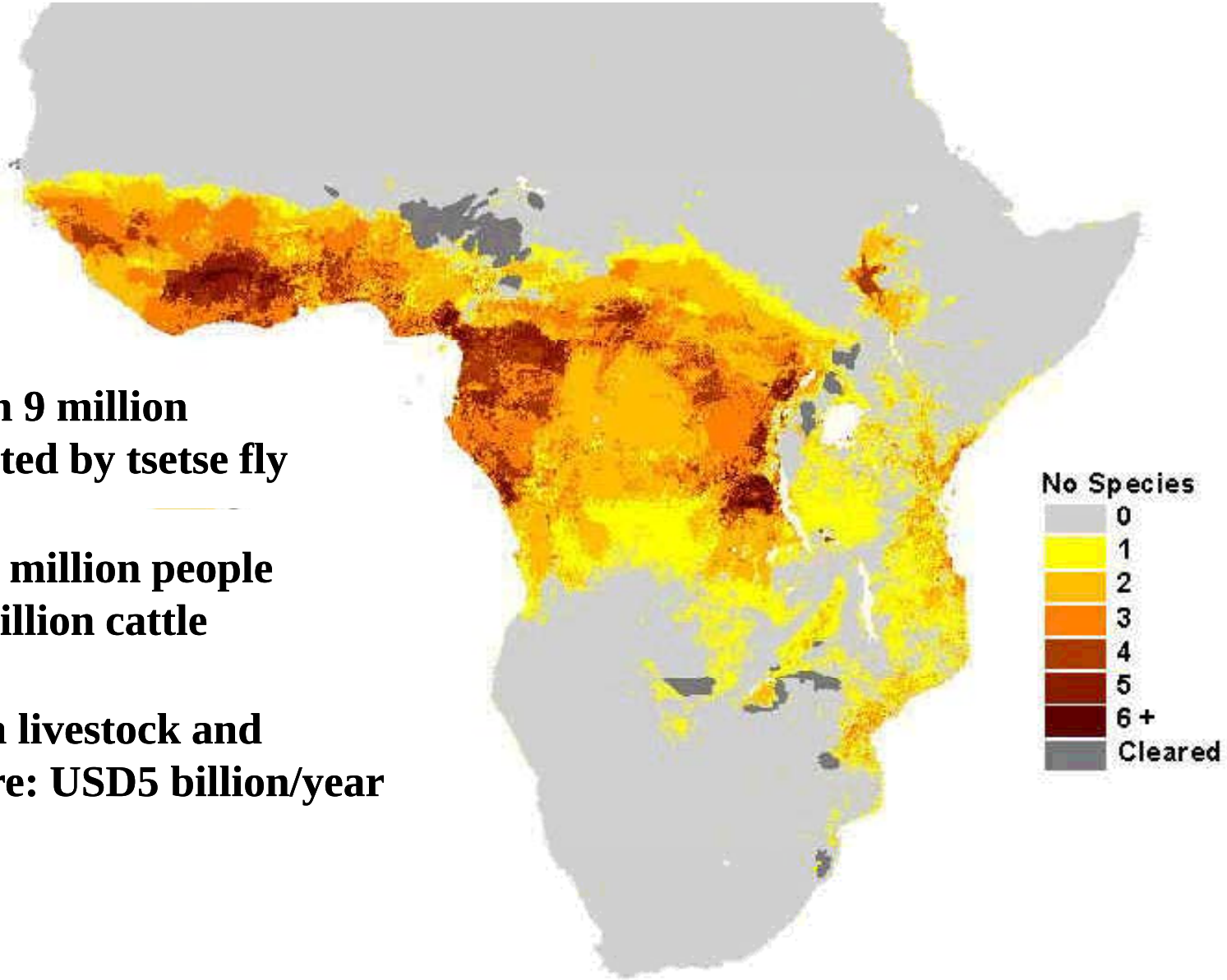
Eco-parasites and Myases

- *Cochliomyia hominivorax (NWS)*
- *Chrysomya bezziana (OWS)*
  - Eggs into wounds (umbilical cord, injuries, injection sites ...); larvae feed off tissue, debilitation, death
  - Secondary myases

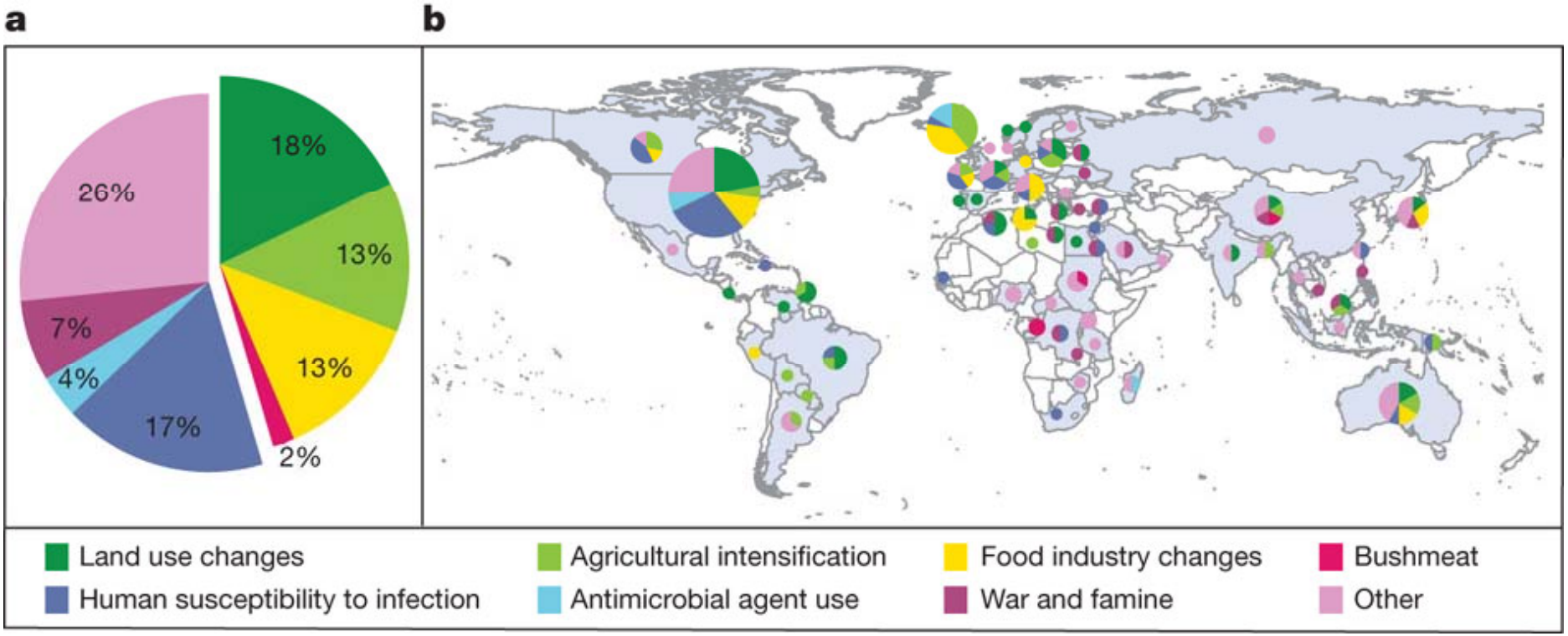
More than 9 million km^2 infested by tsetse fly

At risk 60 million people and 50 million cattle

Impact on livestock and agriculture: USD5 billion/year



Drivers and locations of emergence events for zoonotic infectious diseases in humans from 1940–2005.



F Keesing *et al. Nature* **468**, 647-652 (2010) doi:10.1038/nature09575

One Health

- Complexities
- Multidisciplinarity and transdisciplinarity
- Human-Animal-Ecosystem and Health

Forestry

Agriculture and Consumer Protection

Natural Resources Mgmt / Environ

Fisheries and Aquaculture

Economic and Social Development

Legal Services

Communica-tions

Technical Cooperation

WHO

OiE

Animal Health and Food Safety

Fisheries

Domestic

Wildlife

Animal Production and Feed Safety

Agro-Ecosystems and **Land Use**

Socio-Economics

Marketing and Trade

Policies and Legislation

UNEP

Coping and Adaptation

- coping with the negative consequences
- ***Preventive veterinary medicine***
- ***Adjustment of animal husbandry***
- ***Social resilience***

Preventive veterinary medicine

- FAO EMPRES programme
- early warning, early detection, and early response

Adjustment of animal husbandry

- Improvement in sanitation, hygiene or biosecurity
- animal genetic resources, feeding practices, housing and *bio-exclusion*
- Vaccination and herd health

Social resilience

- Local empowerment
- … weak link at the community level
- … weak at the rural level
- Participatory disease surveillance and control

One Health

- Complex challenges require the banding of disciplines
- Health is complex
- Physicians, veterinary practitioners – terrestrial and marine or aquatic - food inspectors, wildlife and forestry, plant protection, natural resource management and conservation, and … food safety and public health.

Conclusions

- oversimplify the mechanisms by which climate change affects disease transmission and the animal health status
- novel pest and disease of wildlife and livestock origin, and food safety hazards is likely to continue for decades to come
- Transmission involving free-living parasite stages is more likely to be modulated by environmental factors including temperature, humidity and seasonality.