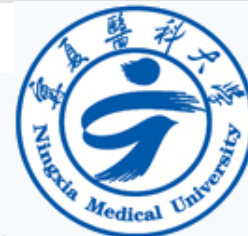


# Ecohealth and the GDRI EHEDE

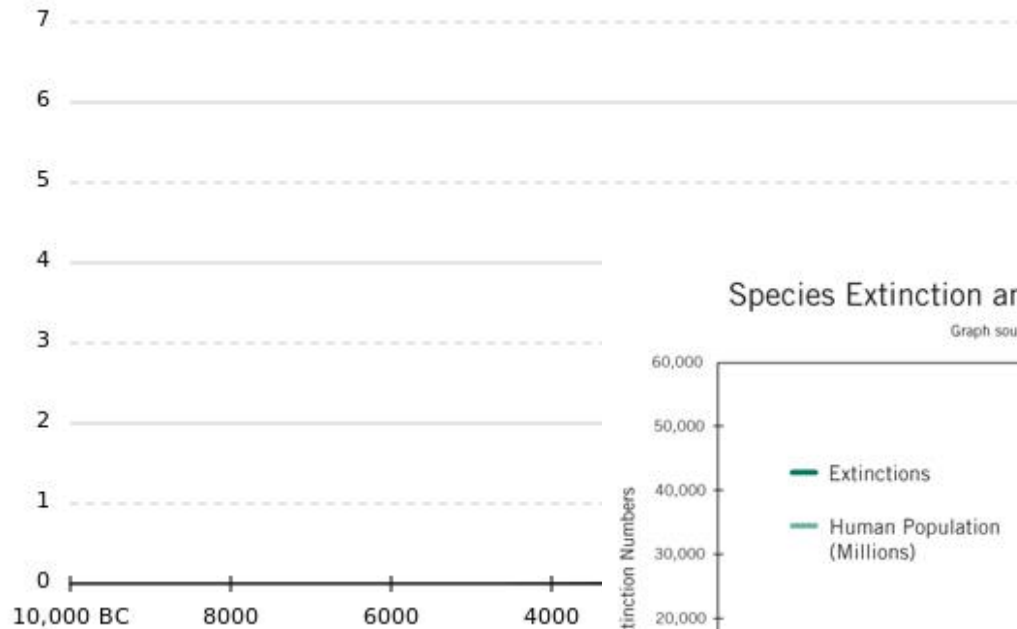
What's up ?

Patrick Giraudoux



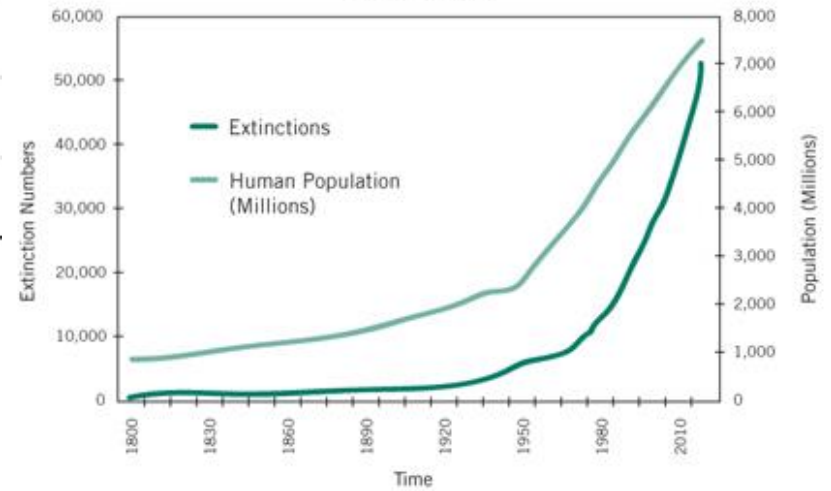
## The world movement...

World population (billions)



Species Extinction and Human Population

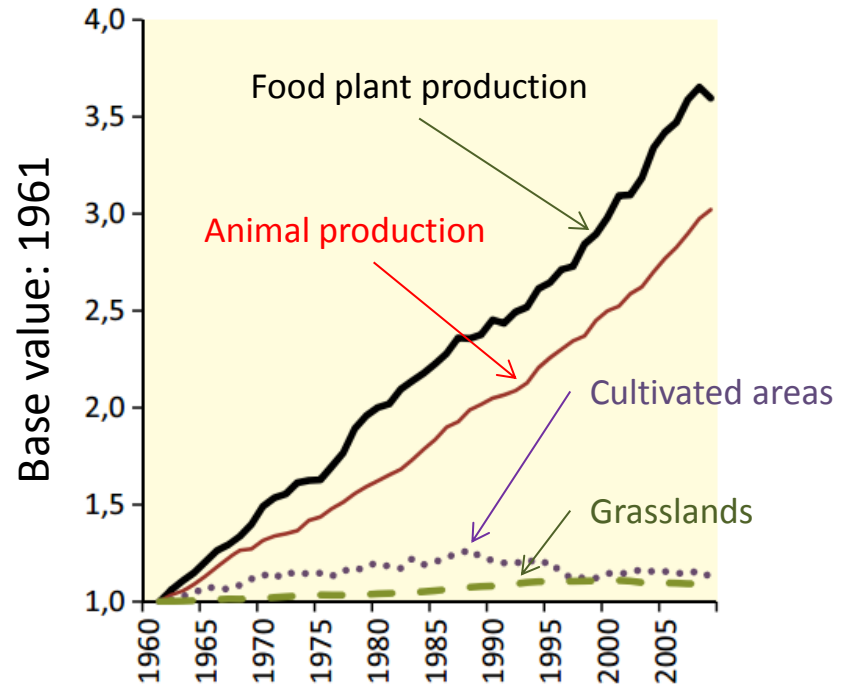
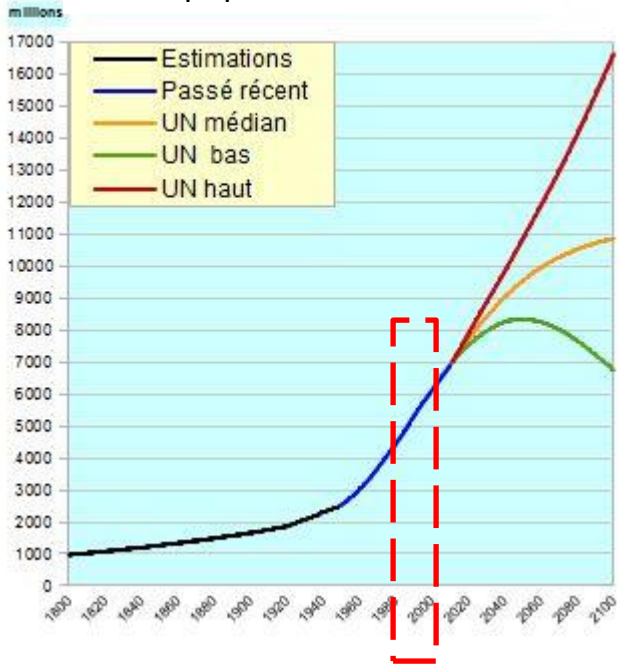
Graph source: USGS



# Context

## The world movement...

World population 1800 - 2100



Habitat destruction  
Invasive species  
Pollution  
Population (human)  
Overharvesting

Hippo



## Ecosystem services...

1. **Provisioning services:** food, timber, fiber, minerals, etc.
2. **Regulating services:** flood control, storm protection, water regulation, **disease regulation**, air quality, pollination, pest control, climate control, etc.
3. **Cultural services:** recreation, esthetic, scientific, cultural identity, sense of place, etc.
4. **Supporting services:** basic ecosystem processes and functions (soil formation, primary productivity, evolution, etc.)

## EcoHealth:

- fostering the health of humans, animals and ecosystems
- conducting research which recognizes the inextricable linkages between the health of all species and their environments.



“An ecological system is healthy if it preserves the dynamics and evolutionary capacities of the bigger systems it belongs to and the ecosystem services\* provided on a larger space and time scale”

\* biodiversity included

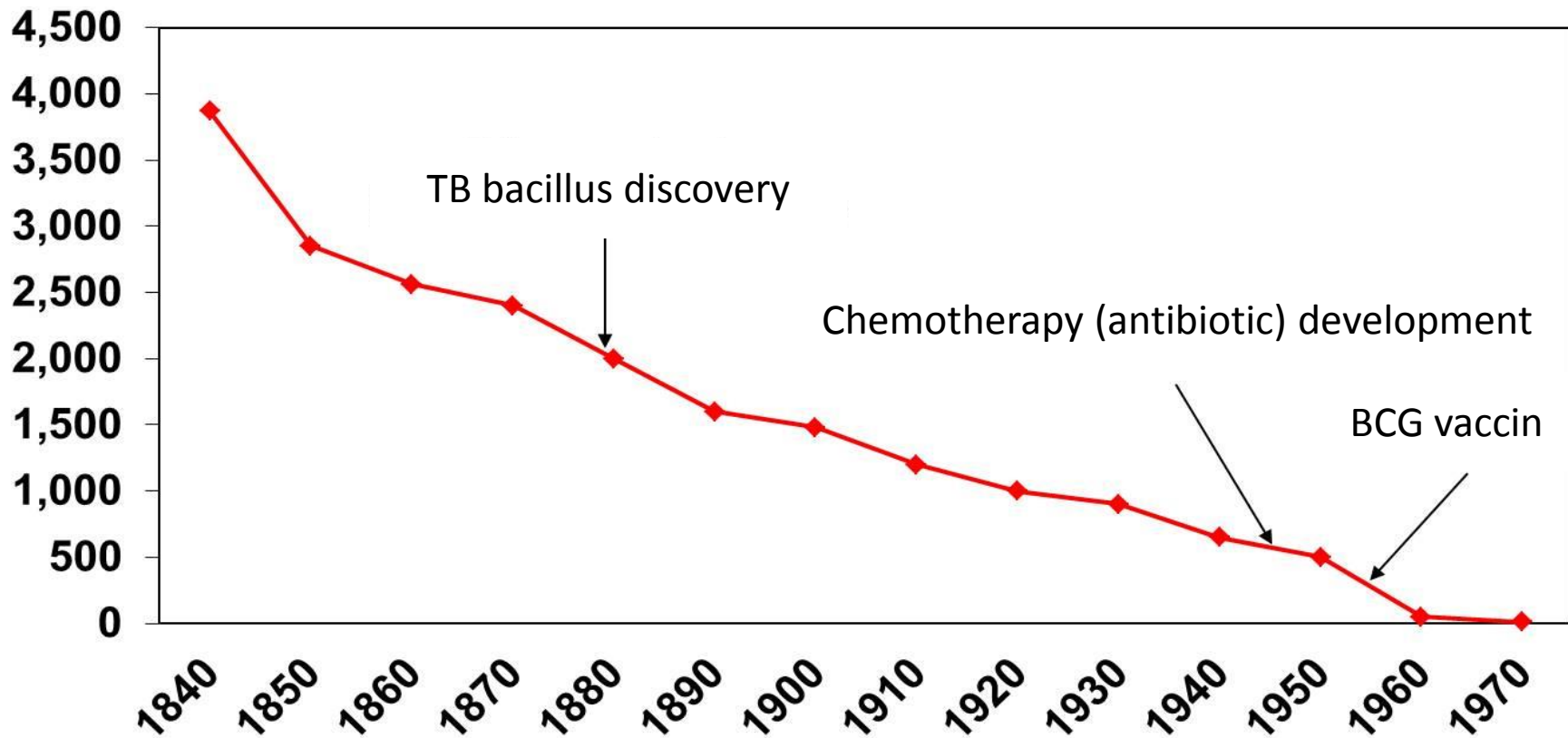




Didier Bompangue

## Tuberculosis in England and Wales, 1840–1970

Annual deaths due to tuberculosis  
(age standardized) per million





Didier Bompangue

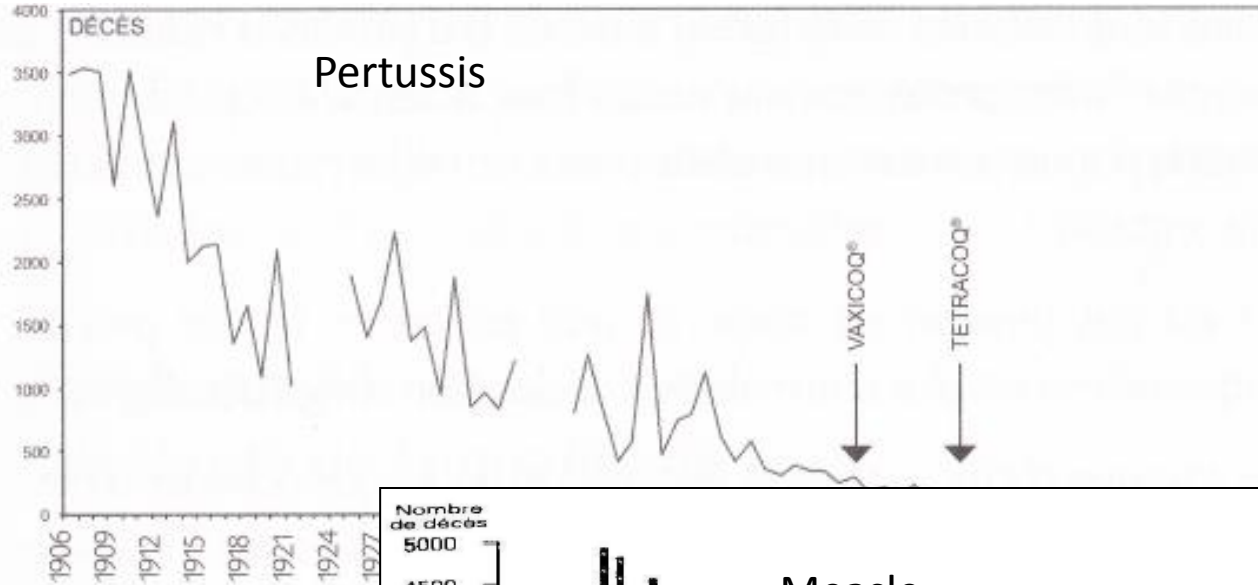
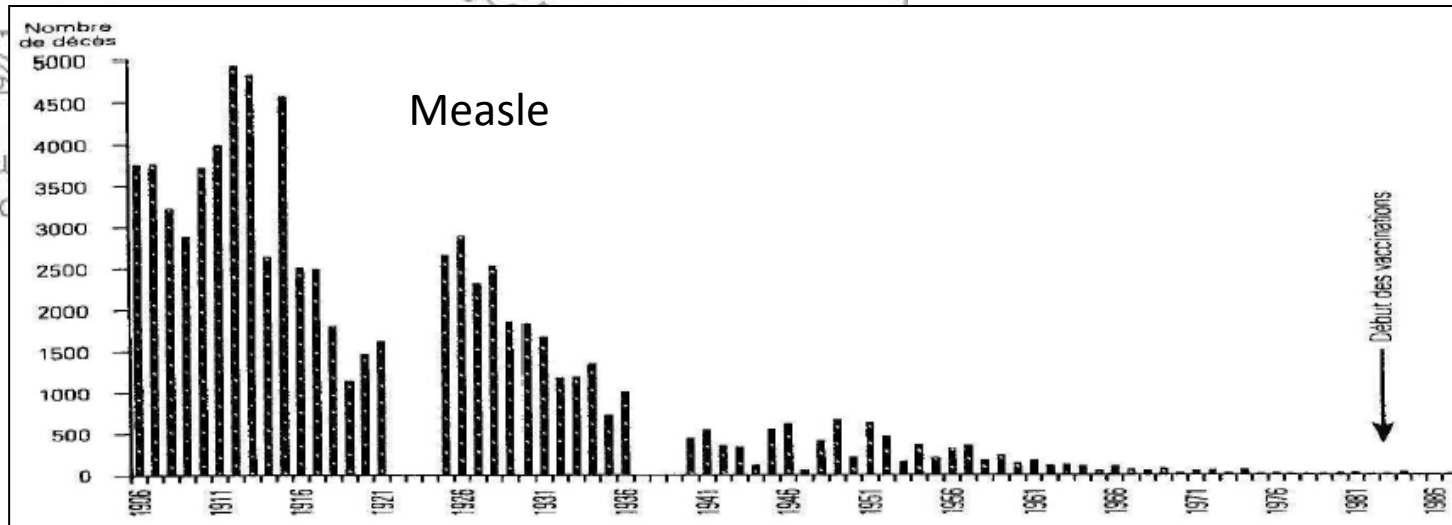


Figure 6. Décès dus à la coqueluche  
Absence de données pour les années 1922-1924 et 1937-1939

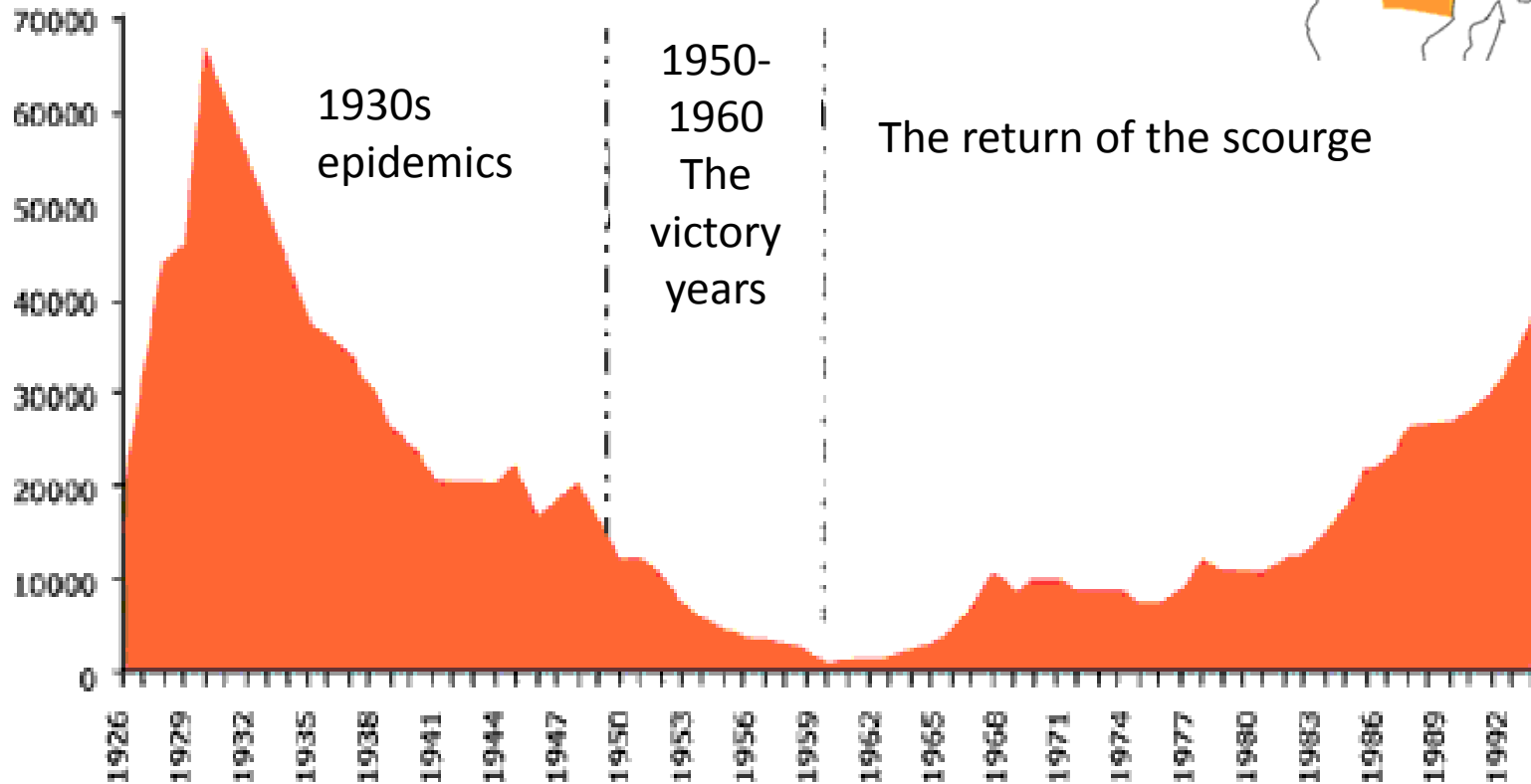


**Fig. 13 : décès dus à la rougeole en France de 1906 à 1986 (début des vaccinations en 1983)**  
(Absence de données pour les années 1922-1924 et 1937-1939)  
(Annuaire statistique de la France.)



Didier Bompangue

## Sleeping sickness



## Driving forces

Fact sheet ?:

How to problematize ?

Climate change ?

Demography

Socio-anthropology

Sanitarian

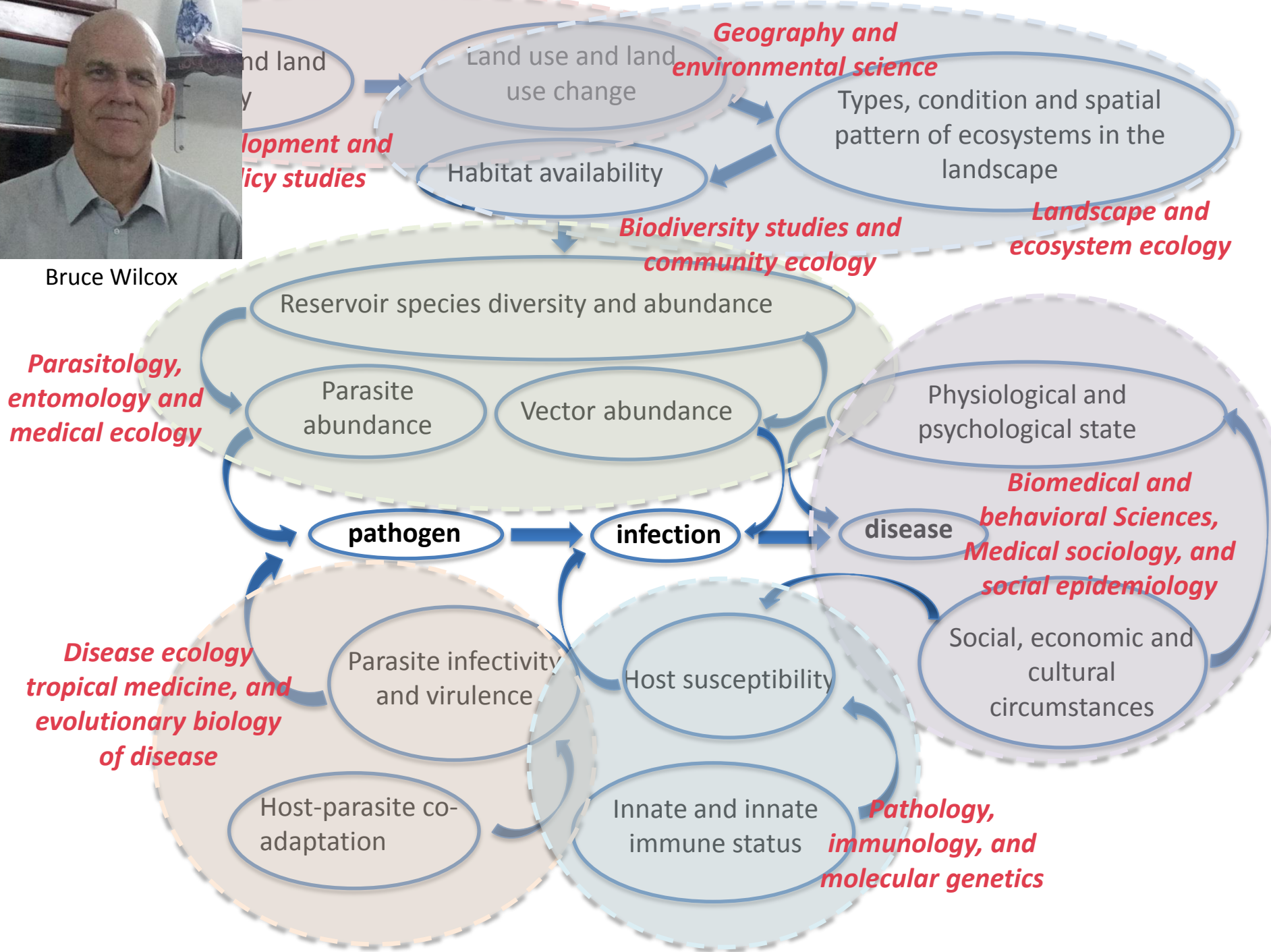
Epidemiological

Economical



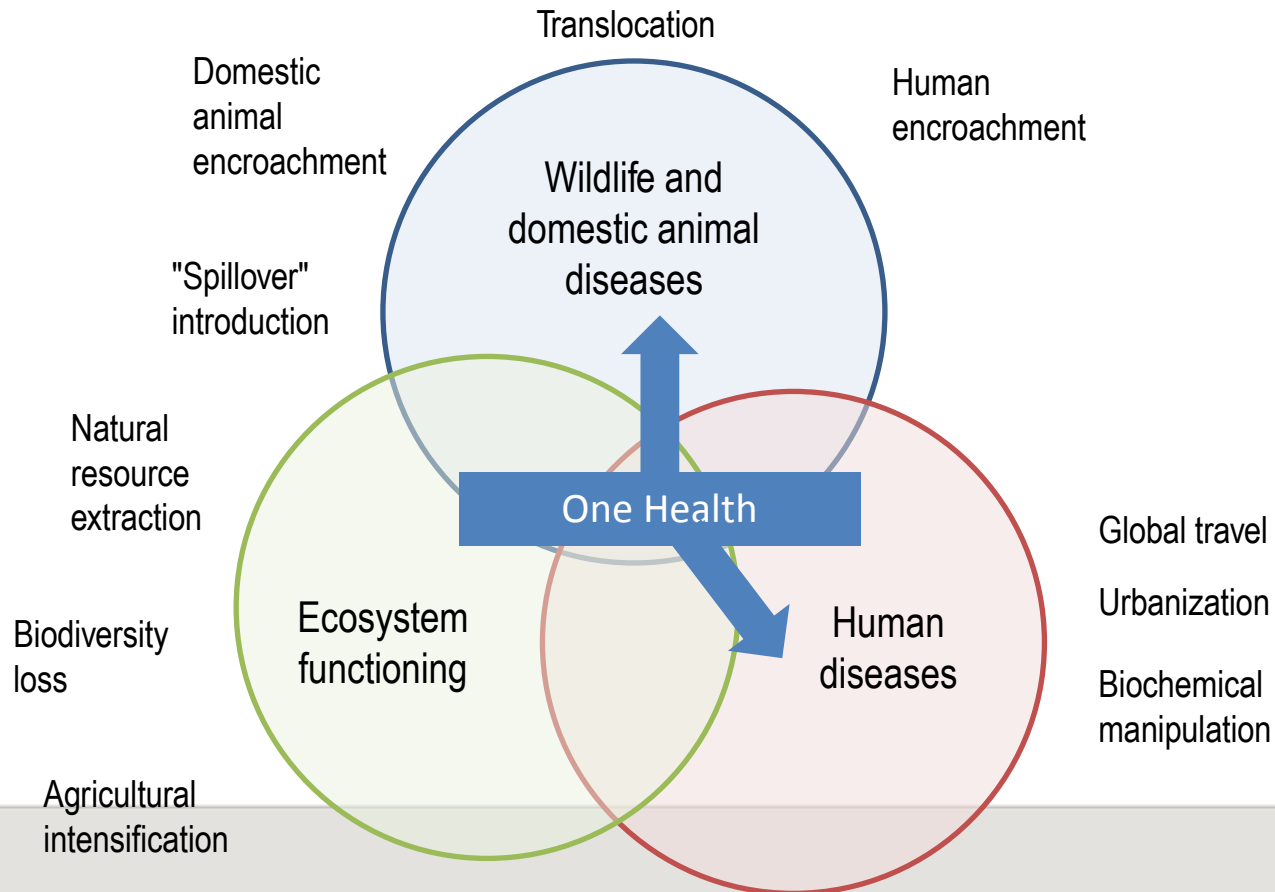


Bruce Wilcox



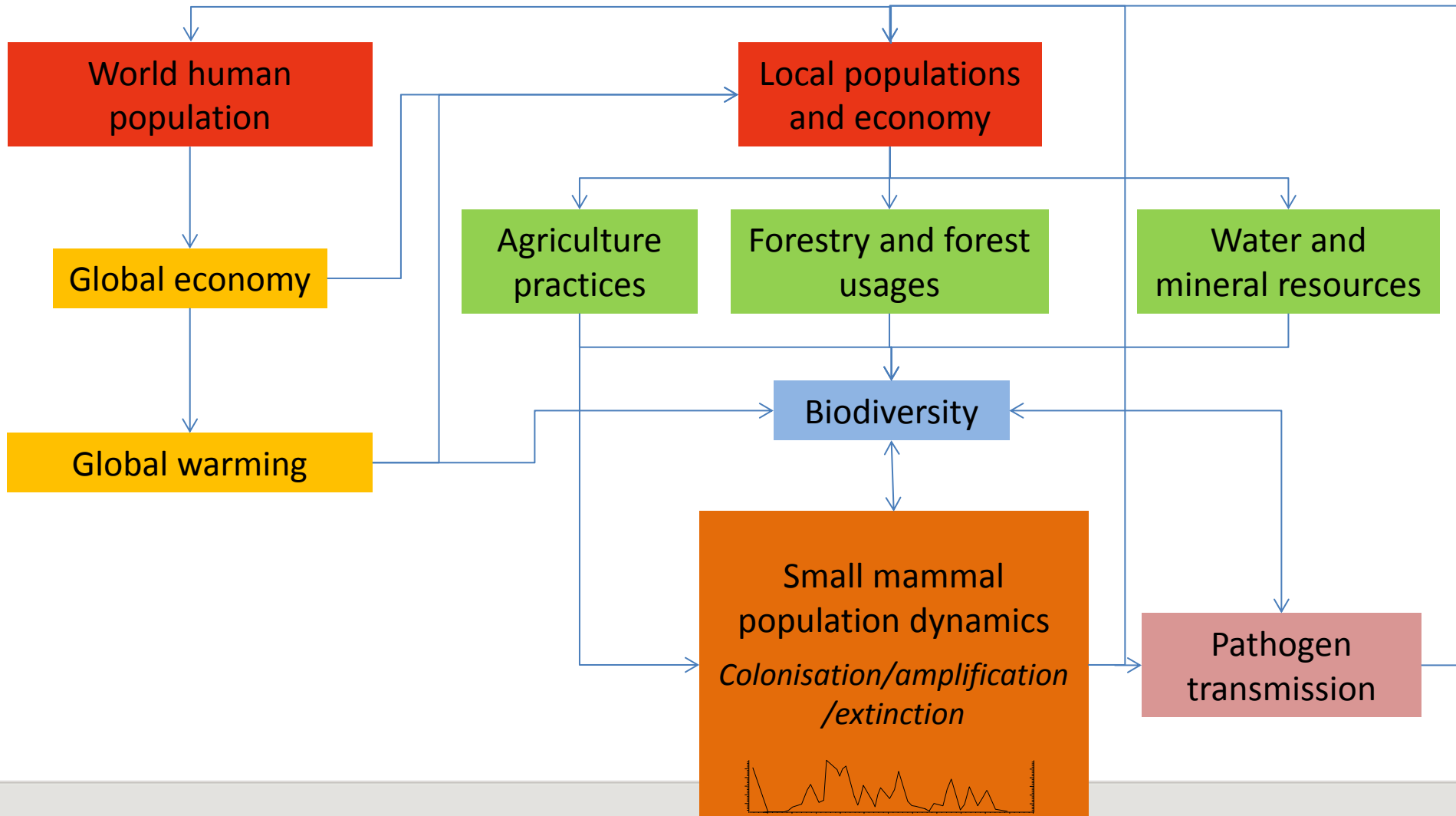
## Unhealthy Landscapes: Policy Recommendations on Land Use Change and Infectious Disease Emergence

Jonathan A. Patz,<sup>1</sup> Peter Daszak,<sup>2</sup> Gary M. Tabor,<sup>3</sup> A. Alonso Aguirre,<sup>4</sup> Mary Pearl,<sup>4</sup> Jon Epstein,<sup>2</sup> Nathan D. Wolfe,<sup>5</sup> A. Marm Kilpatrick,<sup>2</sup> Johannes Foufopoulos,<sup>6</sup> David Molyneux,<sup>7</sup> David J. Bradley,<sup>8</sup> and Members of the Working Group on Land Use Change and Disease Emergence

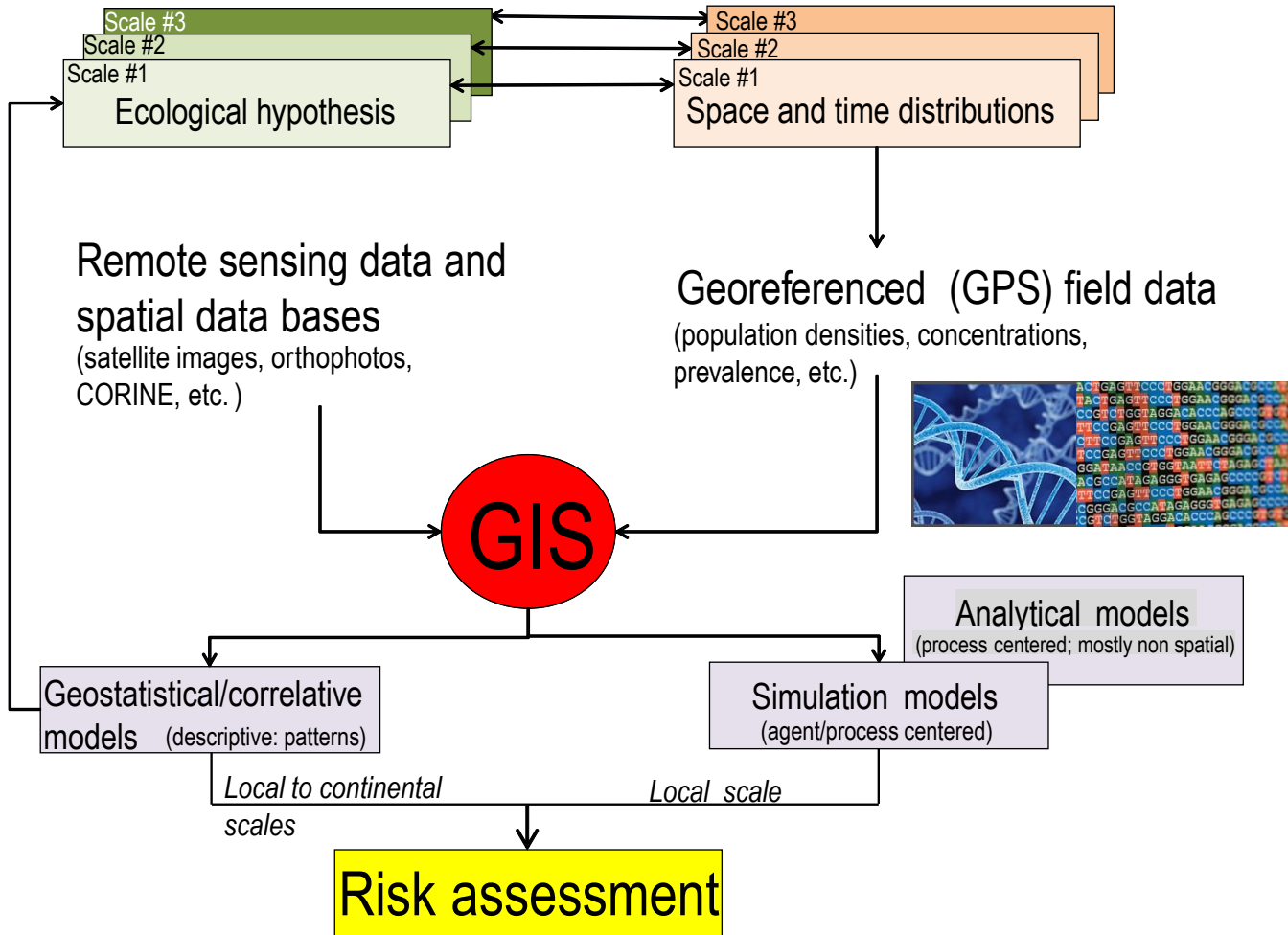


# Systems approach

## Rodent borne diseases



# Systems approach

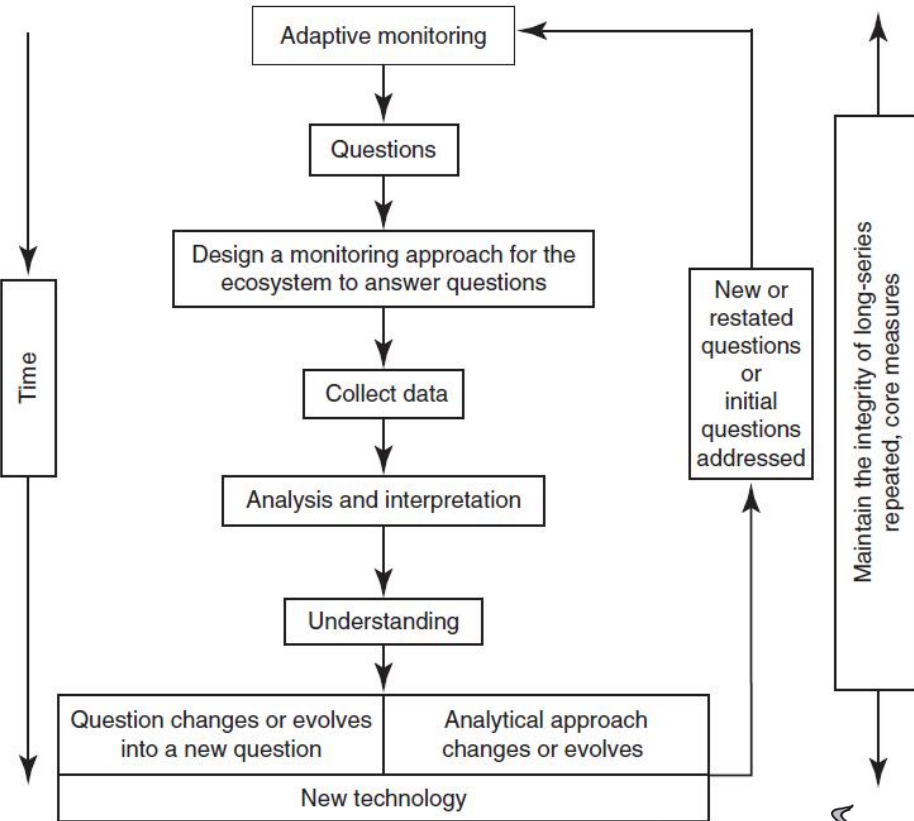


Applies to any living population:

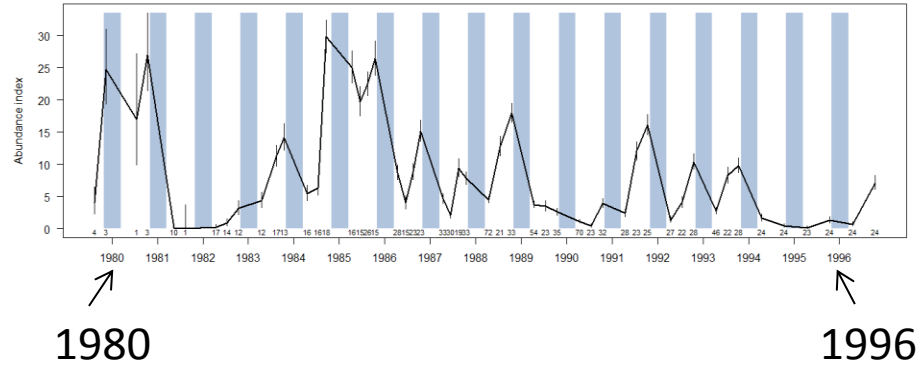


- ✓ Disease control
- ✓ Pest control
- ✓ Conservation
- ✓ Etc...

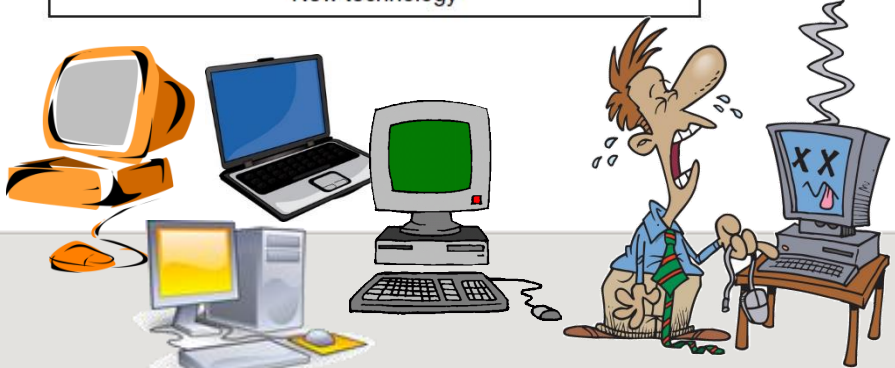
# Data lifetime issues



## Microtus arvalis demography

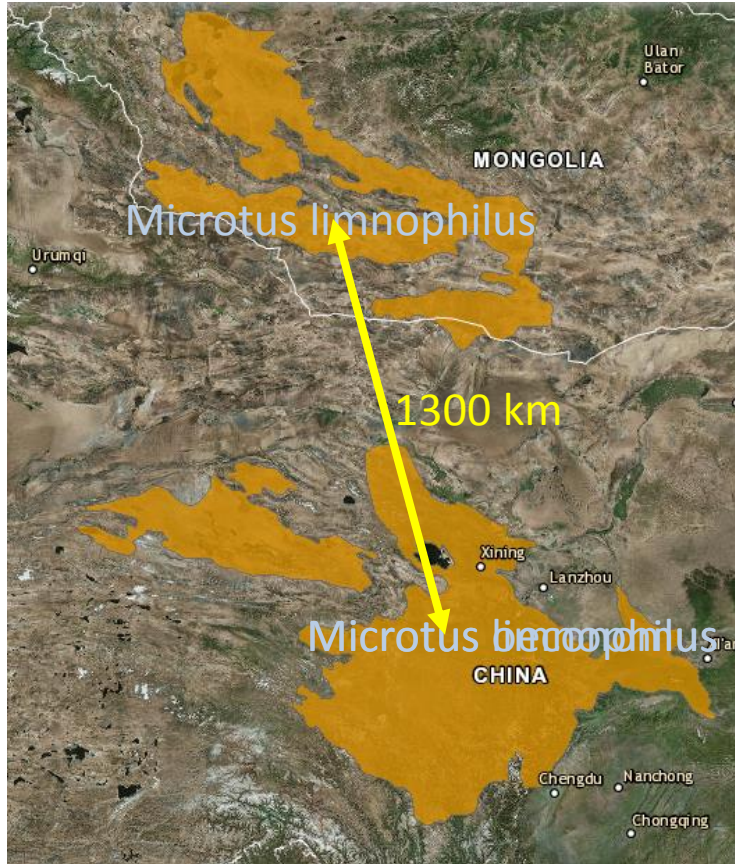


A screenshot of a biodiversity database entry for 'Micromela: small mammal surveys in Western China and Kyrgyztan'. The entry includes general metadata such as 'Identifier', 'Description', 'Disciplines', 'Keywords', 'Dates', and 'Update periodicity'. It also features a 'Spatial coverage' section with a list of specific survey locations and their coordinates, and a map showing the geographical distribution of these surveys in Western China and Kyrgyzstan. A large 'data2osu' watermark is overlaid on the map.



# Taxonomy issues

Rat is rat, not vole



## Karyological and dental identification of *Microtus limnophilus* in a large focus of alveolar echinococcosis (Gansu, China)

Frédéric Courant<sup>a\*</sup>, Patrick Brunet-Lecomte<sup>a</sup>, Vitaly Volobouev<sup>b</sup>, Jean Chaline<sup>a</sup>, Jean-Pierre Quéré<sup>c</sup>, Adam Nadachowski<sup>d</sup>, Sophie Montuire<sup>a</sup>, Genshu Bao<sup>e</sup>, Laurent Viriot<sup>f</sup>, Robert Rausch<sup>g</sup>, Margarita Erbajeva<sup>a,h</sup>, Dazhong Shi<sup>e</sup>, Patrick Giraudoux<sup>i</sup>

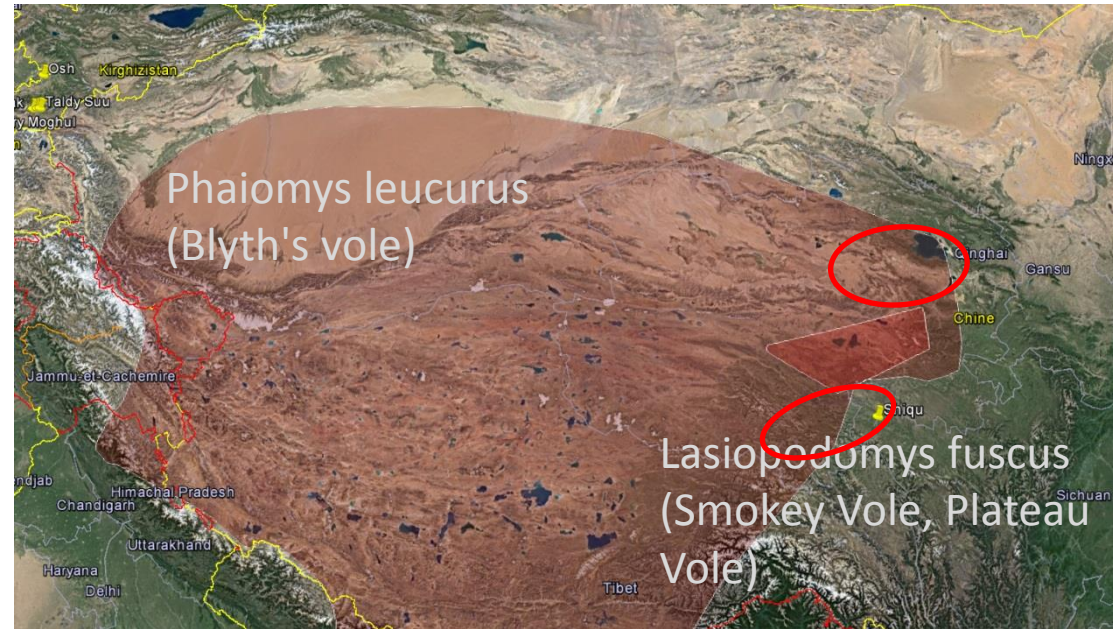
C. R. Acad. Sci. Paris. Sciences de la vie / Life Sciences  
1999. 322, 473–480

The IUCN Red List of Threatened Species™ 2016-2

Guiding Conservation for 50 Years

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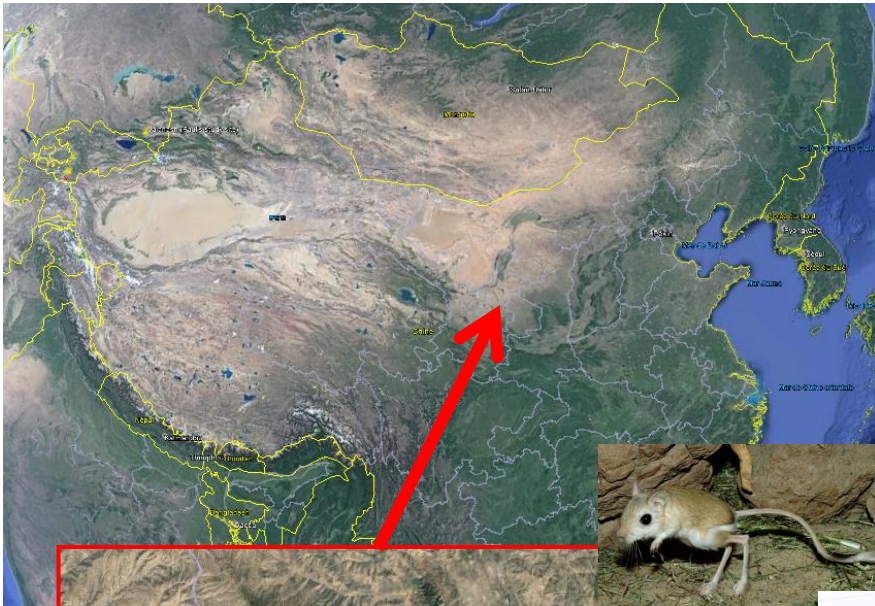
Enter Red List search term(s)   [Discover more](#)



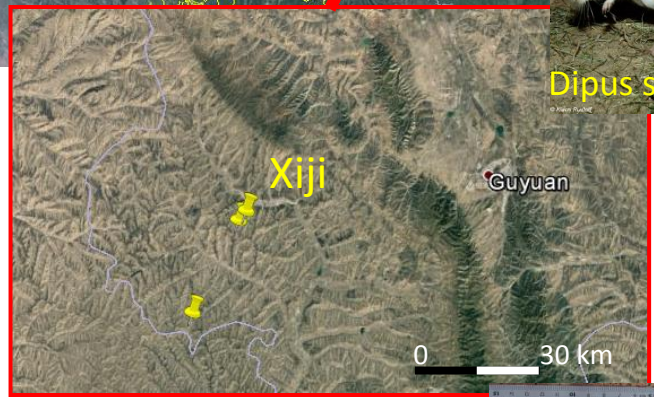
Reliability of gene bank sequences ?

# Taxonomy issues

## Rat is rat, not vole



Dipus sagitta

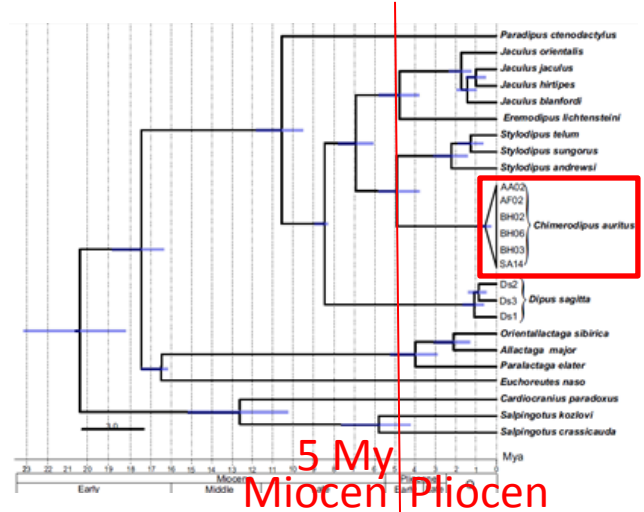


Dipus sagittaritus



2003 : *Dipus sagitta* (Raoul et al. 2008)

2016 : *Chimerodipus auritus* (Shenbrot et al. in prep.) – **Lazarus species**



5 My  
Miocen | Pliocen

# The GDRI Ecosystem health and environmental disease ecology

#1 2013 – 2016, #2 2017-2020 ?



## Ecology of Cestode transmission in Asia, Europe and North America



## Wildlife – human conflicts



## Permanent workshop on adaptive monitoring, data management and modelling

GAMA, modeling made easy



graphab



dat@osu

GAMA PLATFORM