VetAgro Sup

Université de Lyon

humanité et biodiversité
ENSEMBLE PROTÉGEONS LE VIVANT

Sur l'initiative
et avec le soutien

Région RhôneAlpes

Et des partenaires

Ministère de l'Écologie, du Développement durable et de l'Énergie

agence de l'eau

ars Agence Régionale de Santé Rhône-Alpes

OIE

ECOFECT
UNIVERSITE DE LYON

Colloque Santé-Biodiversité
27&28 octobre 2014 à VetAgro Sup

La complexité du lien entre santé et biodiversité

Serge Morand
CNRS - CIRAD
Centre d'Infectiologie Christophe Mérieux du Laos
Faculté de Médecine Tropicale, Univ Mahidol, Thaïlande

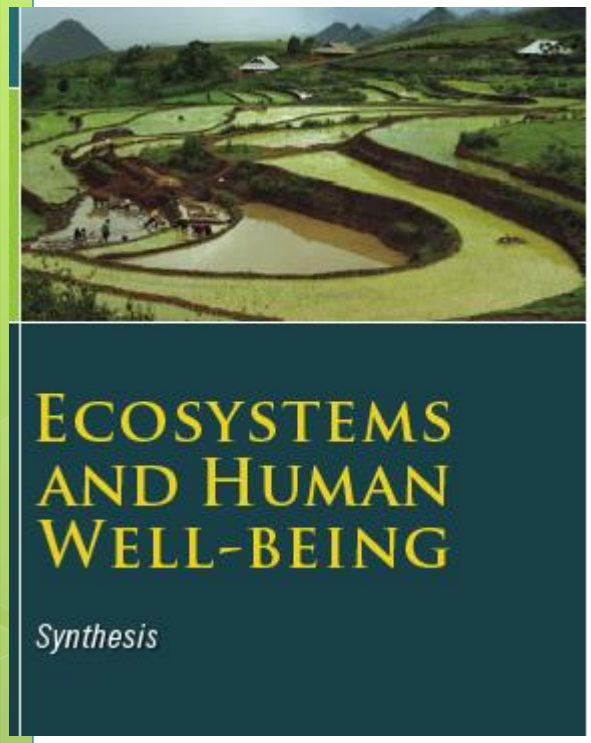
Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity

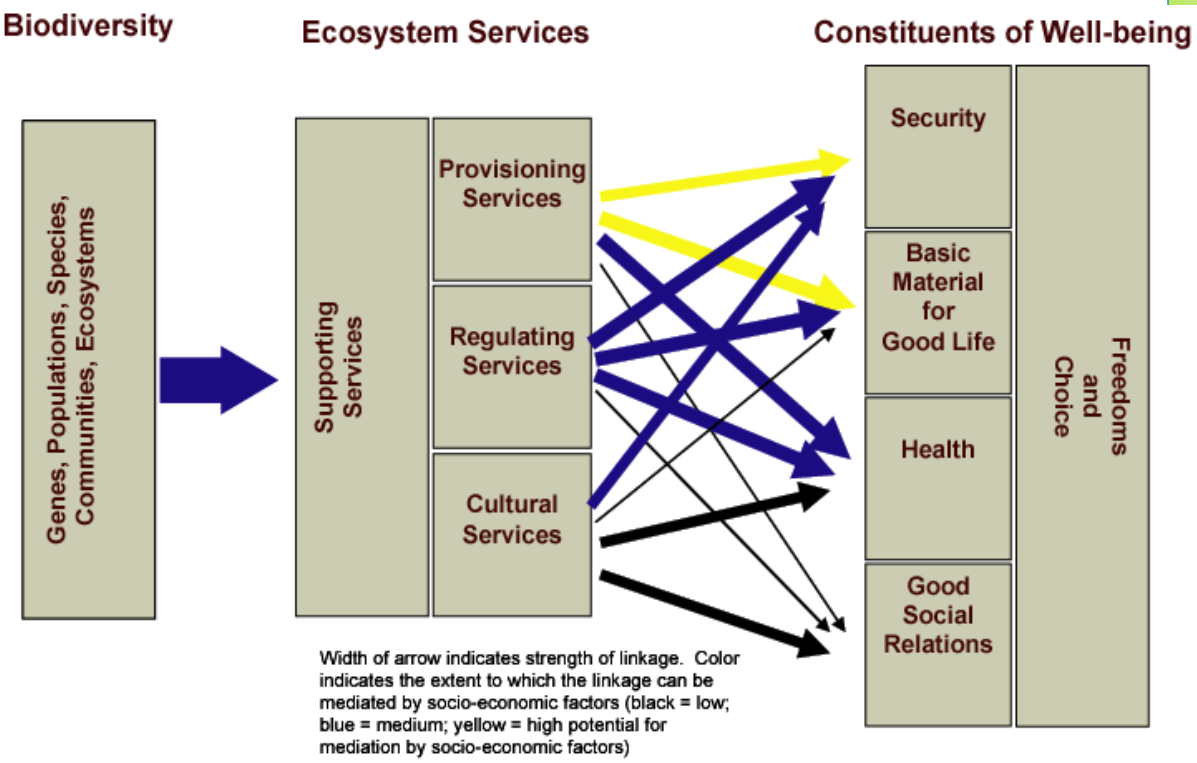
Preamble to the Constitution of the World Health Organization (1946)

"Biological diversity" means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems

The Convention on Biological Diversity (1993)

Millenium Ecosystem Assessment (2005): services écosystémiques



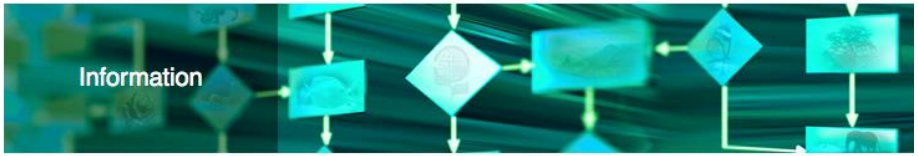


- 60% des écosystèmes sont dégradés
- source de conflits
- réduction de la pauvreté implique un usage soutenable des écosystèmes

Convention on Biological Diversity

Se

The Convention | Cartagena Protocol | Nagoya Protocol | Programmes



- News & Communications
- Web Announcements
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> Information > SBSTTA Recommendation

Back to SBSTTA Recommendations

SBSTTA 18 Recommendation XVIII/14

XVIII/14. Health and biodiversity

World Health Organization

centre | Publications | Countries | Programmes | About WHO

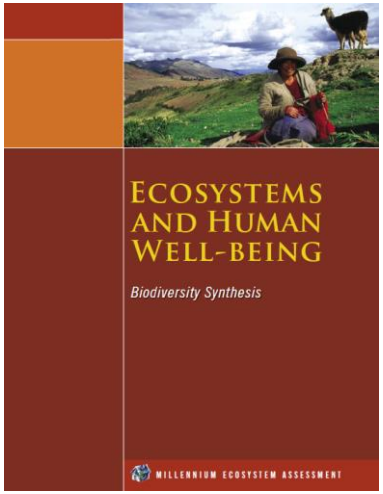
Climate change and human health

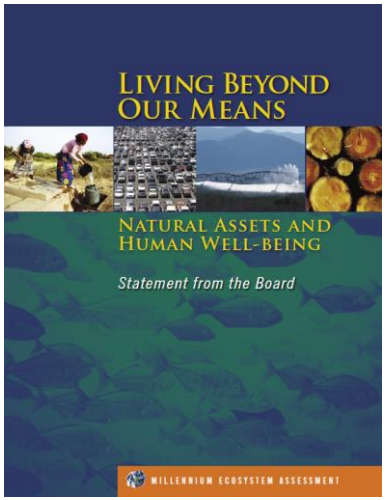
Biodiversity

What is biodiversity?

Biodiversity underpins life on Earth, and refers to the variety found in biota from genetic make up of plants an animals to cultural diversity.

What does biodiversity mean for human health?





Food and Agriculture Organization of the United Nations

About FAO | In Action | Countries | Themes

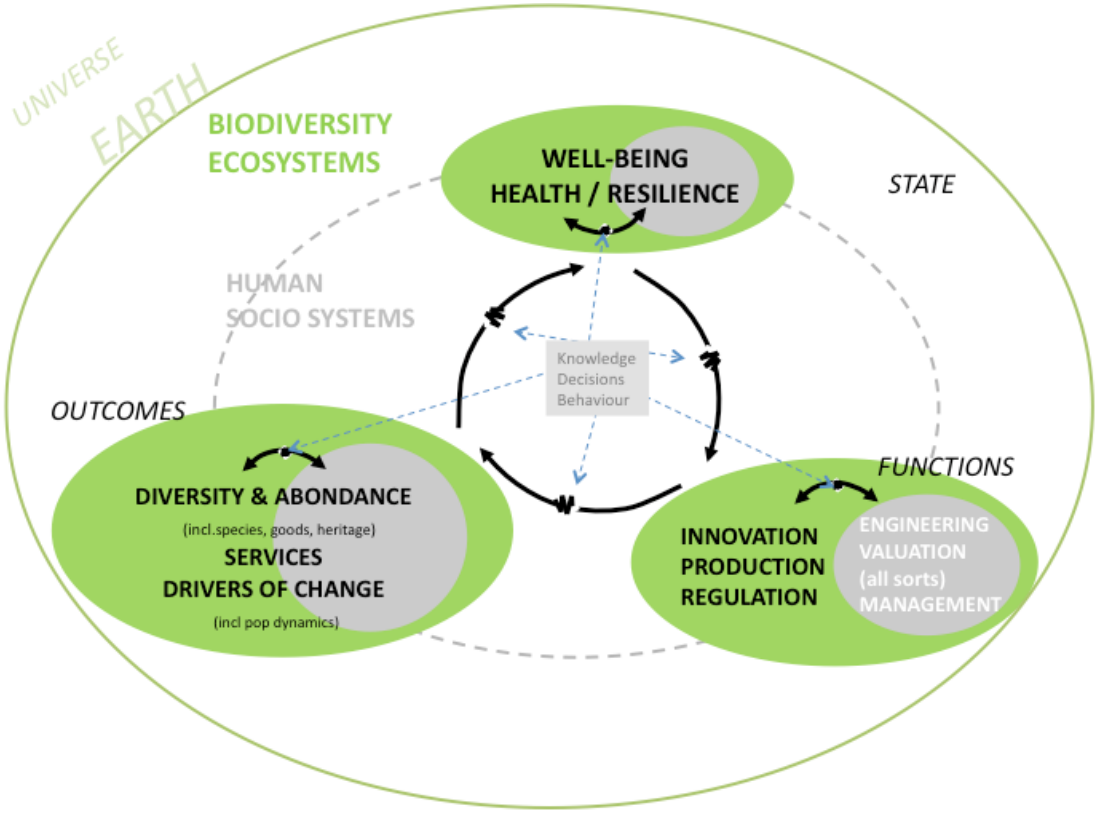
Home > Themes > Biodiversity

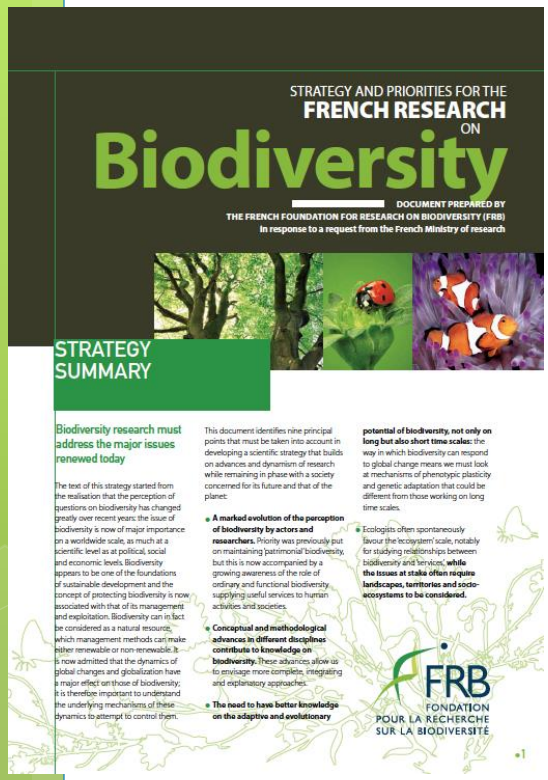
Biodiversity

Biodiversity is essential for food security and nutrition. Thousands of interconnected species make up a vital web of biodiversity within the ecosystems upon which global food production depends.

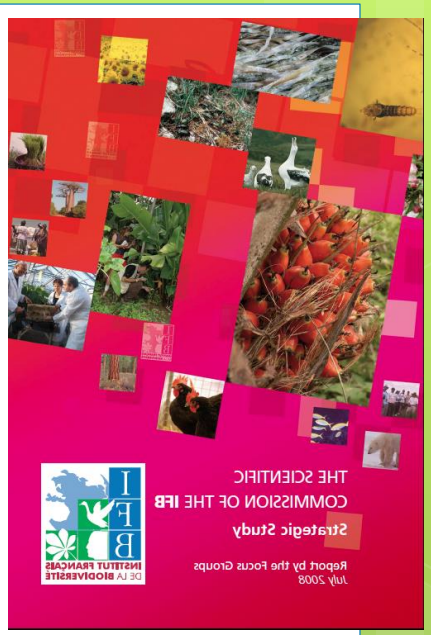
With the erosion of biodiversity, humankind loses the potential to adapt ecosystems to new challenges such as population growth and climate change. Achieving food security for all is intrinsically linked to the maintenance of biodiversity.


Intergovernmental Platform on
Biodiversity & Ecosystem Services
ipbes
Science and Policy
for People and Nature


UNIVERSE
EARTH
BIODIVERSITY
ECOSYSTEMS
WELL-BEING
HEALTH / RESILIENCE
STATE
HUMAN
SOCIO SYSTEMS
Knowledge
Decisions
Behaviour
OUTCOMES
DIVERSITY & ABONDANCE
(incl.species, goods, heritage)
SERVICES
DRIVERS OF CHANGE
(incl pop dynamics)
FUNCTIONS
INNOVATION
PRODUCTION
REGULATION
ENGINEERING
VALUATION
(all sorts)
MANAGEMENT



2009. Stratégies et priorités pour
La recherche française en biodiversité



2008. Rapport stratégique,
groupe “biodiversité et Santé”

2011. Changement Climatique
et biodiversité en France
(Programme ECOFOR)

Gauthier-Clerc M, Thomas F, eds
Ecologie de la Santé et Biodiversité
De Boeck, 2010

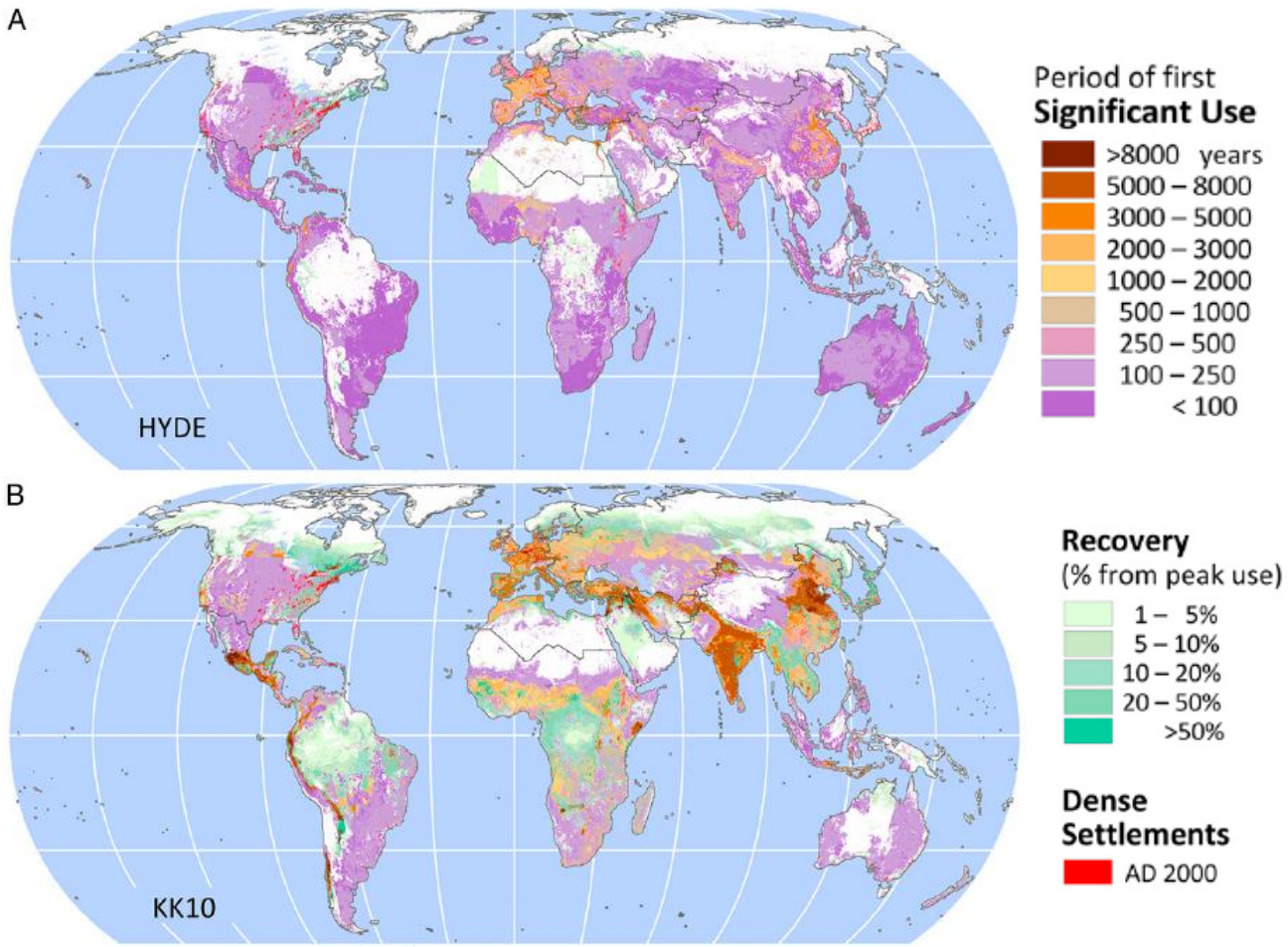
Morand S, Pipien G, eds
Notre Santé et la biodiversité
Buchet Chastel, 2013

Morand S, Moutou D, Richomme C, eds
Faune sauvage, biodiversité et santé, quels défis ?
Quae, 2014

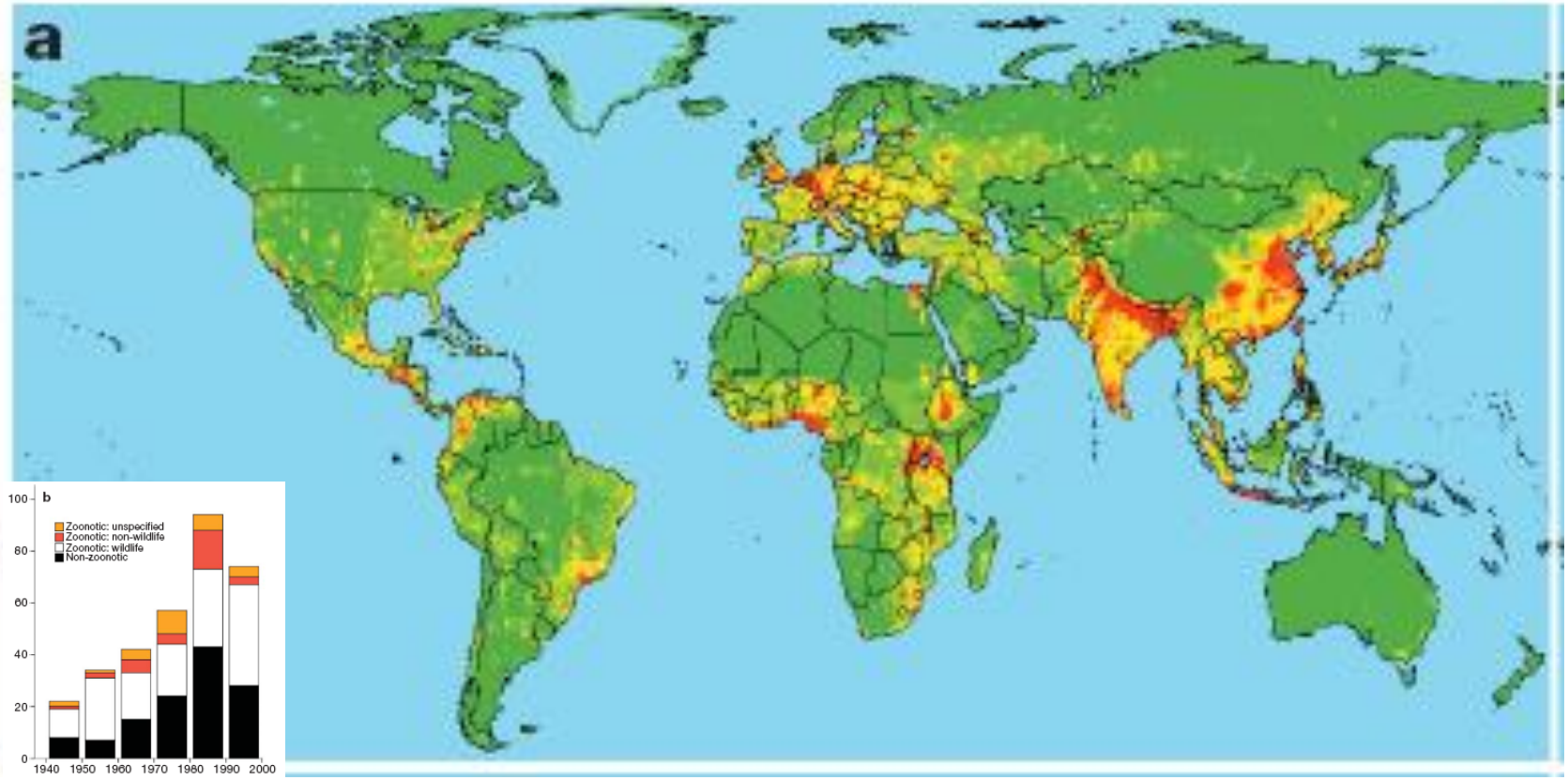
L’importance des changements planétaires

Used planet: A global history

Erle C. Ellis[a,1], Jed O. Kaplan[b], Dorian Q. Fuller[c], Steve Vavrus[d], Kees Klein Goldewijk[e], and Peter H. Verburg[f]



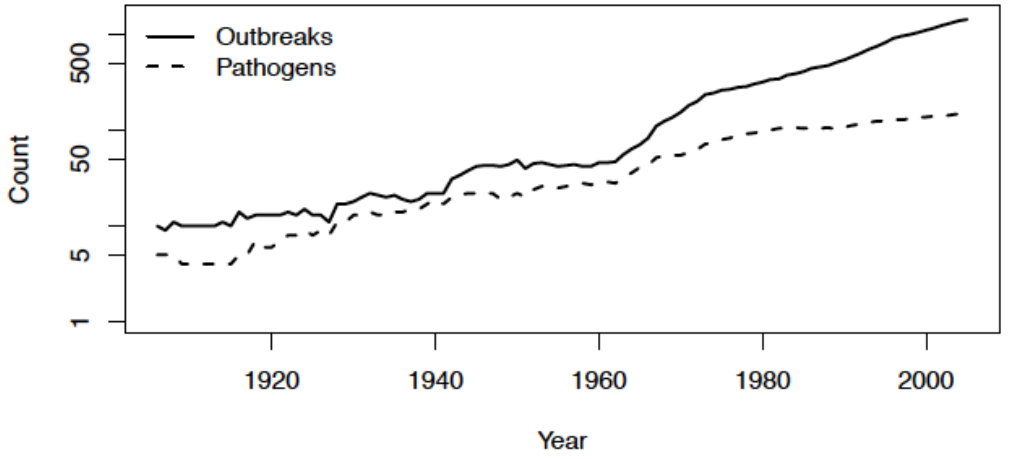
Risques d'émergence de maladies infectieuses émergentes liées à la faune sauvage



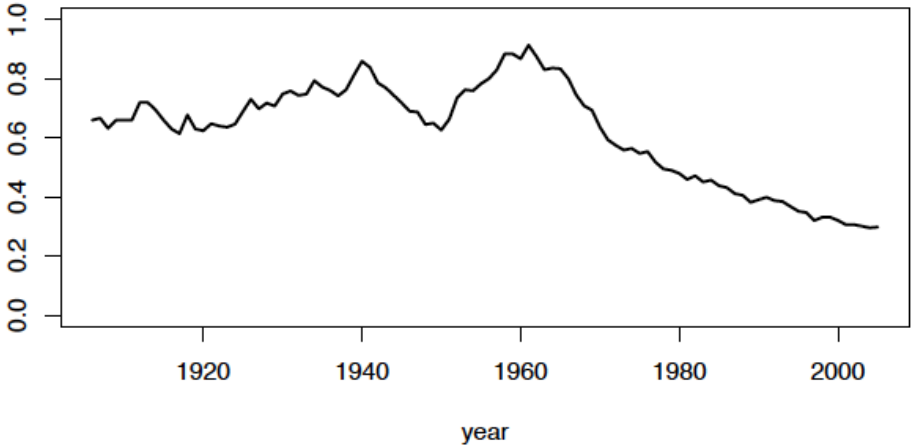
(Jones et al., 2008)

Homogénéisation globale des pathogènes humains

Augmentation des épidémies

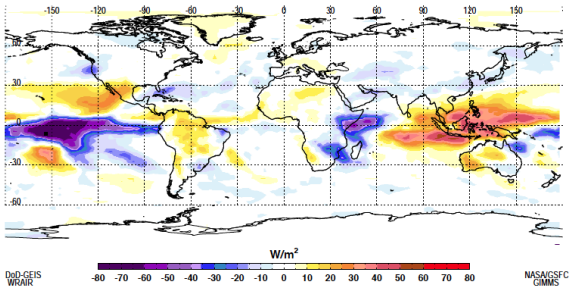


Homogénéisation (pathogen-country modularity)



(Poisot, Nunn & Morand, sub)

Changement climatique et maladies infectieuses, une relation compliquée



OPEN

Climate variability and outbreaks of infectious diseases in Europe

T AREAS:
NFECTION

Serge Morand[1,2], Katharine A. Owers[1], Agnes Waret-Szkuta[2], K. Marie McIntyre[3] & Matthew Bay

Climate change: the impact on the epidemiology and control of animal diseases

Scientific and Technical Review 27(2), 2008

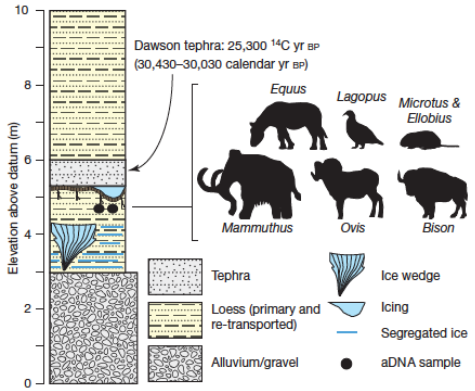
(de la Rocque, Morand & Hendrickx, eds)

Antoine Andremont
Michel Tibon-Cornillot

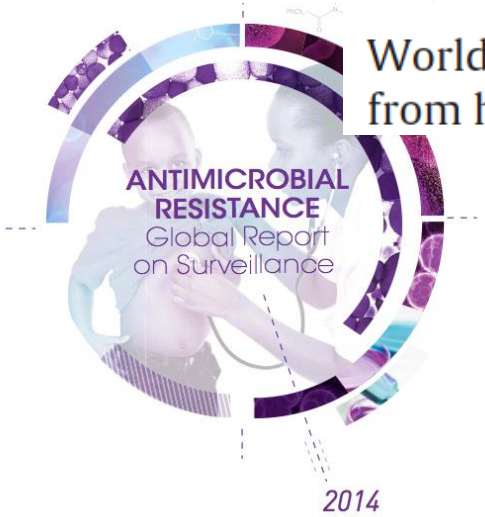
Le Triomphe des bactéries
La fin des antibiotiques ?

Antibiotic resistance is ancient

Vanessa M. D'Costa[1,2]*, Christine E. King[3,4]*, Lindsay Kalan[1,2], Mariya Morar[1]



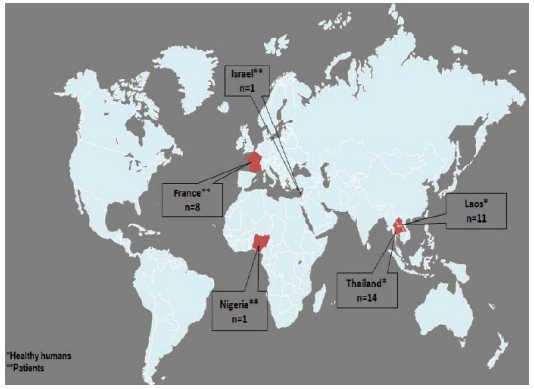
Max Milo
L'inconnu



World Health Organization

Worldwide emergence of colistin resistance in *Klebsiella pneumoniae* from healthy humans and patients in Lao PDR, Thailand, Israel,

Abiola Olumuyiwa Olaitan



Les produits pharmaceutiques dans l'environnement

Avian scavengers and the threat from veterinary pharmaceuticals

Richard J. Cuthbert[1,2], Mark A. Taggart[3], Vibhu Prakash[4], Soumya

The Daily Star Your Right To Know Sunday, October 26, 2014

Home NEWSPAPER Business Sports Wide Angle OP-ED ENTER

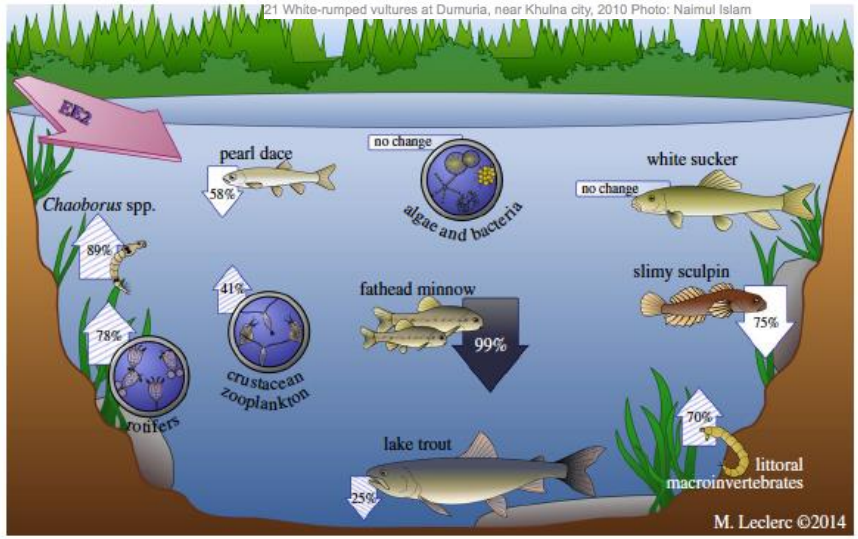
Saturday, September 29, 2012

Where have the vultures gone?

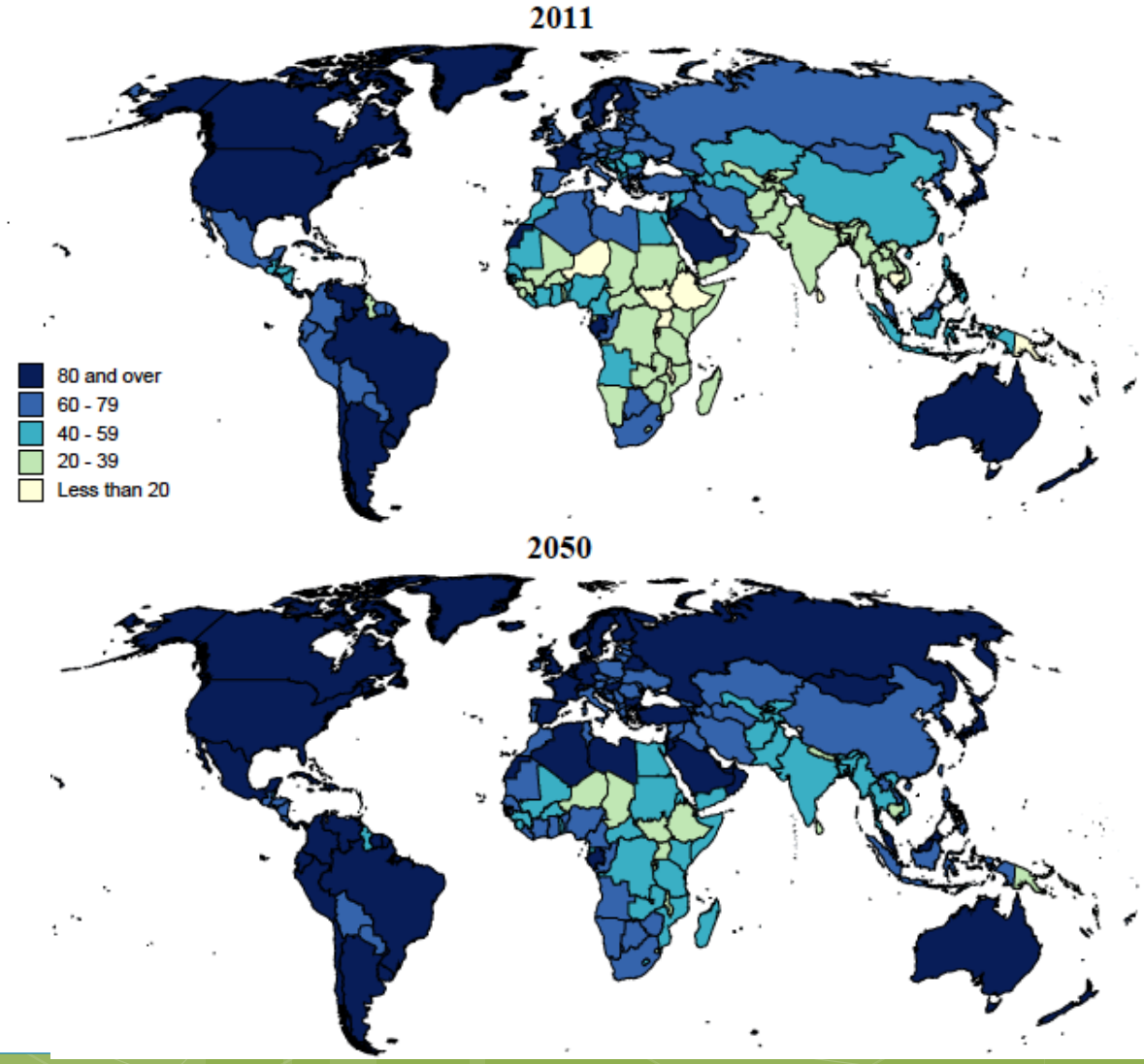
21 White-rumped vultures at Dumuria, near Khulna city, 2010 Photo: Naimul Islam

Bioaccumulation and trophic dilution of human pharmaceuticals across trophic positions of an effluent-dependent wadeable stream

Bowen Du[1,2], Samuel P. Haddad[1], Andreas Luek[5], W. Casan Scott[1,2],

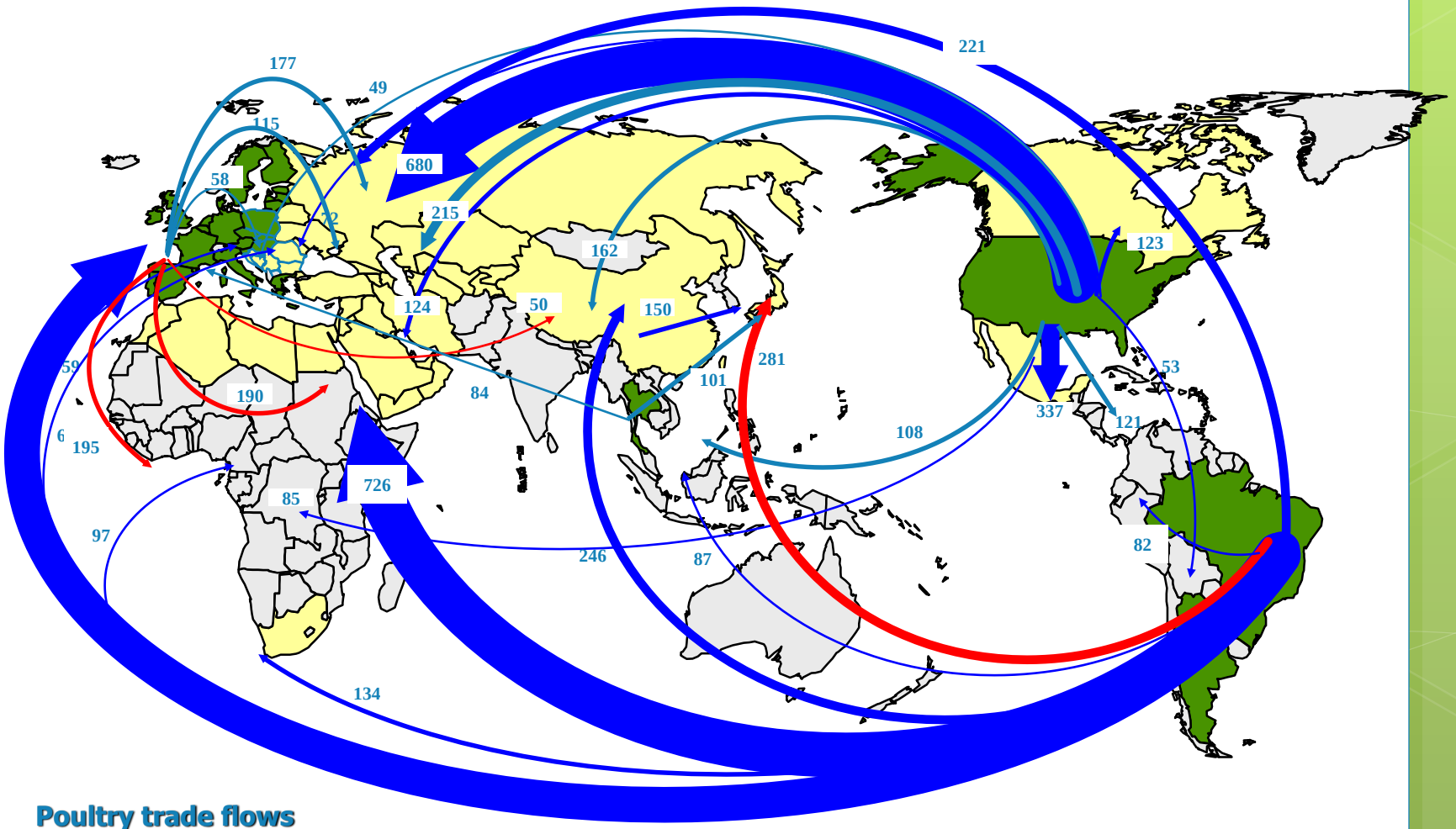


Dans un monde de plus en plus urbain

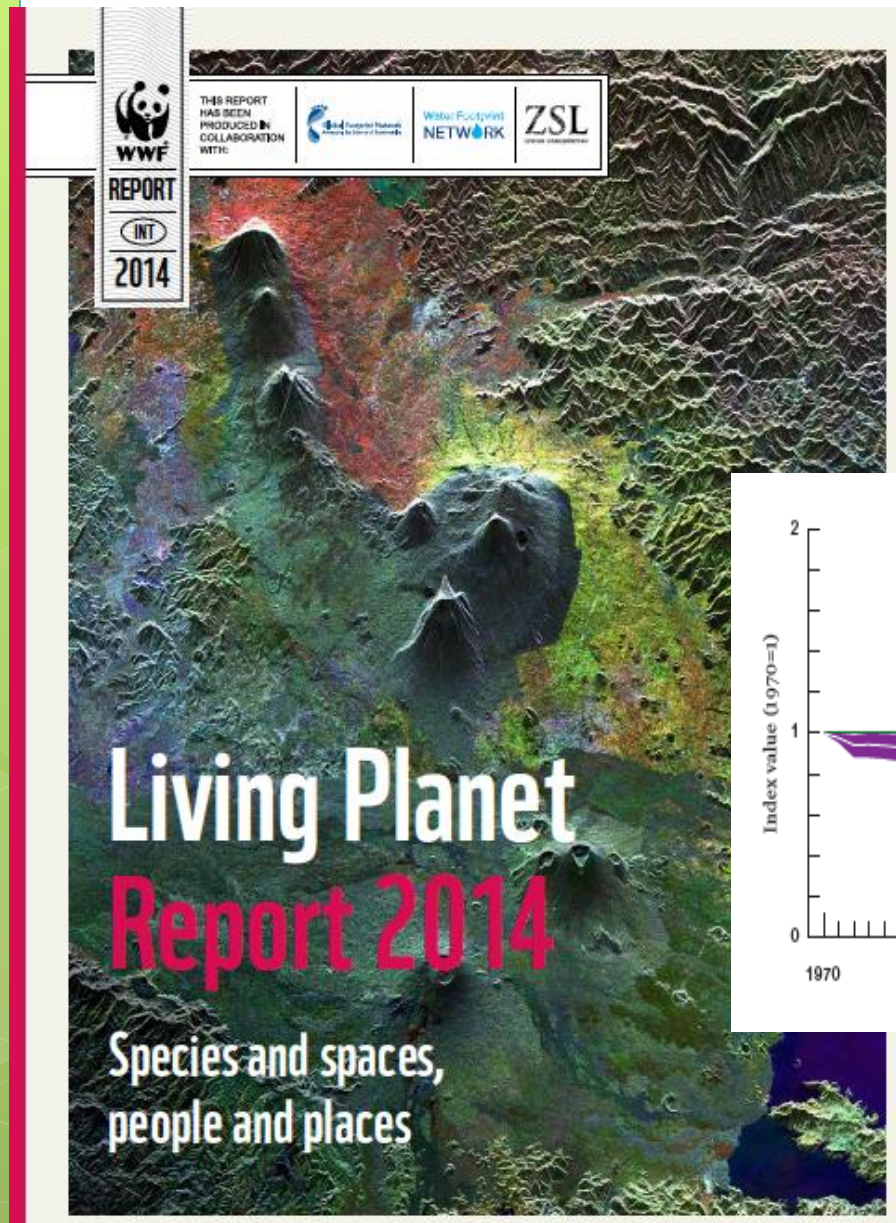


United Nations
New York, 2012

Commerce mondial des poulets



Poultry trade flows
(GIRA, 2004. Courtesy of Cargill)



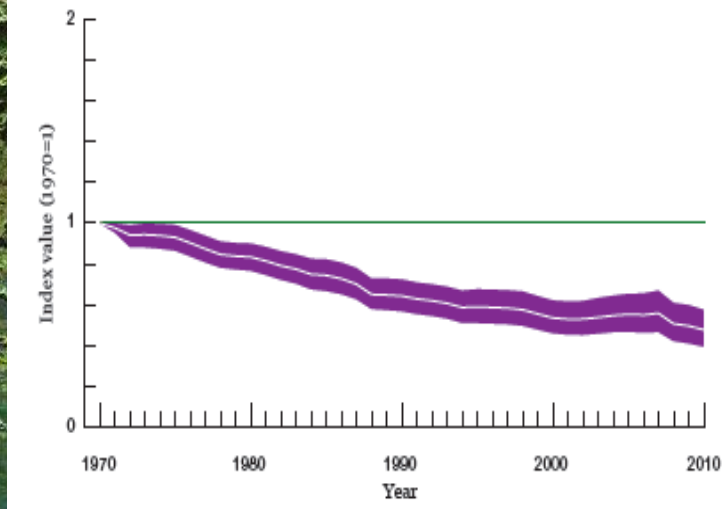
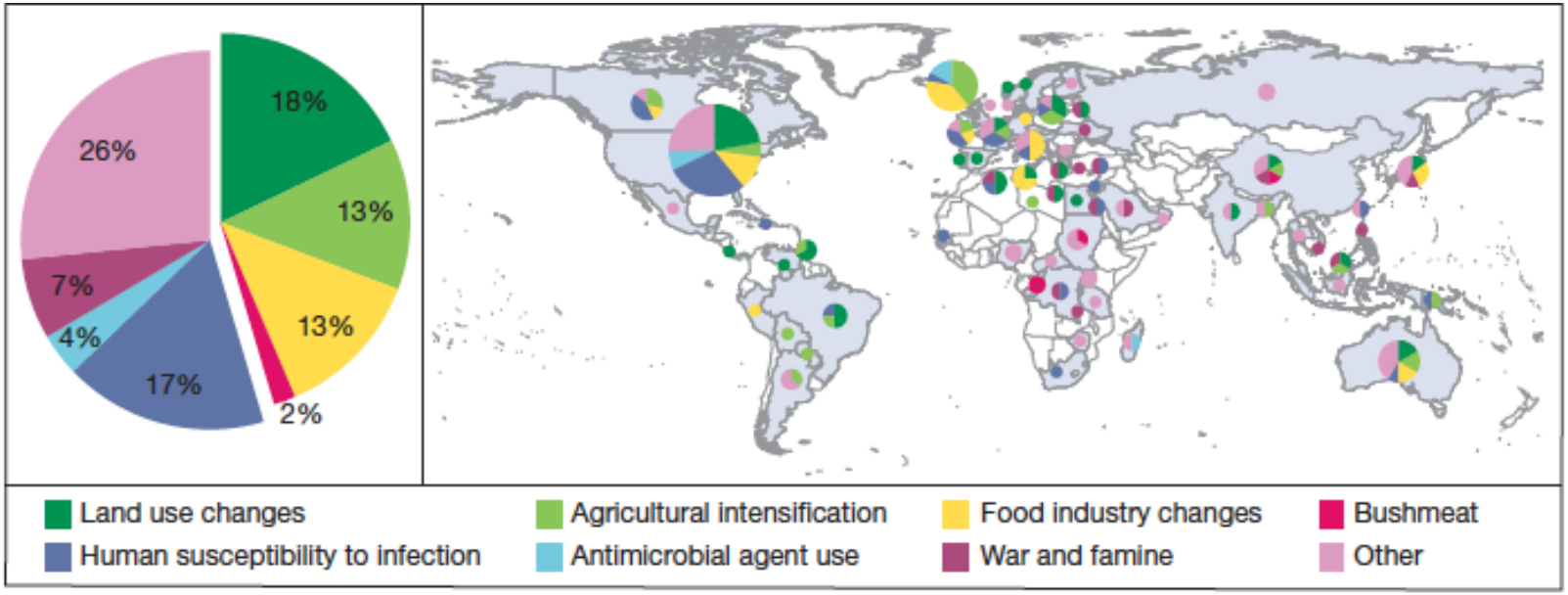


Figure 5: Global Living Planet Index shows a decline of 52 per cent between 1970 and 2010 (WWF, ZSL, 2014).

Impacts of biodiversity on the emergence and transmission of infectious diseases

Felicia Keesing[1], Lisa K. Belden[2], Peter Daszak[3], Andrew Dobson[4], C. Drew Harvell[5], Robert D. Holt[6], Peter Hudson[7], Anna Jolles[8], Kate E. Jones[9], Charles E. Mitchell[10], Samuel S. Myers[11], Tiffany Bogich[3] & Richard S. Ostfeld[12]



⇒ changements de biodiversité et d'usage des sols

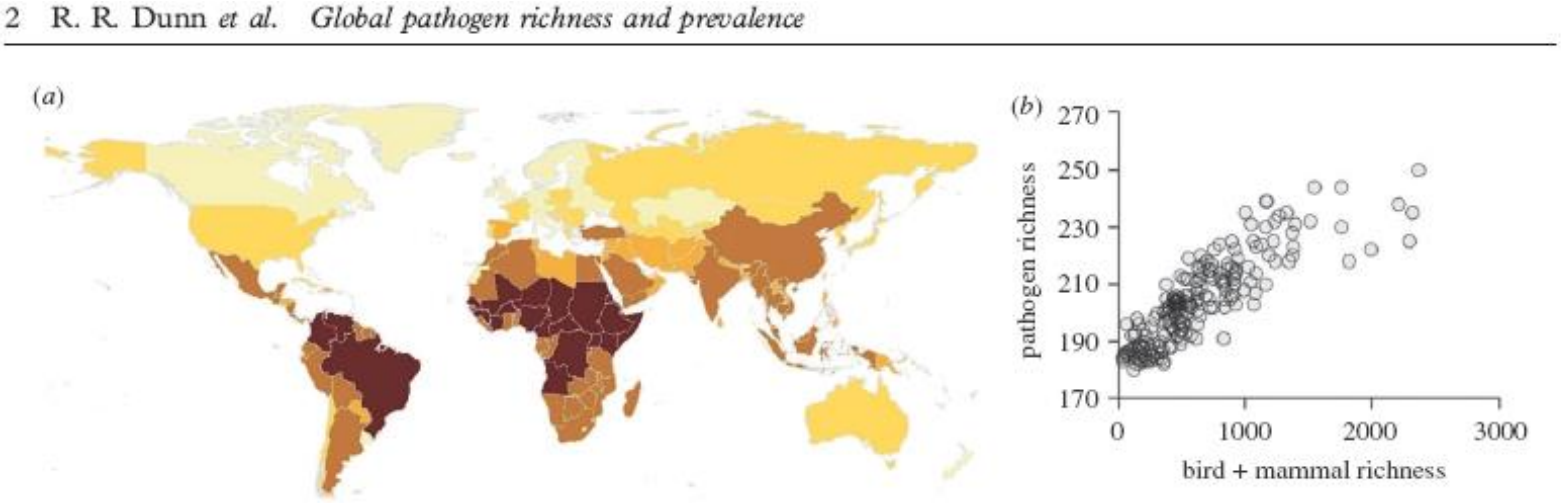
⇒ antibiotiques

Cependant, ….

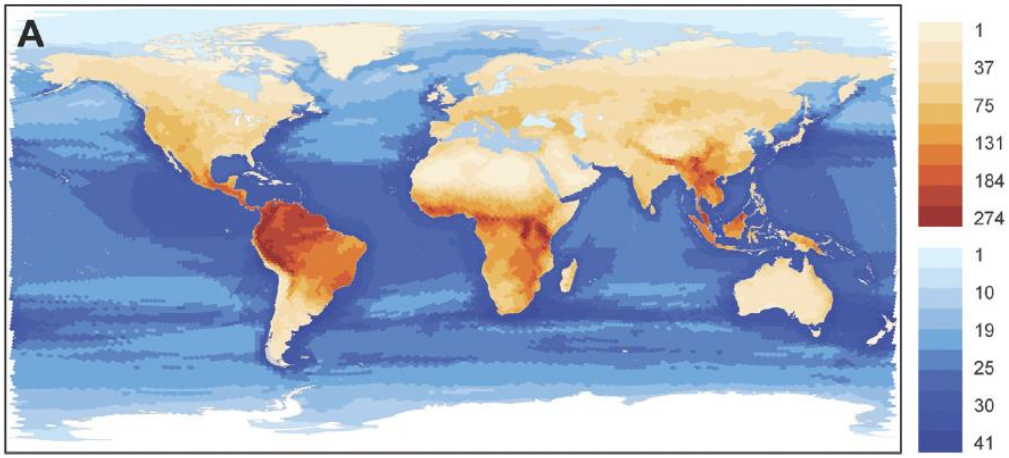
… des liens pas si simples

Biodiversité et maladies infectieuses

Richesse en pathogènes



Richesse en mammifères



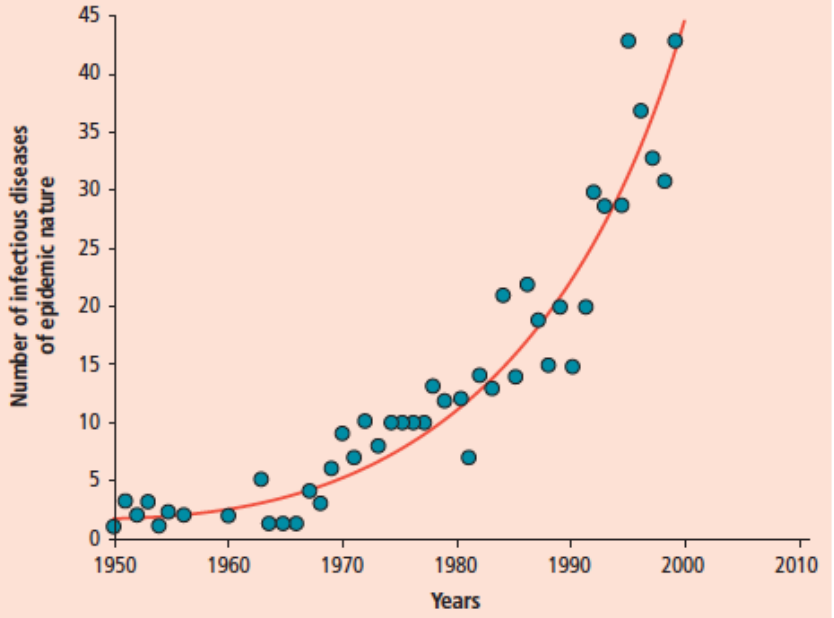
La richesse en maladies infectieuse est liée à la richesse en biodiversité (mammifères et oiseaux)

Schipper et al. 2009. Nature

Determinants of human infectious diseases in Europe

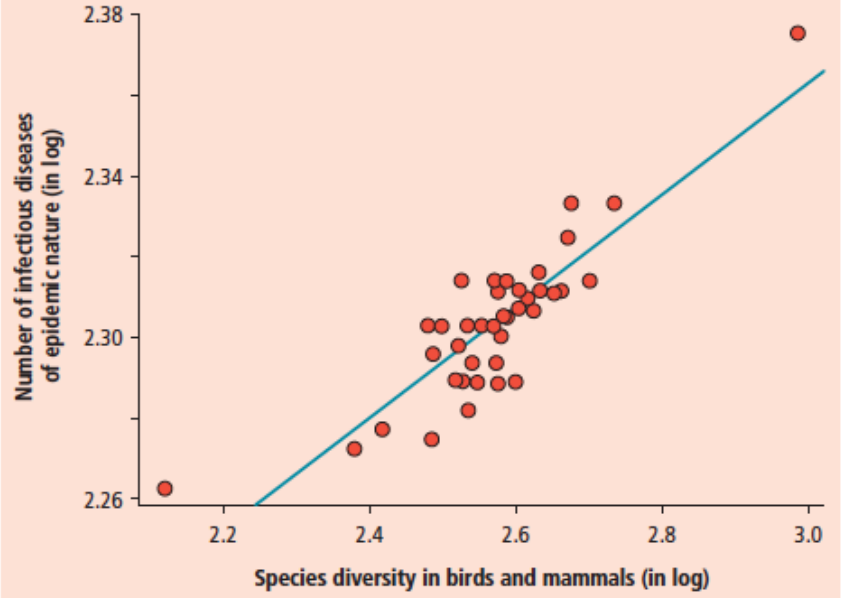
Augmentation des épidemies

Figure 1 Increase in epidemic infectious diseases since the 1950s in Europe



Biodiversité et Rrichesse en maladies

Figure 2 Relationship between the number of infectious diseases and the species diversity in birds and mammals among various European countries

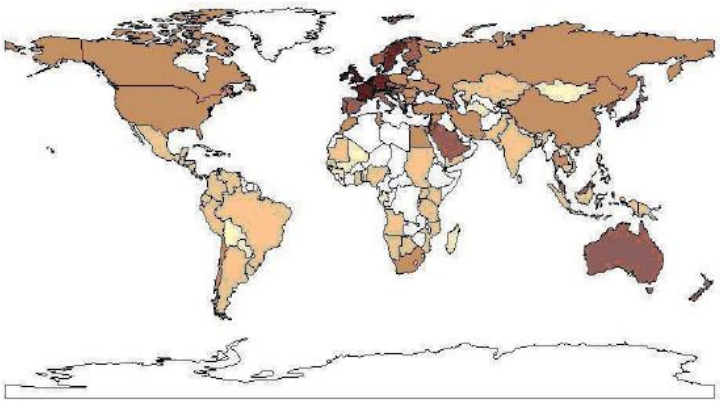


(Morand & Waret-Szkuta, 2012)

Mondialisation et santé

Is globalization healthy: a statistical indicator analysis of the impacts of globalization on health

Pim Martens[1,2*], Su-Mia Akin[1], Huynen Maud[1], Raza Mohsin[1]



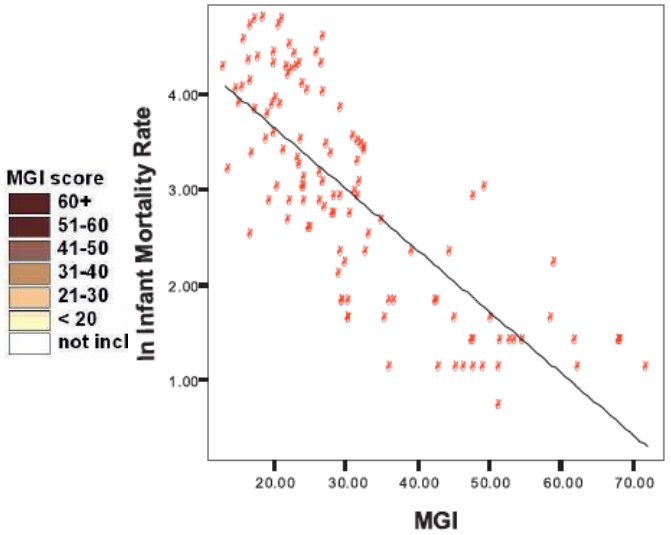


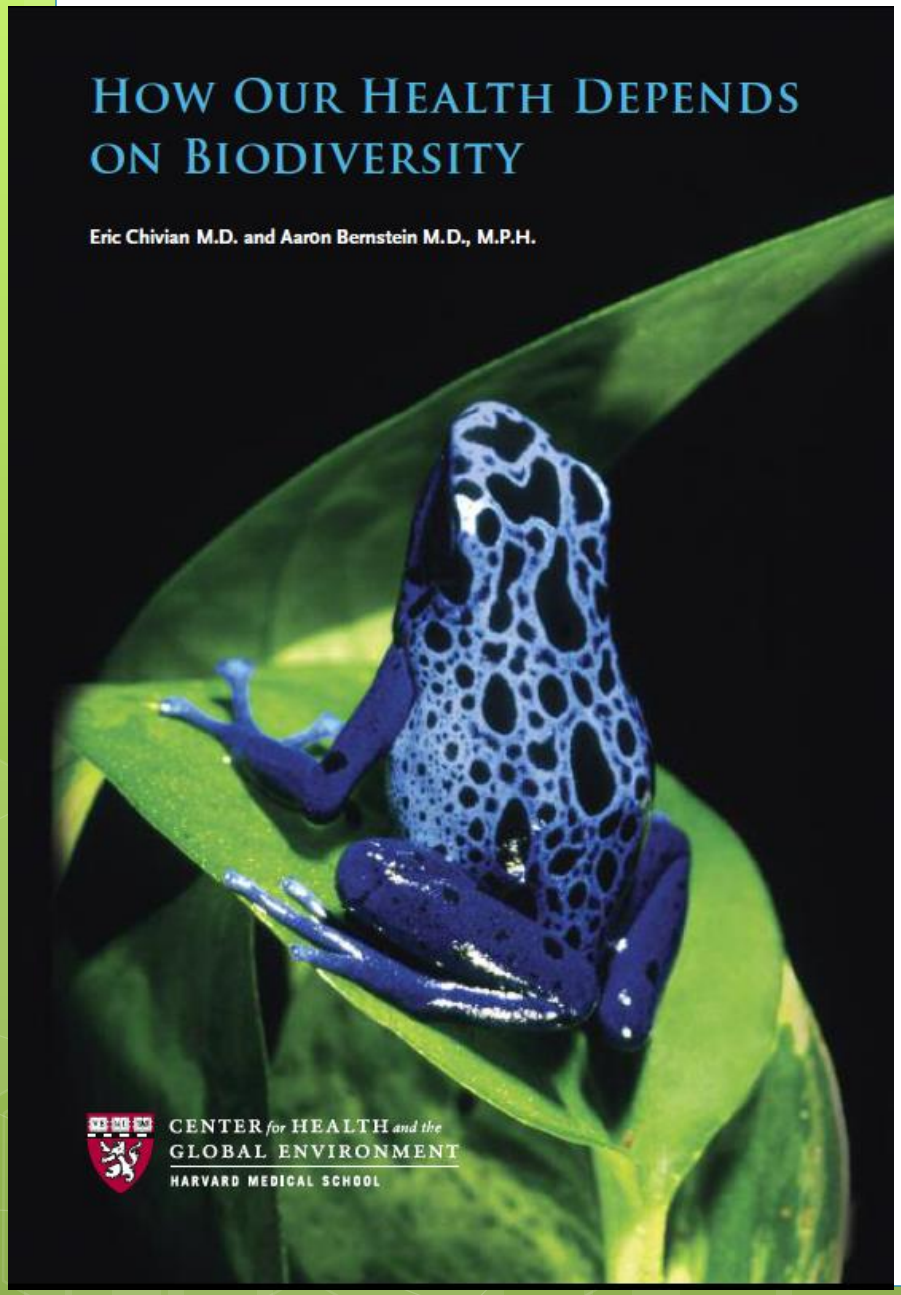
Figure 1 Map of the Maastricht Globalization Index (MGI) 2008 [27].

Association positive entre niveau de mondialisation et faible taux de mortalité infantile

Cependant, ….

… des problèmes de représentations

La biodiversité vue par les écologistes …



Quant les abeilles disparaissent …

… les humains pollinisent à la main

… et celle vue par (certains) épidémiologistes (et décideurs)

A walk on the wild side—emerging wildlife diseases

They increasingly threaten human and animal health

Pteropus alecto—the black flying fox—known t

The New York Times
SundayReview | The Opinion Pages

WORLD U.S. N.Y. / REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SPORTS OPINION AUTOS

NEWS ANALYSIS

The Ecology of Disease

Olaf Hajek

By JIM ROBBINS
Published: July 14, 2012 | 114 Comments

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3 September 2013 Last updated at 01:01 GMT

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Mammals harbour 'at least 320,000 new viruses'

By Rebecca Morelle
Science reporter, BBC World Service

There could be at least 320,000 viruses awaiting discovery that are circulating in animals, a study suggests.

Researchers say that identifying these viral diseases, especially those that can spread to humans, could help to prevent future pandemics.

The team estimates that this could cost more than £4bn ($6bn), but says this is a fraction of the cost of dealing with a major pandemic.

The flying fox is one of many mammals that carry viruses that spread to humans

Les chauve-souris sont elles responsables? … la viande de brousse … la déforestation ..

…. ou, l'effondrement des systèmes de santé publique, des liens sociaux après des années de guerre civile et d'ingérences …

M Planète

PLANÈTE Climat Énergies Ressources naturelles Biodiversité Population Agriculture & A

Le virus Ebola « hors de contrôle » en Afrique de l'Ouest

Le Monde.fr avec AFP | 30.07.2014 à 12h59 • Mis à jour le 31.07.2014 à 09h56

Abonnez-vous à partir de 1 € Réagir Classer Partager

Recommander Partager 6 930 personnes le recommandent. Inscription pour voir ce que vos amis recommandent.

Brucellose: vers un abattage total à Bargy

ACTUALITE > FLASH ACTU Par lefigaro.fr avec AFP | Mis à jour le 30/09/2014 à 11:44 | Publié le 30/09/2014 à 11:43

L'AUTEUR
SUR LE MÊME SUJET

Le préfet de la Haute-Savoie va saisir le conseil national de protection de la nature (CNPN) d'une demande d'abattage total des 300 bouquetins du massif du Bargy, atteints de brucellose.

Brucellose du bouquetin : l'abattage total n'assainira pas le massif du Bargy

Par Morgane Kergoat
Voir tous ses articles

Publié le 30-09-2014 à 18h10
Mis à jour le 01-10-2014 à 11h21

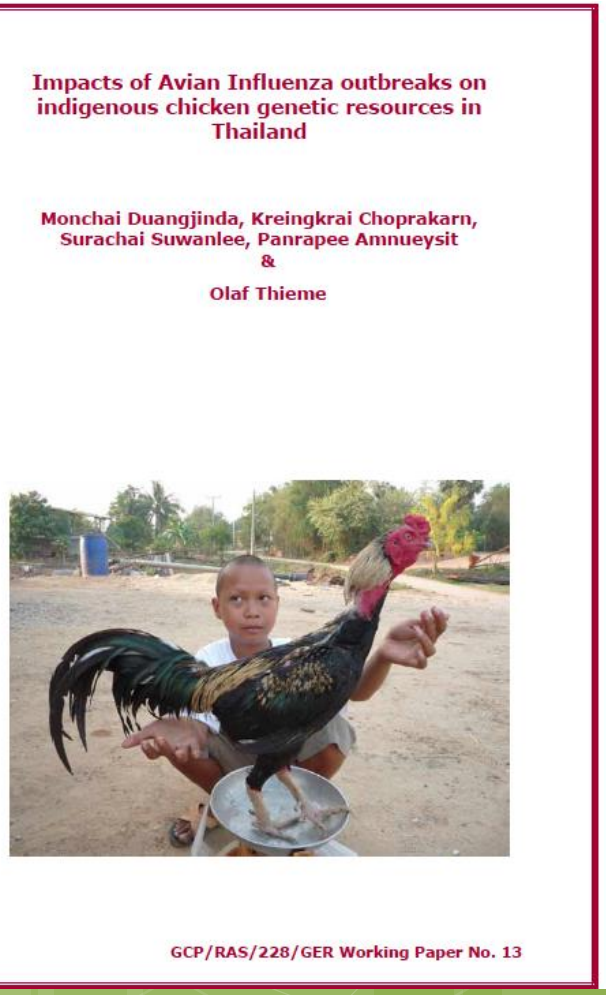
Les politiques veulent éradiquer le troupeau pour supprimer la maladie. Mais les scientifiques contestent cette mesure qui favoriserait au contraire la propagation de la brucellose.

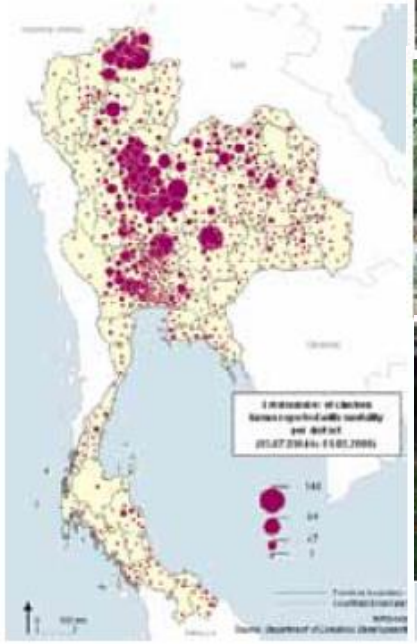
Au lieu d'endiguer l'épidémie de brucellose, l'abattage massif des bouquetins du Bargy pourrait au contraire précipiter sa diffusion aux troupeaux voisins. ©JEAN-PAUL CHATAGNON /

Cependant, ….

… l’action publique ne suit pas (toujours) …

La grippe aviaire en Thaïlande





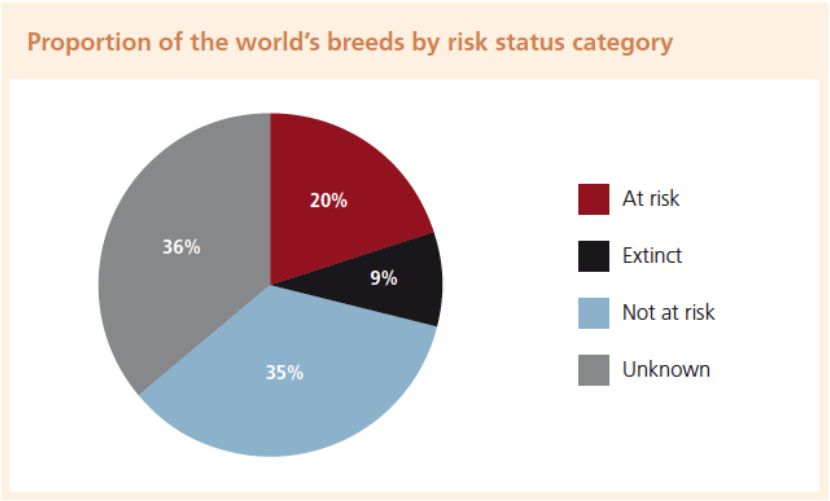
La gestion de l'épidémie a abouti à diminuer la diversité génétique des poulets indigènes :
- abattage des poulets indigènes
- restockage privilégiant le poulet exogène

Baisse globale des ressources génétiques…

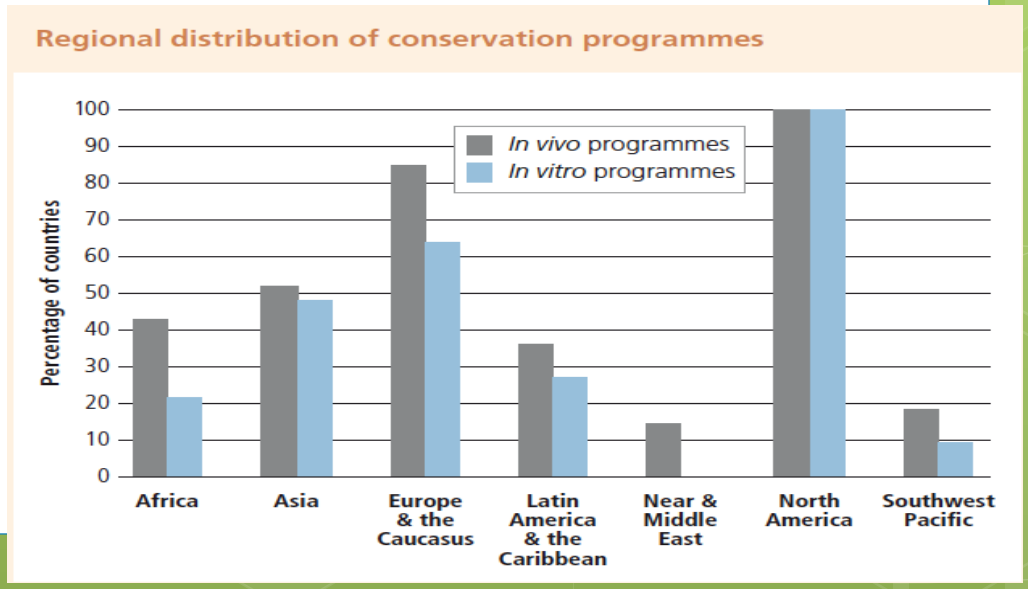
THE STATE
OF THE WORLD's
ANIMAL GENETIC RESOURCES FOR FOOD AND AGRICULTURE

- This brochure presents key findings of the first global assessment of animal genetic resources.
- Sustainable management of the world's livestock genetic diversity is of vital importance to agriculture, rural development and the environment.
- This assessment has led to a process of policy development and a *Global Plan of Action for Animal Genetic Resources*.

COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE



.. Et peu de programmes de conservation dans les centres de domestication



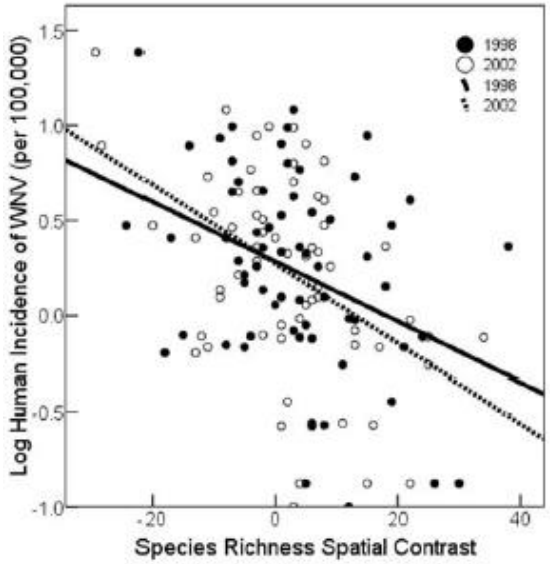
Cependant, ….

… des controverses scientifiques...

L'Effet de Dilution (avantage d'une biodiversité riche)
Après des résultats prometteurs et des idées brillantes …..

Increased Avian Diversity Is Associated with Lower Incidence of Human West Nile Infection: Observation of the Dilution Effect

John P. Swaddle[1,2]*, Stavros E. Calos[2]



… critiques, réfutation et…. pessimisme …

Biodiversity loss and its impact on humanity

Bradley J. Cardinale[1], J. Emmett Duffy[2], Andrew Gonzalez[3], David U. Hooper[4], Charles Perrings[5], Patrick Venail[1], Anita Narwani[1], Georgina M. Mace[6], David Tilman[7], David A. Wardle[8], Ann P. Kinzig[5], Gretchen C. Daily[9], Michel Loreau[10], James B. Grace[11], Anne Larigauderie[12], Diane S. Srivastava[13] & Shahid Naeem[14]

Table 1 | Balance of evidence linking biodiversity to ecosystem services

Category of service	Measure of service provision	SPU	Diversity level	Source	Study type	*N*	Relationship	
							Predicted	Actual
Regulating								
Biocontrol	Abundance of herbivorous pests (bottom-up effect of plant diversity)	Plants	Species	DS*	Obs	40	↗	↗
		Plants	Species	DS†	Exp	100	↗	↗
		Plants	Species	DS‡	Exp	287	→	↗↘
		Plants	Species	DS§	Exp	100	↘	0
	Abundance of herbivorous pests (top-down effect of natural enemy diversity)	Natural enemies	Species/trait	DS*	Obs	18	↗	↗
		Natural enemies	Species	DS†	Exp/Obs	266	↗	↗
		Natural enemies	Species	DS‡	Exp	38	→	↗↘
	Resistance to plant invasion	Plants	Species	DS	Exp	120	↗	↘
	Disease prevalence (on plants)	Plants	Species	DS	Exp	107	↗	↘
	Disease prevalence (on animals)	Multiple	Species	DS	Exp/Obs	45	→	↗↘

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Conservation Efforts May Increase Malaria Burden in the Brazilian Amazon

Denis Valle[1]*, James Clark[2]

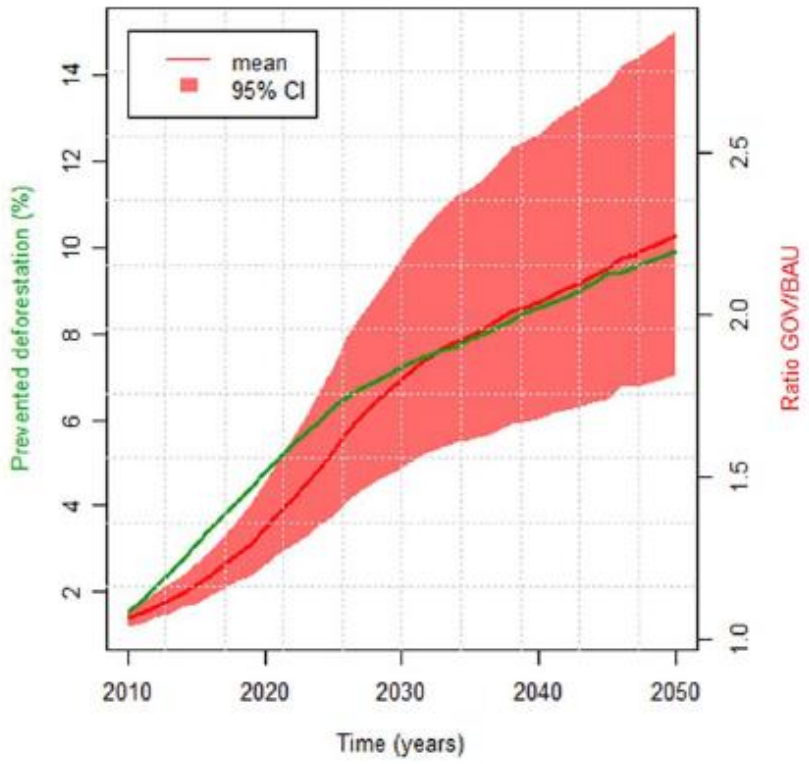

Figure 4. Malaria incidence increase at urban health posts in the governance scenario is predicted to be a direct consequence of prevented deforestation. We depict the relationship between future prevented deforestation under the governance scenario (green line), and the ratio of the expected malaria incidence for each year and city under the governance (GOV) and business-as-usual (BAU) future LULC scenarios (red line) (i.e., $E(C_{iy}^{GOV})/E(C_{iy}^{BAU})$), averaged across all cities. The red polygon represents the 95% credible interval of the average ratio $E(C_{iy}^{GOV})/E(C_{iy}^{BAU})$.

It's a myth that protection against disease is a strong and general service of biodiversity conservation: Response to Ostfeld and Keesing

Kevin D. Lafferty[1] and Chelsea L. Wood[2]

Trends in Ecology & Evolution September 2013, Vol. 28, No. 9

… et pourtant...

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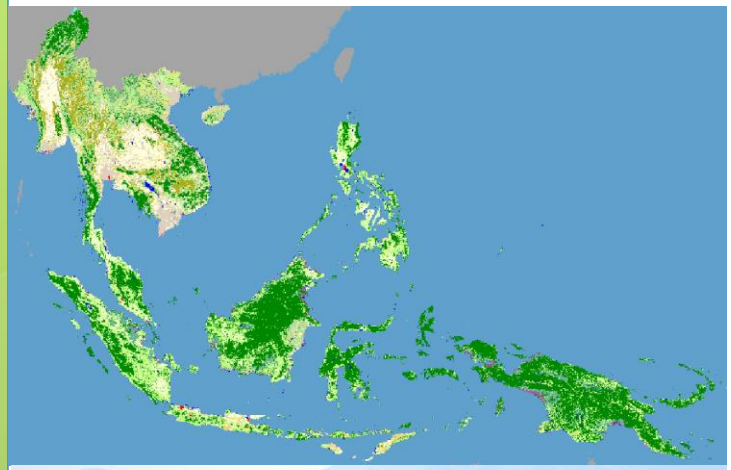
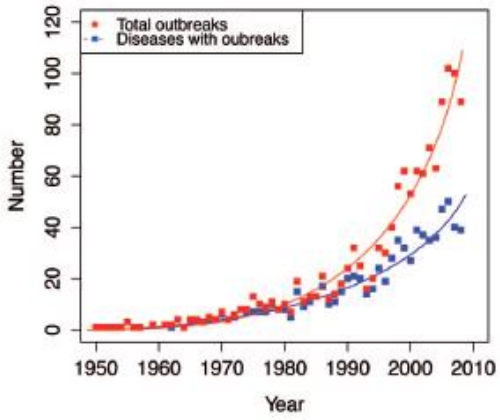
PLOS ONE

Infectious Diseases and Their Outbreaks in Asia-Pacific: Biodiversity and Its Regulation Loss Matter

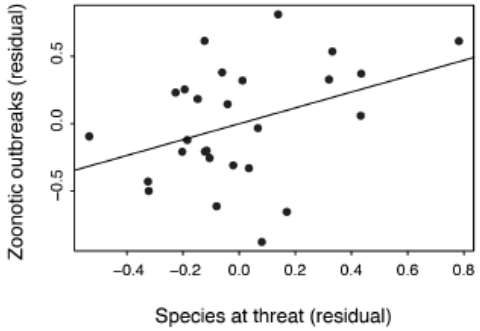
Serge Morand[1,2,3]*, Sathaporn Jittapalapong[4,5], Yupin Suputtamongkol[6], Mohd Tajuddin Abdullah[7], Tan Boon Huan[8]



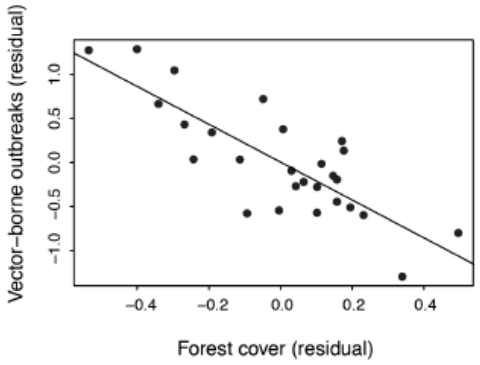
Augmentation des épidémies



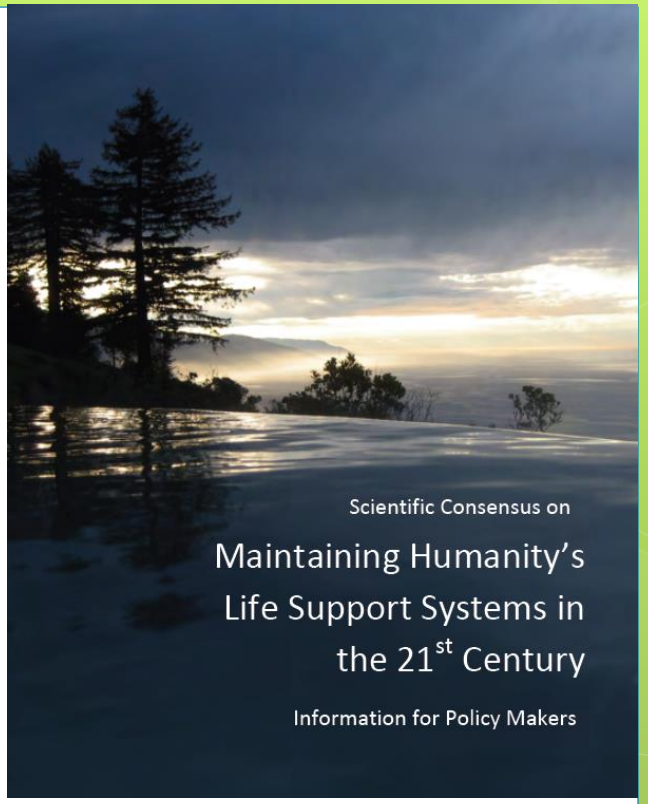
Zoonoses liées à la biodiversité en danger



Maladies infectieuses vectorielles liées à une baisse des couvertures forestières



Que faire ? ….



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Notre santé dépend-elle de la biodiversité ?

humanité et biodiversité

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2. Antibiotic resistance
3. Pollutants and the trophic web
4. Ecosystem services, conservation and health
5. “One Health” and biodiversity
6. Laws and ethics for biodiversity and health

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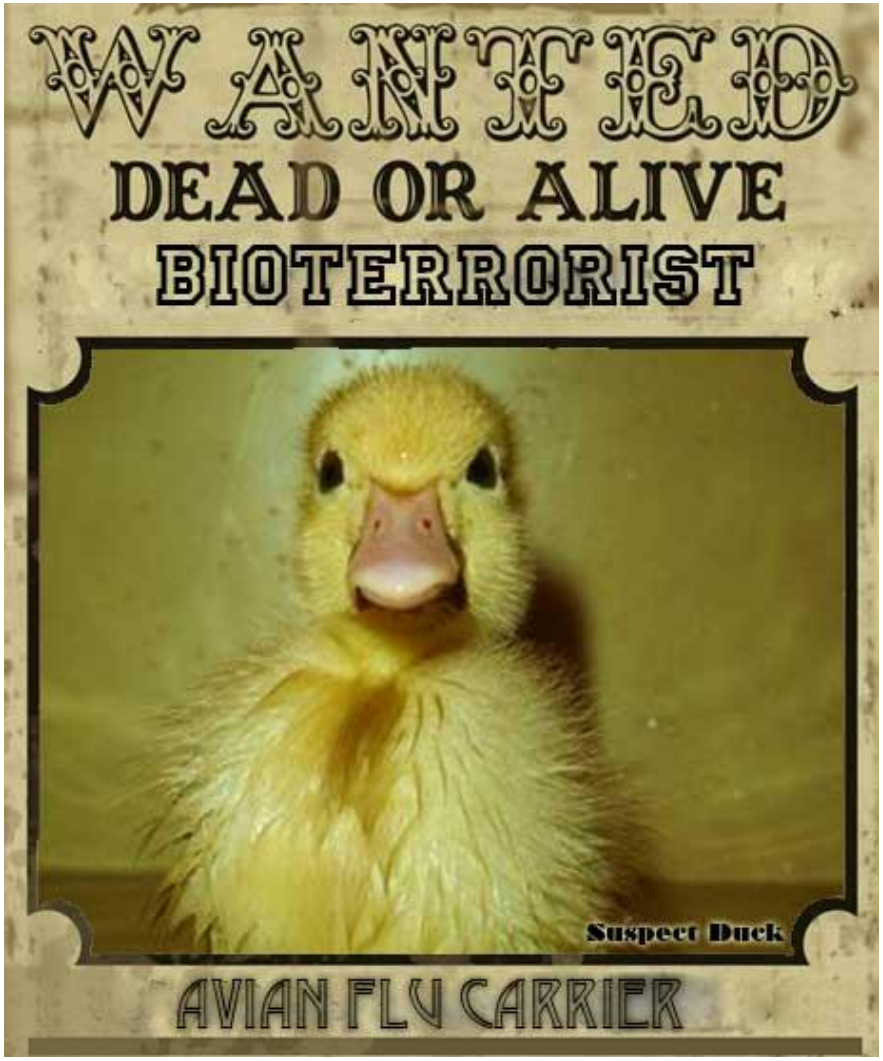
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BIOTERRORIST
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AVIAN FLU CARRIER