Conference

Biodiversity and Re/insurance

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Should Re/insurance care about biodiversity ?

SCOR The Art & Science of Risk | Foundation for science

MUSÉUM NAL HIST NATURELLE

- I What biodiversity brings to man and economy ?
- II Risks
- III Opportunities

I What biodiversity brings to man and economy ?

- 1) Diversification: ↘ risks
- 2) Free production factors
- 3) Economic value of biodiversity ?

1) Diversification: ↘ risks

Biodiversity : a life insurance :

« *Our life insurance, our natural capital: an EU biodiversity strategy to 2020* » (UE, 2011)

2) Free factors of production

Concept of ecosystems services (MEA,2005)

Disagreement ?

Limitations of economic valuation for biodiversity ?

Protection of biodiversity not profitable in economic terms ?

3) Value of biodiversity

a) Total value ?

1997 : 33 000 billions $

2014: 125 - 140 000 billions $

b) Some commercial market values based on biodiversity

Ecotourism

Turnover : 800 billions $

USA : water birds birdwatching turnover = 10 billions $

Australia : tourism + fishing + recreational Great Coral Reef barrier = 4,1 billions $

Fishing

USA : recreationnal fishing : turnover 37 billions $, 1M jobs

Health

10 on 25 most sold drugs in USA

37 % pharmaceutical products sold in USA

} derived from natural sources

Drugs coming from genetic ressources in USA : > 100 billions $

Ginkgo : turnover 500 M$/year

Pacific Yew Tree → Taxol (lungs, ovaries, breast cancer) : turnover : 1,6 billion $

Carbon value

- Stocks conservation

- Anual flows

- Today: 20/25 %

C) Some ecosystems values

Wetlands

- Flood control : La Bassée : 9000 €/ha

- Water purification, Louisiana, USA : > 2000 $/ha/year

- Contribution to commercial fishing USA > 10 billions $

- Europe average: 10 000 e/ha/year (without carbon) (Brander and al., 2006)

French forest

- Wood : 1,3 billion €/year (commercial value) (Stock : 70 billion €)

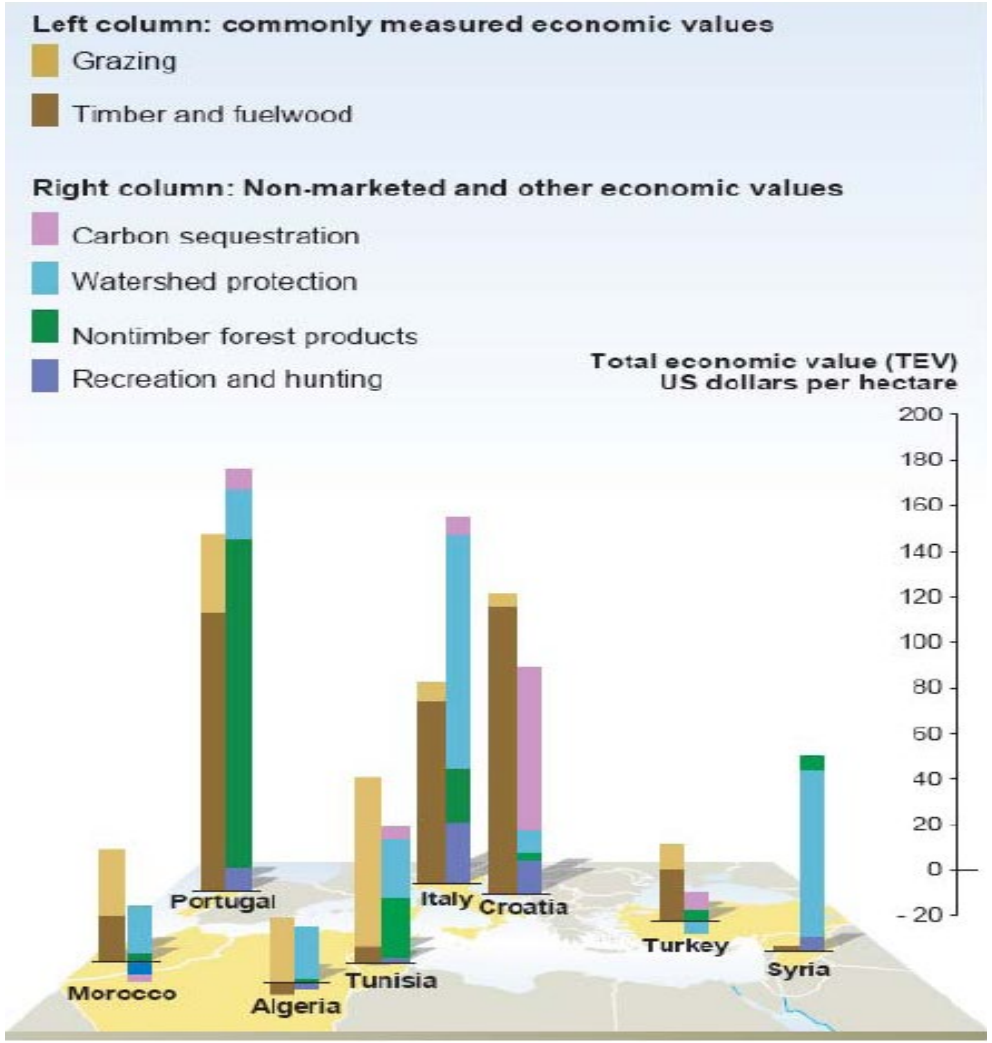
- - Recreational : 2 billions €/year (travel cost method)

- Carbon: 60 MT/an 5 € : 351 M€
  20 € : 1,2 billion €
  40 € : 2,4 bilions €

Where is the problem ?

Non marketed value of biodiversity > commercial value

Annual benefits coming from forests



Disagreement ?

- Common good/Free rider problem ?
    - Wood, game, private reserve, local and national biodiversity, etc.
    - E. Ostrom

II Risks

1) Some examples

- Natural hazards
  - 2014 Asia tsunami: Mangroves as a buffer
- Agriculture
  - April 2020 frozen vines: ↘ genetic diversity

Health: an option value

- Only 1,8 M species described on an estimate of 10/15 M
- Rhythm of extinction: 100 to 1000 time faster than usual

2) New regulatoy constraints (extra financial reporting)

- Loi NRE, 2001, art. 116
- Listed companies only

- Loi TECV, 2015, art. 173
- Insurance, reinsurance companies, etc. must mention in their annual report and make available to their suscribers information on how they take into account in their investment policy social, environment and governance criteria and how they contibute to the energy and ecological transition.

- Regulation EU 2019-2088 sustainability disclosures in the financial services sector

- Loi relative à l'énergie et au climat, 2019, art. 29
  - Include explicitly biodiversity associated risks

- Décret 2021, art. 1
  - Alignment with long terms goals linked to biodiversity (including CDB COP goals, contribution to the reduction of the main pressures and impacts on biodiversity, etc.)
  - Description of biodiversity losses associated risks
  - Etc.

3) Reputation and governance risks beyond regulation

- Rio Tinto: destruction of an aboriginal site: CEO resignation (2020)
- Sociological licence to operate
- Be careful with protected area OR non protected hotspots

4) Some biodiversity risks costs

The restauration cost

EXXON – VALDEZ (overall damages to biodiversity) :

- 2,8 billions $ → restauration cost (MEC, Arrow and Solow)

ERIKA (Bonnieux, 2006)

- Natural habitats restauration + indirect economic losses : 770 M€
- Ecological prejudice: 270 M€

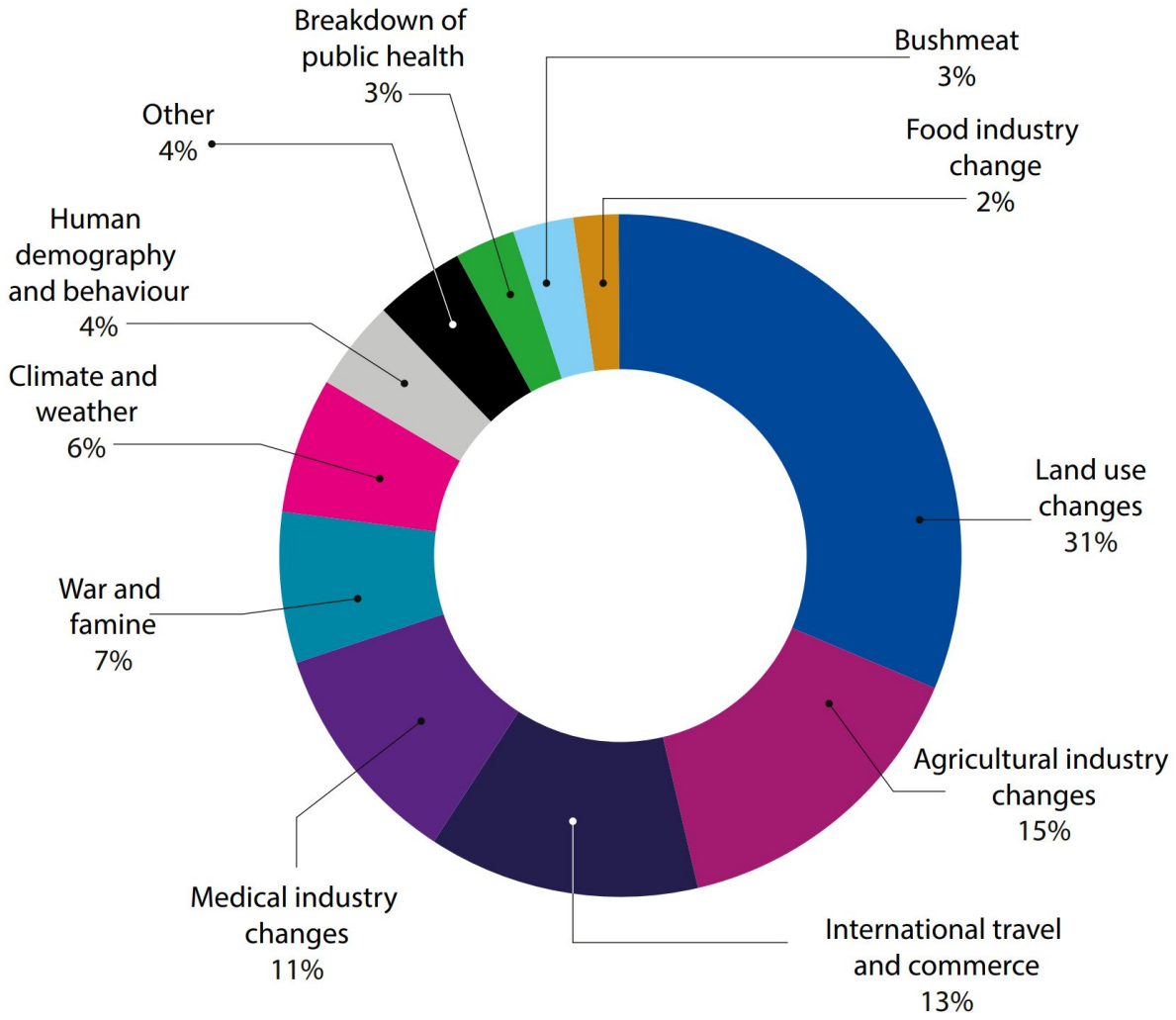
The disappearence of an animal specie cost

-Indian Vultures 1992- 2006: 34 billion $ (health costs)

-1 meter coral reef ersoion in USA: + 5,3 billions $ natural hazard costs (Beck and al. Axa chair on coastal resilience, U of C, Santa-Cruz)

5) The Covid 19 crisis was announced

Primary drivers of past disease emergence (UNEP, 2016, from Loh and al.,2015)



WHO-MEA, 2005

- Intact ecosystems play an important role in regulating the transmission of many infectious diseases
- Changes in ecosystems and ↘ of biodiversity have altered the incidence of many infectious disease, notably:
- ↘ of predator species
- human-induced genetic changes of disease vectors or pathogens (such as mosquito resistance to pesticides or the emergence of antibiotic resistant bacteria)
- Etc.

- Disease/ecosystem relationships that best illustrate these biological mechanisms include the following examples with high certainty:

- Overcrowded and mixed livestock practices, as well as trade in bushmeat, can facilitate interspecies host transfer of disease agents, leading to dangerous novel pathogens, such as **SARS** and new strains of influenza

- Etc.

Infectious diseases and mechanisms of potential changing incidence as related to ecosystem changes - some examples (WHO, 2015)

Disease	DALYs a (thousand)	(Proximate) Emergence mechanism	(Ultimate) Emergence driver	Geographical distribution	Sensitivity to ecological change	Confidence level
Malaria	46486	niche invasion, vector expansion	deforestation, water projects	tropical (America, Asia and Africa)	+ + + +	+ + +
Dengue fever	616	vector expansion	urbanization, poor housing	tropical	+ + +	+ +
Leishmaniasis	2090	host transfer, habitat alteration	deforestation, agricultural development	tropical Americas, Europe and Middle East	+ + + +	+ + +
Lyme disease		depletion of predators, biodiversity loss, reservoir expansion	habitat fragmentation	North America Europe	+ +	+ +
Chagas disease	667	habitat alteration	deforestation, urban sprawl and encroachment	Americas	+ +	+ + +
Japanese encephalitis	709	vector expansion	irrigated rice fields	south-east Asia	+ + +	+ + +
Guanarito, Junin and Machupo viruses		biodiversity loss, reservoir expansion	monoculture in agriculture after deforestation	South America	+ +	+ + +
Oropouche / Mayaro viruses in Brazil		vector expansion	forest encroachment, urbanization	South America	+ + +	+ + +
Rabies		biodiversity loss, altered host selection	deforestation and mining	tropical	+ +	+ +
Schistosomiasis	1702	intermediate host expansion	dam building, irrigation	America, Africa, Asia	+ + + +	+ + + +

a Disability-adjusted life years. Key: + = low; + + = moderate; + + + = high; + + + + = very high.

III Opportunities

1) New markets (report):

- Coral reef (Swiss Re/TNC)
- Liability guarantee soil depollution (Marsh)
- Blue carbon in coastal wetlands (Axa/TNC)

2) New markets from new regulation

- EU Directive 2004-35 on environmental liability
  - Cover 3 types of direct or indirect environmental damages
    - Water
    - Soil contamination when important risk for human health
    - Protected species and natural habitats
  - Goal: no monetary compensation but equivalence in ecosystem services delivered by the damaged ecosystem
    - Primary restauration: come back to the initial state
    - Interim losses

3) Other new markets

- Forest
- Agriculture (UK, France)
- Big game damages
- Carbon storage
- Biodiversity loss in protected areas (ex. Natura 2000)