Ciclo:

Cambio global, extinciones y perspectivas de futuro

Cambio global y vulnerabilidad humana a enfermedades y plagas: Desafíos científicos, éticos y sociales

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Contenido

- **Evidencias del Cambio Global**
  1. Elementos sobre los que existe consenso científico amplio
  2. Dificultades para evaluar riesgos globales y emergencias complejas
  3. Interrelación de variables en el sistema tierra → complejidad
- **Impactos en la salud: simulación de escenarios**
  1. Escenario base y proyecciones
  2. Poblaciones más vulnerables - Desglose por continentes
  3. Enfs. emergentes y reemergentes
  4. Vulnerabilidad a fenómenos extremos ligados al clima
- **Percepción pública del riesgo y debate ético**
  - Escasa capacidad de comprensión de procesos lentos y complejos
  - Componente científico-técnico de muchas decisiones políticas
  - Fragilidad e inadecuación del marco internacional
  - Aspectos ligados al clima en las decisiones políticas → Climate justice

http://www.lpl.arizona.edu/resources/globalwarming/documents/oreskes-on-science-consenus.pdf

4

The Scientific Consensus on Climate Change: How Do We Know We're Not Wrong?

Naomi Oreskes

"…most of the observed warming over the last 50 years is very likely to have been due to the increase in greenhouse gas concentrations."

IPCC 4th Assessment (2007)

February 2007: Fourth Assessment Report

Scientific position has not really changed since 2001.

Hardly changed since 1979…

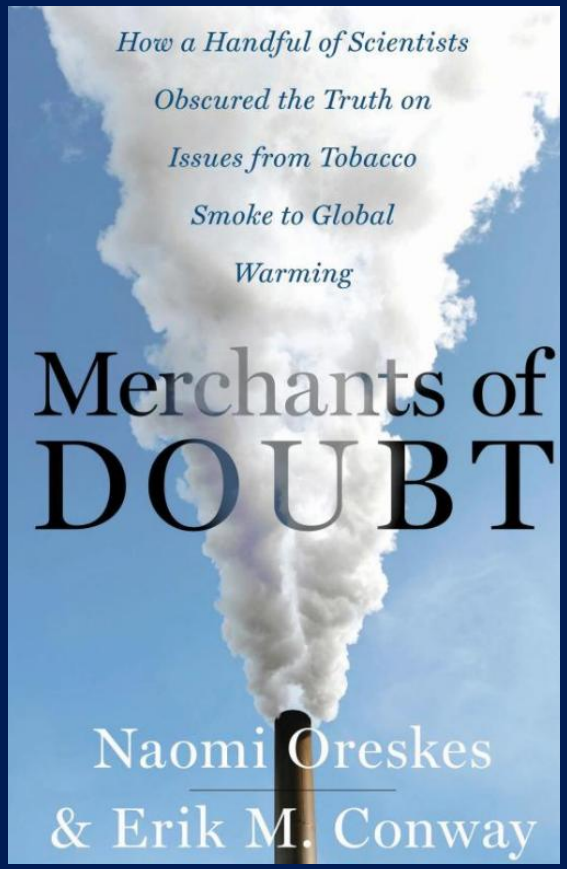
"If carbon dioxide continues to increase, [we] find no reason to doubt that climate changes will result, and no reason to believe that these changes will be negligible."

U.S. National Academy of Sciences
"Carbon Dioxide and Climate: A Scientific Assessment," (Charney report), 1979

Lo nuevo, desde 1979:

- El cambio global en el sistema tierra, y el impacto de la acción humana en el clima, dejó de ser una predicción.
- Es un hecho constatado.

- Oreskes N, Conway EM (2010): *Merchants of doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*. Bloomsbury Press: London.



Concepto de cambio climático

- **IPCC (Panel Intergubernamental de las Naciones Unidas para el Cambio Climático):**
  - Constituido por Naciones Unidas y la Organización Meteorológica Mundial en 1988.
  - Recopila información sobre el cambio climático y elabora informes para la toma de decisiones políticas.
  - Informe de 2007:
    - El calentamiento del sistema terrestre es inequívoco
    - Incremento de temperaturas medias del aire y océanos
    - Derretimiento generalizado del hielo y de la nieve
    - Incremento medio global del nivel del mar (IPCC, 2007)

Concepto de cambio climático

- **¿Por qué ahora preocupa el CC?**
  - Ritmo de cambio mucho más rápido en los últimos 100 años y distinto a otros producidos con anterioridad:
    - La temperatura media ha aumentado en 0,5 °C (últ. 30 años).
    - A escala mundial, 11 de los últimos 12 años están entre los 12 años más calurosos desde que los registros de temperatura de superficie fueron instrumentalizados en 1850 (IPCC, 2007).
    - La temperatura media de la Tierra es de unos 14,5 °C.
      - La tendencia lineal al calentamiento de los últimos 50 años es de 0,3°C por década, casi el doble que en los últimos cien años.
      - El primer informe del IPCC en 1990, preveía incremento de la temperatura global de 0.15 a 0.3 °C por década, entre 1990 y 2005. Los valores observados en directo han sido de cerca de unos 0.2 °C por década.

CC y efecto invernadero

- Pequeñas acumulaciones de dos factores fundamentales:
  - Cantidad de agua dulce que se añade poco a poco al Océano Ártico, y
  - Cantidad de CO_2 que se añade poco a poco a la atmósfera.

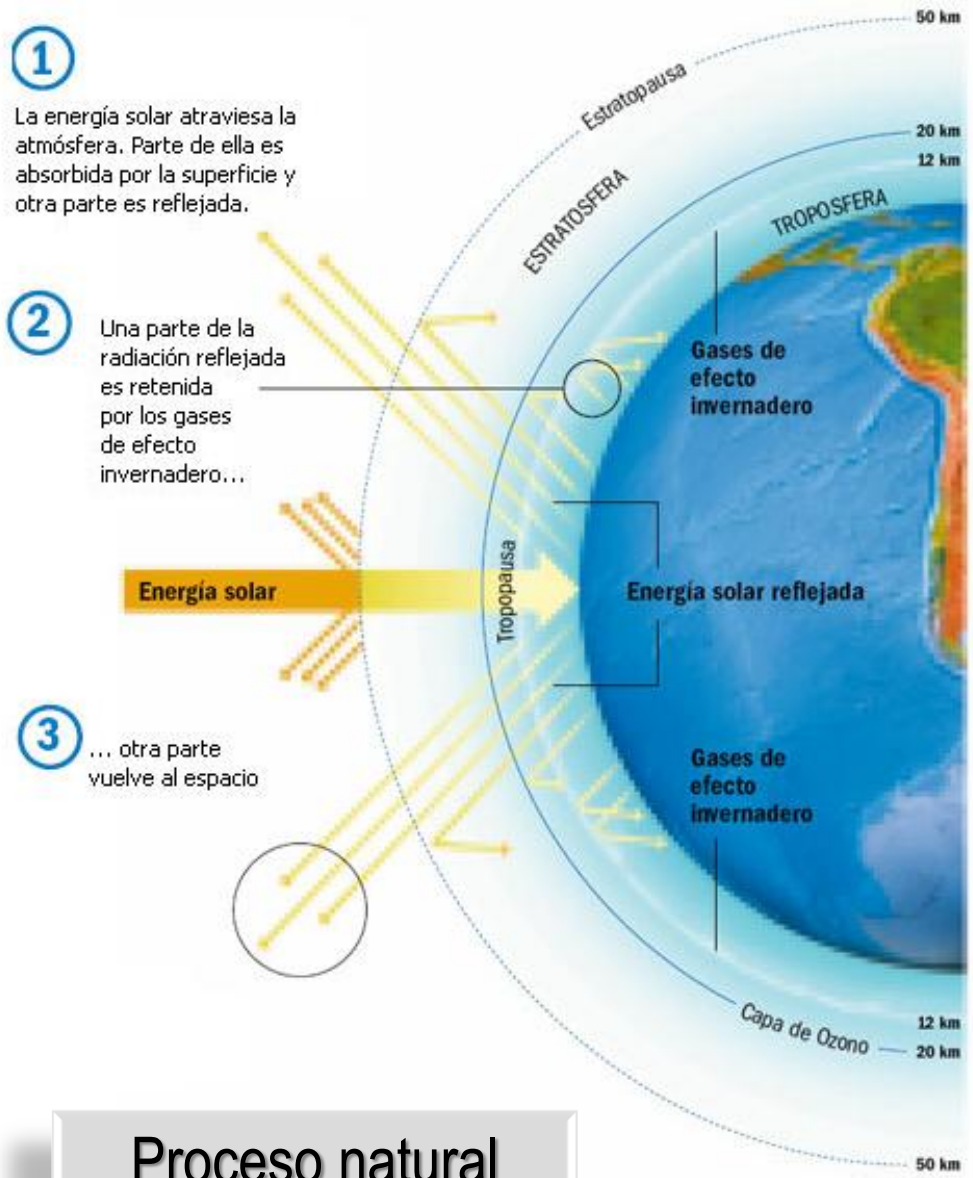
- Vapor de agua (H_2O)
- Dióxido de carbono (CO_2)
- Metano (CH_4)
- Óxidos de nitrógeno (NO_x)
- Ozono (O_3), y
- Clorofluorocarburos (*artificiales*).

- Ambas generan un balancín climático que oscila con escalas de 100.000 años (en estado helado) y de 20.000 (en su estado cálido). [Ruiz de Elvira, 2006: 1].

- El CC actual se produce, fundamentalmente, por el incremento de temperatura que ocasiona una concentración creciente de los **gases efecto invernadero** en la fina capa de la atmósfera terrestre, sobre todo de dióxido de carbono (CO_2).

EL EFECTO INVERNADERO

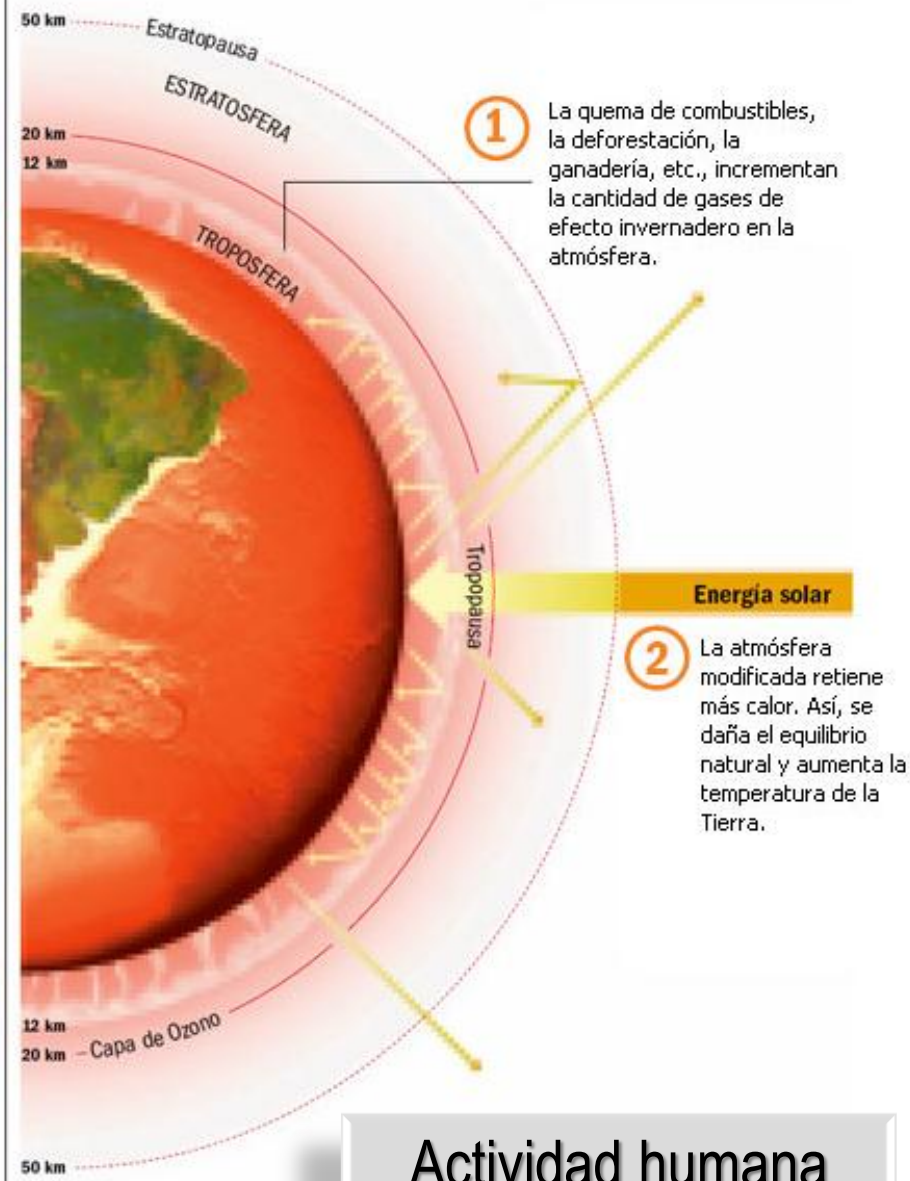
Es el calentamiento natural de la Tierra. Los gases de efecto invernadero, presentes en la atmósfera, retienen parte del calor del Sol y mantienen una temperatura apta para la vida.



Proceso natural

EL CALENTAMIENTO GLOBAL

Es el incremento a largo plazo en la temperatura promedio de la atmósfera. Se debe a la emisión de gases de efecto invernadero que se desprenden por actividades del hombre.



Actividad humana

CC y gases de efecto invernadero (GEI)

- Proceso natural:
  - GEI como filtro que permite el paso de las longitudes de onda más cortas provenientes del sol; generan energía calorífica pero no dejan pasar las radiaciones de vuelta emitidas desde la superficie de la Tierra hacia la atmósfera.
  - En la atmósfera del planeta, los gases traza anhídrido carbónico, metano y vapor de agua retienen, durante un intervalo de tiempo, entre la superficie de la Tierra y la estratosfera, parte de la energía emitida desde la superficie hacia el espacio exterior constantemente.
  - Sin los gases de efecto invernadero, la TMG de la atmósfera de la Tierra estaría alrededor de unos -15°C.

CC y gases de efecto invernadero (GEI)

- Proceso inducido por la acción humana:
  - Relacionado con el aumento de la emisión de CO_2 y de otros GEI, que aumentan la retención del calor emitido desde la superficie.
  - Esa energía tiene que redistribuirse entre las masas de aire, el mar y la superficie terrestre, produciendo un cambio climático a nivel planetario.
  - Factores determinantes de este aumento de emisiones:
    - consumo creciente de combustibles fósiles
    - cambios en la explotación de la tierra
    - aumento de la actividad agrícola

CC y gases de efecto invernadero (GEI)

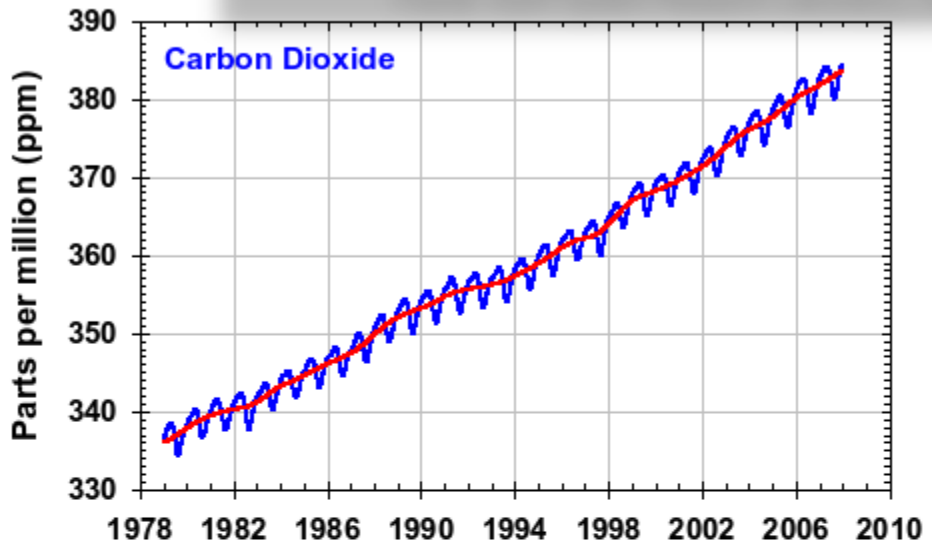
- El CO_2 es el principal GEI (75% del total de emisiones)
  - Origen: tubos de escape, chimeneas, incendios…
  - Según el informe del IPCC de 2007, la concentración atmosférica global ha aumentado de 280 ppm (valor preindustrial) a 379 ppm en 2005.
  - Excede con mucho el rango natural de los últimos 650.000 años (de 180 a 300 ppm), según muestran las burbujas de aire del manto de hielo en los glaciares.
- Metano:
  - vertederos, explotaciones ganaderas, cultivos de arroz y determinados métodos agrícolas de fertilización.
  - De 715 ppb (valor preindustrial,1760) a 1.774 ppb (2005).

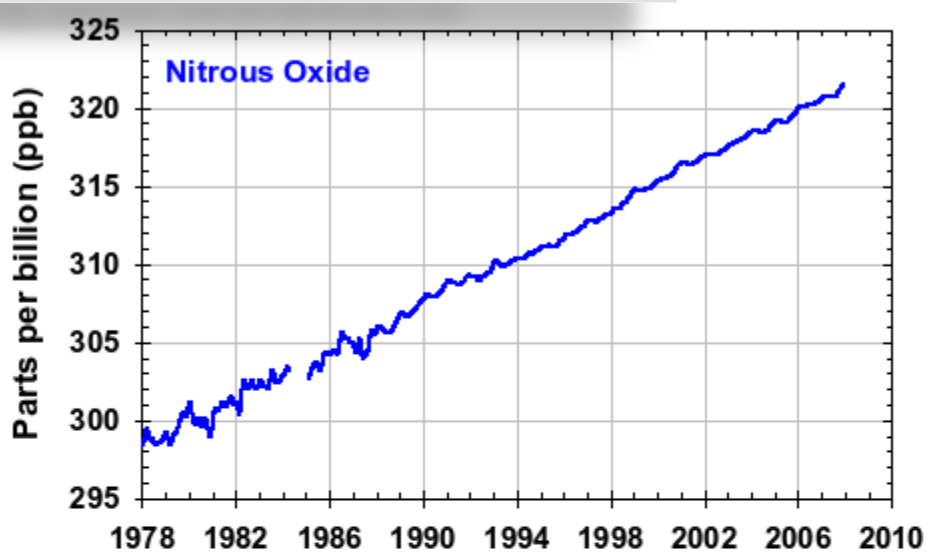
CC y gases de efecto invernadero (GEI)

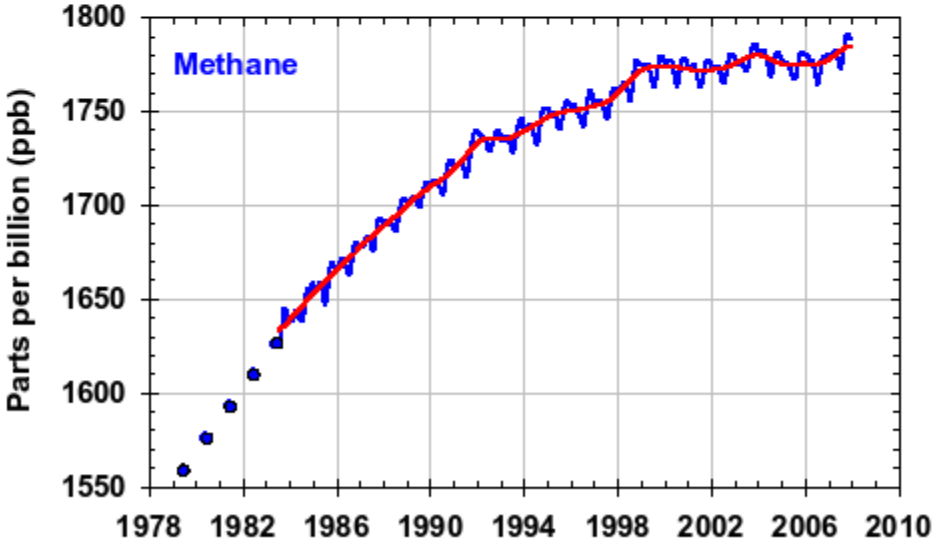
- Metano:
  - Se halla en sitios húmedos con falta de oxígeno (pantanos, ciénagas) y en el tracto intestinal de algunos animales. Normalmente es absorbido en el suelo vegetal congelado (permafrost) o en procesos marinos del subsuelo. La industria y la ganadería intensiva han hecho aumentar mucho el metano atmosférico.
  - Fuentes humanas de metano: minas de carbón, pozos de petróleo, fugas en las tuberías de gas natural, plantaciones de arroz, vertederos y ganadería.
- Óxido nitroso:
  - Aumento de 270 ppb (valor preindustrial) a 319 ppb (2005).
  - Más de una tercera parte de las emisiones son de origen humano, debidas sobre todo a la agricultura (IPCC, 2007).
- Otros GEI: Gases industriales fluorados
  - hidrofluorocarbonos, perfluorocarbonos y hexafluoruro de azufre
  - En refrigerantes, disolventes de limpieza, aerosoles, espumas plásticas, extintores, etc.

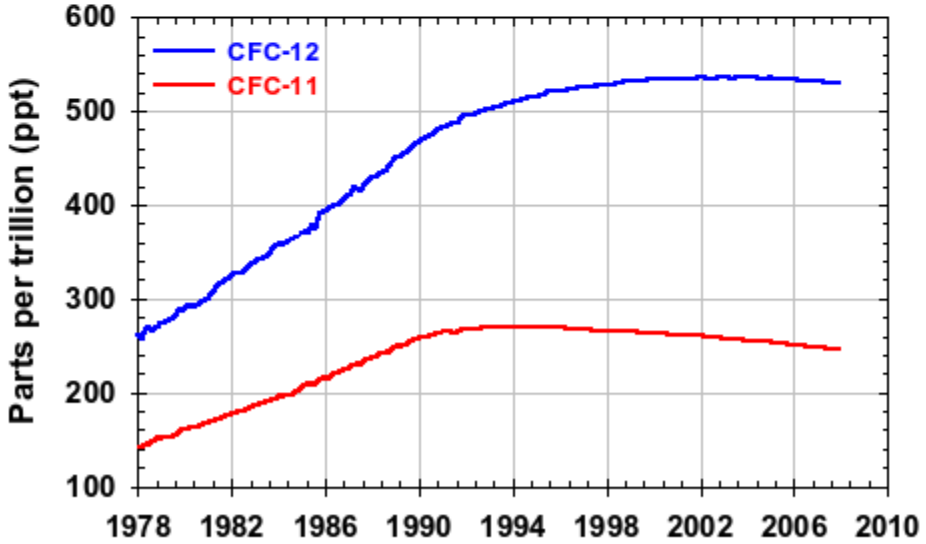
CC y gases de efecto invernadero

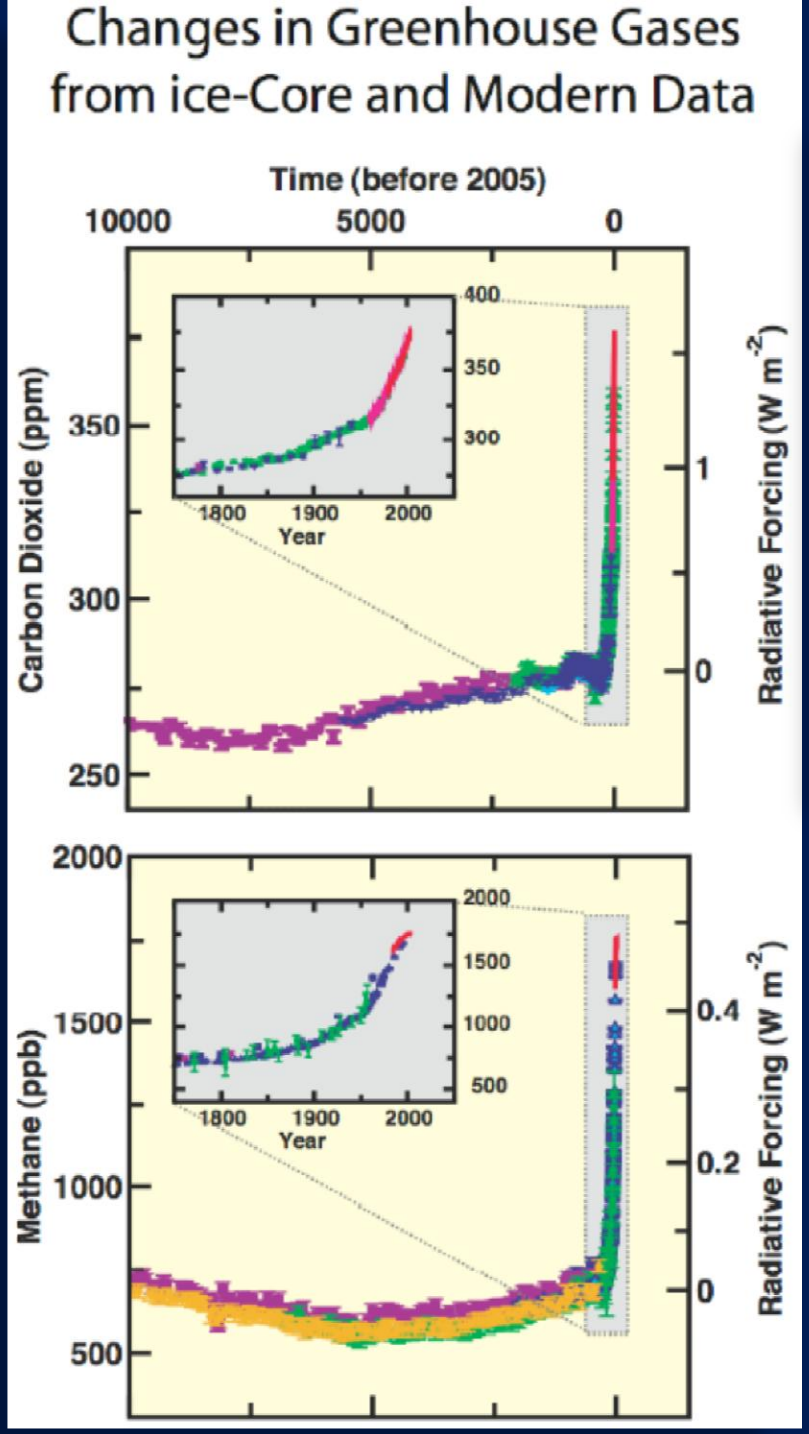
Fuente: Earth System Research Laboratory | http://www.esrl.noaa.gov/gmd/index.html

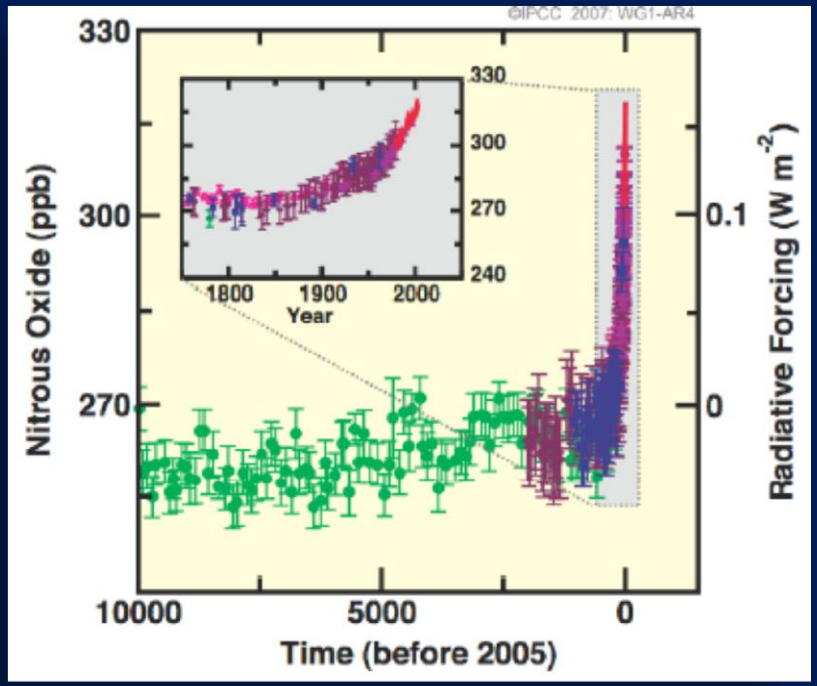












Atmospheric concentrations of carbon dioxide, methane and nitrous oxide over the last 10,000 years (large panels) and since 1750 (inset panels). Measurements are shown from ice cores (symbols with different colours for different studies) and atmospheric samples (red lines). The corresponding radiative forcings are shown on the right hand axes of the large panels.

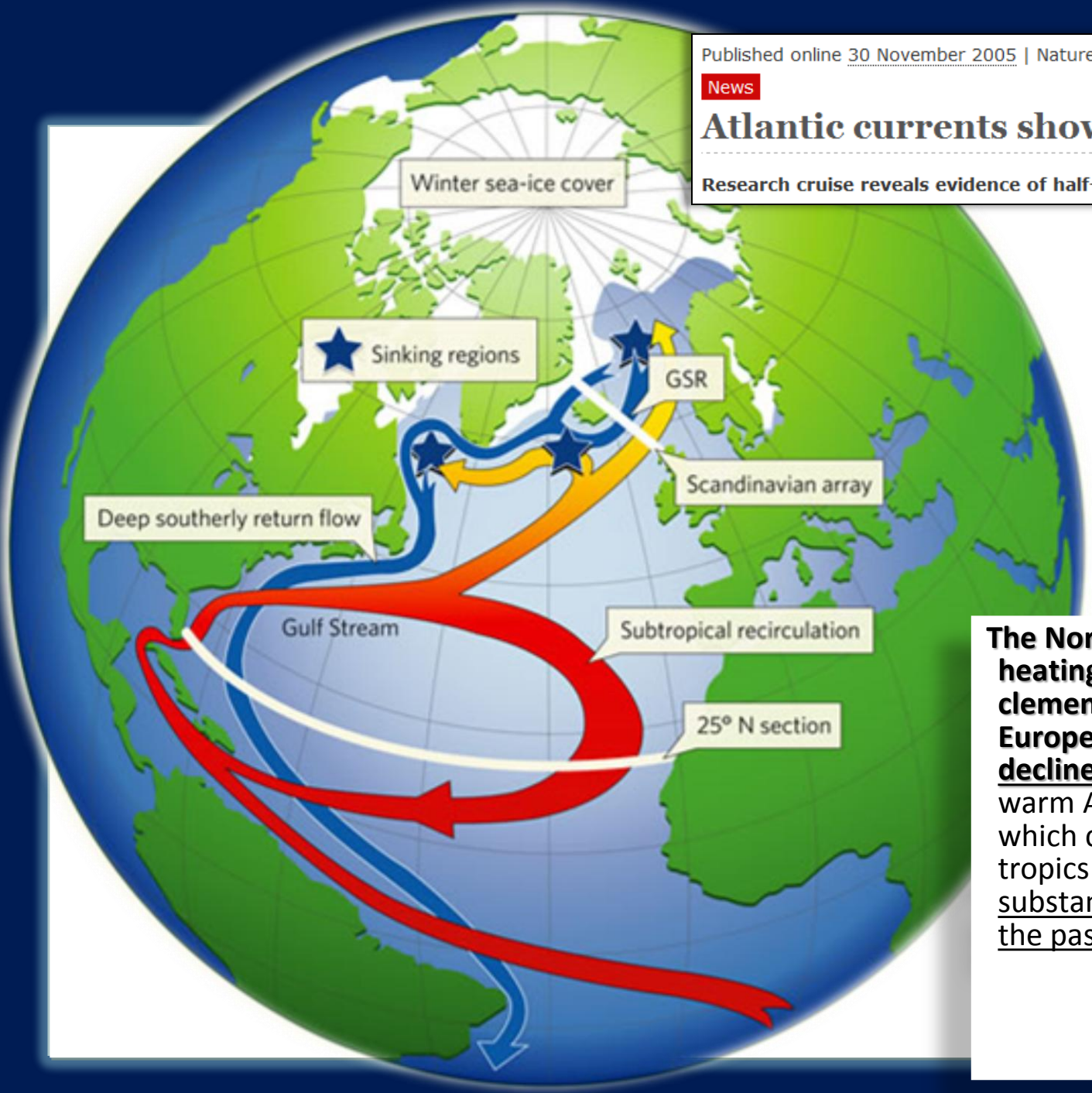
(IPCC, Summary for Policymakers, Feb. 2007)

Published online 30 November 2005 | Nature | doi:10.1038/news051128-9

News

Atlantic currents show signs of weakening

Research cruise reveals evidence of half-century of wane.

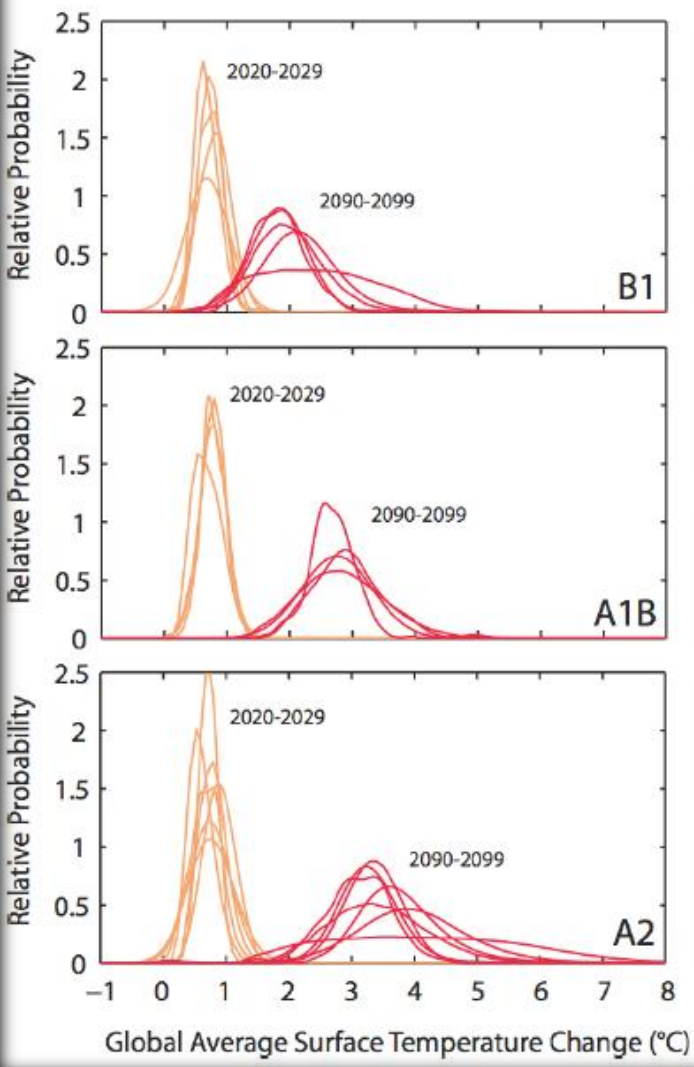


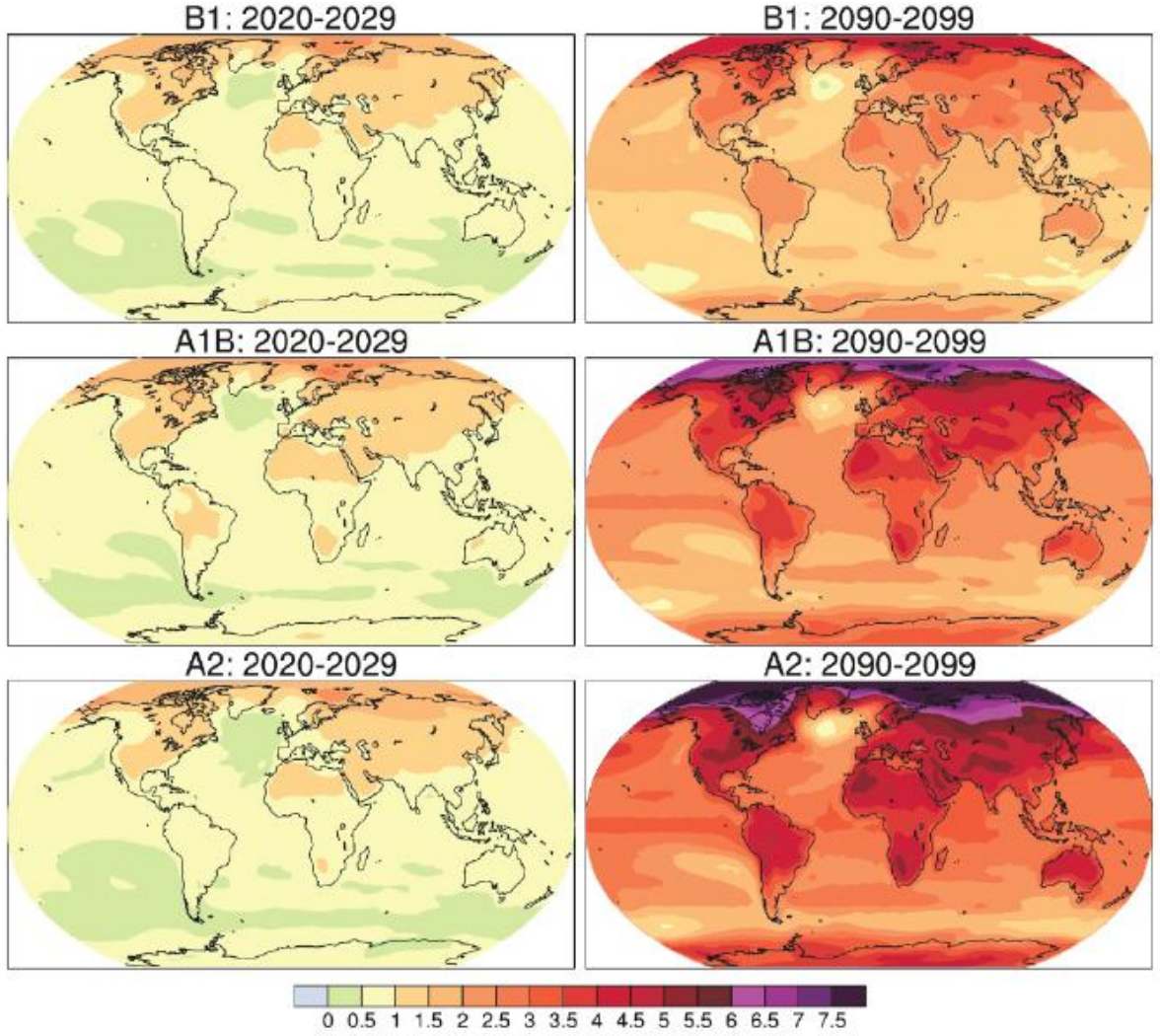
The North Atlantic's natural heating system, which brings clement weather to western Europe, is showing signs of decline. Scientists report that warm Atlantic Ocean currents, which carry heat from the tropics to high latitudes, have substantially weakened over the past 50 years.

Quirin Schiermeier,

Nature, 30 Nov. 2005.

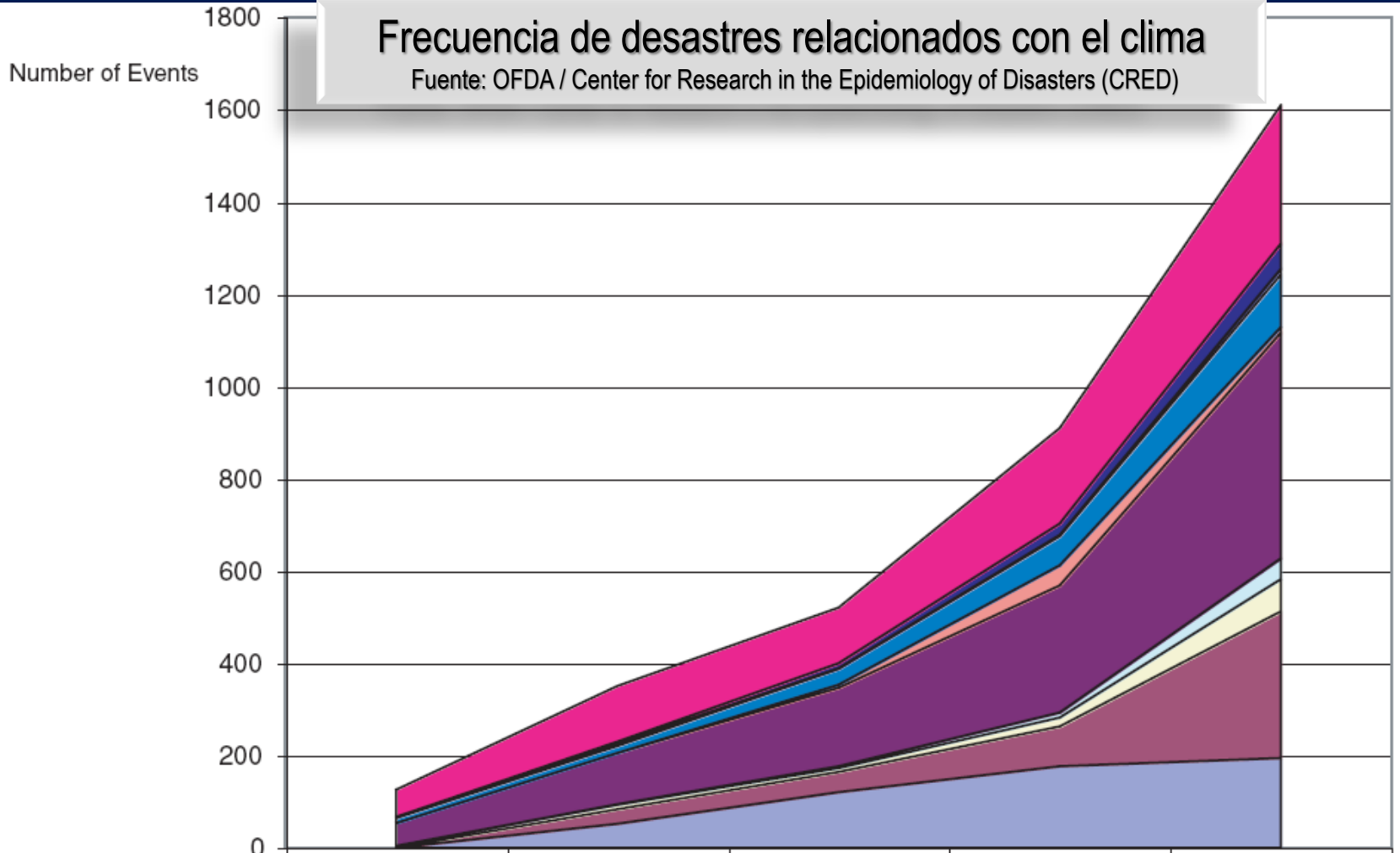
AOGCM Projections of Surface Temperatures





Frecuencia de desastres relacionados con el clima

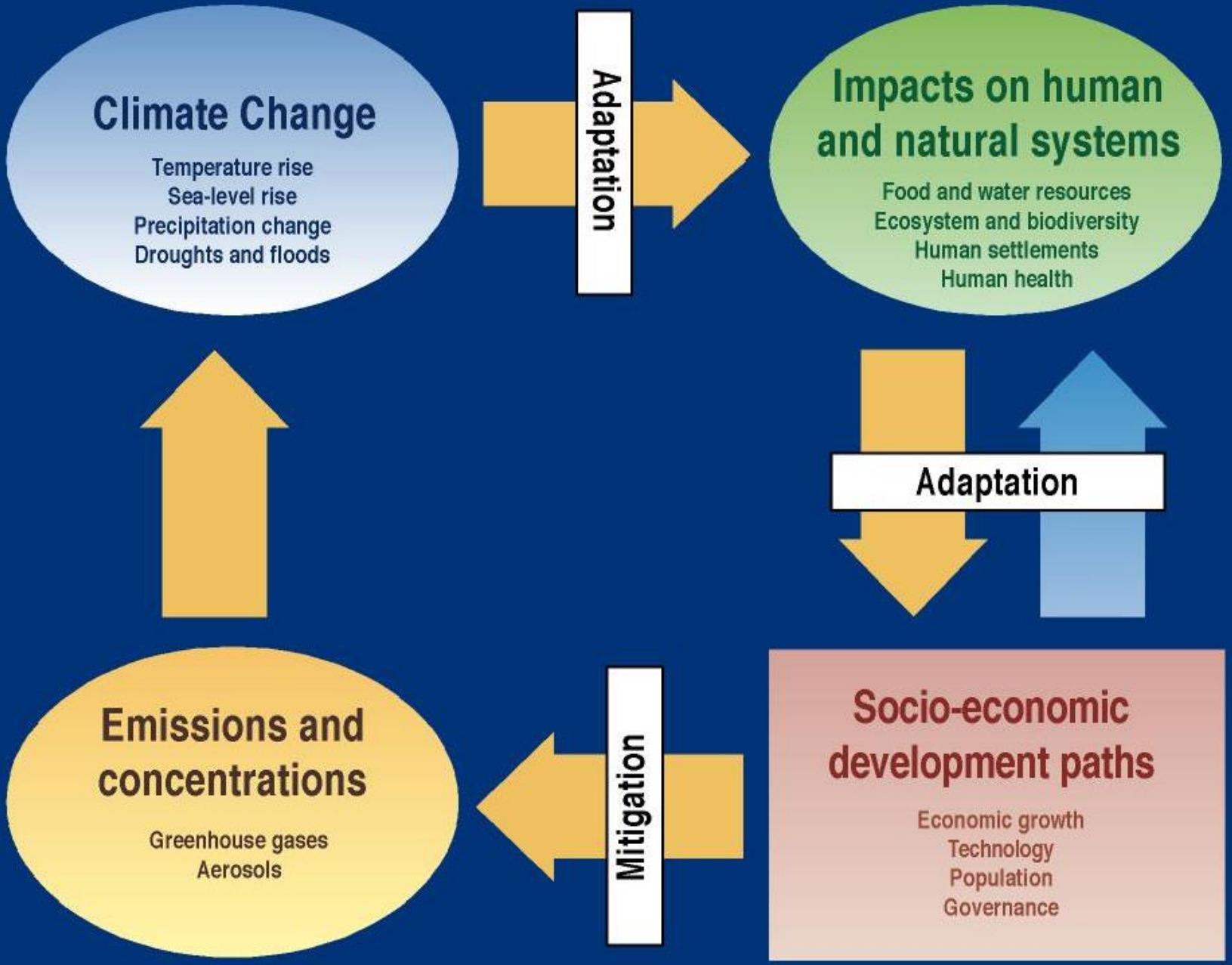
Fuente: OFDA / Center for Research in the Epidemiology of Disasters (CRED)



	1950-59	1960-69	1970-79	1980-89	1990-2001
Wind storm	59	121	121	207	300
Wild fire	0	4	11	25	54
Wave/surge	2	5	2	3	12
Slide	11	15	34	63	114
Insect infestation	0	1	6	43	13
Flood	50	110	170	276	489
Famine	0	2	4	11	45
Extreme temp	4	10	9	19	70
Epidemic	0	31	44	86	317
Drought	0	52	120	177	195

Epstein PR, Mills E (Eds.), *Climate Change Futures: Health, Ecological and Economic Dimensions*. Center for Health and the Global Environment (Harvard Medical School & Swiss Re, United Nations Development Programme). November 2005, p. 23.

Climate Change - an integrated framework



WMO UNEP

IPCC | INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

Impacto en la salud

nature

review article

The challenge of emerging and re-emerging infectious diseases

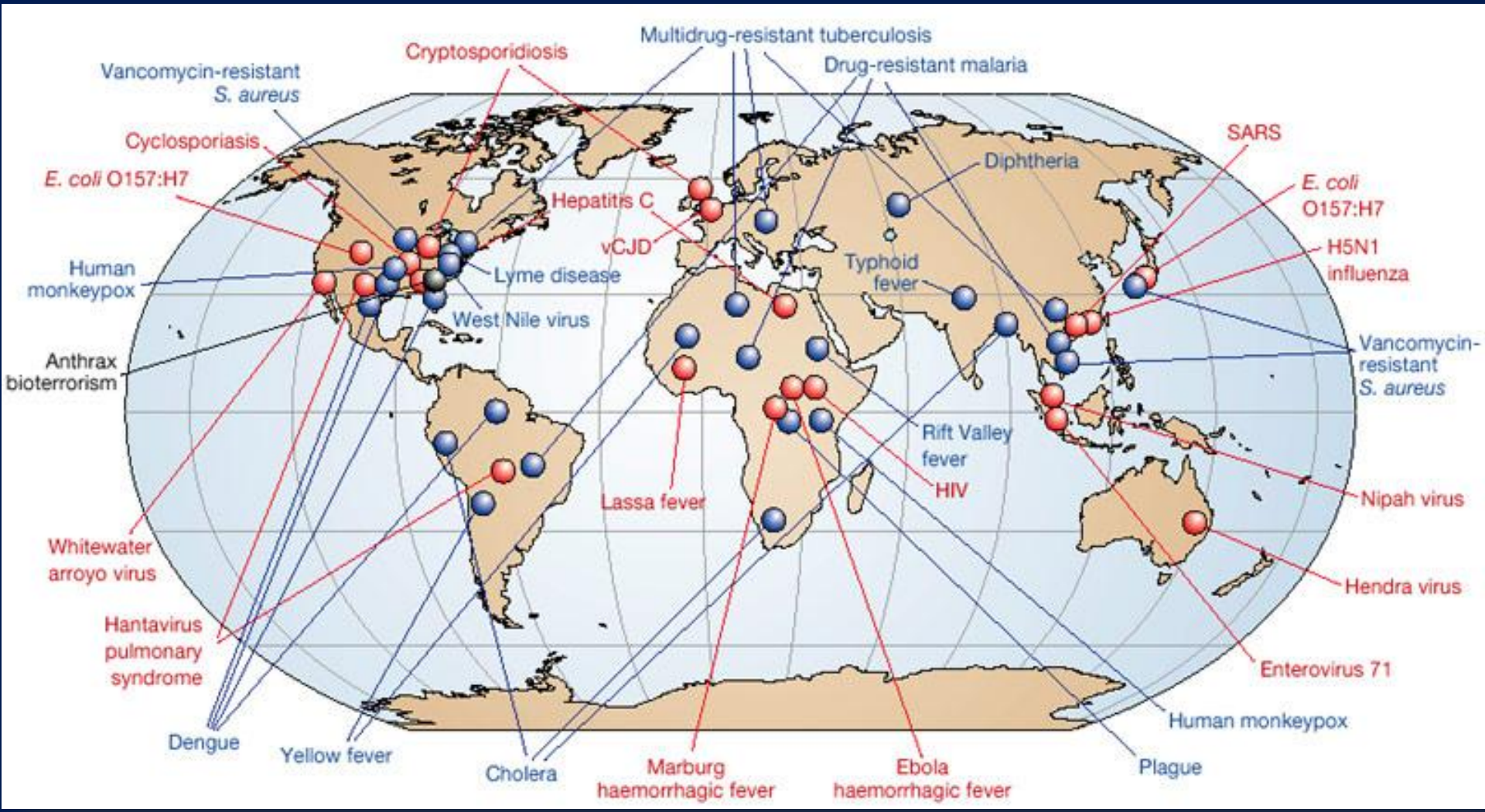
David M. Morens[1], Gregory K. Folkers[1] & Anthony S. Fauci[1]

Infectious diseases have for centuries ranked with wars and famine as major challenges to human progress and survival. They remain among the leading causes of death and disability worldwide. Against a constant background of established infections, epidemics of new and old infectious diseases periodically emerge, greatly magnifying the global burden of infections. Studies of these emerging infections reveal the evolutionary properties of pathogenic microorganisms and the dynamic relationships between microorganisms, their hosts and the environment.

▲ Top

The challenge of emerging and re-emerging infectious diseases
David M. Morens, Gregory K. Folkers & Anthony S. Fauci
***Nature* 430**, 242-249(8 July 2004)

Global examples of emerging and re-emerging infectious diseases



The challenge of emerging and re-emerging infectious diseases

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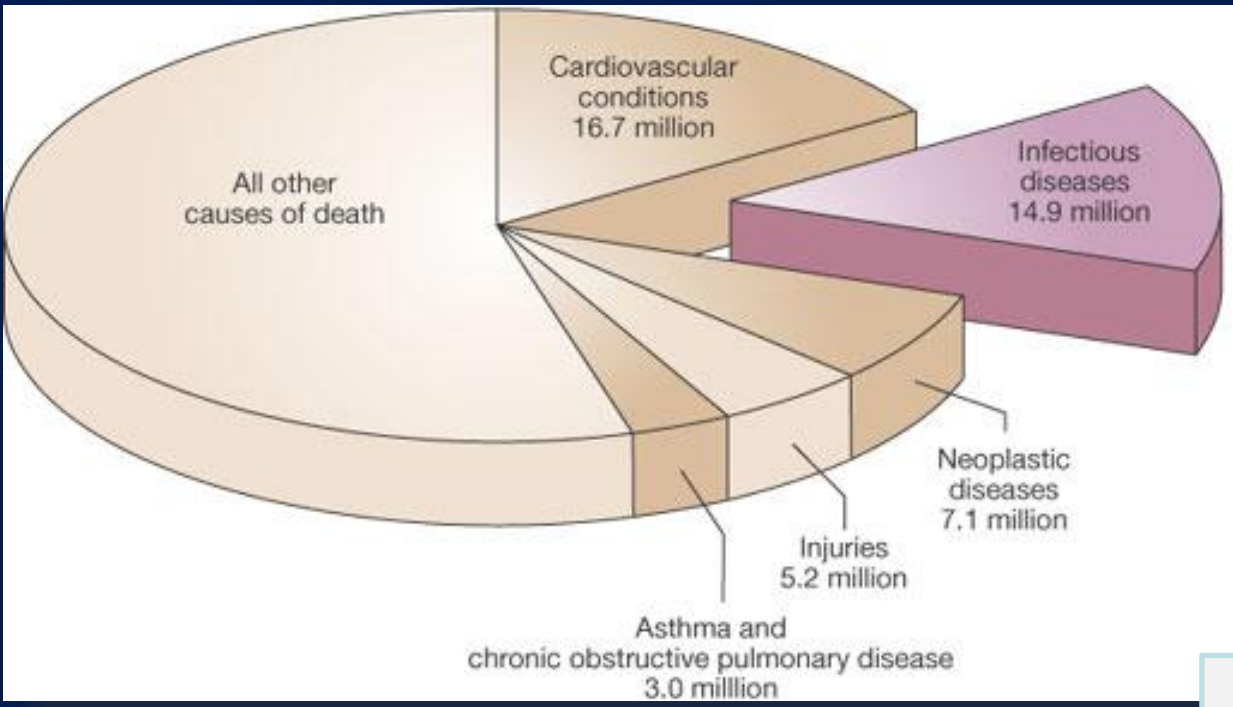
About 15 million (>25%) of 57 million annual deaths worldwide are the direct result of infectious disease.



Infectious diseases	Annual deaths (million)
Respiratory infections	3.96
HIV/AIDS	2.77
Diarrhoeal diseases	1.80
Tuberculosis	1.56
Vaccine-preventable childhood diseases	1.12
Malaria	1.27
STDs (other than HIV)	0.18
Meningitis	0.17
Hepatitis B and C	0.16
Tropical parasitic diseases	0.13
Dengue	0.02
Other infectious diseases	1.76

World Health Organization (http://www.who.int/whr/en, and ref. 7).

The challenge of emerging and re-emerging infectious diseases
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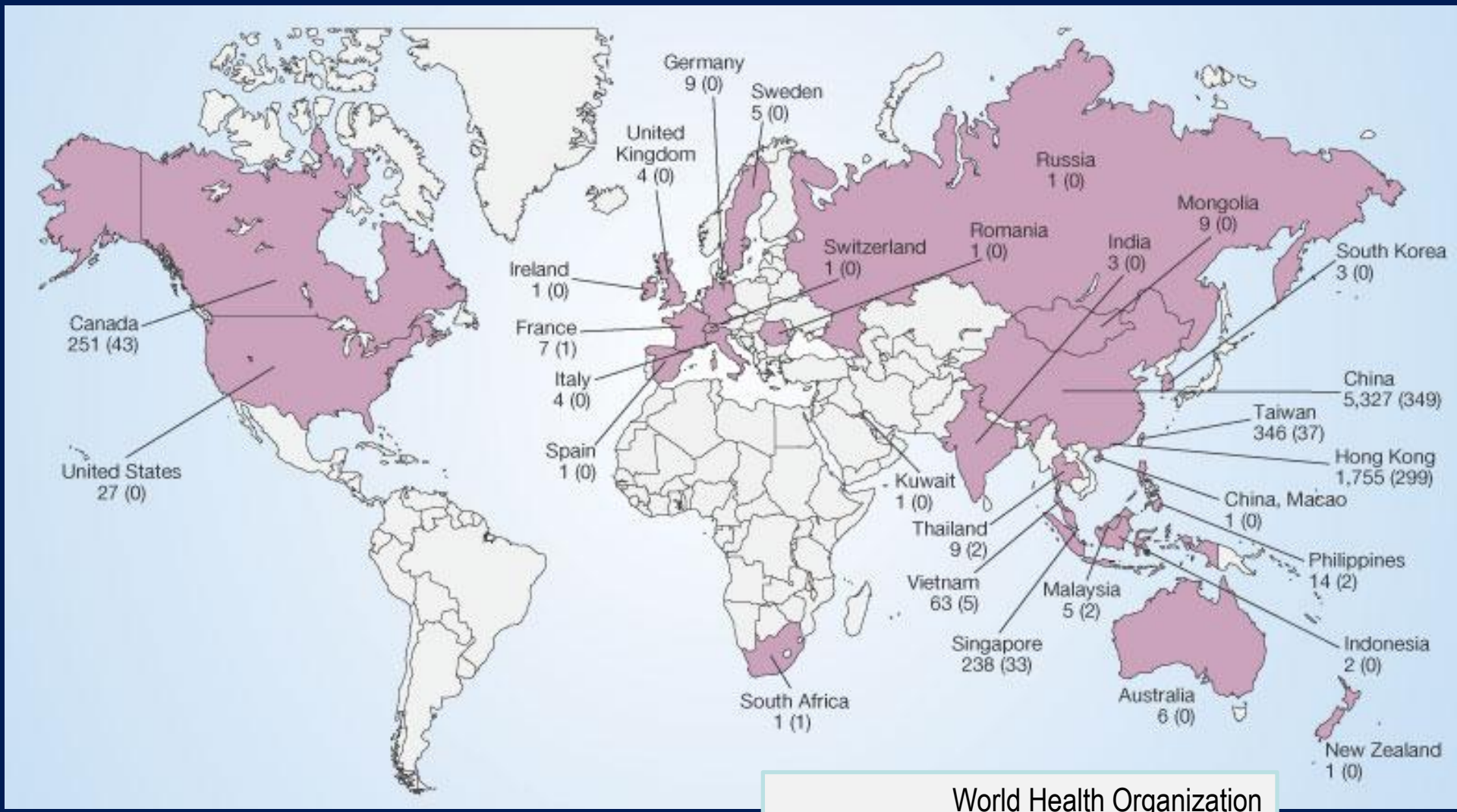
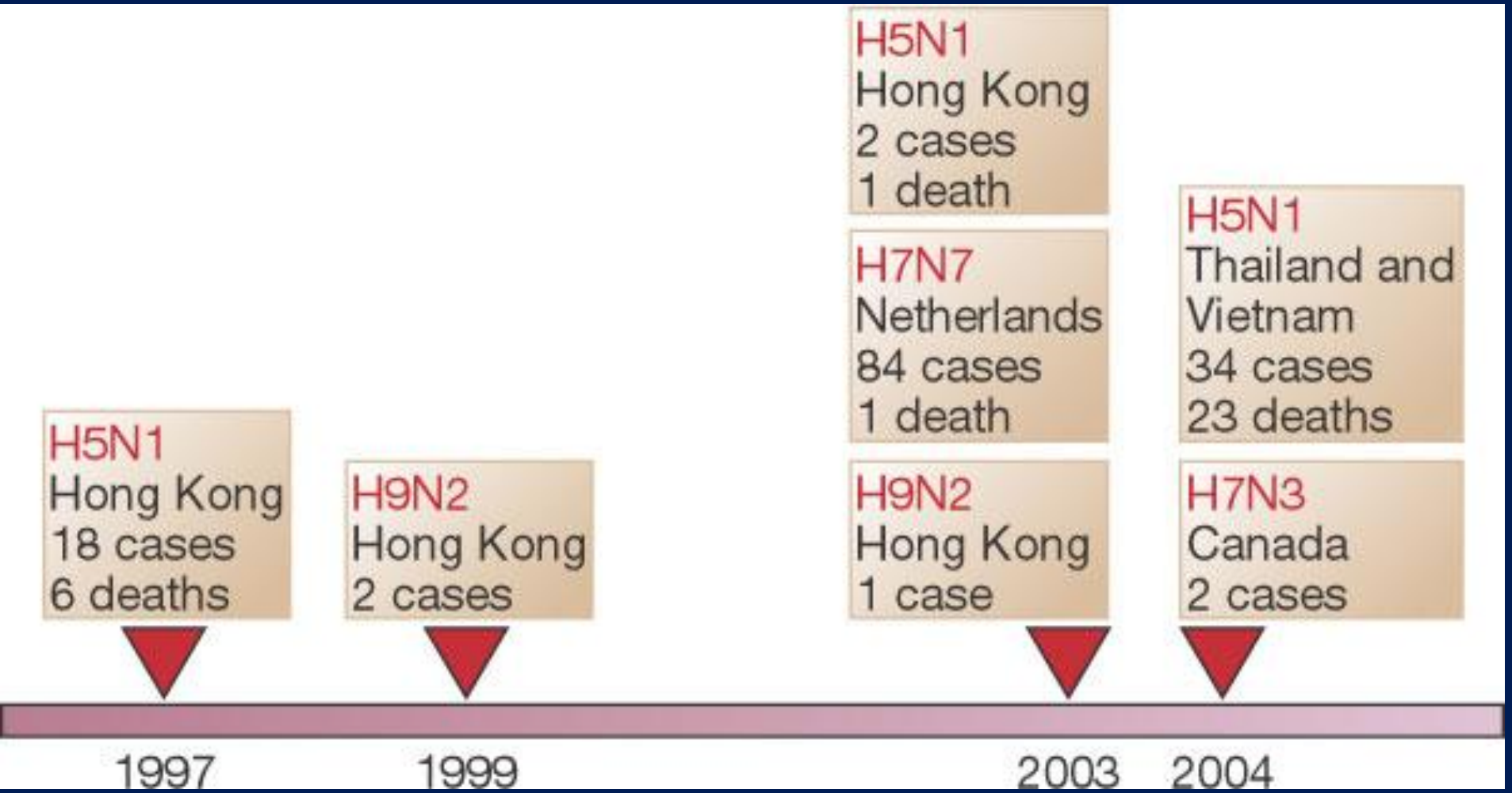
A total of 8,096 cases (and 774 deaths)

Cases by country. SARS-related deaths (in parentheses).



World Health Organization
http://www.who.int/csr/sars/country/en

Documented human infections with avian influenza viruses
1997–2004



World Health Organization
http://www.who.int/csr/disease/influenza/en

Health in Southeast Asia 3

www.thelancet.com Vol 377 February 12, 2011

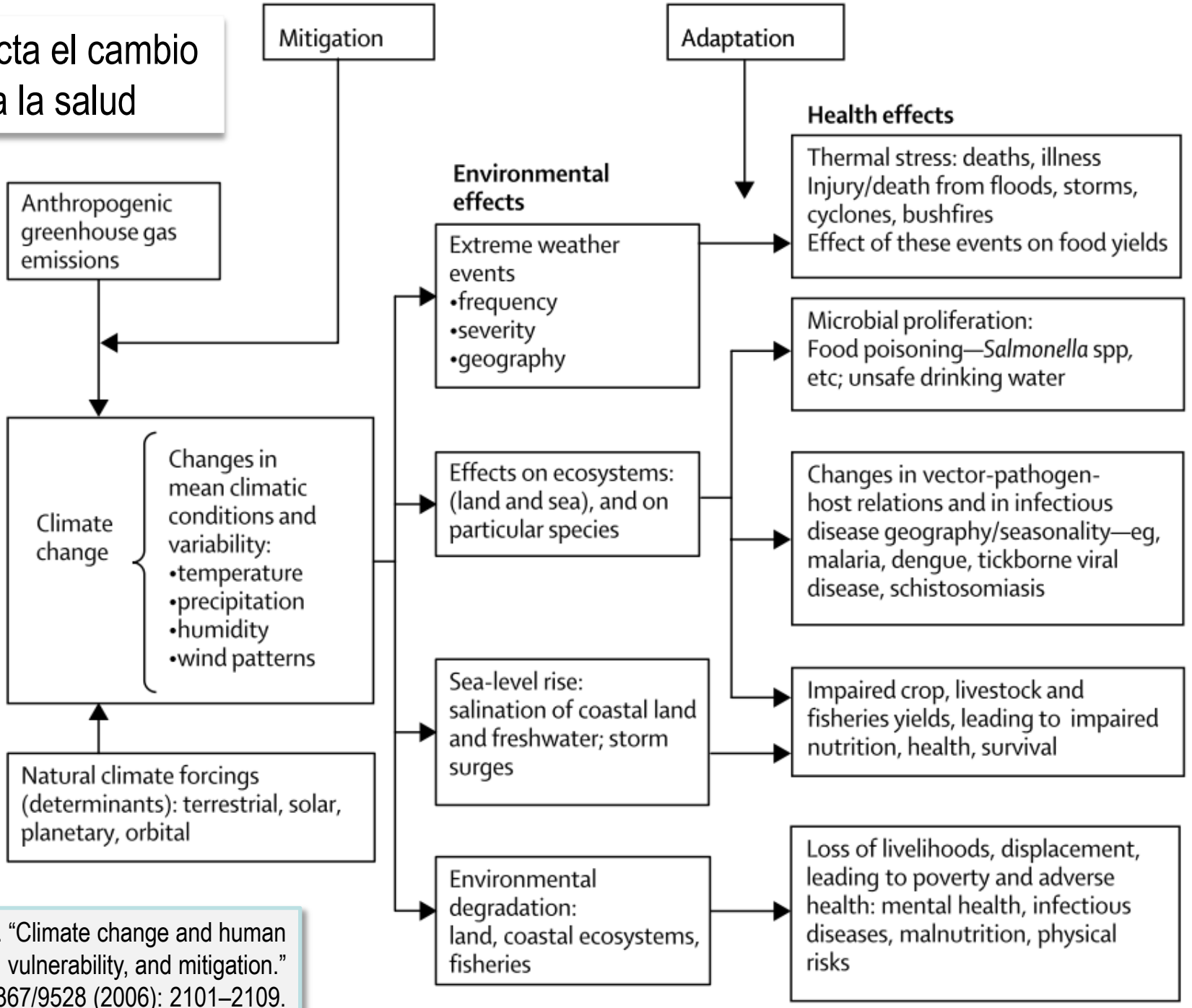
Emerging infectious diseases in southeast Asia: regional challenges to control

Richard J Coker, Be

Key messages

- Southeast Asia is a diverse region that is undergoing rapid social, environmental, and demographic change.
- The emergence of new ecological niches means that the region is likely to remain a hotspot for emerging infectious diseases.
- Governance of infectious disease control is challenging, with overlapping institutional roles and responsibilities. The region also is politically complex, with some intranational and international tensions that have the potential to further hinder control.
- There has been substantial investment in surveillance capacity in recent years, but it remains weak in many areas.
- Research in the region that practically informs policy and practice is scarce. Research areas demanding attention include the development of predictive surveillance (including the potential risks associated with social and environmental changes) and priority setting within health systems to allow response to surges in demand and to improve equity, effectiveness, and efficiency.

Cómo afecta el cambio climático a la salud



Haines et al. "Climate change and human health: impacts, vulnerability, and mitigation." **The Lancet** 367/9528 (2006): 2101–2109.

Cómo afecta el cambio climático a la salud

	Adverse effect	Beneficial effect	References	
			Climate variability	Climate change
Temperature extremes (more very hot days, possibly fewer very cold days)	More daily deaths and disease events—primarily due to more very hot days	Reduced winter deaths and disease events in (at least some) temperate countries	11–13, 14, 15–18, 19–29	30–36
Floods	More injuries, deaths and other sequelae (infectious disease, mental health disorders)		37–44	2, 34, 45–47
Aero-allergen production	Increased allergic disorders (hay fever, asthma) due to longer pollen season	Reduced exposure to aero-allergens in some regions due to lesser production or shorter season of pollen circulation	48	
Food-poisoning (diarrhoeal disease)	Greater risks at higher temperature (especially salmonellosis)		40, 49–55	34
Water-borne infection	Cholera risk might be amplified by coastal/estuarine water warming, local flooding	Less risk where (heavy) rainfall diminishes	40, 56–61	62–64
Vector-borne infections	Mosquito-borne infections tend to increase with warming and certain changes in rainfall patterns: heightened transmission. Likewise tick-borne infections, although via more complex ecological changes	Mosquito reproduction and survival could be impaired by altered rainfall and surface water and by excessive heat: reduced transmission. Similar determinants may apply to ticks, snails and other vectors.	65–76	34, 60, 77–95
Regional crop yields	Reductions in many low-latitude and low-rainfall regions	Increases in currently too-cold regions (might not be sustained with continuing climate change)		34, 96, 97
Fisheries	Declines or shifts in local fisheries: protein shortages (in poor populations). Possible increased contamination	Latitudinal shifts of fisheries, with ocean warming, may benefit new host populations		98–100
Sea-level rise	Health consequences of population displacement, lost livelihood, exposure to coastal storm surges and floods. Salinisation of freshwater and coastal soil.			101

Table: **Main known and probable health hazards of climate variability and climate change**

Haines et al. "Climate change and human health: impacts, vulnerability, and mitigation." **The Lancet** 367/9528 (2006): 2101–2109.

Cómo afecta el cambio climático a la salud

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Cómo afecta el cambio climático a la salud

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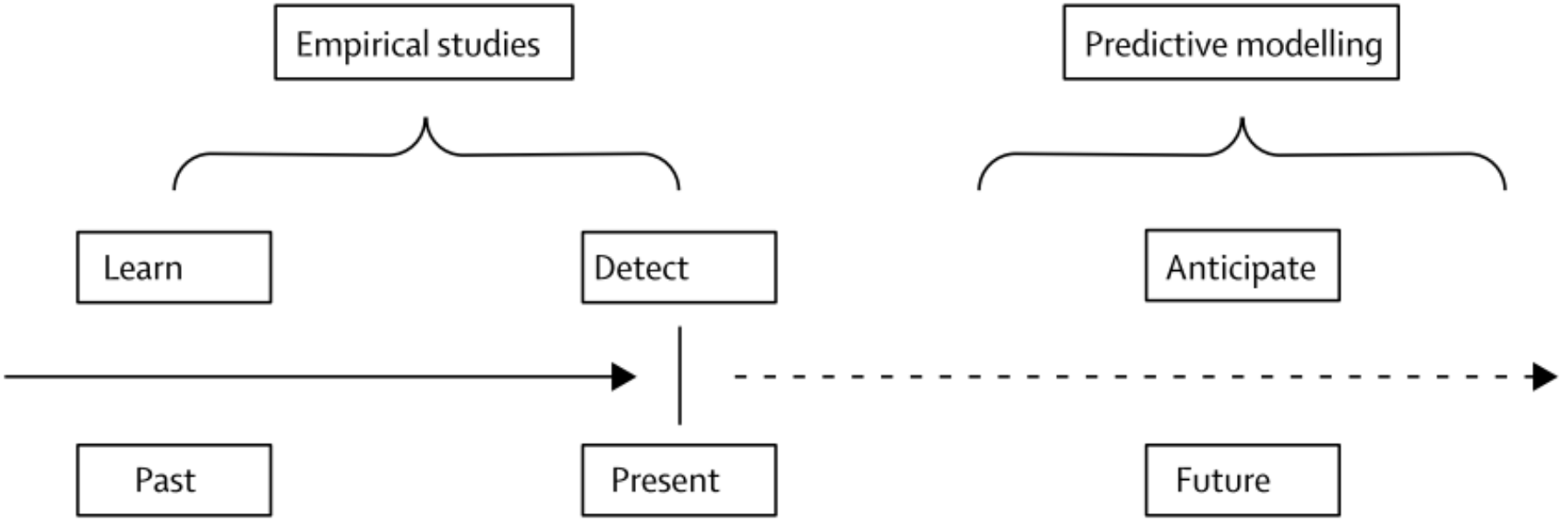
Haines et al. "Climate change and human health: impacts, vulnerability, and mitigation." **The Lancet** 367/9528 (2006): 2101–2109.

Líneas de investigación



Haines et al. "Climate change and human health: impacts, vulnerability, and mitigation." **The Lancet** 367/9528 (2006): 2101–2109.

Exceso de mortalidad atribuido a la ola de calor de 2003 en Europa

Location (date)	Excess mortality (% increase)	Reference
England and Wales (Aug 4–13)	2091 deaths (17%)	Johnson et al[16]
Italy (Jun 1–Aug 15)	3134 (15%) in all Italian capitals	Conti et al[17]
France (Aug 1–20)	14 802 (60%)	Anon[18]
Portugal (Aug)	1854 (40%)	Botelho et al[19]
Spain (Jul–Aug)	4151 deaths (11%)	Simon et al[20]
Switzerland (Jun–Sept)	975 deaths (6·9%)	Grize et al[21]
Netherlands (Jun–Sept)	1400–2200 deaths (not reported)	Garssen et al[22]
Germany (Aug 1–24)	1410 deaths (not reported)	Sozialministerium Baden-Wuerttemberg[23]

Haines et al. "Climate change and human health: impacts, vulnerability, and mitigation." **The Lancet** 367/9528 (2006): 2103.

Algunas enfermedades transmitidas por vectores que pueden ser sensibles al cambio climático

Vector	Major diseases
Mosquitoes	Malaria, filariasis, dengue fever, yellow fever, West Nile fever
Sandflies	Leishmaniasis
Triatomines	Chagas disease
Ixodes ticks	Lyme disease, tick-borne encephalitis
Tsetse flies	African trypanosomiasis
Blackflies	Onchocerciasis
Snails (intermediate host)	Schistosomiasis

Haines et al. "Climate change and human health: impacts, vulnerability, and mitigation." **The Lancet** 367/9528 (2006): 2104.

Adaptación y vulnerabilidad en distintos escenarios, sg. análisis de la carga mundial de enfermedad (OMS)

	Biological* adaptation affecting relative risks	Socioeconomic adaptation affecting relative risks
Direct effects of heat and cold	Yes. Temperature associated with lowest mortality was assumed to change directly with temperature increases driven by climate change	None
Diarrhoea	None	Assumed RR=1 if GDP per capita rises above US$6000/year
Malnutrition	None	Food-trade model assumed future increases in crop yields from technological advances, increased liberalisation of trade, and increased GDP
Disasters: coastal floods	None	Model assumed the relative risk of deaths in floods decreases with GDP
Disasters: inland floods and landslides	None	Model assumed the RR of deaths in floods decreases with GDP
Vector-borne diseases: malaria	None	None (for RR)

GDP=gross domestic product; RR=relative risk. *Physiological, immunological, and behavioural.

Haines et al. "Climate change and human health: impacts, vulnerability, and mitigation." **The Lancet** 367/9528 (2006): 2104.

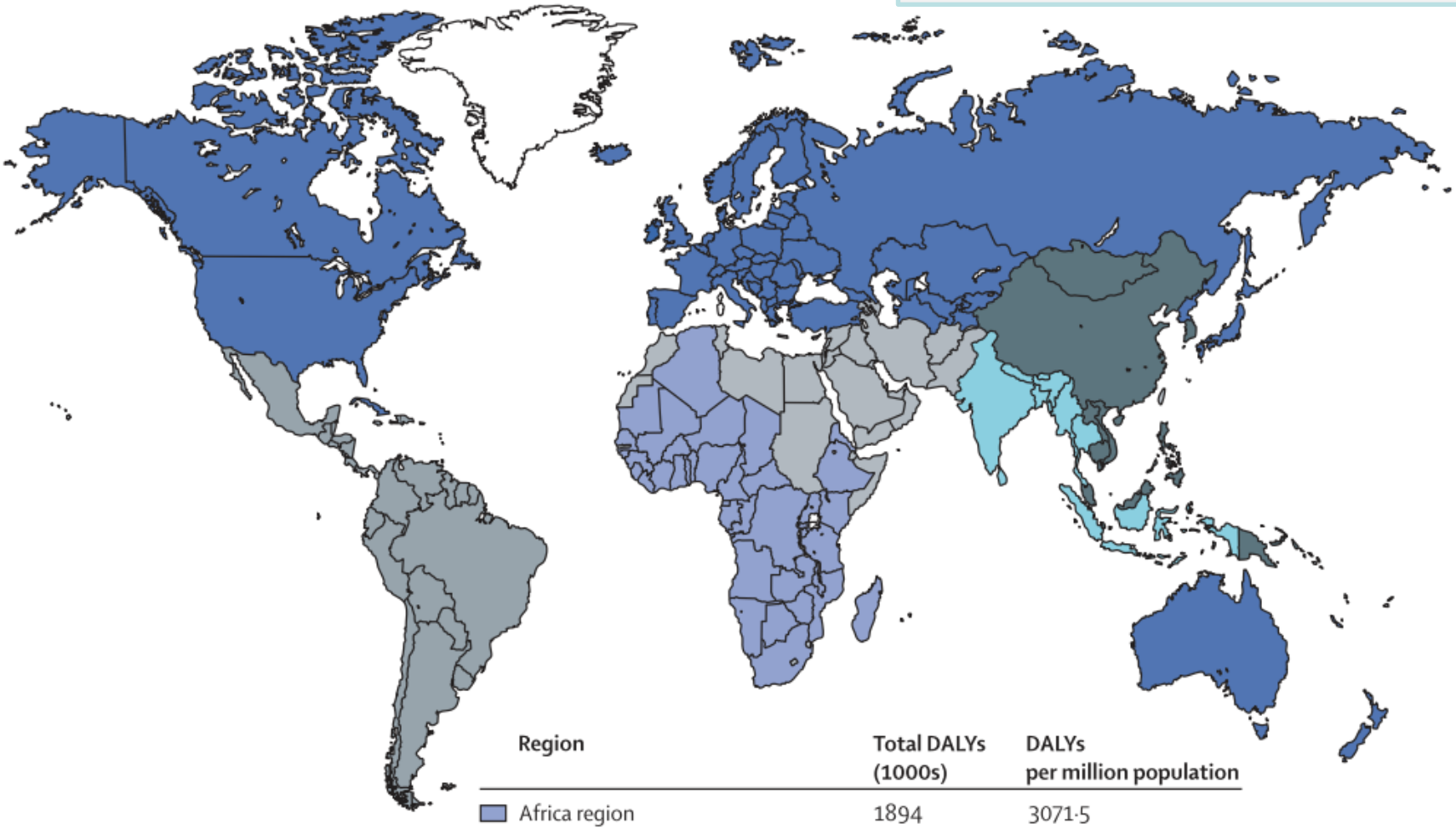
Medidas de adaptación en salud pública al impacto del cambio climático (aplicable a poblaciones europeas)

Health outcome	Public health	Surveillance
Mortality and morbidity due to heat waves	Public-health education Heat health warning systems Emergency preparedness	Enhance health surveillance of routine data for early detection of heat wave effects (eg, monitoring from funeral homes, calls to NHS Direct)
Floods	Public-health education—eg, boil water notices Emergency preparedness Check list for post-flood activities	Surveillance for flood effects, with long-term follow-up Coordinated national surveillance for flood deaths, injuries, and illnesses
Air quality	Warnings for high pollution days	Daily air pollution measurements
Vector-borne diseases	Public education, especially to avoid contact with ticks	Monitoring of vectors and reservoir host Integrated surveillance for human and animal diseases
Food-borne disease	Maintenance and strengthening of food hygiene measures	Integrated surveillance for human and animal diseases
Water-borne diseases	Risk assessment for extreme rainfall events Risk assessment of health effects of algal blooms	Increased microbiological monitoring of public water supplies and private wells, and enhanced surveillance during and following heavy rainfall events

Haines et al. "Climate change and human health: impacts, vulnerability, and mitigation." **The Lancet** 367/9528 (2006): 2104.

***Figure 2:* Estimated effects of climate change in 2000, by WHO region[16]**
DALY=disability adjusted life year.

Costello et al. "Managing the health effects of climate change." *The Lancet* 373, no. 9676 (May 22, 2009): 1699.



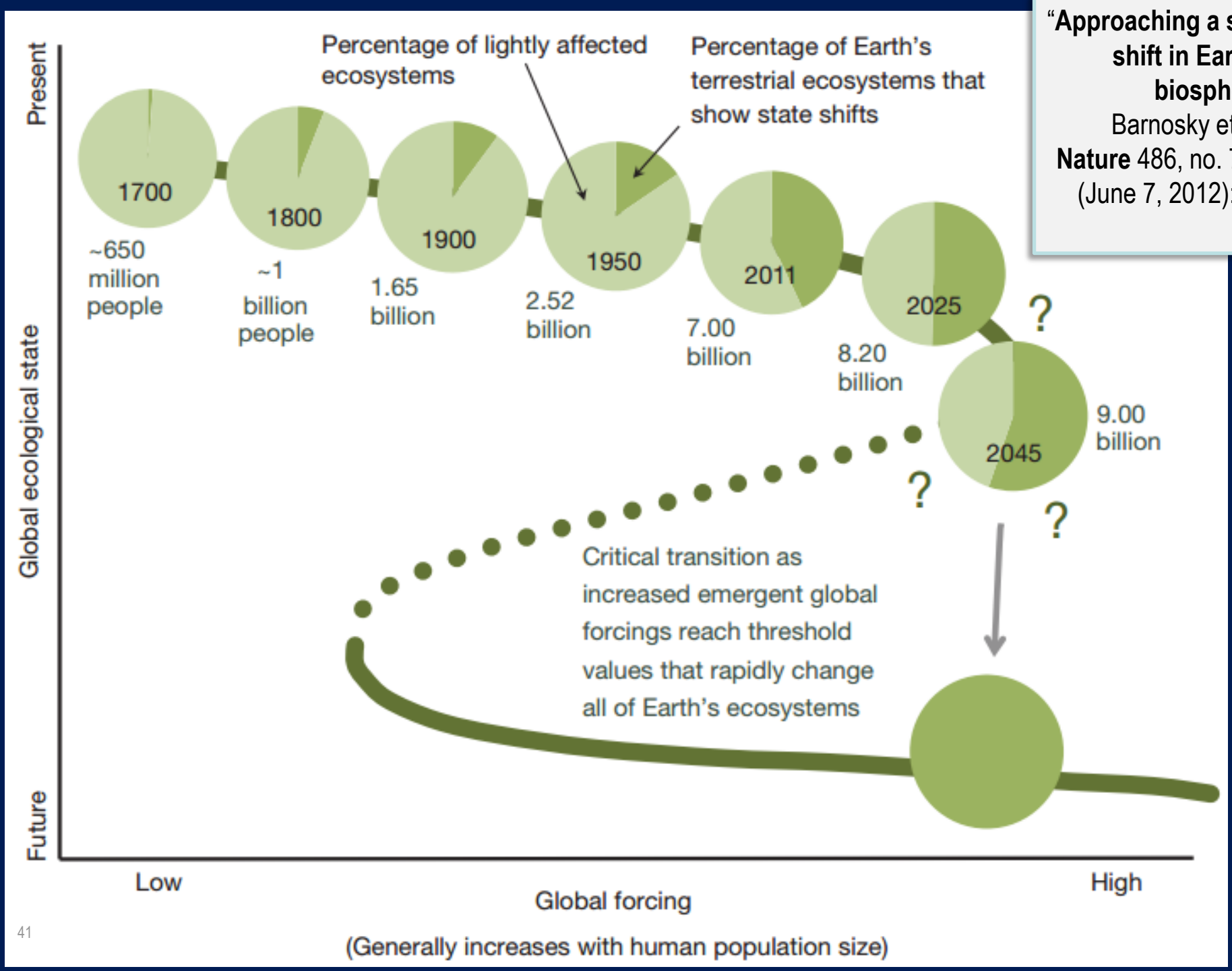
Region	Total DALYs (1000s)	DALYs per million population
Africa region	1894	3071·5
Eastern Mediteranean region	768	1586·5
South America and Caribbean region	92	188·5
Southeast Asia region	2572	1703·5
Western Pacific region*	169	111·4
Developed countries†	8	8·9
World	5517	920·3

*Without developed countries. †And Cuba.

Costello et al. “Managing the health effects of climate change.” *The Lancet* 373, no. 9676 (May 22, 2009): 1700.

The cost of climate mitigation and adaptation

What is the cost of avoiding climate change? According to the UK Government commissioned Stern review on the economics of climate change in 2006, if we do everything we can now to reduce global greenhouse gas emissions and ensure we adapt to the future effects of climate change, the average estimated cost is 1% of the world gross domestic product (GDP) every year.[14] However, if we do nothing, the effects of climate change could cost 5–20% of the world GDP every year. These figures have been disputed. Pielke and colleagues[5] argue



"**Approaching a state shift in Earth/'s biosphere**." Barnosky et al. - **Nature** 486, no. 7401 (June 7, 2012): 52–58.

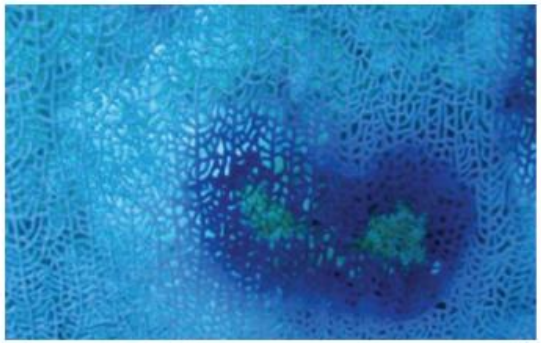
"Emerging fungal threats to animal, plant and ecosystem health." Fisher M et al., **Nature** 484, no. 7393 (April 12, 2012): 186–194.

- Increasing number of virulent infectious diseases
  - in natural populations and managed landscapes (1992-2012)
- In both animals and plants, an unprecedented number of fungal and fungal-like diseases
  - have recently caused some of the most severe die-offs and extinctions ever witnessed in wild species
  - and are jeopardizing food security.
- Human activity is intensifying fungal disease dispersal
  - by modifying natural environments
  - creating new opportunities for evolution.
- Nascent fungal infections will cause increasing attrition of biodiversity, with wider implications for human and ecosystem health, unless steps are taken to tighten biosecurity worldwide.

Fisher et al. “Emerging fungal threats to animal, plant and ecosystem health.” Nature 484/7393 (2012): 186–194.

Table 1 | Major fungal organisms posing threats to animal and plant species.

	Host	Pathogen (Phylum)	Disease dynamics leading to mass mortality in animal and plant hosts
	Amphibian species (for example, the common midwife toad, *Alytes obstetricans*)	*Batrachochytrium dendrobatidis* (Chytridiomycota)	Worldwide dispersal of a hypervirulent lineage by trade[64]. Ultra-generalist pathogen manifesting spillover between tolerant/susceptible species. Extent of chytridiomycosis is dependent on biotic and abiotic context[15,82] .
	Rice (*Oryza sativa*); *Magnaporthe grisea* species complex on 50 grass and sedge species, including wheat and barley	*Magnaporthe oryzae* (Ascomycota)	Rice blast disease in 85 countries, causing 10–35% loss of harvest. Global blast population structure determined by deployment of seeds with inbred race-specific disease resistance (RSR). Invasions occur by ‘host hops’ and altered pathogen demographics.
	Bat spp. (little brown bats, *Myotis lucifugus*)	*Geomyces destructans* (Ascomycota)	New invasion of North American bat roosts occurred in approximately 2006, and disease is spreading rapidly[8]. Pathogen reservoir may exist in cave soil. Disease is more aggressive compared to similar infections in European bats, possibly owing to differences in roosts and host life histories[65].

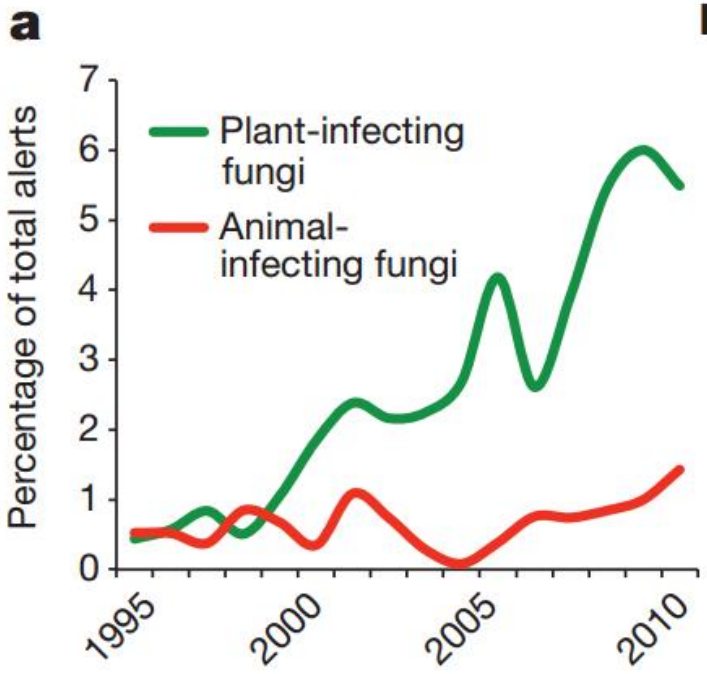
 Wheat (*Triticum aestivum*); 28 *Puccinia graminis* f. *tritici* species, but *P. graminis* is found on 365 cereal or grass species	*Puccinia graminis* (Basidiomycota)	Wheat stem rust is present on six continents. Population structure is determined by deployment of RSR cultivars and long-distance spread of aeciospores. Strain Ug99 poses a notable threat to resistant wheat varieties, causing up to 100% crop loss.
 Coral species (for example, the sea fan, *Gorgonia ventalina*)	*Aspergillus sydowii* (Ascomycota)	Sea-fan aspergillosis caused by a common terrestrial soil fungus[21,86]. Epizootics are associated with warm-temperature anomalies. Coral immunosuppression is probably a factor causing decline.
 Bee species (for example, the hive of the domestic honeybee (*Apis mellifera*) suffering colony collapse disorder)	*Nosema* species (Microsporidia)	Microsporidian fungal infections are associated with colony collapse disorder and declining populations. Pathogen prevalence is probably a part of a multifactorial phenomenon that includes environmental stressors and polyparasitism[87,88].
 Sea turtle species (the loggerhead turtle, *Caretta caretta*)	*Fusarium solani* (Ascomycota)	Soil-dwelling saprotroph and phytopathogenic fungus. Infection causes hatch failure in loggerhead turtle nests and suboptimal juveniles[44]. The disease dynamics fulfil Koch's postulates. Environmental forcing is suspected but not proven.

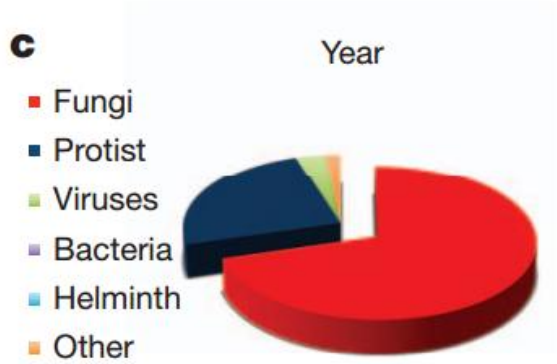
Fisher et al. "Emerging fungal threats to animal, plant and ecosystem health." Nature 484/7393 (2012): 186–194.

Images in Table 1, with permission: *A. obstetricans* chytridiomycosis mortalities, M.C.F.; *M. oryzae*, N. Talbot; WNS-affected little brown bats, A. Hicks; *P. graminis*, R. Mago; *G. ventalina* infected with *A. sydowii*, D. Harvell; *A. mellifera* hive suffering from colony collapse disorder, J. Evans; sea turtle eggs infected with *F. solani*, J. Diéguez-Uribeondo and A. Marco.

Worldwide reporting trends in fungal EIDs. (a) Disease alerts in the ProMED database for pathogenic fungi of animals and plants; (b) spatial location of the associated reports

Fisher et al. Nature 2012: 186–194.





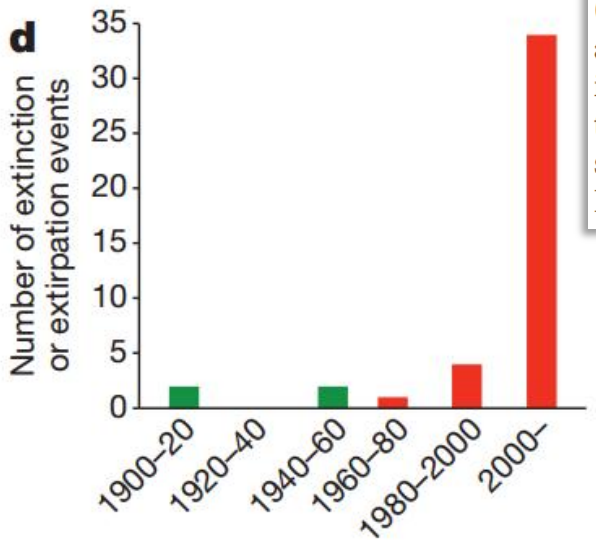
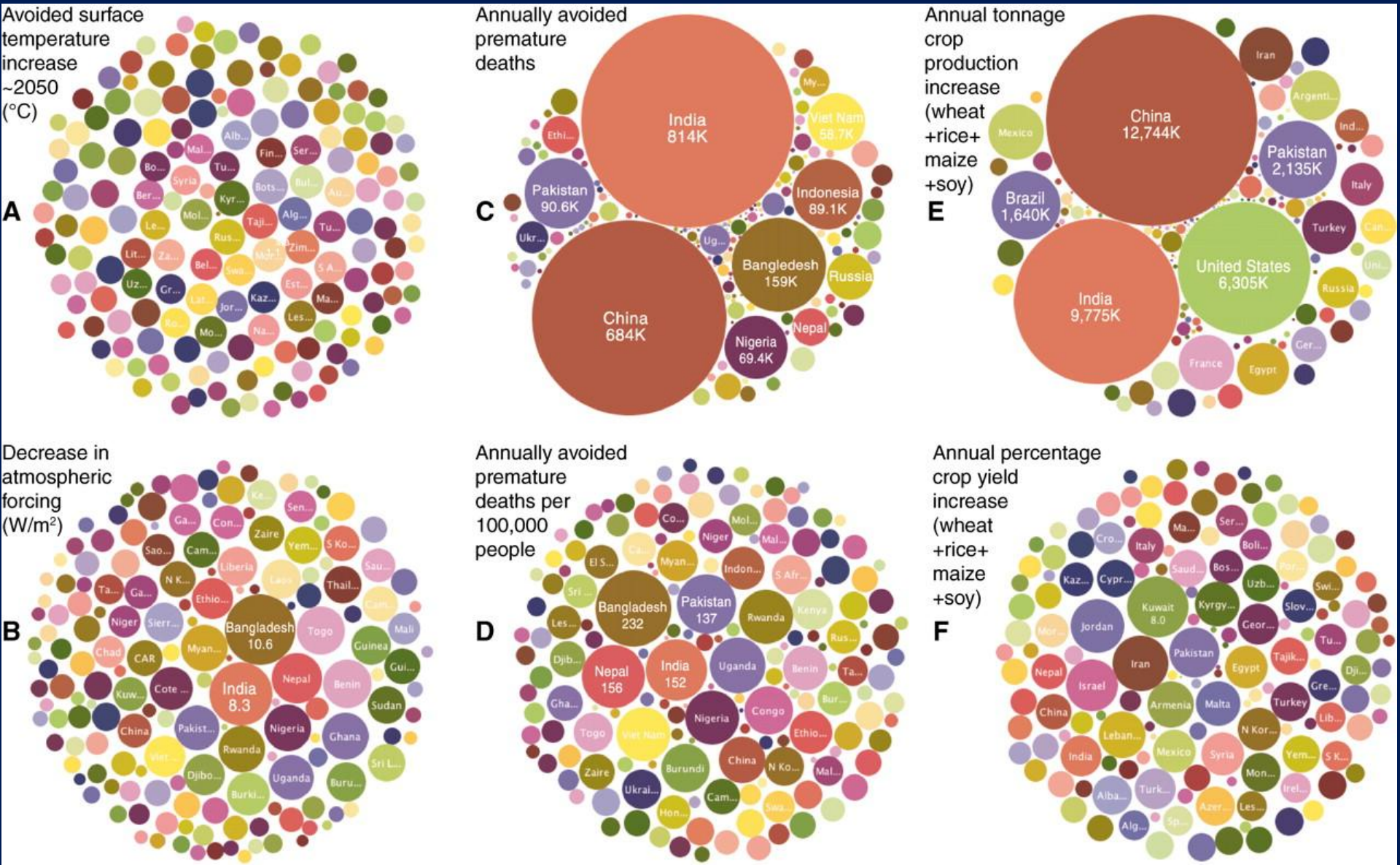


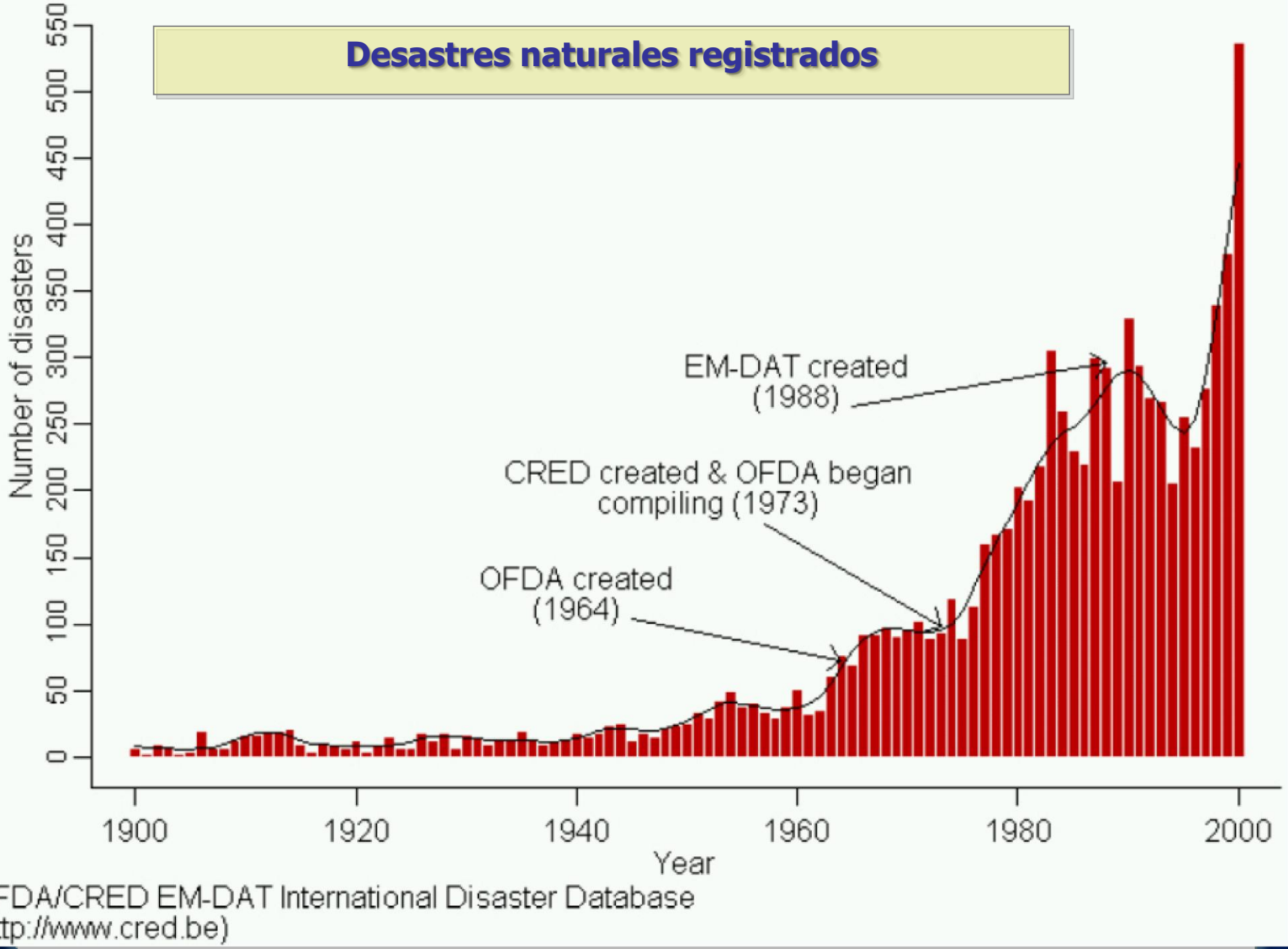
Figure 1 | Worldwide reporting trends in fungal EIDs. **a**, **b**, Disease alerts in the ProMED database for pathogenic fungi of animals and plants (**a**), and the spatial location of the associated reports (**b**). **c**, **d**, Relative proportions of species extinction and/or extirpation events for major classes of infectious disease agents (**c**) and their temporal trends for fungal pathogens (**d**). Primary data sources are given in the Supplementary Information.

National benefits of the CH_4 plus Black Carbon (BC) reduction (versus the reference scenario). Circle areas are proportional to values for (**A** and **B**) **climate change**, (**C** and **D**) human **health** (values for population over age 30), and (**E** and **F**) agriculture.



Vulnerabilidad humana

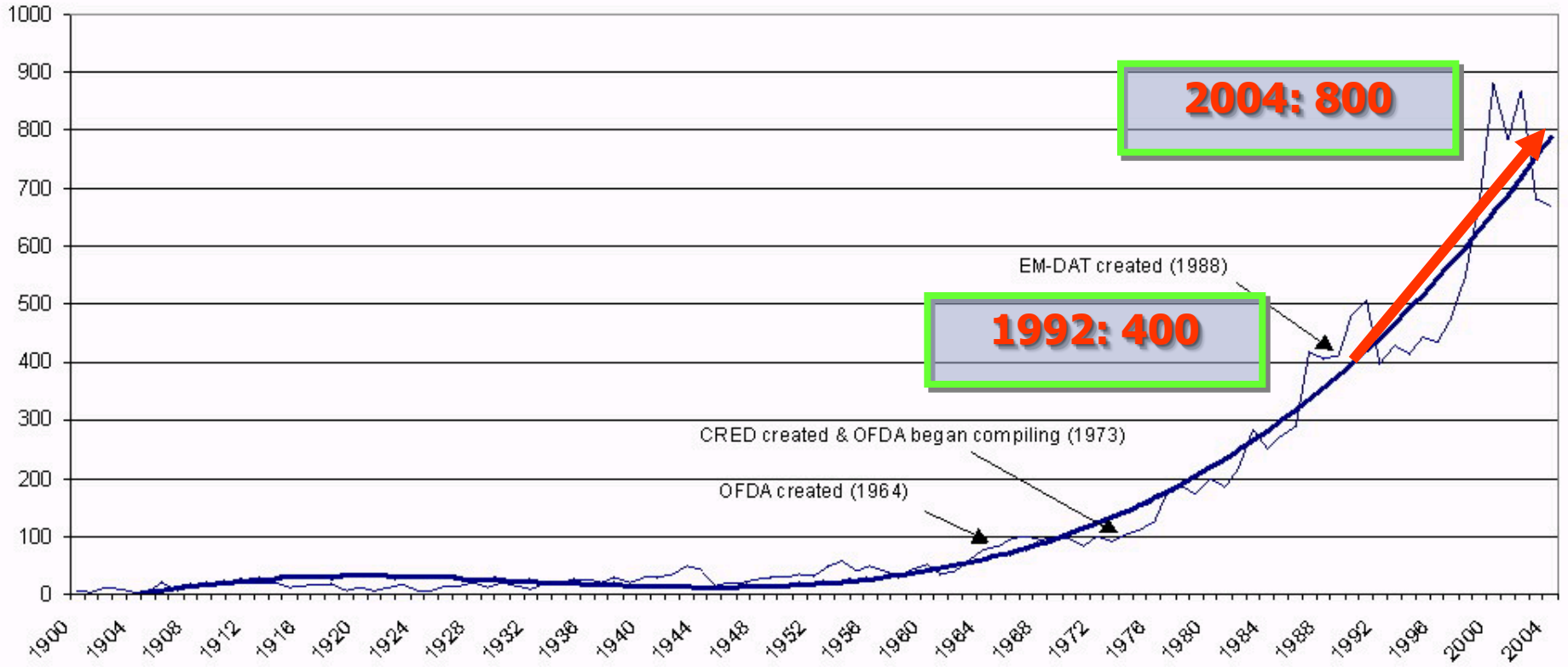
Desastres naturales registrados



OFDA/CRED EM-DAT International Disaster Database
(http://www.cred.be)

Desastres naturales registrados

Total number of disasters reported. World : 1900 - 2004



Equation for time-trend line : y = 0,0023x3 - 0,2311x2 + 6,6707x - 29,376; R2 = 0,9564

Source : "EM-DAT : The OFDA/CRED International Disaster Database; www.em-dat.net - Université Catholique de Louvain - Brussels - Belgium"

Factores que agravan los desastres

- **Vulnerabilidad humana asociada a pobreza y desigualdad social**
- **Degradación ambiental y urbanización intensa en zonas de riesgo**
- **Crecimiento rápido de la población con pocos recursos**

  1920: 100 millones hab. urbanos
  1980: 1.000 millones
  2004: 2.000 millones y 20 ciudades con >10 mill. Habs.
- **Imprevisión e incumplimiento de normas de construcc.**

Los desastres no afectan por igual

- >90% de las muertes ocurren entre el 66% de la población en las regiones más pobres.[1]

- Tasas diferentes de mortalidad por desastre:
  3.000 en zonas pobres
  500 en países industrializados

[1] Anderson MB (1991): “Which costs more: prevention or recovery?” En: Kreimer A, Munasinghe M, eds. *Managing natural disasters and the environment*. Washington, D.C.: World Bank.

Vulnerabilidad

IPCC (2000):

"El grado de susceptibilidad de un sistema natural o social para soportar los perjuicios del cambio climático en función de su magnitud, la sensibilidad del sistema a los cambios del clima y la habilidad de este para adaptarse a esos cambios".

Un **sistema muy vulnerable** es aquel que es muy sensible a cambios moderados del clima y cuya capacidad para adaptarse está muy restringida.

Vulnerabilidad

IPCC (2001):

- La vulnerabilidad de los diferentes sectores de una población depende en gran medida de su bienestar socioeconómico.

- **La pobreza limita la capacidad adaptativa**; por ello, la vulnerabilidad será mayor a mayor sensibilidad y menor adaptabilidad.

- Es preciso identificar las condiciones ambientales y socioeconómicas que disminuyen la capacidad de diferentes grupos de adaptarse al cambio climático (fortalezas y oportunidades locales).

Vulnerabilidad

Fuente: http://www.bcie.org

La vulnerabilidad es la predisposición o susceptibilidad física, económica, política o social que tiene una comunidad de ser afectada o de sufrir daños en caso de que un fenómeno desestabilizador de origen natural o antrópico se manifieste. Cardona, 2001: 2

Las condiciones de pobreza de las poblaciones disminuyen la capacidad de recuperación de las personas.
Los efectos negativos en muchos lugares son acumulativos (inundaciones o sequías cada año).

Vulnerabilidad y ubicación geográfica

- Las comunidades, grupos de personas o persona individual es propensa a ser afectada por un proceso de tipo natural o antrópico.

- **Comunidades centroamericanas**: Riesgo muy alto de afectación por **procesos hidrometeorológicos intensificados por el cambio climático**, dada su ubicación geográfica (zona tropical con incidencia de huracanes, tormentas tropicales y sistemas de baja presión menos intensos).
- **Costas caribeñas**: **Precipitaciones extraordinarias**, aumento de sistemas de baja presión.
- **Costas pacíficas**: **Desertificación**

Fuente: http://www.bcie.org

Riesgo

- **Probabilidad de que un evento suceda**.
  - **Referida a procesos naturales**: probabilidad de que las personas y sus bienes resulten afectados de forma negativa, en función de su exposición y vulnerabilidad.
  - **Reducción del riesgo:** resultado de relacionar la amenaza (probabilidad de que ocurra un evento) y la vulnerabilidad de los elementos expuestos (factores interno que modulan la severidad de los efectos).
  - **Medidas estructurales**: desarrollo de obras de protección
  - **Medidas no estructurales**: regulación de los usos del suelo;
    - Financiar adecuadamente la actividad preventiva
    - **Dimensionar los medios y servicios locales** para atención en situaciones de emergencia y catástrofe (los factores que más pueden reducir las consecuencias de un evento sobre una región o una población).

Percepción de riesgo

- Proceso complejo de articulación de creencias individuales y colectivas sobre un problema.
  - Implica conocimiento científico-técnico
  - Pero no basta la **alfabetización científica** para tener una percepción de riesgo “razonable”
  - **La falta de información se suple con creencias** (religiosas, morales) y convicciones muy arraigadas
  - Se articulan **consideraciones prudenciales**, según la **credibilidad** de los actores involucrados.
  - En cada sociedad se configuran estándares diferentes, según su tradición cultural.

Poblaciones vulnerables

- Densidad de población,
- Tipo de asentamiento
- Nivel de desarrollo económico y cultural
- Condiciones ambientales locales
- Estado de salud previo
- Calidad y disponibilidad de asistencia médica
- Servicios públicos a su alcance
- Posibilidad de afectación del modo de vida

- **Exposición**: Riesgo = Vulnerabilidad * Amenaza

Gestión del riesgo

- Proceso social complejo e institucionalizado:
  - Implica estrecha colaboración multidisciplinar y multidimensional (técnicos, políticos, servicios, etc.)
  - Orientado a la identificación, previsión, reducción y control permanente de los factores de riesgo de desastre tecno-natural en la sociedad.
  - Integrando pautas de desarrollo humano, económico, ambiental y territorial sostenibles.

(Narváez et al., 2009)

- Por lo tanto abarca diversas formas de intervención, que van desde la formulación e implementación de políticas y estrategias, hasta la implementación de acciones e instrumentos concretos de reducción y control (Narváez et al., 2009), los mismos pueden ser implementados tanto a nivel nacional como local.

PARTE II

MARCO CONCEPTUAL Y ESTRATÉGICO SOBRE CAMBIO CLIMÁTICO, GESTIÓN DEL RIESGO DE DESASTRES Y SECTOR AGROPECUARIO 17

ARTICULANDO L
GESTIÓN DEL RIESG
Y LA ADAPTACIÓN A
CAMBIO CLIMÁTIC
EN EL SECTO
AGROPECUARI

GAR 2011

Estudio Sobre la Implementación de Estrategias para Incoporar Criterios de Gestión de Riesgo en la Inversión Pública en América Latina

Ana Campos García &
Lizardo Narváez Marulanda

2011

Figura 5. La gestión del riesgo de desastre en los procesos de desarrollo

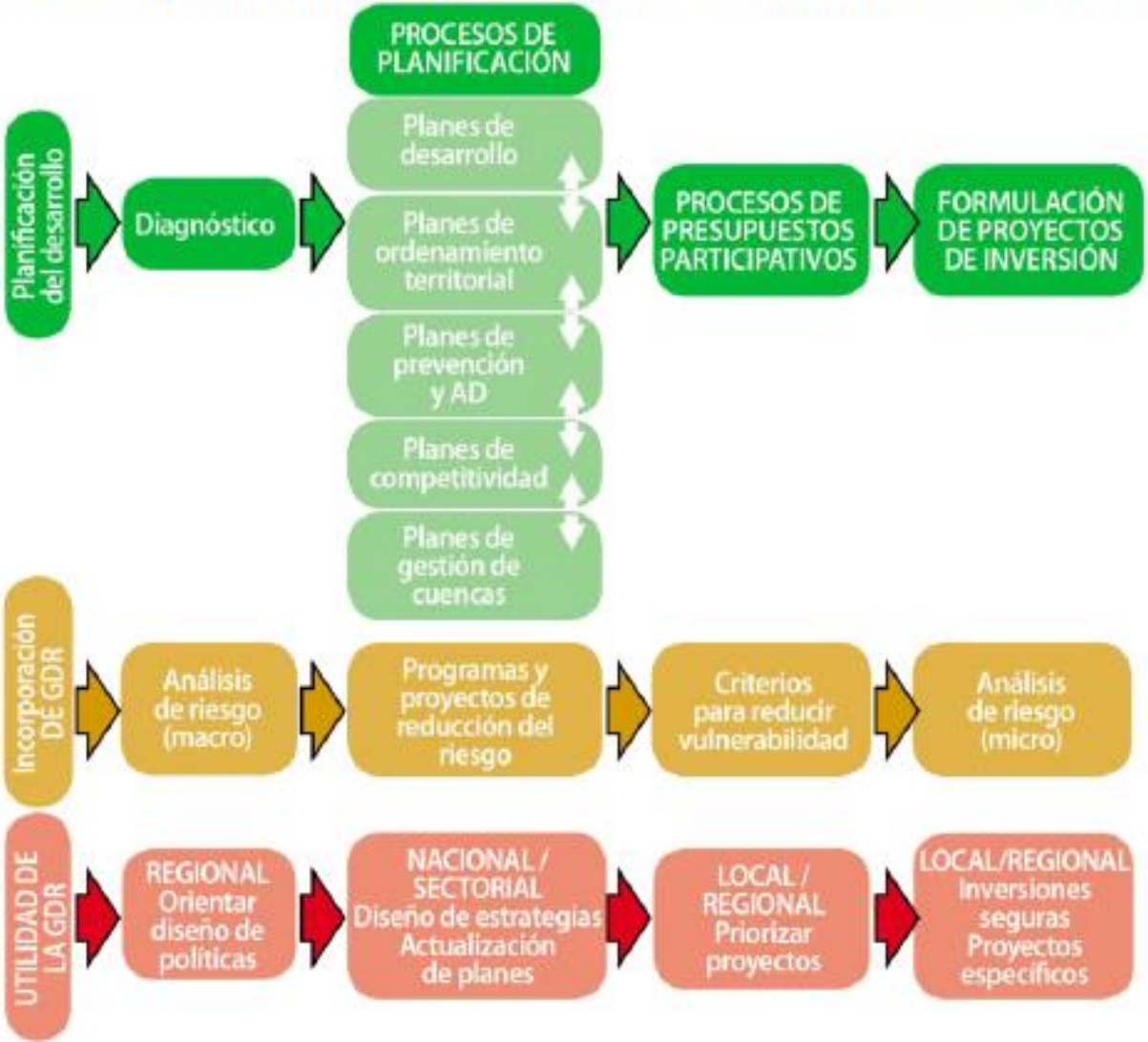
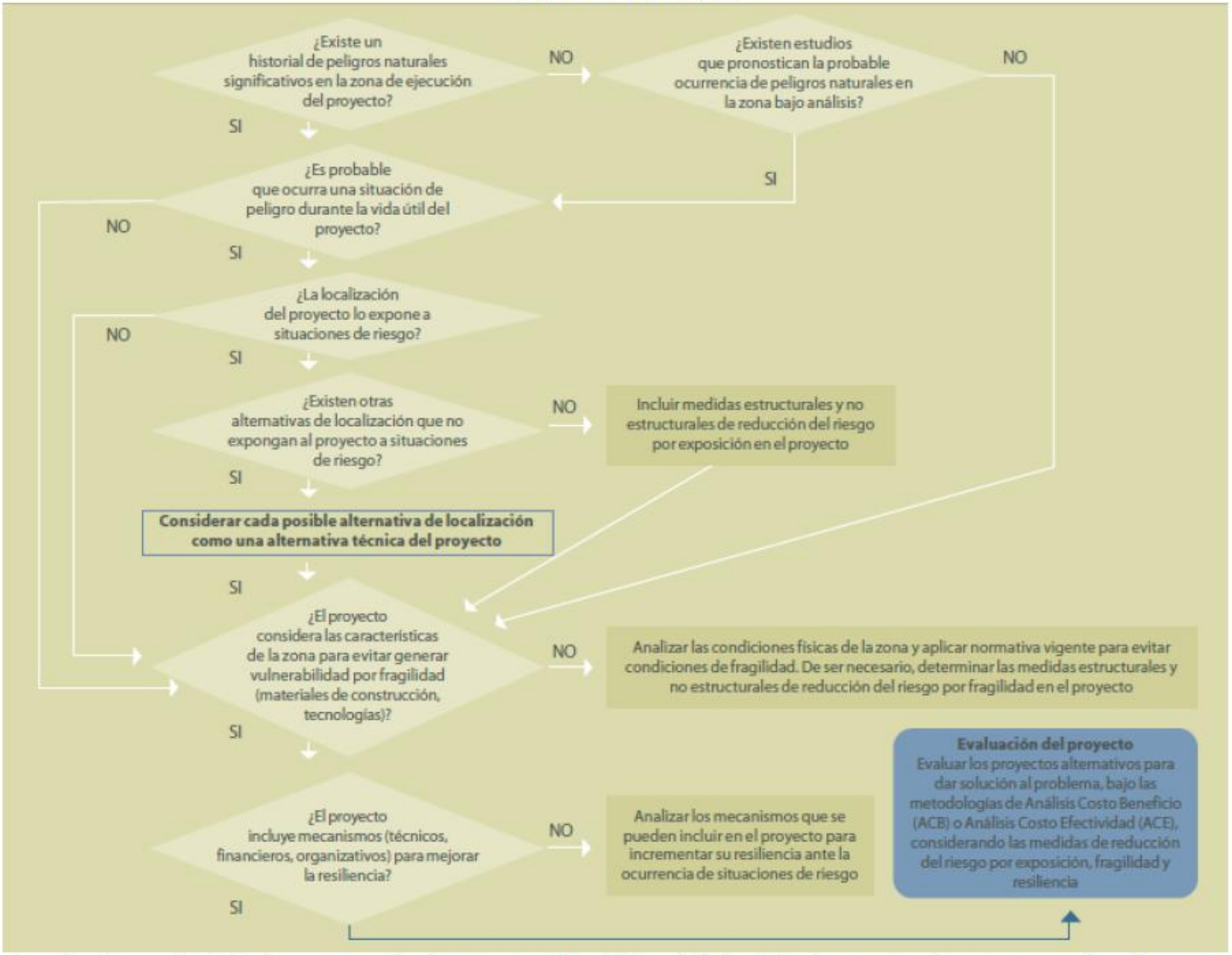


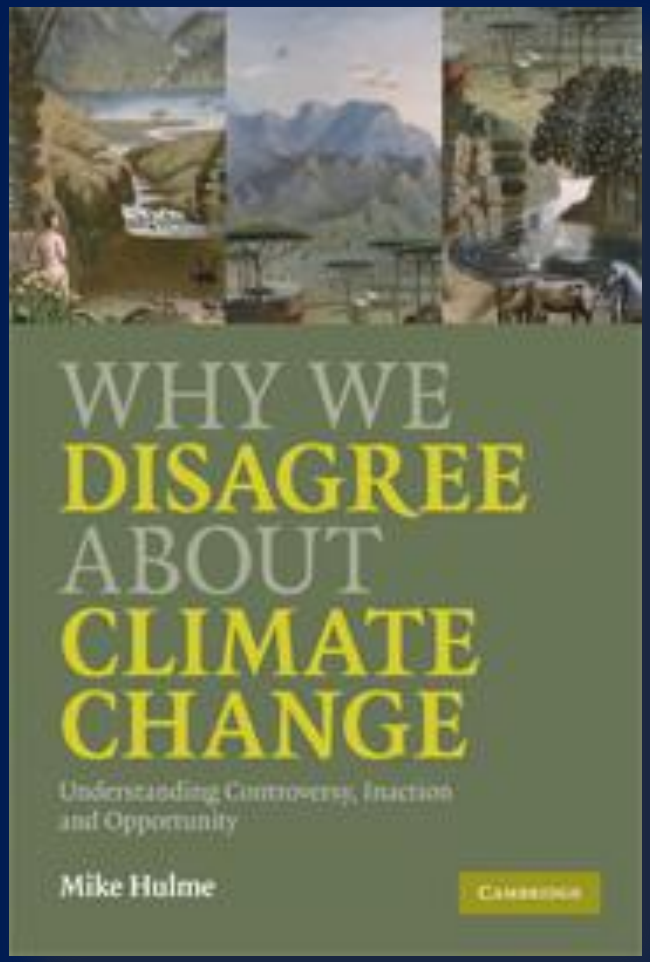
Figura 8. Flujograma de decisión para evaluar los elementos del riesgo: peligros y vulnerabilidades



Fuente: Pautas metodológicas para la incorporación del análisis del riesgo de desastres en los Proyectos de Inversión Pública. MEF, Dirección General de Programación Multianual. Lima, Perú. 2007.

Debate socio-político

Consenso científico, disenso político



Hulme M. ***Why We Disagree about Climate Change: Understanding Controversy***, ***Inaction and Opportunity***. Cambridge: Cambridge University Press; 2009.

Kythreotis, A. P. "**Progress in global climate change politics? Reasserting national state territoriality in a 'post-political' world**." *Progress in Human Geography* 36, no. 4 (December 7, 2011): 457–474.

Methmann, C., and D. Rothe. "**Politics for the day after tomorrow: The logic of apocalypse in global climate politics**." *Security Dialogue* 43, no. 4 (August 15, 2012): 323–344.

Weber, Elke U. "**What shapes perceptions of climate change?**" *Wiley Interdisciplinary Reviews: Climate Change* 1, no. 3 (May 19, 2010): 332–342.

Cote, M., and a. J. Nightingale. "**Resilience thinking meets social theory**: Situating social change in socio-ecological systems (SES) research." *Progress in Human Geography* 36, no. 4 (December 2, 2011): 475–489.

Base sólida de conocimiento científico → política

- Pese a las incertidumbres, existe conocimiento suficiente para cuestionar las metas y prácticas del modelo de desarrollo predominante. **Evidencias**:
  - los seres humanos están cambiando el clima global del sistema tierra (consenso interdisciplinar abrumador)
  - Pese a la incertidumbre en los modelos científicos para predecir escenarios futuros de cambios climáticos

  → Es el **turno del debate social** y de la **negociación política**

  – La **ciencia** ha sido eficaz en mostrar *cómo son las cosas* y en anticipar el curso posible de los fenómenos físicos
    - Constituye un dominio limitado, insuficiente para decidir qué se debe hacer ante problemas complejos, multidimensionales, como el cambio climático.
    - **La ciencia no basta para determinar** cuál, entre muchas, es **la opción más responsable**, y **quién/es o cuándo** deben emprender ciertas acciones.

Base sólida de conocimiento científico → política

- Ciertas cuestiones se deciden en el terreno de la política;
  - No las dicta la ciencia
- Pero nuevo conocimiento sobre el impacto físico de la acción humana en la dinámica global del sistema tierra conlleva nueva percepción de responsabilidad.
  - La ciencia puede sugerir / hacer previsibles algunas consecuencias del CCG
    - aumento del nivel del mar,
    - aumento de las temperaturas
    - tormentas más intensas
  - Pero las predicciones climáticas en para todo el sistema, en un intervalo temporal amplio, nunca serán lo bastante precisas como para orientar estrategias de planificación adaptación óptimas.
  - La incertidumbre forma parte de la gestión del riesgo
  - Origina percepciones públicas de riesgo muy diferenciadas.

Base sólida de conocimiento científico → política

- Los agentes concernidos por el debate buscan influir en la opinión pública según sus intereses (contrapuestos), mecanismos de poder y juicios de valor
- Decidir qué estrategias de prevención de riesgos reciben inversión y cuáles no, constituye un proceso político.
- Y dimensionar la inversión en prevención del riesgo de inundación a una probabilidad de 1/100 años, en lugar de a 1/1000 años, refleja **juicios de valor**.
- Pero el fenómeno del cambio climático inducido por la acción humana plantea cuestiones inéditas para el debate ético-político (y para la ciencia):
  - Reabre antiguos debates acerca del poder, la justicia y el desarrollo en un mundo de colonizadores y colonizados.
  - Plantea el contraste entre las emisiones que son resultado de un estilo de vida basado en el lujo y lo superfluo frente a la supervivencia: p.ej., las del turismo internacional o jacuzzis en el jardín frente a los procedentes de actividades esenciales como la cocina, la calefacción y la iluminación.
  - Origina discusiones lastrados por un fuerte componente ético (las responsabilidades individuales, políticas e históricas; obligaciones hacia las generaciones futuras; sobre la naturaleza del bienestar humano… Son parte de los discursos sobre el cambio climático.

El significado de las “acciones urgentes”

- En este debate se desvelan las muchas razones que explican el desacuerdo y los enfrentamientos en un mundo cada vez más lleno de gente con problemas.
- Si los datos científicos y los modelos de simulación más sofisticados apuntan a la conveniencia de "acciones urgentes“, ¿Cómo entenderlo y aplicarlo?
  - ¿significa cambios radicales en las prácticas de consumo o descarbonización radical de las tecnologías y modelos energéticos?
  - ¿Quién puede realizar esta acción: políticos, empresarios, emprendedores, los ricos de Occidente, o los ricos de todo el mundo?
  - ¿Y cuándo han de llevarse a cabo esas acciones?
  - ¿Mediante objetivos difusos de reducción de emisiones para el año 2050 o mediante metas a corto plazo, para los próximos cinco años?
  - No basta recurrir a los datos científico-técnicos; aparte de expertos y técnicos, hay más actores concernidos en el debate.

Un desafío para la política

- Los desacuerdos sobre el cambio climático tienen raíces muy complejas:
  - diferentes trayectorias intelectuales y maneras de "ver el mundo”
  - culturas políticas y tradiciones nacionales diferentes
  - diferentes estilos de organización, de relación con la naturaleza
  - Creencias religiosas y morales diferentes
  - tradiciones religiosas diferentes entienden de manera distinta la preservación, la conservación o manipulación de la "naturaleza“, incluyendo el clima.
  - La relación entre el Estado, la comunidad y los ciudadanos se entiende de manera muy distinta desde culturas políticas diversas.

Racionalidad científica y racionalidad política

- **Tras el consenso científico no viene, de manera automática, el consenso político (la racionalidad política no es racionalidad científica).**
  - En la XV **Conferencia** Internacional **sobre** el **Cambio Climático** de **Copenhague**, **Dinamarca** (7-18 de diciembre de 2009) fue precedida por un amplio consenso científico.
  - Pero su resultado decepcionó por la ambigüedad de sus compromisos, y la dificultad para armonizar los intereses en conflicto, los valores y visiones del mundo que allí confluyeron.
  - Es iluso confiar en un gran consenso impulsado por la ciencia que "salvará a la humanidad“ de sus peores males.
- **RK Pachauri**, presidente del IPCC, **pidió acertadamente a los medios que se centren en la "justificación científica para la acción“, más que en los aspectos políticos** del debate sobre el clima.
  - Pero la ciencia en abstracto no nos dota de valores, de sentido de la responsabilidad ética, o de elementos utópicos para el futuro.
  - La política tiene la última palabra: Ahora se necesitan mejores políticas.

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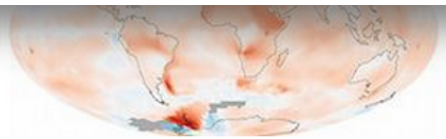
Sostenibilidad 23 de Octubre

EQUO denuncia la compra de derechos de emisión de CO2 a Polonia por 40 millones de euros



Para EQUO la lucha contra el cambio climático debe ser una prioridad, por lo que frente a estos acuerdos poco transparentes, reclama un Plan de acción contra el cambio climático que tenga como objetivo reducir emisiones.

Para EQUO la confirmación de que España un año más ha adquirido derechos de emisión de CO2 a Polonia, es un indicativo de la falta de compromiso de este gobierno con el cambio climático y su nula transparencia. En concreto, hace unas semanas se firmó un acuerdo hispano-polaco oficialmente centrado en la "reducción de manera verificable de sus gases de efecto", por el cual se compraba 100 millones de toneladas de derecho de emisión de CO2 a Polonia, lo que ha supuesto un desembolso de 40 millones de euros.

EQUO ha criticado, el secretismo del acuerdo y poca transparencia, ya que se ha intentado ocultar a la ciudadanía, así como el contenido del mismo.

Para EQUO, las afirmaciones del Ministro de Agricultura y Medio Ambiente de que "España avanza en el cumplimiento de reducción de nuestras emisiones en el marco del Protocolo de Kyoto" esconden otra mentira más, como queda demostrado con este acuerdo.

http://partidoequo.es/equo-denuncia-la-compra-de-derechos-de-emisi%C3%B3n-de-co2-polonia-por-40-millones-de-euros

Referencias

Referencias

- Alsan, Marcella M, Michael Westerhaus, Michael Herce, Koji Nakashima, and Paul E Farmer. “Poverty, Global Health, and Infectious Disease: Lessons from Haiti and Rwanda.” *Infectious Disease Clinics of North America* 25, no. 3 (September 2011): 611–622.
- Altizer, Sonia, Rebecca Bartel, and Barbara A Han. “Animal Migration and Infectious Disease Risk.” *Science* 331, no. 6015 (January 21, 2011): 296–302.
- Barker, Kezia. “Infectious Insecurities: H1N1 and the politics of emerging infectious disease.” *Health & Place* 18, no. 4 (July 2012): 695–700.
- Barnett, C. “Geography and ethics: Placing life in the space of reasons.” *Progress in Human Geography* 36, no. 3 (April 19, 2011): 379–388.
- Barnosky, Anthony D, Elizabeth A Hadly, Jordi Bascompte, Eric L Berlow, James H Brown, Mikael Fortelius, Wayne M Getz, et al. “Approaching a state shift in Earth/’s biosphere.” *Nature* 486, no. 7401 (June 7, 2012): 52–58.
- Behnassi, Mohamed, and Sanni Yaya. “Food Crisis Mitigation: The Need for an Enhanced Global Food Governance.” edited by Mohamed Behnassi, Sidney Draggan, and Sanni Yaya, 93–125. Springer Netherlands, 2011.
- Bezirtzoglou, Christos, Konstantinos Dekas, and Ekatherina Charvalos. “Climate changes, environment and infection: Facts, scenarios and growing awareness from the public health community within Europe.” *Anaerobe* 17, no. 6 (December 2011): 337–340.
- Birkmann, Jörn. “First- and second-order adaptation to natural hazards and extreme events in the context of climate change.” *Natural Hazards* 58, no. 2 (August 1, 2011): 811–840.
- Birkmann, Jörn. “First- and second-order adaptation to natural hazards and extreme events in the context of climate change.” *Natural Hazards* 58, no. 2 (August 1, 2011): 811–840.
- Birkmann, Jörn, Matthias Garschagen, Vo Tuan, and Nguyen Thanh Binh. “Vulnerability, Coping and Adaptation to Water Related Hazards in the Vietnamese Mekong Delta.” edited by Fabrice G Renaud and Claudia Kuenzer, 245–289. Springer Netherlands, 2012.
- Black, Robert, Fabio Fava, Niccolo Mattei, Vincent Robert, Susan Seal, and Valerie Verdier. “Case studies on the use of biotechnologies and on biosafety provisions in four African countries.” *Journal of Biotechnology* 156, no. 4 (December 20, 2011): 370–381.
- Blashki, Grant, Alan Abelsohn, Robert Woollard, Neil Arya, Margot Parkes, Paul Kendal, Erica Bell, and R Bell. “General Practitioners’ responses to global climate change - lessons from clinical experience and the clinical method.” *Asia Pacific Family Medicine* 11, no. 1 (December 1, 2012): 1–5.
- Briggs, Chad Michael, and Inka Weissbecker. “Security and Conflict: The Impact of Climate Change.” edited by Inka Weissbecker, 97–116. Springer New York, 2011.
- Brown, Tim. “‘Vulnerability is universal’: Considering the place of ‘security’ and ‘vulnerability’ within contemporary global health discourse.” *Social Science & Medicine* 72, no. 3 (February 2011): 319–326.

Referencias

- Brown, Tim. "'Vulnerability is universal': Considering the place of 'security' and 'vulnerability' within contemporary global health discourse." *Social Science & Medicine* 72, no. 3 (February 2011): 319–326.
- Bryant, John H, and Anvar Velji. "Global Health and the Role of Universities in the Twenty-First Century." *Infectious Disease Clinics of North America* 25, no. 2 (June 2011): 311–321.
- Chen, I-Ching, Jane K Hill, Ralf Ohlemüller, David B Roy, and Chris D Thomas. "Rapid Range Shifts of Species Associated with High Levels of Climate Warming." *Science* 333, no. 6045 (August 19, 2011): 1024–1026.
- Cobb, A, and M S Carolan. "Public attitudes to climate change: Their origins and significance in mitigation and adaptation." *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources* 6, no. 2 (2011).
- Coker, Richard J, Benjamin M Hunter, James W Rudge, Marco Liverani, and Piya Hanvoravongchai. "Emerging infectious diseases in southeast Asia: regional challenges to control." *The Lancet* 377, no. 9765 (February 18, 2011): 599–609.
- Confalonieri, U E C, and M A Effen. "Overview of How Ecosystem Changes Can Affect Human Health." edited by Editor-in-Chief: Jerome O Nriagu B T - Encyclopedia of Environmental Health, 291–299. Burlington: Elsevier, 2011.
- Cote, M., and a. J. Nightingale. "Resilience thinking meets social theory: Situating social change in socio-ecological systems (SES) research." *Progress in Human Geography* 36, no. 4 (December 2, 2011): 475–489.
- Deckelbaum, Richard J, James M Ntambi, and Debra J Wolgemuth. "Basic Science Research and Education: A Priority for Training and Capacity Building in Developing Countries." *Infectious Disease Clinics of North America* 25, no. 3 (September 2011): 669–676.
- Diaz, J H. "Global Climate Changes and International Trade and Travel: Effects on Human Health Outcomes." edited by Editor-in-Chief: Jerome O Nriagu B T - Encyclopedia of Environmental Health, 965–975. Burlington: Elsevier, 2011.
- Eastin, Josh, Reiner Grundmann, and Aseem Prakash. "The two limits debates: 'Limits to Growth' and climate change." *Futures* 43, no. 1 (February 2011): 16–26.
- Ellenwood, Mikaela, Lisa Dilling, and Jana Milford. "Managing United States Public Lands in Response to Climate Change: A View From the Ground Up." *Environmental Management* 49, no. 5 (May 1, 2012): 954–967.
- Ewald, Paul. "Evolution of virulence, environmental change, and the threat posed by emerging and chronic diseases." *Ecological Research* 26, no. 6 (November 1, 2011): 1017–1026.
- Falagas, Matthew E, Ioannis A Bliziotis, John Kosmidis, and George K Daikos. "Unusual climatic conditions and infectious diseases: observations made by Hippocrates." *Enfermedades Infecciosas y Microbiología Clínica* 28, no. 10 (December 2010): 716–718.
- Feldbaum, Harley, Kelley Lee, and Joshua Michaud. "Global Health and Foreign Policy." *Epidemiologic Reviews* 32, no. 1 (April 1, 2010): 82–92.
- Fisher, Matthew C, Daniel. A Henk, Cheryl J Briggs, John S Brownstein, Lawrence C Madoff, Sarah L McCraw, and Sarah J Gurr. "Emerging fungal threats to animal, plant and ecosystem health." *Nature* 484, no. 7393 (April 12, 2012): 186–194.

Referencias

- Eastin, Josh, Reiner Grundmann, and Aseem Prakash. “The two limits debates: ‘Limits to Growth’ and climate change.” *Futures* 43, no. 1 (February 2011): 16–26.
- Ellenwood, Mikaela, Lisa Dilling, and Jana Milford. “Managing United States Public Lands in Response to Climate Change: A View From the Ground Up.” *Environmental Management* 49, no. 5 (May 1, 2012): 954–967.
- Ewald, Paul. “Evolution of virulence, environmental change, and the threat posed by emerging and chronic diseases.” *Ecological Research* 26, no. 6 (November 1, 2011): 1017–1026.
- Falagas, Matthew E, Ioannis A Bliziotis, John Kosmidis, and George K Daikos. “Unusual climatic conditions and infectious diseases: observations made by Hippocrates.” *Enfermedades Infecciosas y Microbiología Clínica* 28, no. 10 (December 2010): 716–718.
- Feldbaum, Harley, Kelley Lee, and Joshua Michaud. “Global Health and Foreign Policy.” *Epidemiologic Reviews* 32, no. 1 (April 1, 2010): 82–92.
- Fisher, Matthew C, Daniel. A Henk, Cheryl J Briggs, John S Brownstein, Lawrence C Madoff, Sarah L McCraw, and Sarah J Gurr. “Emerging fungal threats to animal, plant and ecosystem health.” *Nature* 484, no. 7393 (April 12, 2012): 186–194.
- Ford, James D, Lea Berrang-Ford, Malcolm King, and Chris Furgal. “Vulnerability of Aboriginal health systems in Canada to climate change.” *Global Environmental Change* 20, no. 4 (October 2010): 668–680.
- ———. “Globalization and Infectious Diseases.” *Infectious Disease Clinics of North America* 25, no. 3 (September 2011): 593–599.
- Frieden, Thomas R. “Centers for Disease Control and Prevention_2013”, 2012.
- Garg, Nisha Jain. “Global Health: Neglected Diseases and Access to Medicines.” *Infectious Disease Clinics of North America* 25, no. 3 (September 2011): 639–651.
- Greenhalgh, Trisha. “Global health and primary care: building capacity.” *InnovAiT* 5, no. 8 (August 1, 2012): 456–461.
- Hanlon, Phil, Sandra Carlisle, Margaret Hannah, Andrew Lyon, and David Reilly. “Learning our way into the future public health: a proposition.” *Journal of Public Health Medicine* 33, no. 3 (September 1, 2011): 335–342.
- Hasnain, Seyed E, Bärbel Friedrich, Thomas Mettenleiter, Ulrich Dobrindt, and Jörg Hacker. “Climate change and infectious diseases – Impact of global warming and climate change on infectious diseases: Myth or reality?” *International Journal of Medical Microbiology* 302, no. 1 (January 2012): 1–3.
- Hoffman, A J. “Talking past each other? cultural framing of skeptical and convinced logics in the climate change debate.” *Organization and Environment* 24, no. 1 (2011): 3–33.

Referencias

- Horwitz, Pierre, Lucilla Spini, Kathryn Campbell, R J Thomas, and Jo Mulongoy. “The relationship between water, health and global environmental change, as interpreted through five key Multilateral Environmental Agreements (MEAs).” *Current Opinion in Environmental Sustainability* 3, no. 6 (December 2011): 520–526.
- Iglesias, A., S. Quiroga, and A. Diz. “Looking into the future of agriculture in a changing climate.” *European Review of Agricultural Economics* 38, no. 3 (July 19, 2011): 427–447.
- Iverson, Terrence, and Charles Perrings. “Precaution and proportionality in the management of global environmental change.” *Global Environmental Change* 22, no. 1 (February 2012): 161–177.
- Jerneck, Anne, and Lennart Olsson. “Breaking out of sustainability impasses: How to apply frame analysis, reframing and transition theory to global health challenges.” *Environmental Innovation and Societal Transitions* 1, no. 2 (December 2011): 255–271.
- Kan, Haidong, Renjie Chen, and Shilu Tong. “Ambient air pollution, climate change, and population health in China.” *Environment International* 42, no. 0 (July 2012): 10–19.
- Karanja, Diana, Susan J Elliott, and Sascha Gabizon. “Community level research on water health and global change: where have we been? Where are we going?” *Current Opinion in Environmental Sustainability* 3, no. 6 (December 2011): 467–470.
- Kelley, Patrick W. “Global Health: Governance and Policy Development.” *Infectious Disease Clinics of North America* 25, no. 2 (June 2011): 435–453.
- Keune, Hans. “Critical complexity in environmental health practice: simplify and complexify.” *Environmental health : a global access science source* 11 Suppl 1 (January 2012): S19.
- Kickbusch, Ilona, and Paulo Buss. “Global Health Diplomacy and Peace.” *Infectious Disease Clinics of North America* 25, no. 3 (September 2011): 601–610.
- Kilpatrick, A Marm. “Globalization, Land Use, and the Invasion of West Nile Virus.” *Science* 334, no. 6054 (October 21, 2011): 323–327.

Referencias

- Kishore, Sandeep, Karen R Siegel, Bridget Kelly, Rajesh Vedanthan, Mohammed K Ali, Jeffrey Koplan, K M Venkat Narayan, and Valentin Fuster. “Preparing the University Community to Respond to 21st Century Global Public Health Needs.” *Global Heart* 6, no. 4 (December 2011): 183–190.
- Koehlmoos, Tracey Pérez, Shahela Anwar, and Alejandro Cravioto. “Global Health: Chronic Diseases and Other Emergent Issues in Global Health.” *Infectious Disease Clinics of North America* 25, no. 3 (September 2011): 623–638.
- Kovats, R S, and C D Butler. “Global health and environmental change: linking research and policy.” *Current Opinion in Environmental Sustainability* 4, no. 1 (February 2012): 44–50.
- Kythreotis, A. P. “Progress in global climate change politics? Reasserting national state territoriality in a ‘post-political’ world.” *Progress in Human Geography* 36, no. 4 (December 7, 2011): 457–474.
- Larsen, Rasmus Kløcker, Åsa Gerger Swartling, Neil Powell, Brad May, Ryan Plummer, Louise Simonsson, and Maria Osbeck. “A framework for facilitating dialogue between policy planners and local climate change adaptation professionals: Cases from Sweden, Canada and Indonesia.” *Environmental Science & Policy* 23, no. 0 (November 2012): 12–23.
- Leach, Melissa, Ian Scoones, and Andrew Stirling. “Governing epidemics in an age of complexity: Narratives, politics and pathways to sustainability.” *Global Environmental Change* 20, no. 3 (August 2010): 369–377.
- Leatherman, Sheila, Marcia Metcalfe, Kimberley Geissler, and Christopher Dunford. “Integrating microfinance and health strategies: examining the evidence to inform policy and practice.” *Health policy and planning* 27, no. 2 (March 2012): 85–101.

Referencias

- ———. “Integrating microfinance and health strategies: examining the evidence to inform policy and practice.” *Health policy and planning* 27, no. 2 (March 2012): 85–101.
- Leemans, Rik, Martin Rice, Ann Henderson-Sellers, and Kevin Noone. “Research Agenda and Policy Input of the Earth System Science Partnership for Coping with Global Environmental Change.” edited by Hans Günter Brauch, Úrsula Oswald Spring, Czeslaw Mesjasz, John Grin, Patricia Kameri-Mbote, Béchir Chourou, Pál Dunay, and Jörn Birkmann, 5:1205–1220. Springer Berlin Heidelberg, 2011.
- Lemons, John. “The Urgent Need for Universities to Comprehensively Address Global Climate Change Across Disciplines and Programs.” *Environmental Management* 48, no. 3 (September 1, 2011): 379–391.
- Lindgren, Elisabet, Yvonne Andersson, Jonathan E Suk, Bertrand Sudre, and Jan C Semenza. “Monitoring EU emerging infectious disease risk due to climate change.” *Science* 336, no. 6080 (April 27, 2012): 418–9.
- Lynch, Garry W, Paul Selleck, W Bret Church, and John S Sullivan. “Seasoned adaptive antibody immunity for highly pathogenic pandemic influenza in humans.” *Immunol Cell Biol* 90, no. 2 (February 2012): 149–158.
- Lynn, Kathy, Katharine Mackendrick, and Ellen M Donoghue. “Social Vulnerability and Climate Change: Synthesis of Literature.” *GENERAL TECHNICAL REPORT PNW-GTR-838, August 2011*, 2011. http://www.fs.fed.us/pnw/pubs/pnw_gtr838.pdf.
- Mackey, Tim K., and Bryan a. Liang. “A United Nations Global Health Panel for Global Health Governance.” *Social Science & Medicine* (October 2012).
- Maller, Cecily J, and Yolande Strengers. “Housing, heat stress and health in a changing climate: promoting the adaptive capacity of vulnerable households, a suggested way forward.” *Health Promotion International* 26, no. 4 (December 1, 2011): 492–498.
- Margai, Florence M, and Fatoumata B Barry. “Global Geographies of Environmental Injustice and Health: A Case Study of Illegal Hazardous Waste Dumping in Côte d’Ivoire.” edited by Juliana A Maantay and Sara McLafferty, 4:257–281. Springer Netherlands, 2011.
- Martin, Robert, and Scott Barnhart. “Global Laboratory Systems Development: Needs and Approaches.” *Infectious Disease Clinics of North America* 25, no. 3 (September 2011): 677–691.
- Massad, Eduardo, Francisco Antonio Bezerra Coutinho, Luis Fernandez Lopez, and Daniel Rodrigues da Silva. “Modeling the impact of global warming on vector-borne infections.” *Physics of Life Reviews* 8, no. 2 (June 2011): 169–199.
- Messner, Steven, Sandra Miranda, Emily Young, and Nicola Hedge. “Climate change-related impacts in the San Diego region by 2050.” *Climatic Change* 109, no. 0 (December 1, 2011): 505–531.
- Methmann, C., and D. Rothe. “Politics for the day after tomorrow: The logic of apocalypse in global climate politics.” *Security Dialogue* 43, no. 4 (August 15, 2012): 323–344.

Referencias

- Mulligan, K, S J Elliott, and C Schuster-Wallace. “The place of health and the health of place: Dengue fever and urban governance in Putrajaya, Malaysia.” *Health & Place* 18, no. 3 (May 2012): 613–620.
- Murray, Emma J, Virginia A Bond, Ben J Marais, Peter Godfrey-Faussett, Helen M Ayles, and Nulda Beyers. “High levels of vulnerability and anticipated stigma reduce the impetus for tuberculosis diagnosis in Cape Town, South Africa.” *Health Policy and Planning* (September 2, 2012): czs072.
- Myers, S S, and J Patz. “Land Use Change and Human Health.” edited by Editor-in-Chief: Jerome O Nriagu B T - Encyclopedia of Environmental Health, 396–404. Burlington: Elsevier, 2011.
- Nordgren, Anders. “Ethical Issues in Mitigation of Climate Change: The Option of Reduced Meat Production and Consumption.” *Journal of Agricultural and Environmental Ethics* 25, no. 4 (August 1, 2012): 563–584.
- Oels, Angela. “From ‘Securitization’ of Climate Change to ’Climatization‘ of the Security Field: Comparing Three Theoretical Perspectives.” edited by Jürgen Scheffran, Michael Brzoska, Hans Günter Brauch, Peter Michael Link, and Janpeter Schilling, 8:185–205. Springer Berlin Heidelberg, 2012.
- Pascal, M, A C Viso, S Medina, M C Delmas, and P Beaudeau. “How can a climate change perspective be integrated into public health surveillance?” *Public Health* 126, no. 8 (August 2012): 660–667.
- Patrick, Rebecca, Teresa Capetola, Mardie Townsend, and Sonia Nuttman. “Health promotion and climate change: exploring the core competencies required for action.” *Health Promotion International* (September 12, 2011): dar055.
- Peeling, Rosanna W, and Solomon Nwaka. “Drugs and Diagnostic Innovations to Improve Global Health.” *Infectious Disease Clinics of North America* 25, no. 3 (September 2011): 693–705.
- Pesce, Julianna E, Chinwe S Kpaduwa, and Marion Danis. “Deliberation to enhance awareness of and prioritize socioeconomic interventions for health.” *Social Science & Medicine* 72, no. 5 (March 2011).
- Piguet, Etienne, Pecoud Antoine, and Paul de Guchteneire. “Migration and Climate Change: An Overview.” *Refugee Survey Quarterly* 30, no. 3 (September 1, 2011): 1–23.
- Poland, Blake, Mark Dooris, and Randolph Haluza-Delay. “Securing ‘supportive environments’ for health in the face of ecosystem collapse: meeting the triple threat with a sociology of creative transformation.” *Health promotion international* 26 Suppl 2 (December 2011): ii202–15.
- Polley, Lydden, Eric Hoberg, and Susan Kutz. “Climate change, parasites and shifting boundaries.” *Acta Veterinaria Scandinavica* 52, no. Suppl 1 (2010): S1.

Referencias

- Preston, Benjamin L., Emma J. Yuen, and Richard M. Westaway. “Putting vulnerability to climate change on the map: a review of approaches, benefits, and risks.” *Sustainability Science* 6, no. 2 (March 24, 2011): 177–202.
- Rappuoli, Rino, and Alan Aderem. “A 2020 vision for vaccines against HIV, tuberculosis and malaria.” *Nature* 473, no. 7348 (May 26, 2011): 463–469.
- Rees, William E. “Cities as Dissipative Structures: Global Change and the Vulnerability of Urban Civilization.” edited by Michael P Weinstein and R Eugene Turner, 247–273. Springer New York, 2012.
- Riemer, Manuel, and Stephanie Reich. “Community Psychology and Global Climate Change: Introduction to the Special Section.” *American Journal of Community Psychology* 47, no. 3 (June 1, 2011): 349–353.
- Rindermann, Heiner. “Intellectual classes, technological progress and economic development: The rise of cognitive capitalism.” *Personality and Individual Differences* 53, no. 2 (July 2012): 108–113.
- Robards, Martin D, Michael L Schoon, Chanda L Meek, and Nathan L Engle. “The importance of social drivers in the resilient provision of ecosystem services.” *Global Environmental Change* 21, no. 2 (May 2011): 522–529.
- Rubayet, Sayed, Mohammad Shahidullah, Altaf Hossain, Erica Corbett, Allisyn C Moran, Imteaz Mannan, Ziaul Matin, et al. “Newborn survival in Bangladesh: a decade of change and future implications.” *Health Policy and Planning* 27, no. suppl_3 (July 1, 2012): iii40–56.
- Schwartz, Jason L, and Arthur L Caplan. “Vaccination Refusal: Ethics, Individual Rights, and the Common Good.” *Primary Care: Clinics in Office Practice* 38, no. 4 (December 2011): 717–728.
- Shindell, Drew, Johan C I Kuylenstierna, Elisabetta Vignati, Rita van Dingenen, Markus Amann, Zbigniew Klimont, Susan C Anenberg, et al. “Simultaneously Mitigating Near-Term Climate Change and Improving Human Health and Food Security.” *Science* 335, no. 6065 (January 13, 2012): 183–189.
- Sunyer, Jordi. “[Health promotion and climate change].” *Gaceta sanitaria* 24, no. 2 (2012): 101–2.
- Tirado, M C, R Clarke, L A Jaykus, A McQuatters-Gollop, and J M Frank. “Climate change and food safety: A review.” *Food Research International* 43, no. 7 (August 2010): 1745–1765.
- UNEP Report 2012. *21 Issues for the 21 Century Results of the UNEP Foresight Process on*. Nairobi, 2012.
- Velji, Anvar, and John H Bryant. “Global Health: Evolving Meanings.” *Infectious Disease Clinics of North America* 25, no. 2 (June 2011): 299–309.
- Velji, Anvar. “Editorial: Transforming Global Health, Global Health Education, Infectious Disease, and Chronic Conditions in the 21st Century.” *Infectious Disease Clinics of North America* 25, no. 3 (September 2011): 485–498.
- ———. “Global Health, Global Health Education, and Infectious Disease: The New Millennium, Part II.” *Infectious Disease Clinics of North America* 25, no. 3 (September 2011): xiii–xxii.

Referencias

- ———. “Global Health, Global Health Education, and Infectious Disease: The New Millennium, Part II.” *Infectious Disease Clinics of North America* 25, no. 3 (September 2011): xiii–xxii.
- White, Rob. “The Criminology of Climate Change.” edited by Rob White, 1–11. Springer New York, 2012.
- Willen, Sarah S. “How is health-related ‘deservingness’ reckoned? Perspectives from unauthorized im/migrants in Tel Aviv.” *Social Science & Medicine* 74, no. 6 (March 2012): 812–821.
- ———. “Migration, ‘illegality,’ and health: Mapping embodied vulnerability and debating health-related deservingness.” *Social Science & Medicine* 74, no. 6 (March 2012): 805–811.
- Winans, Bethany, Michael C Humble, and B Paige Lawrence. “Environmental toxicants and the developing immune system: A missing link in the global battle against infectious disease?” *Reproductive Toxicology* 31, no. 3 (April 2011): 327–336.

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