Planetary Health: Bridging Science to Policy

Montira Pongsiri, PhD, MPH
mjp329@cornell.edu
5 May 2017

What is Planetary Health?

> “Put simply, planetary health is the health of human civilisation and the state of the natural systems on which it depends.”

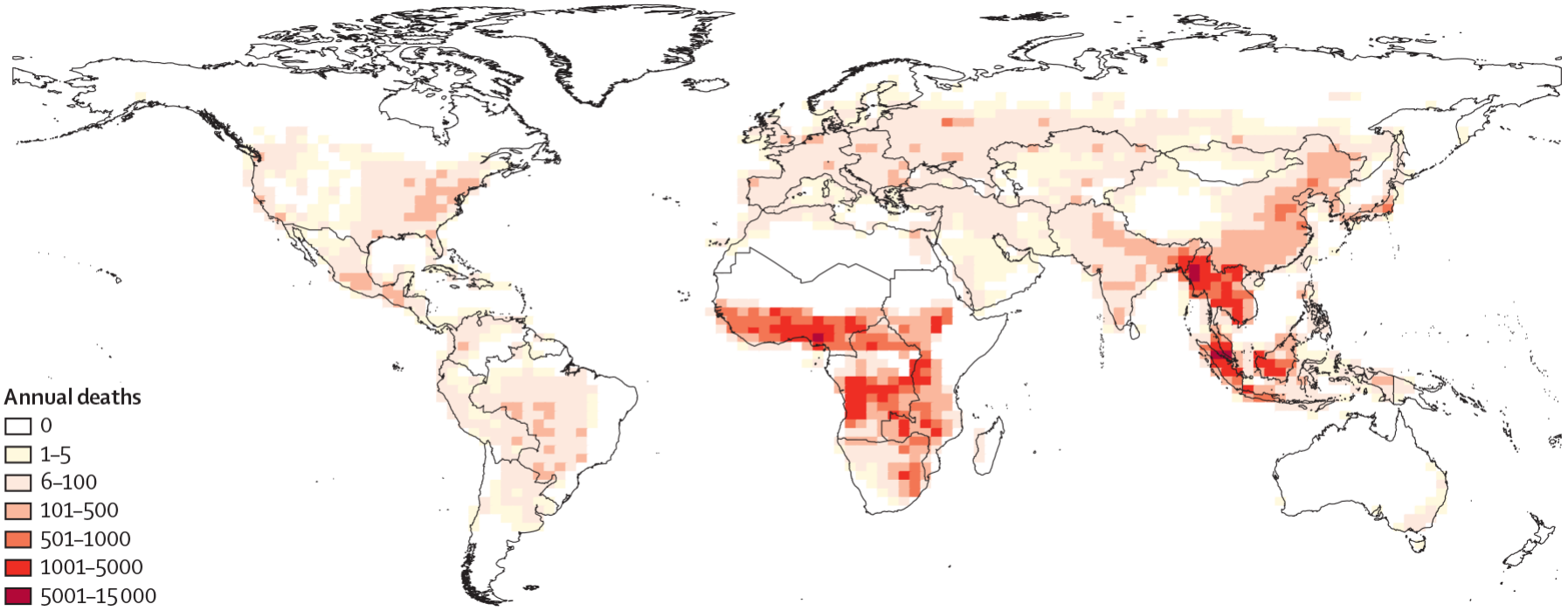
- **Significant gains in health and development likely to be reversed by global environmental changes**
- **Losses can be minimized**

Image: Globaïa

SCIENCE POLICY

- Education/awareness raising among decision and policy makers;
- Identifying their science needs to address key policy gaps and needs;
- Identifying decision support tools (system dynamics models, HIA/EIA) already in use which could be enhanced with environmental change-human health data; and,
- Strategic partnering with other groups working on science to policy application to share experiences and further develop and document best practices on science policy engagement.

Annual average global mortality (1997–2006) due to Landscape fire smoke

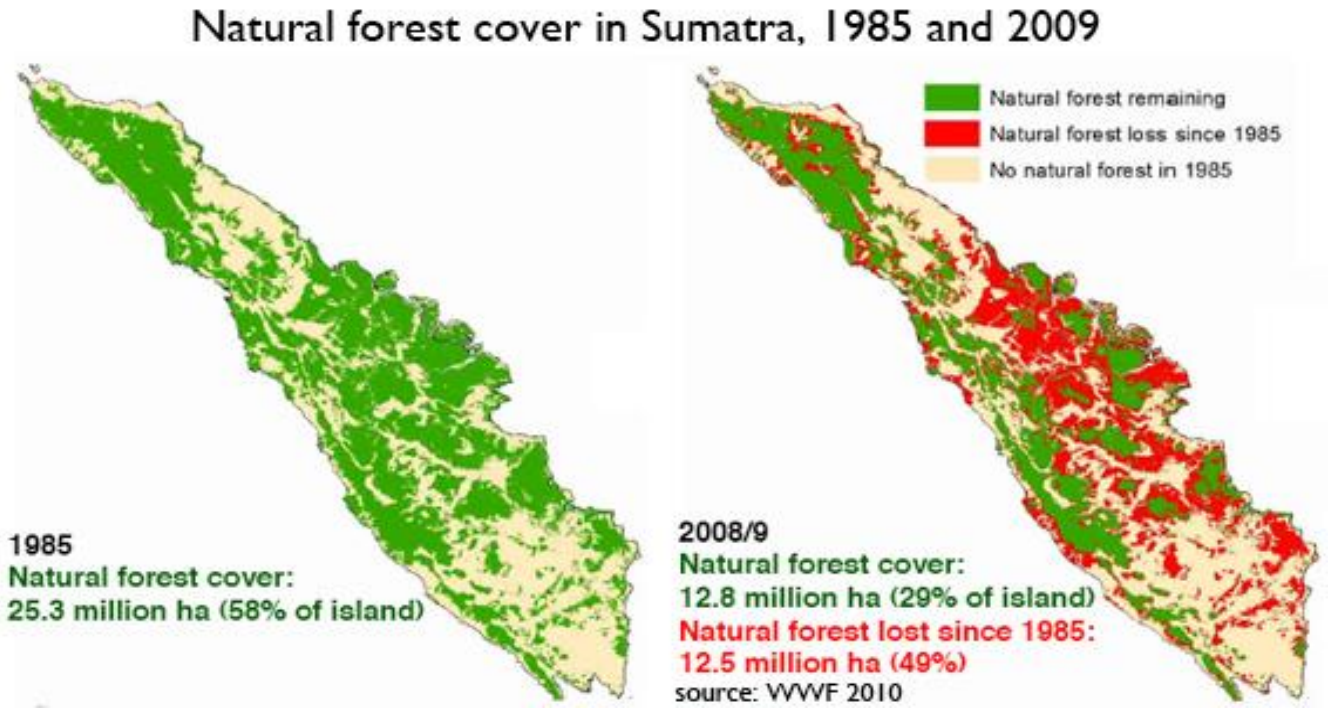


Reproduced from Johnston and colleagues 2012;, by permission of Environmental Health Perspectives.

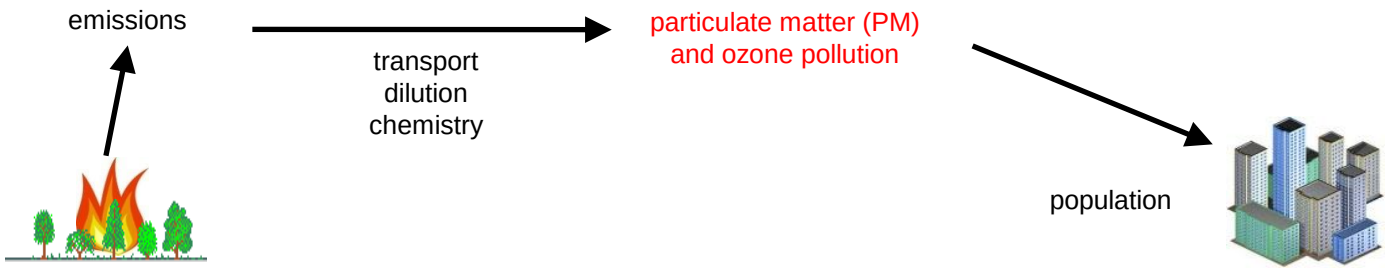
Trends in Equatorial Asia

Southeast Asia has the highest relative rate of deforestation of any major tropical region, and by 2100, could lose:

- Three quarters of its original forests
- Up to 42% of its biodiversity
- (Over half the mammals, plants, amphibians and reptiles in the region are endemic)



Model current patterns of land-use, emissions, transport, and exposures



A farmer in Indonesia clearing rainforest for planting

Haze over Singapore skyline linked to Illegal forest clearing by fire in Indonesia

IOP Publishing Environ. Res. Lett. 11 (2016) 094023 doi:10.1088/1748-9326/11/9/094023

Environmental Research Letters

CrossMark

OPEN ACCESS

RECEIVED
29 January 2016

REVISED
20 July 2016

ACCEPTED FOR PUBLICATION
29 July 2016

PUBLISHED
19 September 2016

LETTER

Public health impacts of the severe haze in Equatorial Asia in September–October 2015: demonstration of a new framework for informing fire management strategies to reduce downwind smoke exposure

Shannon N Koplitz[1,9], Loretta J Mickley[2], Miri...
Tianjia Liu[5], Melissa P Sul...
Samuel S...

...SA

... USA
...ment, Harvard University, Cambri...
... correspondence should be addressed.

E-mail: skoplitz@fas.harvard.edu

Keywords: land use change fires, smoke exposure, GEOS-chem adjoint

Supplementary material for this article is available online

The New York Times

ASIA PACIFIC

Blazes in Southeast Asia May Have Led to Deaths of Over 100,000, Study Says

By JOE COCHRANE SEPT. 19, 2016

The Jakarta Post

Thursday, Sep 22, 2016 | Video | 26°C

NEWS BUSINESS SE ASIA COMMUNITY OPINION LIFE TRAVEL MUL...
POLITICS WORLD NATIONAL CITY

PAPER EDITION • TODAY'S PAPER

Haze caused thousands of deaths in RI in 2015: Study

Abstract

In September–October 2015, El Niño and positive Indian Ocean Dipole conditions set the stage for massive fires in Sumatra and Kalimantan (Indonesian Borneo), leading to persistently hazardous levels of smoke pollution across much of Equatorial Asia. Here we quantify the emission sources and health impacts of this haze episode and compare the sources and impacts to an event of similar magnitude occurring under similar meteorological conditions in September–October 2006. Using the adjoint of the GEOS-Chem chemical transport model, we first calculate the influence of potential fire emissions across the domain on smoke concentrations in three receptor areas downwind—Indonesia, Malaysia, and Singapore—during the 2006 event. This step maps the sensitivity of each receptor to fire emissions in each grid cell upwind. We then combine these sensitivities with 2006 and 2015 fire emission inventories from the Global Fire...

Developing sustainable and healthy cities

Active travel /public transport

Reduced fine particulate air pollution

Green spaces –biodiversity, reduced heat island and mental health benefits

Watershed conservation

Access to healthy food

Increased resilience to floods, storms and droughts

Engaging in planetary health science policy: what will it take to bridge the science-policy gap?

- **availability and quality of data**
- **Who is your policy partner – capacity, clear understanding of science needs, science to decision pathway, strong stakeholder relationships**
- **What types of decisions could be optimized by integrating environment and health?**
- **Identifying which existing decision support tools/approaches in use by policymakers could be enhanced with planetary health science, and how**
- **Transferability** of results to other places experiencing similar environmental changes
- Addresses **environmental justice**, most vulnerable populations
- **Political and legal considerations (not barriers but opportunities)**
- How is the science/technical community prepared to support – technical assistance, training?

Summary

- Aim: **leverage human health for ecosystem protection and biodiversity conservation**
- Collaboration opportunities:

1. develop and share case studies demonstrating applied environmental change-health science for impact
2. Build on existing tools like HIA and EIA
3. partner on new or ongoing research projects beginning with your science needs for policy; demonstrate and share best practices learned from doing **applied interdisciplinary science** linking global environmental changes and health
4. Develop and test methodologies for integration of data and analyses across disciplines (ecology, health, economics, spatial mapping, behavioral science)
   - Approaches to decision support (systems based, participatory)

“We have lived our lives by the assumption that what was good for us would be good for the world. We have been wrong. We must change our lives so that it will be possible to live by the contrary assumption, what is good for the world will be good for us. And that requires that we make the effort to know the world and learn what is good for it.”

Wendell Berry. From The Long Legged House (1969).

Links with health

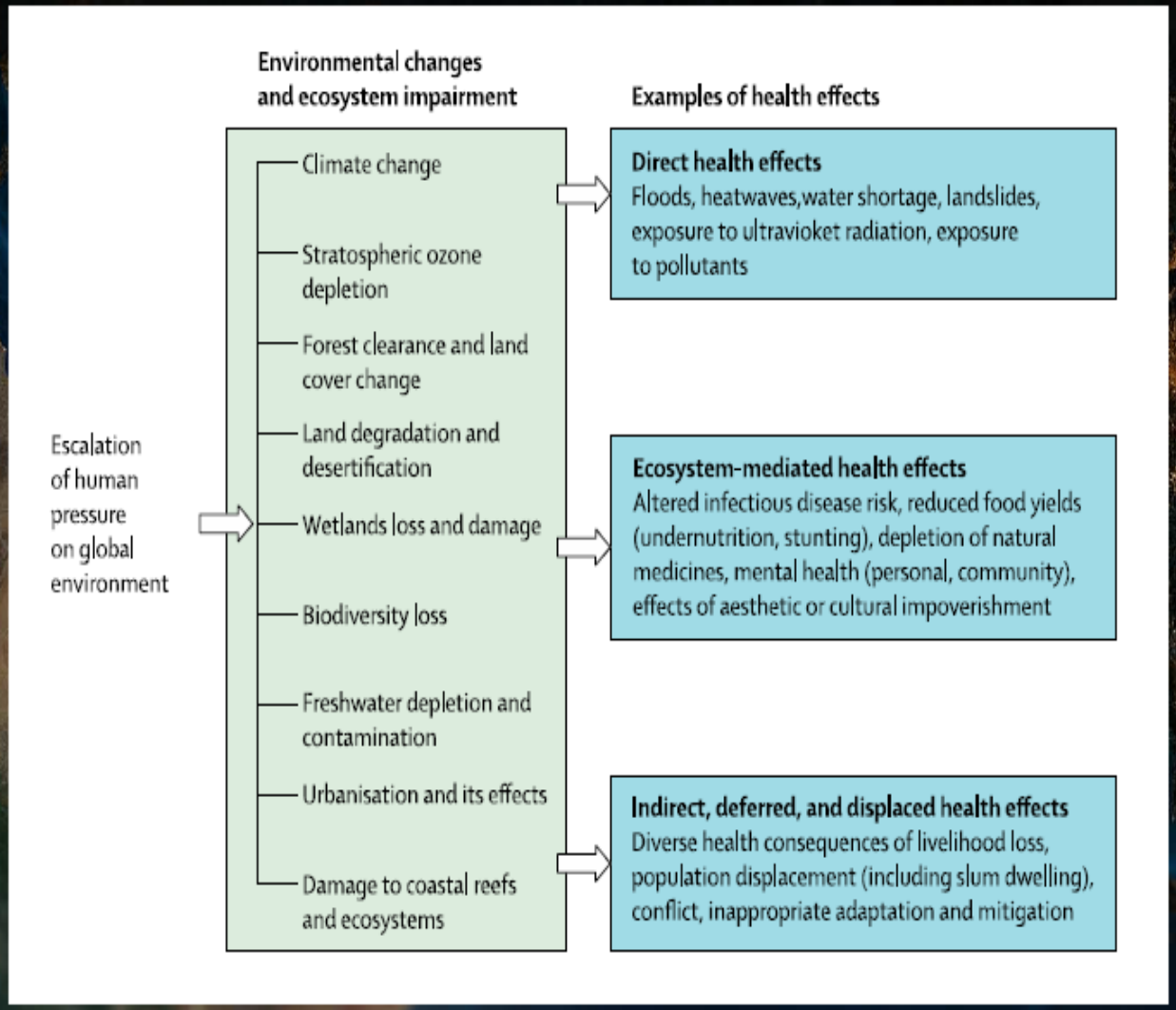
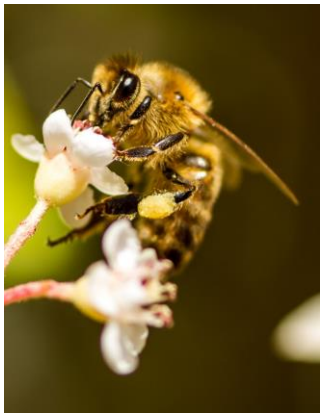


Image: Glo

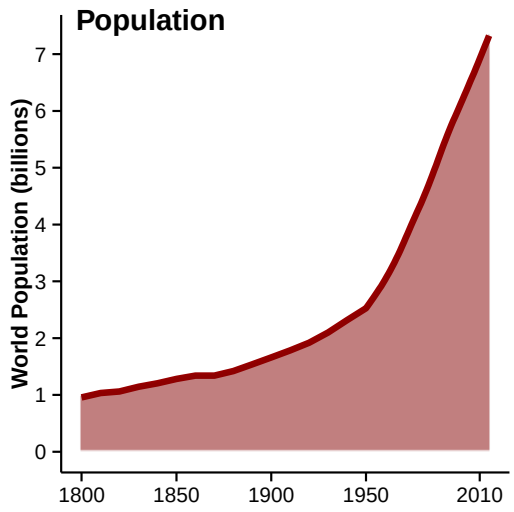
Effects of multiple environmental changes on food availability and quality

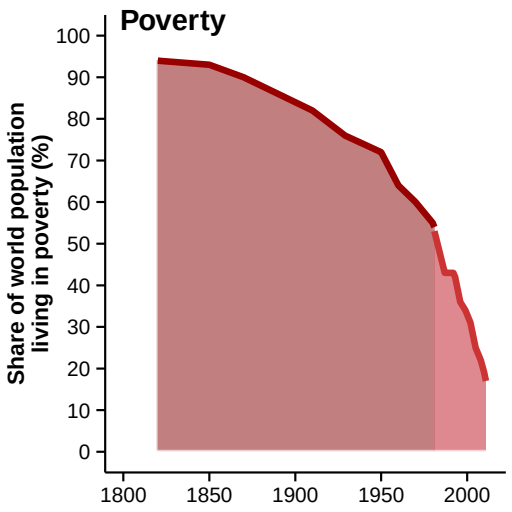


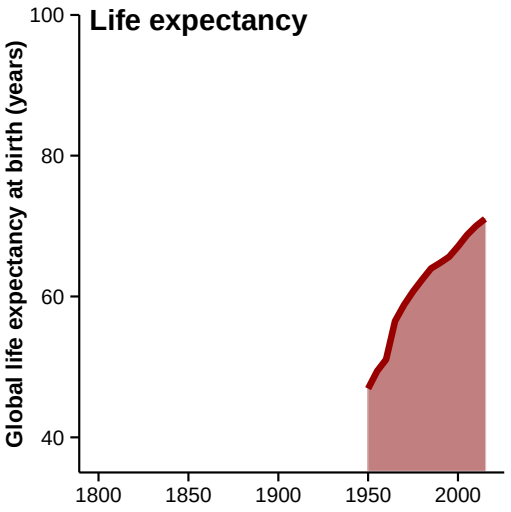
Land degradation and soil erosion
Water scarcity (from overconsumption, diversion to non-food crops, climate change and changes to ecosystem function)
Loss of pollinators
Overfishing/Ocean acidification
Climate change

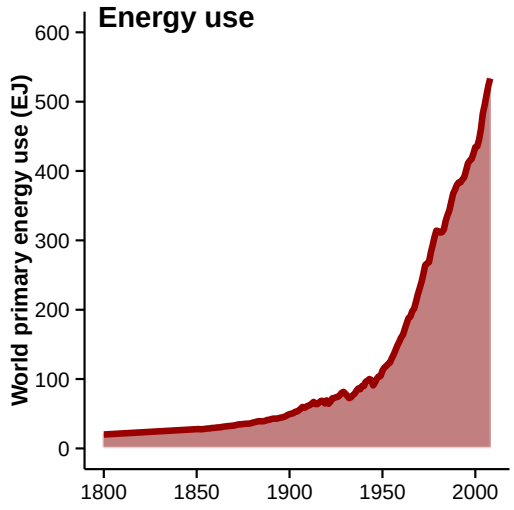
- **Temperature/extreme events**
- **CO_2 fertilization**
- **Ozone**
- **Pests, mold and fungi**

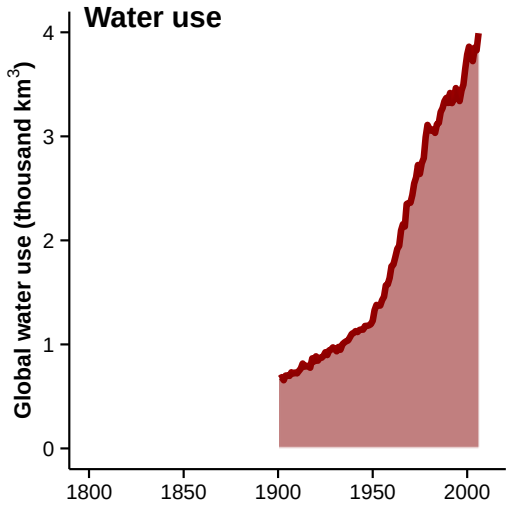

The ROCKEFELLER FOUNDATION
THE LANCET
Commission on Planetary Health
Image: Globaïa

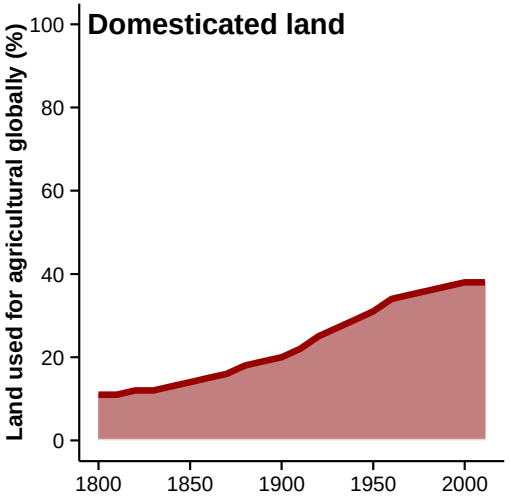

Population
World Population (billions)
0
1
2
3
4
5
6
7
1800
1850
1900
1950
2010

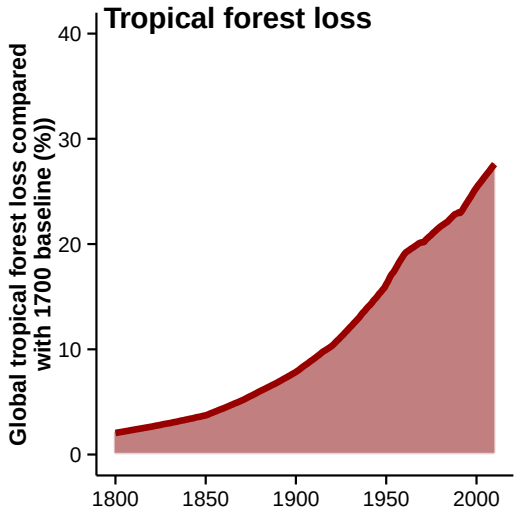

Poverty
Share of world population living in poverty (%)
0
10
20
30
40
50
60
70
80
90
100
1800
1850
1900
1950
2000

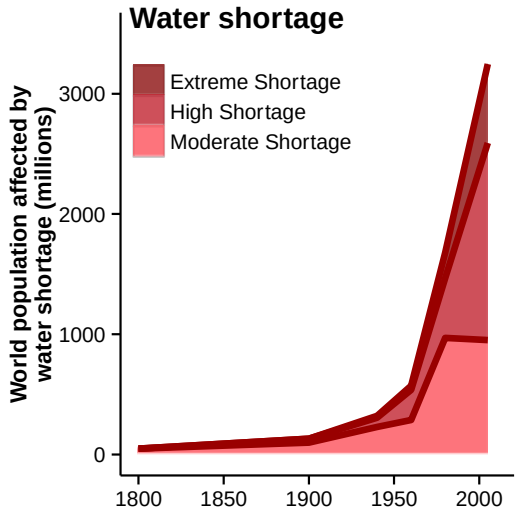

Life expectancy
Global life expectancy at birth (years)
40
60
80
100
1800
1850
1900
1950
2000

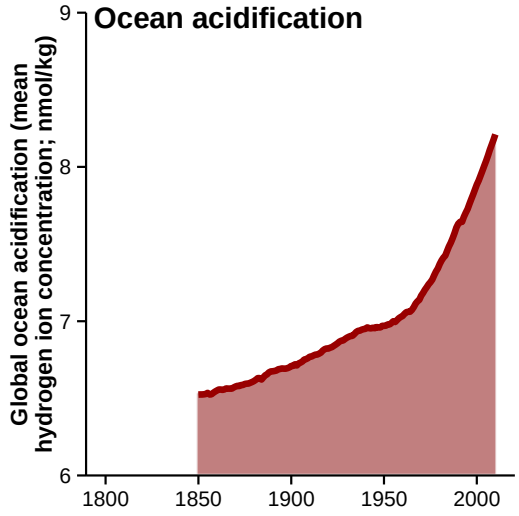

Energy use
World primary energy use (EJ)
0
100
200
300
400
500
600
1800
1850
1900
1950
2000

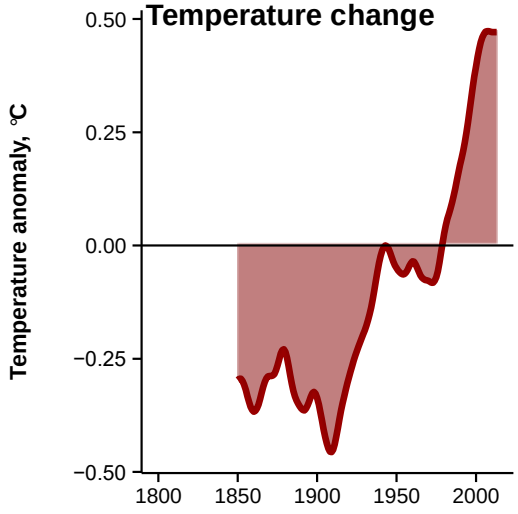

Water use
Global water use (thousand km3)
0
1
2
3
4
1800
1850
1900
1950
2000

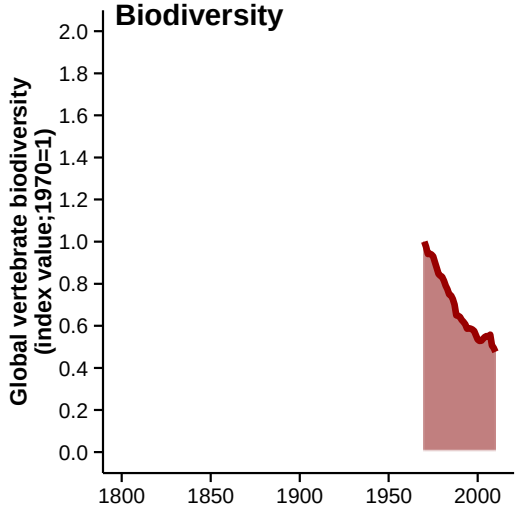

Domesticated land
Land used for agricultural globally (%)
0
20
40
60
80
100
1800
1850
1900
1950
2000


Tropical forest loss
Global tropical forest loss compared with 1700 baseline (%))
0
10
20
30
40
1800
1850
1900
1950
2000


Water shortage
World population affected by water shortage (millions)
Extreme Shortage
High Shortage
Moderate Shortage
0
1000
2000
3000
1800
1850
1900
1950
2000


Ocean acidification
Global ocean acidification (mean hydrogen ion concentration; nmol/kg)
6
7
8
9
1800
1850
1900
1950
2000


Temperature change
Temperature anomaly, °C
−0.50
−0.25
0.00
0.25
0.50
1800
1850
1900
1950
2000


Biodiversity
Global vertebrate biodiversity (index value;1970=1)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
1800
1850
1900
1950
2000