

# Ecological Debt: Social (In)Justice, Overshoot and Looming Tipping Points

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*People Building a Future Without Waste*

GreenAccord 2013

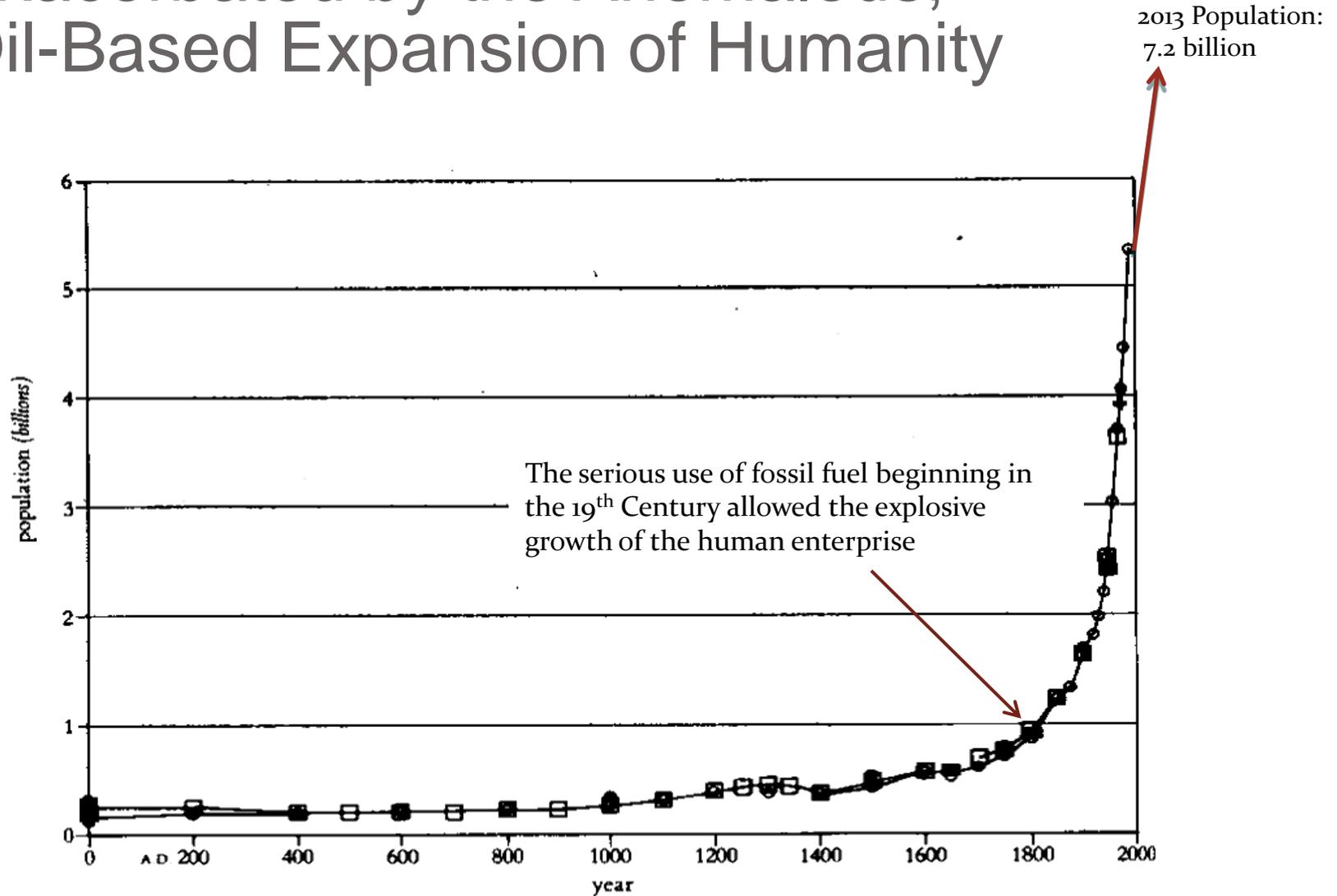
Naples, Italy (6-9 November 2013)

# On Ecological Debt

A legacy of dominance by some humans over nature and other people:

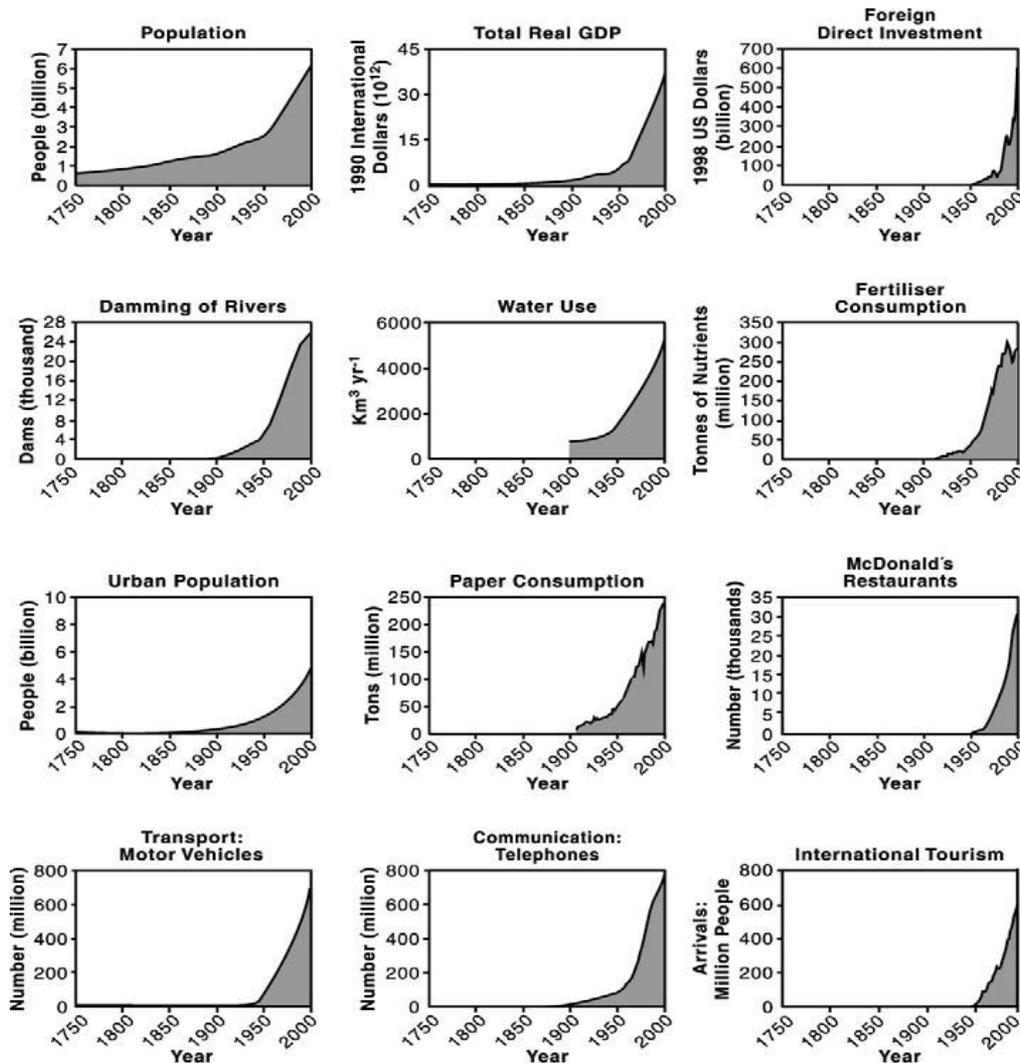
- ❑ “We must find new lands from which we can easily obtain raw materials and at the same time exploit cheap slave labour that is available from the natives of the colonies. The colonies would also provide a dumping ground for the surplus goods produced in our factories” (Cecil Rhodes, 1853-1902 [disputed]).
- ❑ Friends of the Earth International defines ecological debt as “rich countries’ legacy of resource plundering, biodiversity loss, environmental damage, and the free occupation of environmental space to deposit wastes...”

# Exacerbated by the Anomalous, Oil-Based Expansion of Humanity



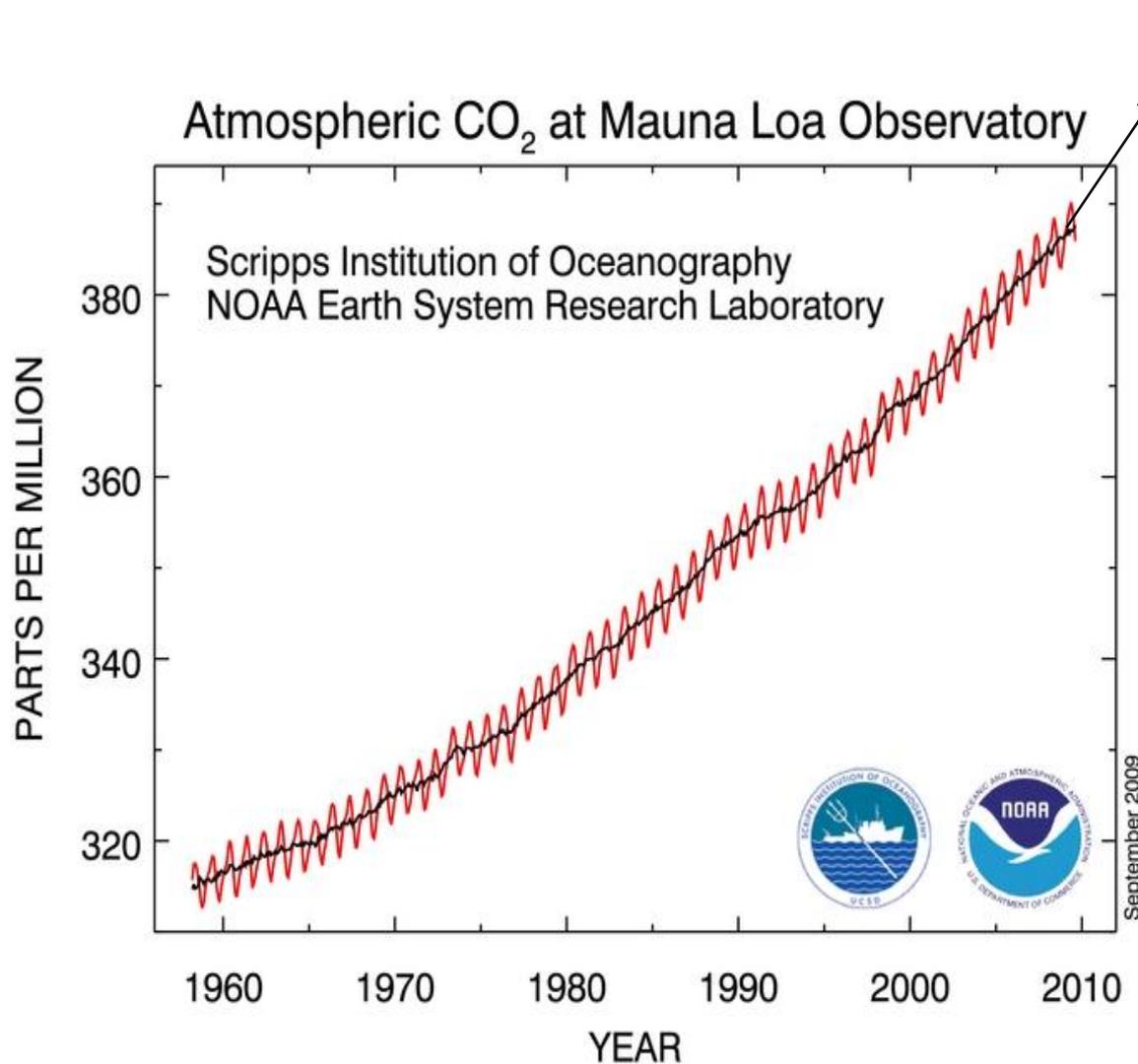
Continuous growth—population and economic—is an anomaly. The growth spurt that recent generations take to be normal is the single most abnormal period of human history.

# It's not just population: The 'Great Acceleration' in consumption



- ❑ “The Great Acceleration is clearly shown in every component of the human enterprise included in the figure. Either the component was not present before 1950 (e.g., foreign direct investment) or its rate of change increased sharply after 1950 (e.g., population)” (Steffen, Crutzen & McNeill 2007 [Ambio 36: 314-321])
- ❑ This explosion of energy and material throughput (consumption and pollution) has occurred during a period of unprecedented technological and economic efficiency gains.

Result: A 40% increase in atmospheric CO<sub>2</sub> in the past century (*CO<sub>2</sub> emissions are a waste management problem*)



400 ppm  
May 2013

**Rate of increase  
(ppm/year)**

1970-79: 1.3

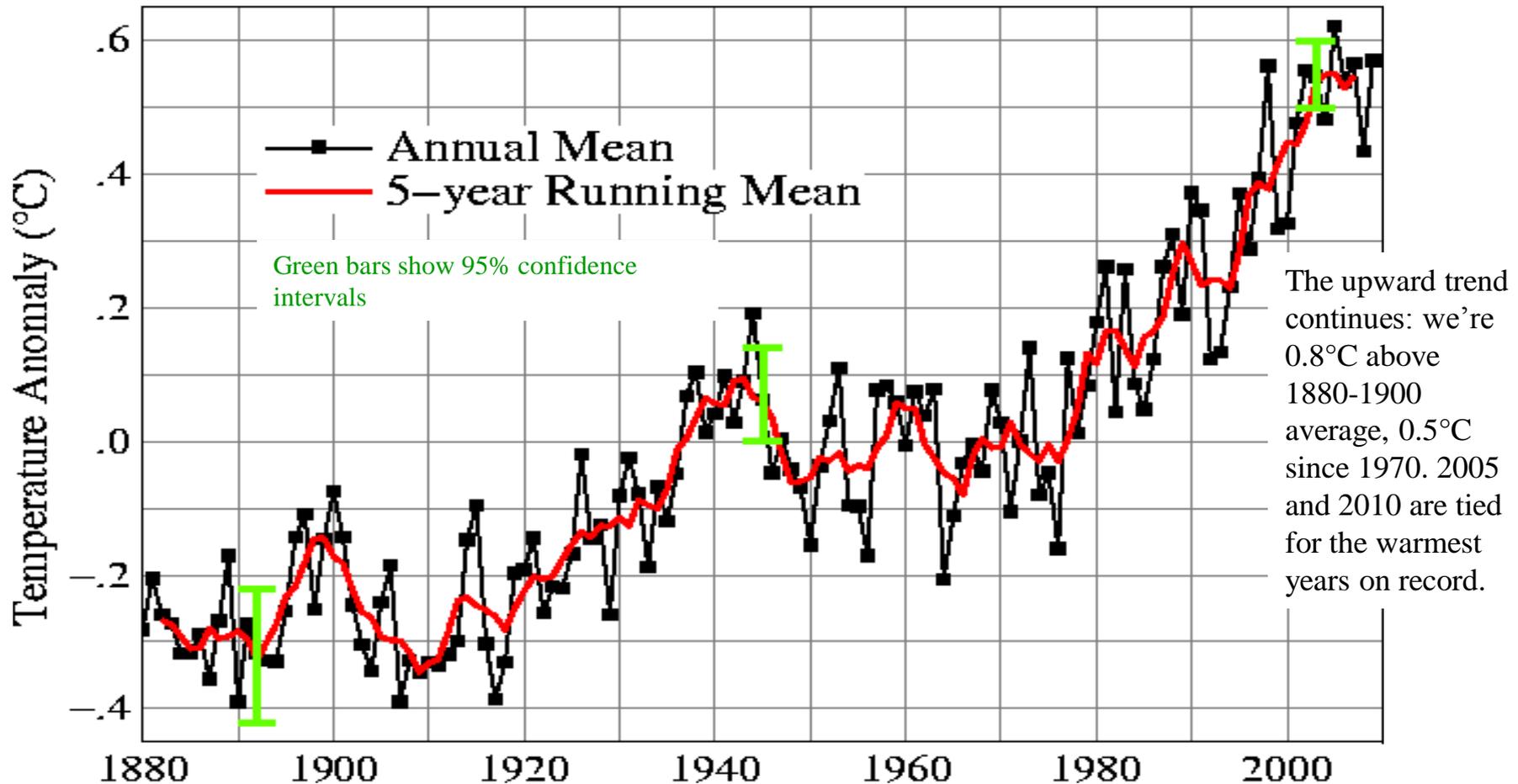
1990-99: 1.5

2000-07: 2.3

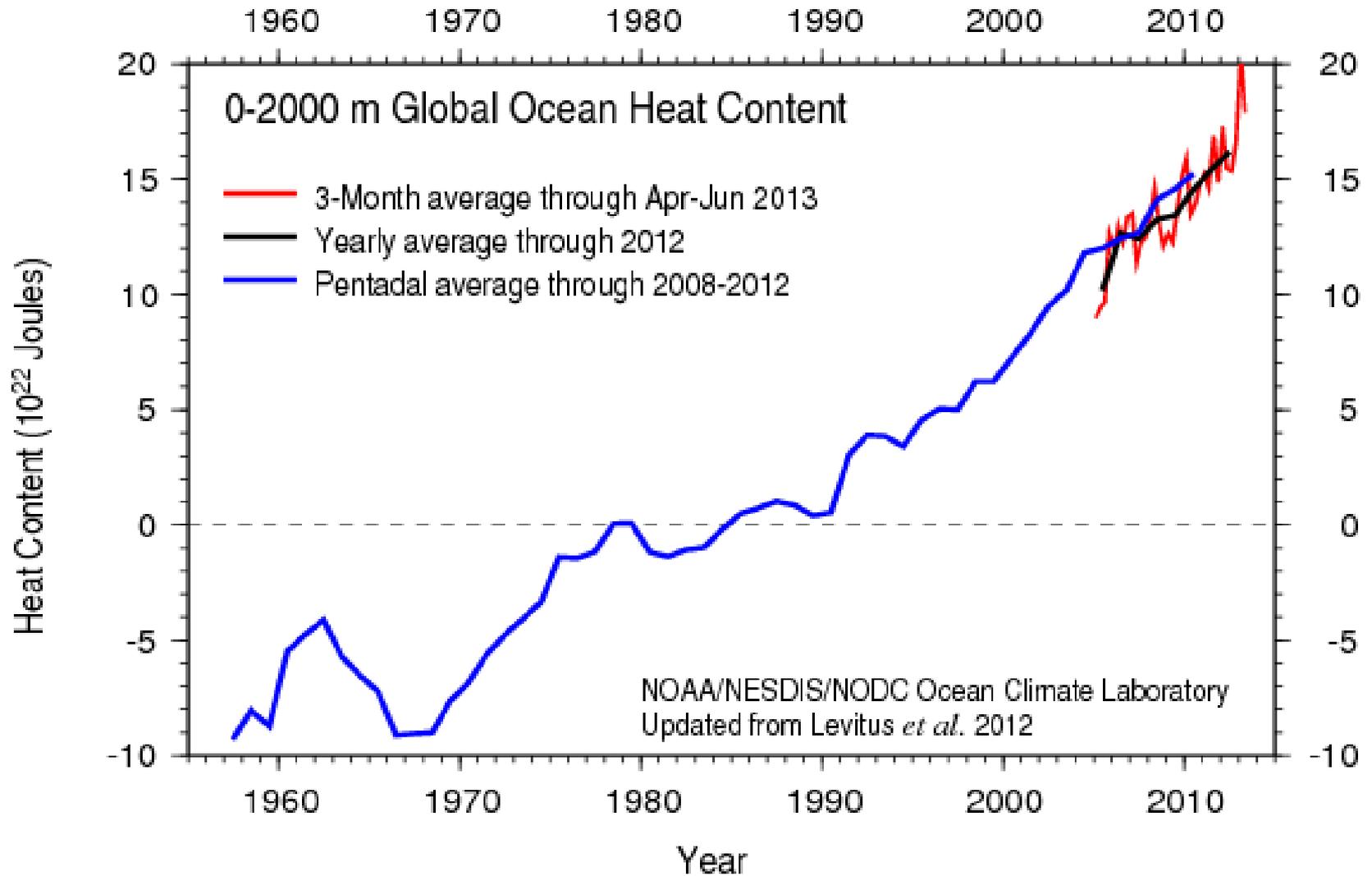
(accelerating!)

# Mean global temp has increased > 0.8 C° in 100 yrs

## Global Land–Ocean Temperature Index



# There is no suspension of heating—the oceans are warming fast



# Recent findings turn up the heat

“Reframing the climate change challenge in light of post-2000 emission trends”

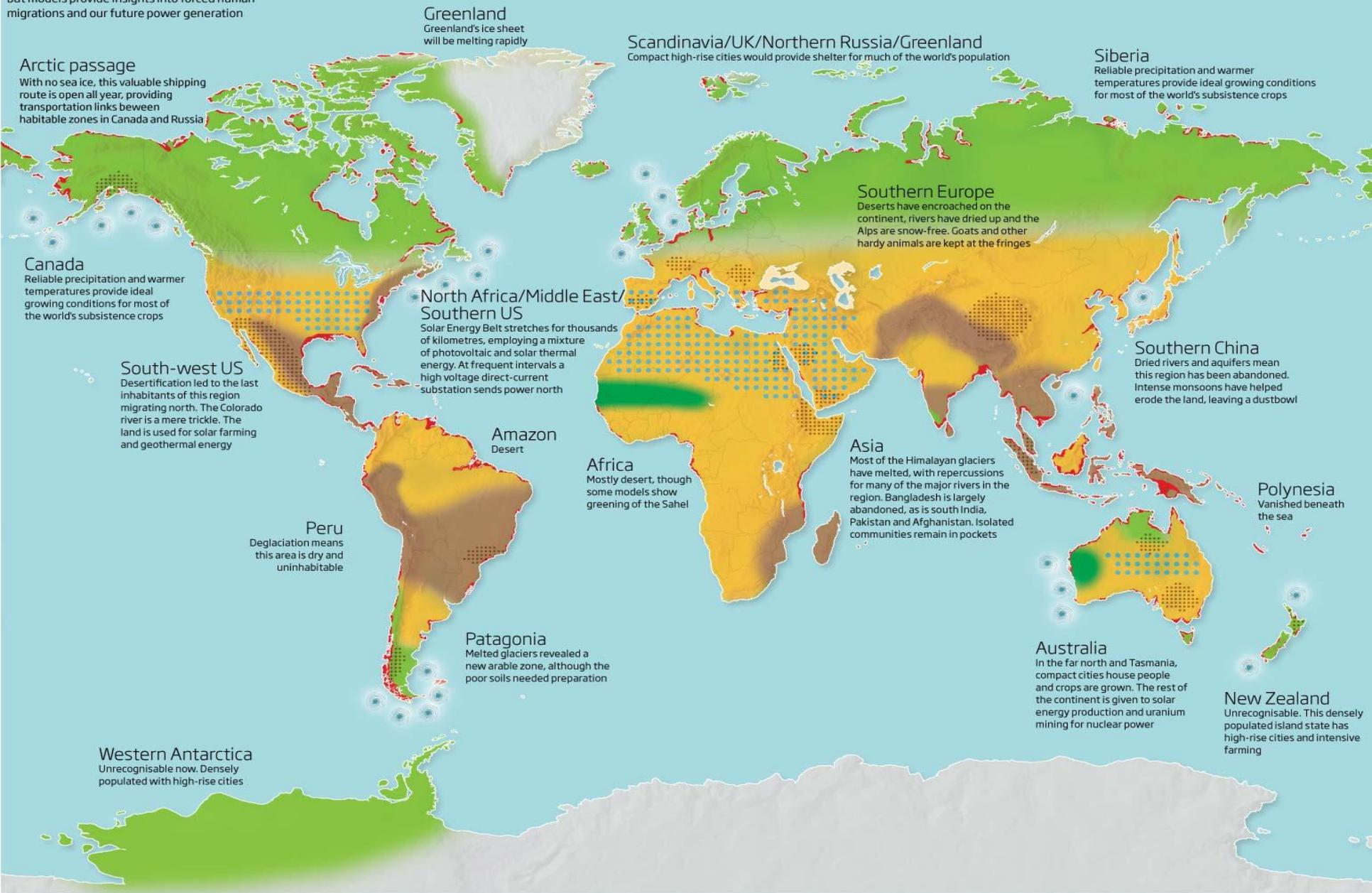
- ❑ To stabilize GHGs at even [a catastrophic] 650 ppmv CO<sub>2</sub>e, **the majority of OECD nations must begin to make draconian emission reductions – 6% per year – in the next few years.**
- ❑ Unless we can reconcile economic growth with decarbonization, **this will require a planned economic recession.**
- ❑ Wealthy nations/people are responsible for 80% of emissions and have a moral duty to compensate for the accumulated debt.

(Anderson and Bows. 2008. *Phil. Trans. R. Soc. A* doi:10.1098/rsta.2008.0138)

(NB: 650 ppm CO<sub>2</sub>e implies a 50% probability of a 4C degree or higher mean global temperature increase by the end of the century.)

# The world: 4°C warmer

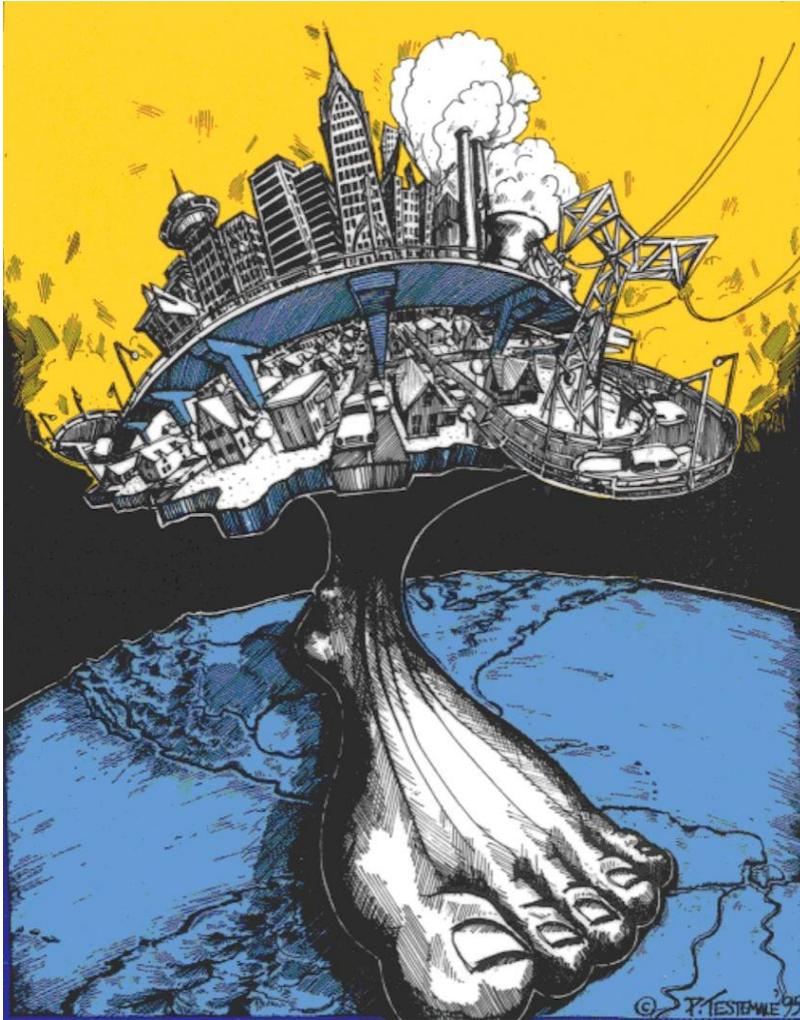
No one knows exactly what this world will look like, but models provide insights into forced human migrations and our future power generation



# Even the World Bank is waking up to climate change reality

- “The projected 4°C warming simply must not be allowed to occur—the heat must be turned down. Only early, cooperative, international actions can make that happen” (World Bank. 2012. *4°-Turn Down the Heat: Why a 4°C Warmer World Must be Avoided*)

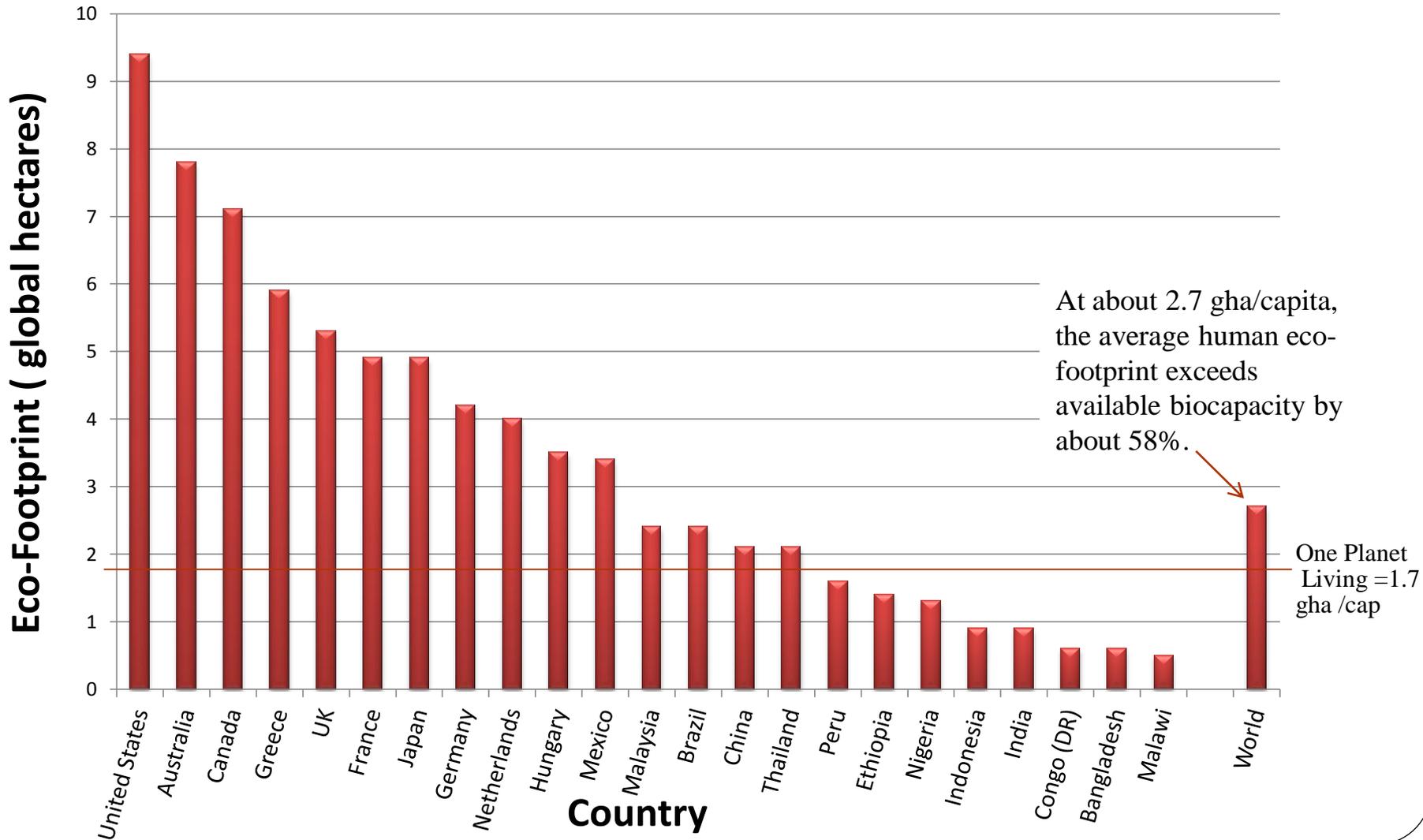
# On eco-equity: Are the rich entitled to a bigger slice of nature's pie?



- ❑ Average per capita EFs in high-income countries: 4 -10 global average hectares (10 to 25 acres).
- ❑ There are only about 1.7 gha per person on earth.
- ❑ The poorest people live on a third of a gha (.74 ac).
- ❑ *Europeans use 2-3 times and North Americans use 3-4 times their equitable share of world biocapacity and contribute proportionately more to humanity's eco-debt.*

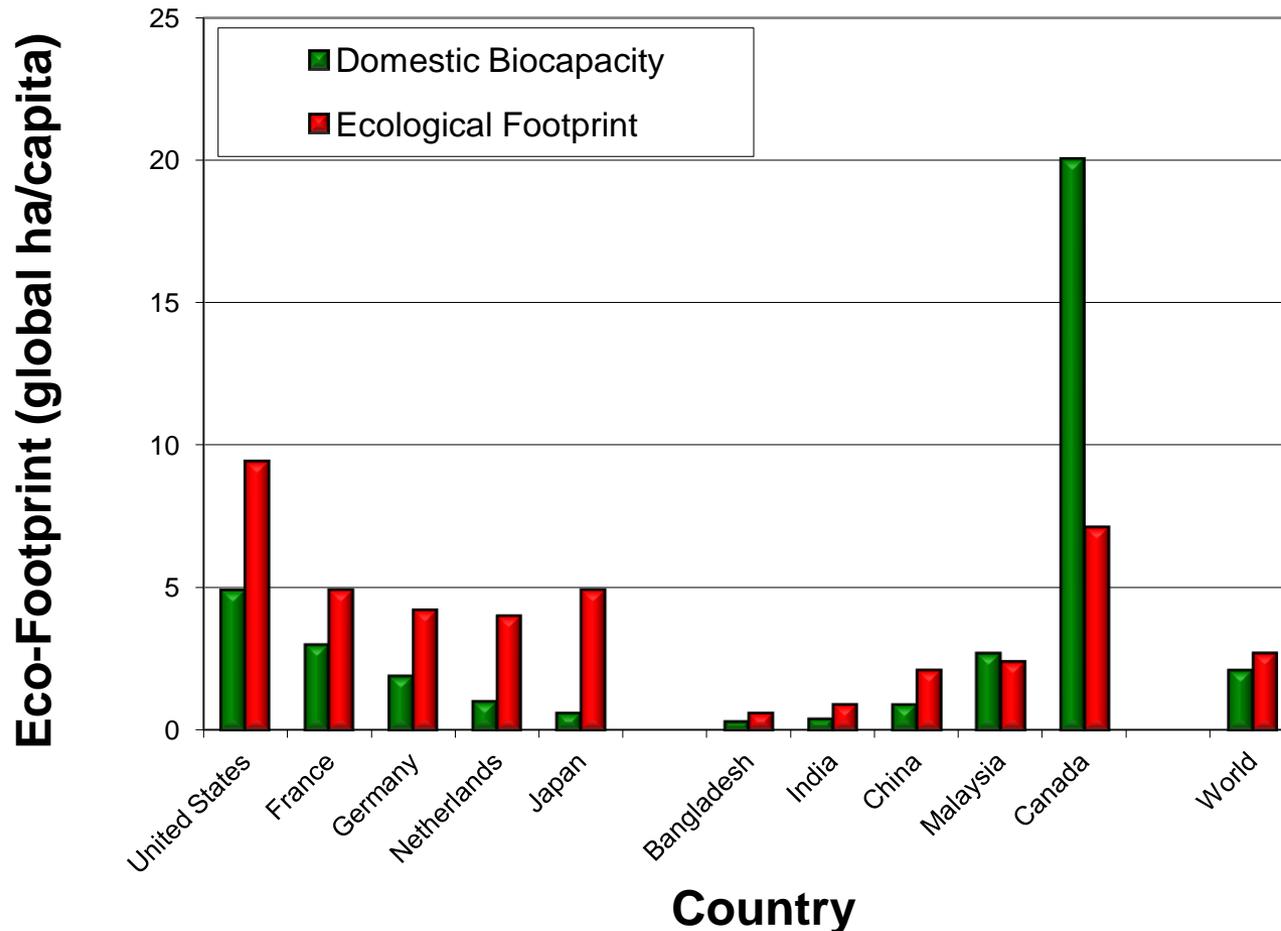
# Per capita Ecological Footprints of Selected countries

(Data from WWF 2008)



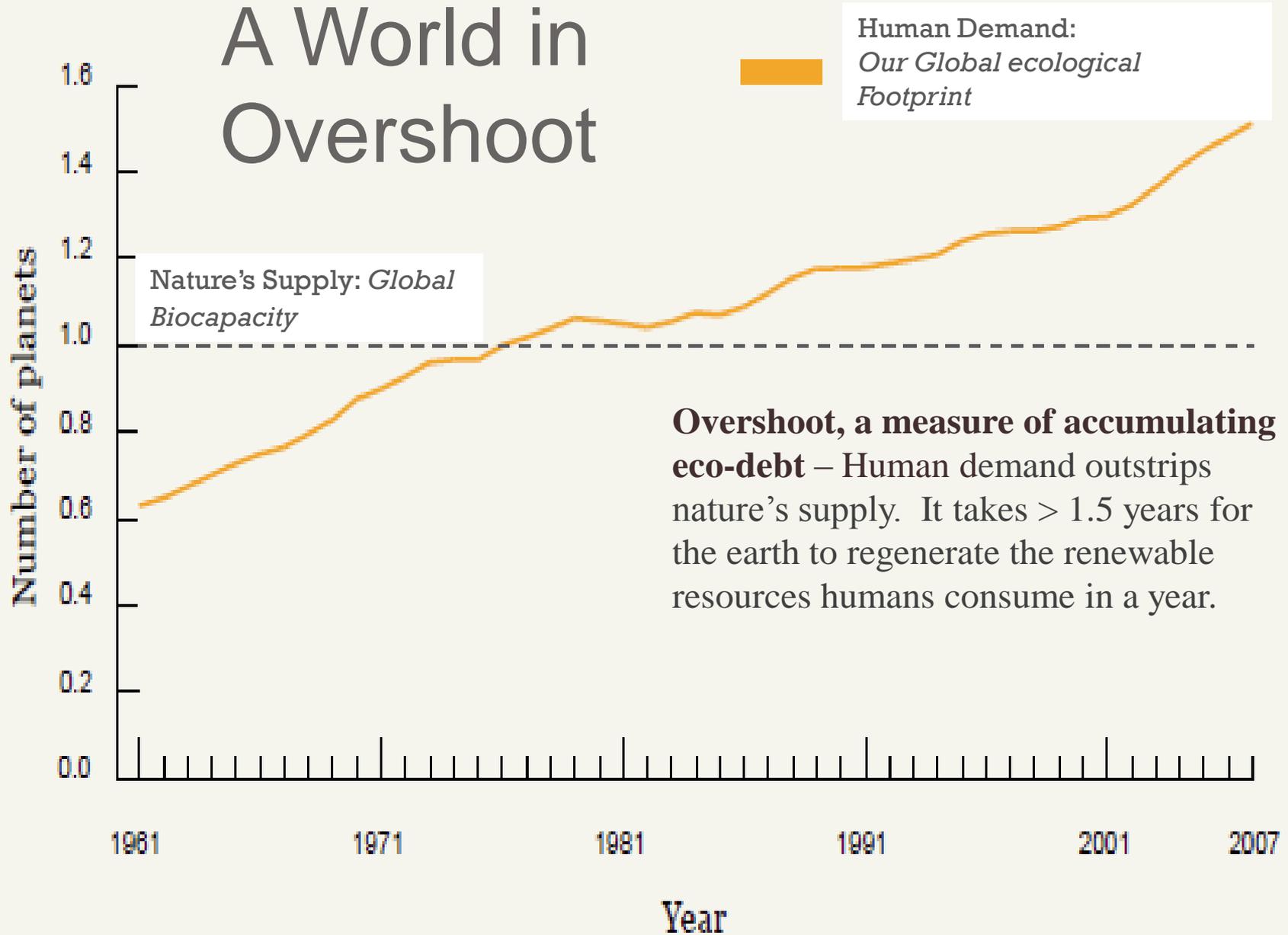
# Bio-capacities and eco-footprints of selected countries

(P.S. Globalization accelerates eco-debt accumulation, the depletion of Ecosystems)



Because of globalization and trade, countries that run eco-deficits can extract 'surplus' biocapacity from low density countries (like Canada) and the global commons and use it to maintain destructive levels of consumption.

# A World in Overshoot



**Overshoot, a measure of accumulating eco-debt** – Human demand outstrips nature's supply. It takes > 1.5 years for the earth to regenerate the renewable resources humans consume in a year.

# The Global Picture



global biocapacity:  
**12.0 billion hectares**

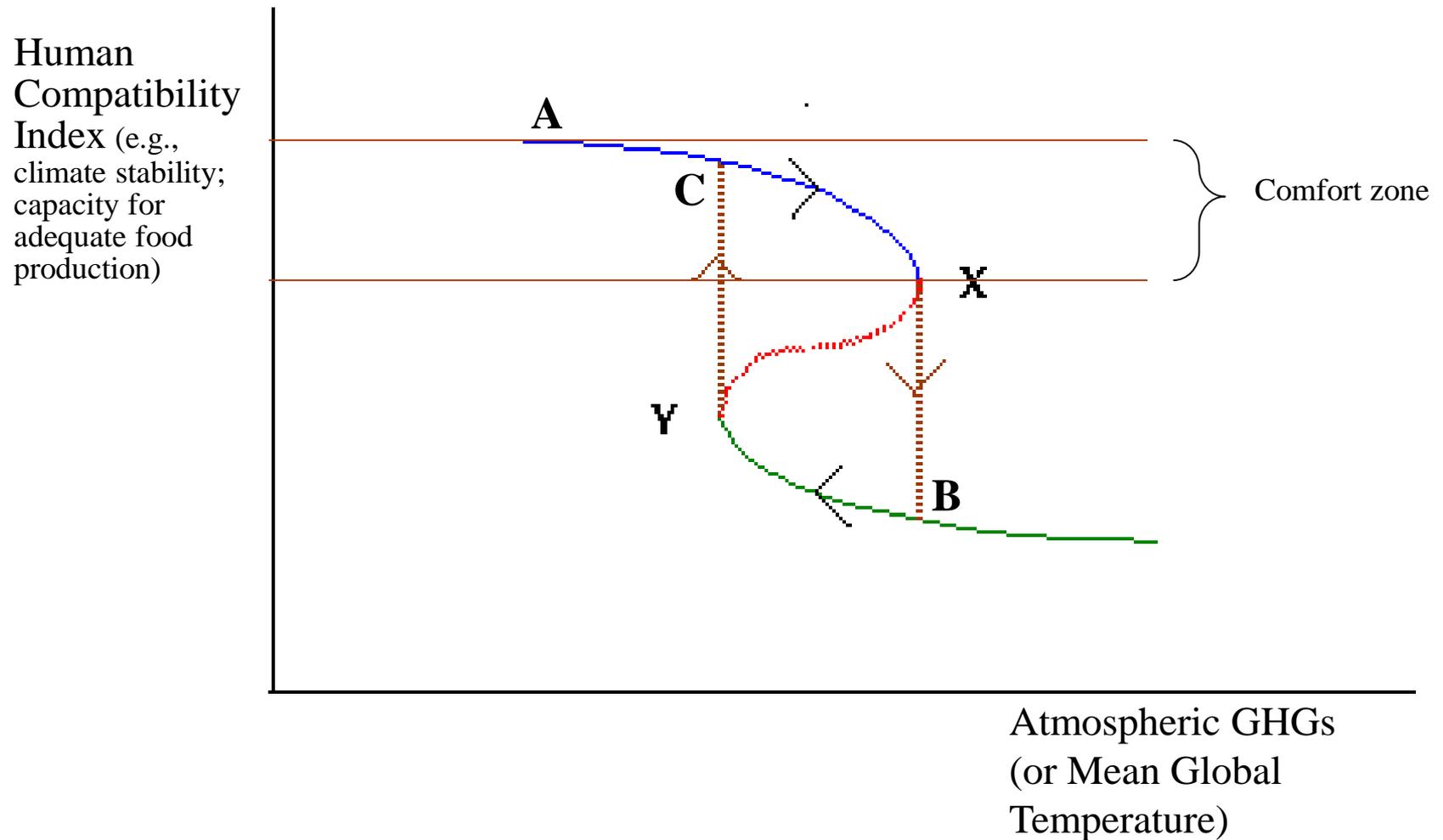
**OVERSHOOT**  
(approx 58% ) :  
Economic and  
material growth  
today is being  
financed , in part,  
by the liquidation of  
essential, non-  
substitutable self-  
producing natural  
capital and at the  
expense of global  
life support  
systems.

current human eco-footprint:  
**19.0 billion hectares**

# Climatic Symptoms of Eco-Debt

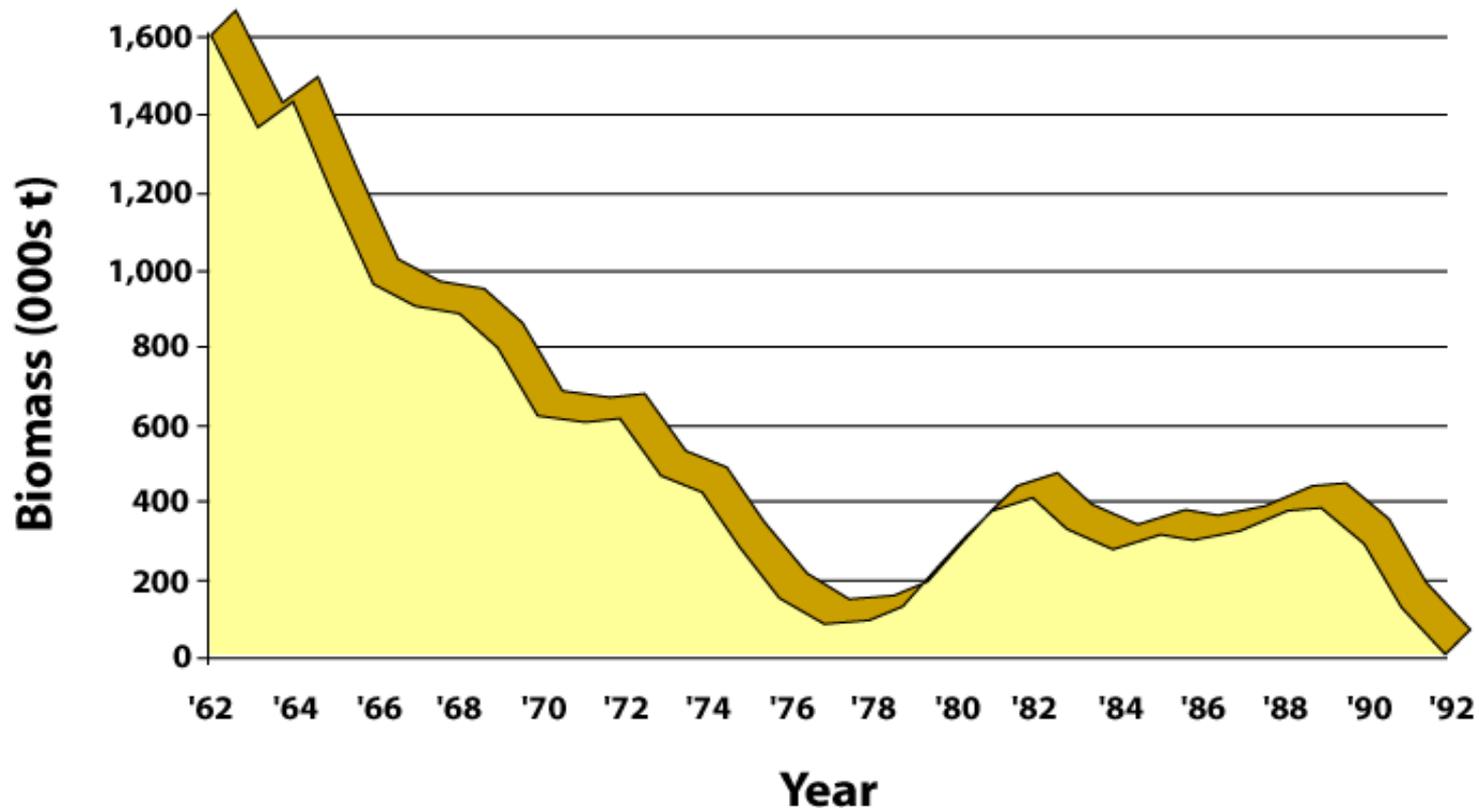
- ❑ Extremely hot weather events have increased by a factor of 50 compared to the decades before 1980.
- ❑ Extreme summer heat, which afflicted between 0.1% and 0.2% of the world 40 years ago, now affects 10%.
- ❑ Twelve of the warmest 14 years on record have occurred in this century.

# Exceeding limits? Lags and tipping points are being tested by growth



# A Fisheries Example: An Un-repayable Debt (and Canada's Shame)

## Spawning Stock Biomass of Northern Cod

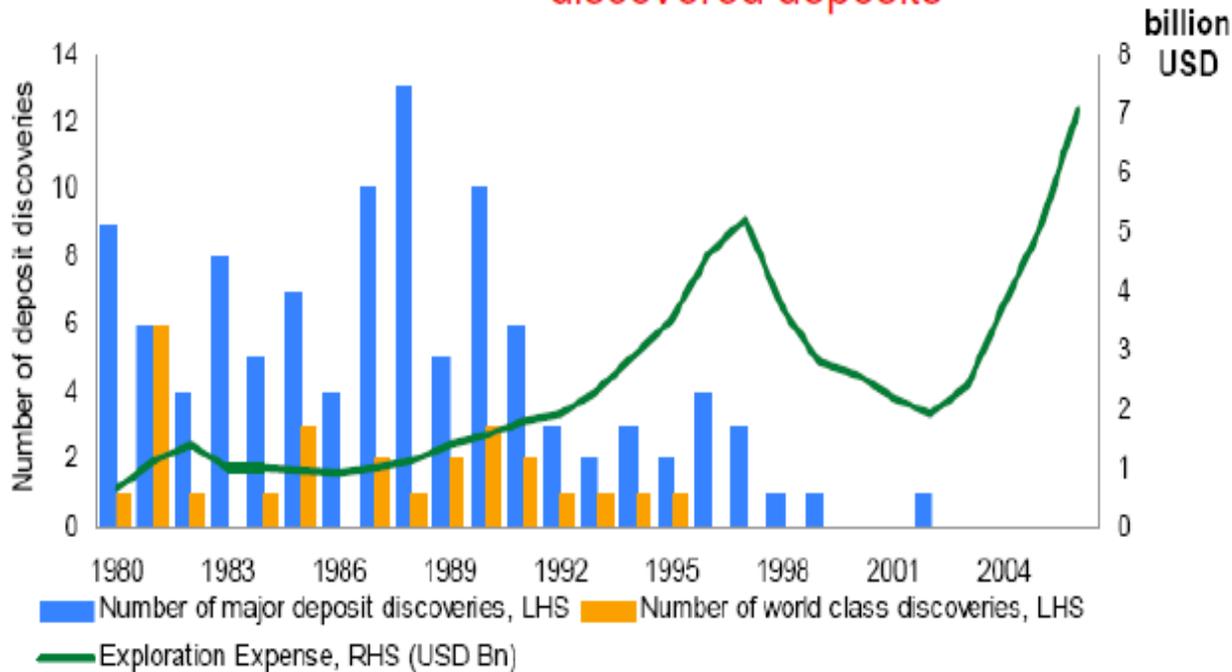


# Material Symptoms of Eco-Debt: Resource Depletion

- ❑ Extraction of ‘conventional’ crude oil peaked in 2006; most major fields were discovered in the 1960s and production from them is declining at 4-6% per year (and ‘new’ oil cannot keep up).
- ❑ 30% of the world’s arable land has become unproductive; soil erosion/degradation continues at 10 to 40 times the rate of natural replenishment.
- ❑ 82% of monitored fish-stocks were fully exploited or overexploited by 2008 (32% are overexploited, up from 10% in the 1970s)

# Declining Mineral Discovery Rate

low expectations of yet to be discovered deposits



□ 63 of the 89 non-renewable resources that enable high-tech industrial society had become globally scarce by 2008.

Sources: BHP Billiton, MEG, UBS WMR. , Raw Materials Group

# Measuring Waste and Pollution (WRI 2000).

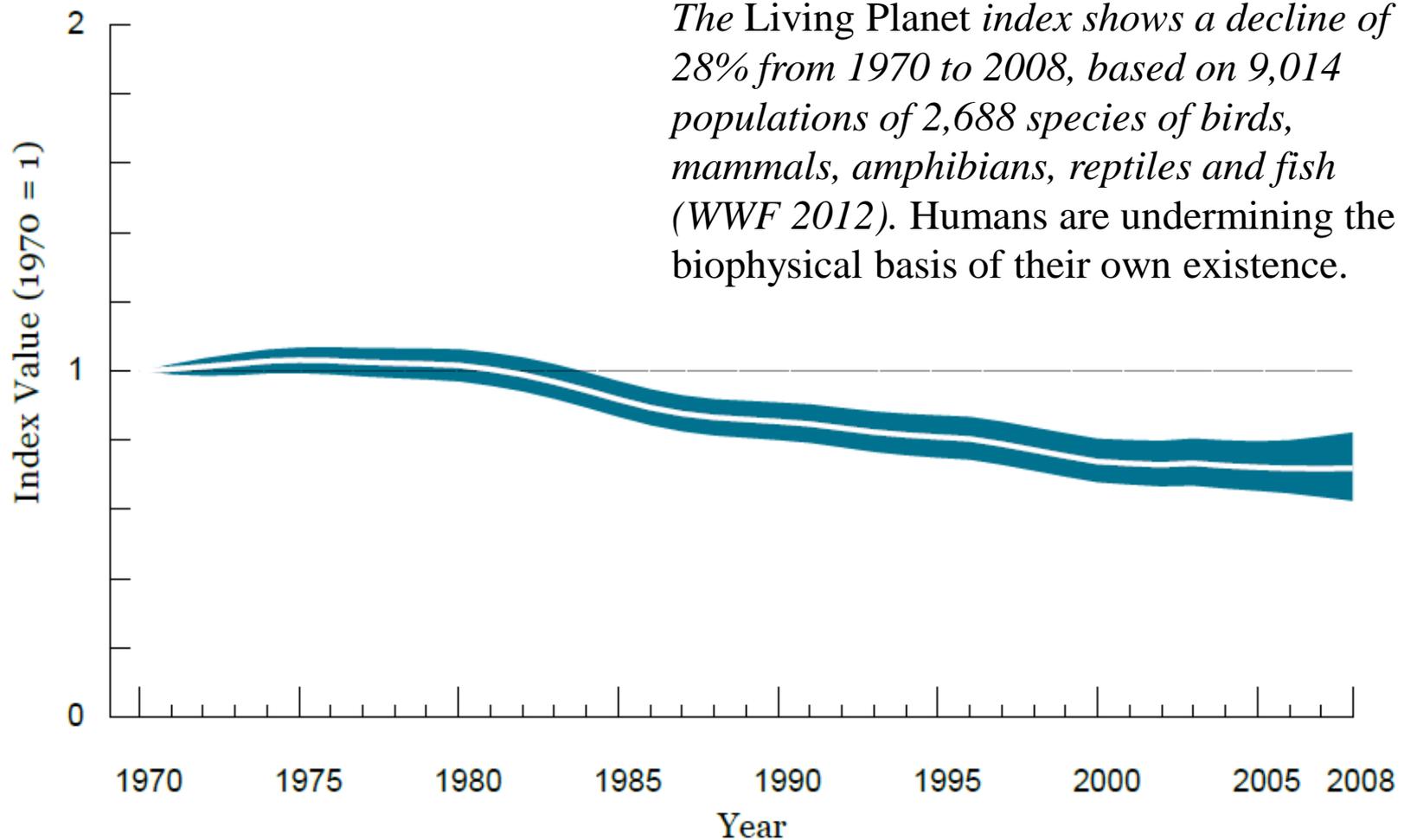
- ❑ Annual waste discharges from urban economies:  
Japan: 11 tonnes *per capita*. US: 25 tonnes *per capita*

If we include material flows (soil erosion, over-burden, construction debris, etc.) not actually used in production:

Japan: 21 tonnes *per capita*. US: 86 tonnes *per capita*

- ❑ Both gross and *per capita* processed output (solid, liquid and gaseous discharges) are generally increasing even in the most efficient economies.
- ❑ The extraction and use of fossil energy resources dominate waste flows in industrialized countries. CO<sub>2</sub> is the greatest single waste-product by weight!

# Degradation + Human Competition for Habitat = Inevitable Biodiversity Loss



# Eco-Apartheid: The world's rich 'Competitively Exclude' the Poor

- ❑ *Eco-apartheid* is a contemporary reality—The rich live in the world's healthiest, most productive habitats. Impoverished people and racial minorities are confined to urban slums and degraded landscapes characterized by toxic waste, polluted air and water and contaminated food.
- ❑ With increasing resource scarcity, global change, and the competitive ethic of the world economic order, the rich are increasingly excluding the poor.

# Increasing the Debt through “Land Grabbing”

- ❑ Richer countries and transnational corporate interests are leasing or buying outright millions of the most productive hectares of land in poorer countries in Africa, Latin America and elsewhere
- ❑ Oxfam, the World Bank and the UN report that as many as 227 million hectares of arable land – an area the size of Western Europe – had been sold or leased in developing countries since 2001.
- ❑ This is enough to feed a billion people, roughly the number of currently calorically undernourished people on the planet.
- ❑ Land-grabbing often forcibly evicts or denies local people access to their traditional lands.
- ❑ This latest expression of egregious inequality in an increasingly fractious resource-poor world is likely to foster civil unrest and exacerbate geopolitical instability in coming years.
- ❑ One government (Madagascar) has already fallen to civil insurrection when the people found out their leaders had dealt away half the nation’s arable land to the Daiwoo corporation on behalf of South Korea.

# In general, developing countries may be hit hardest by global change



- ❑ 5% or more of the world's people (350,000,000) are likely to be displaced from their settlements by sea-level rise (Stern report 2006).
- ❑ This could be 2 billion or more with 4 C degrees warming. In any case:
- ❑ Up to two billion people worldwide will face water shortages and up to 30 per cent of plant and animal species would be put at risk of extinction if the average rise in temperature stabilises at 1.5C to 2.5C (IPCC, Sept 2007)

# Geo-Security Implications

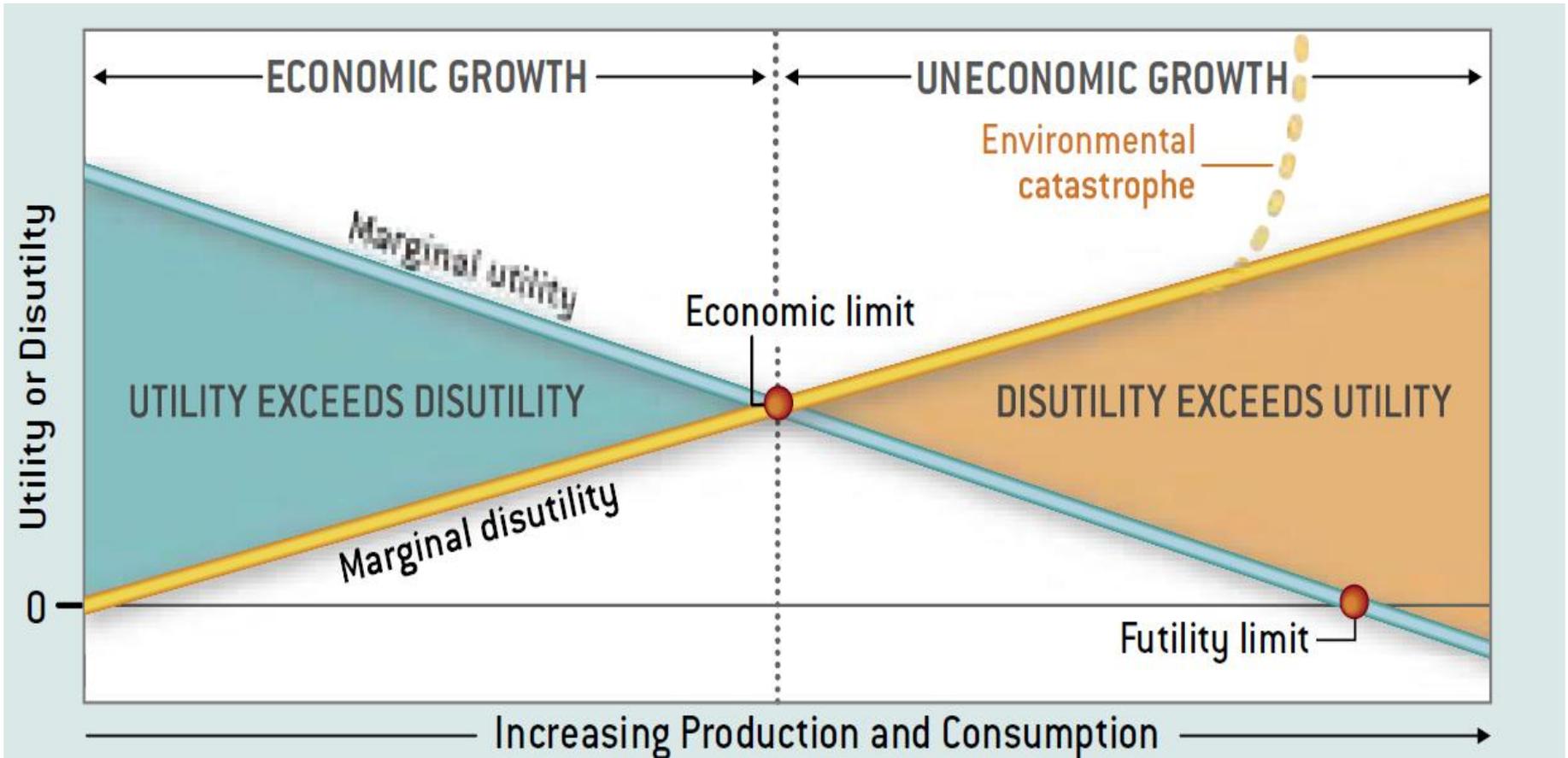
*The Age of Consequences* (November 2007). Washington, Center for Strategic and International Studies

- ❑ “We predict an [inevitable] scenario in which people and nations are threatened by massive food and water shortages, devastating natural disasters and deadly disease outbreaks” (John Podesta, contributing author).
- ❑ Rich countries could “go through a 30-year process of kicking people away from the lifeboat as the world’s poorest face the worst environmental consequences” (Leon Fuerth, contributing author).

*Global Trends 2025 – A Transformed World* Washington, US National Intelligence Council (NIC)

- ❑ Global demand for energy, food and water could easily outstrip available supplies over the next decade or so, thus triggering trade-disrupting international conflicts.

# When growth is uneconomic



Adapted from Daly (2005)

The optimum level of consumption is reached when marginal gains equal marginal losses. Any further increase in consumption (economic scale) implies uneconomic growth (growth that makes us poorer rather than richer).

# With Knowledge, Responsibility

- ❑ Wealthy consumers who are ignorant of the distant systemic consequences of their material habits might be excused. However,...
- ❑ Once we raise to collective consciousness the link between consumption, pollution and eco-debt, global society has an obligation to view such violence in the appropriate light.
- ❑ Not acting to reduce or prevent eco-injustice converts erstwhile blameless consumer choices into acts of positive aggression.

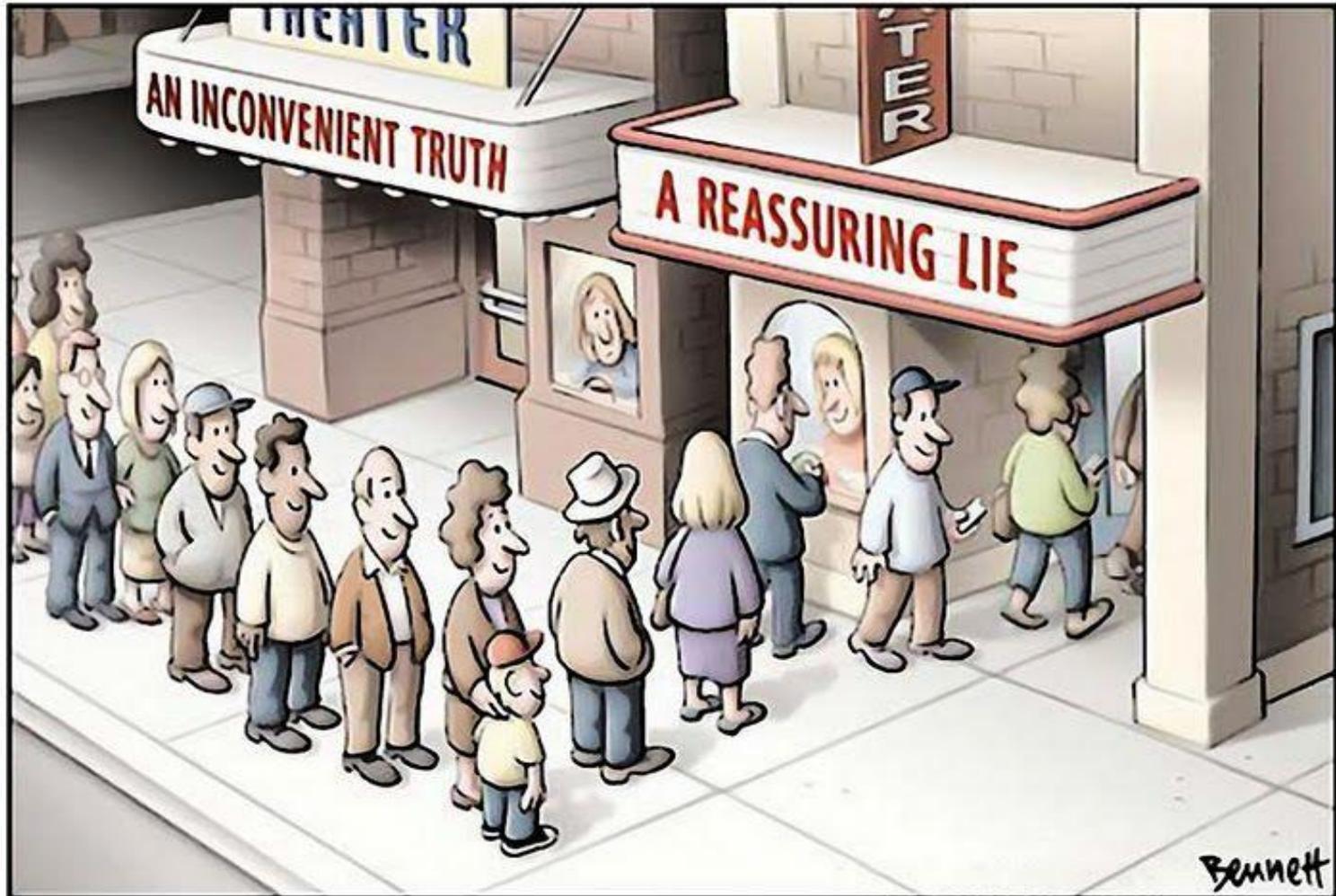
In theory, *H. Sapiens* has unique potential to escape our predicament

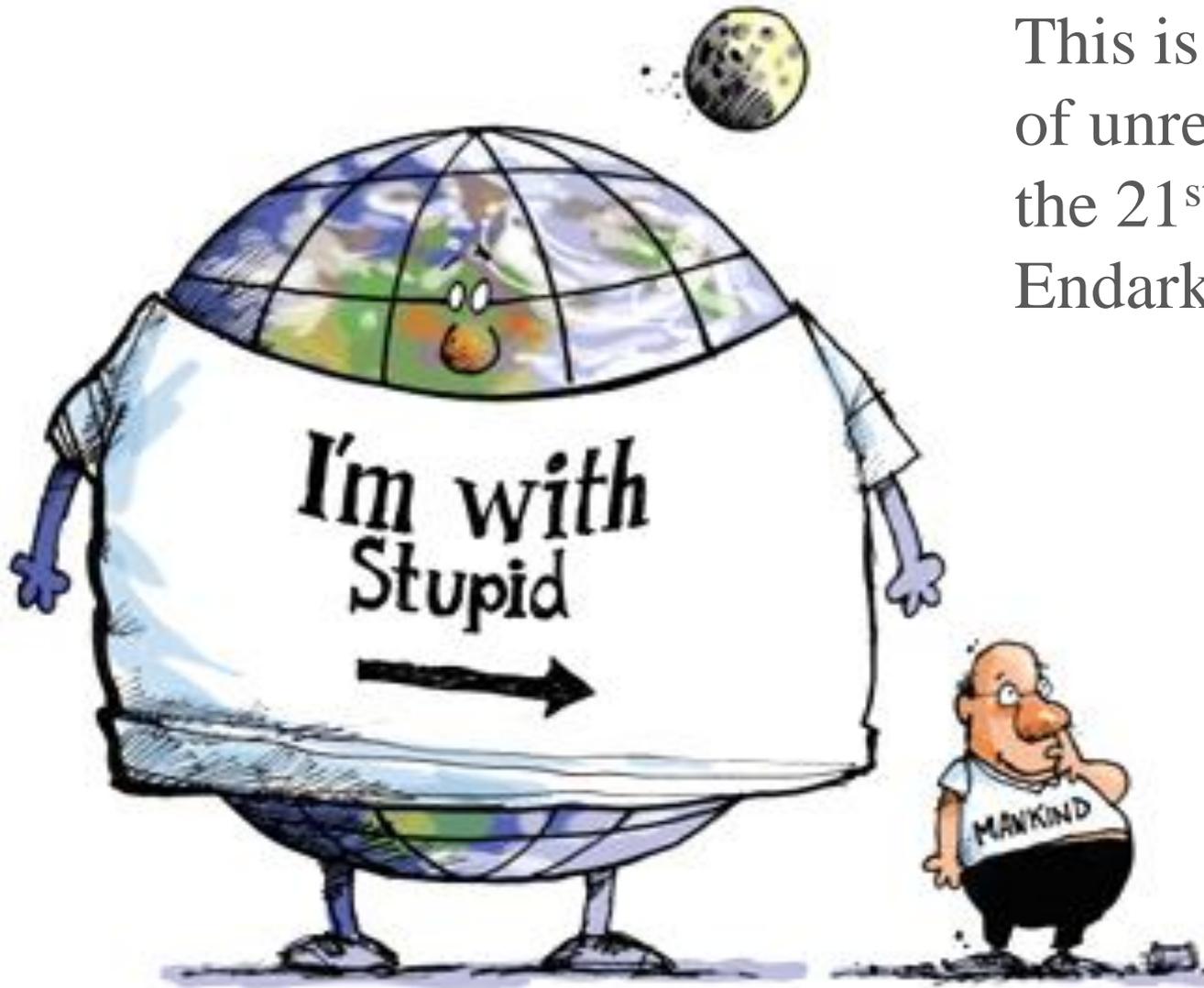
- ❑ Unparalleled capacity for evidence-based reasoning and logical analysis;
- ❑ Unique ability to plan ahead;
- ❑ The capacity to exercise moral judgment;
- ❑ Compassion for other individuals and other species;
- ❑ Unique diversity of mechanisms for cooperative engagement.

# What Could Be: Planned De-Growth Toward a Sustainable Steady-State

- ❑ “Industrialized world reductions in material consumption, energy use, and environmental degradation of over 90% will be required by 2040 to meet the needs of a growing world population fairly within the planet’s ecological means” (BCSD 1993).
- ❑ To avoid a mean global temperature increase above even two C degrees, the world must reduce carbon emissions by 90% by 2050 (Tyndall Centre for Climate Change Research 2006).
- ❑ For sustainability with equity, wealthy OECD nations should be taking steps to reduce their ecological footprints by 50% to 80% (Rees 2006).

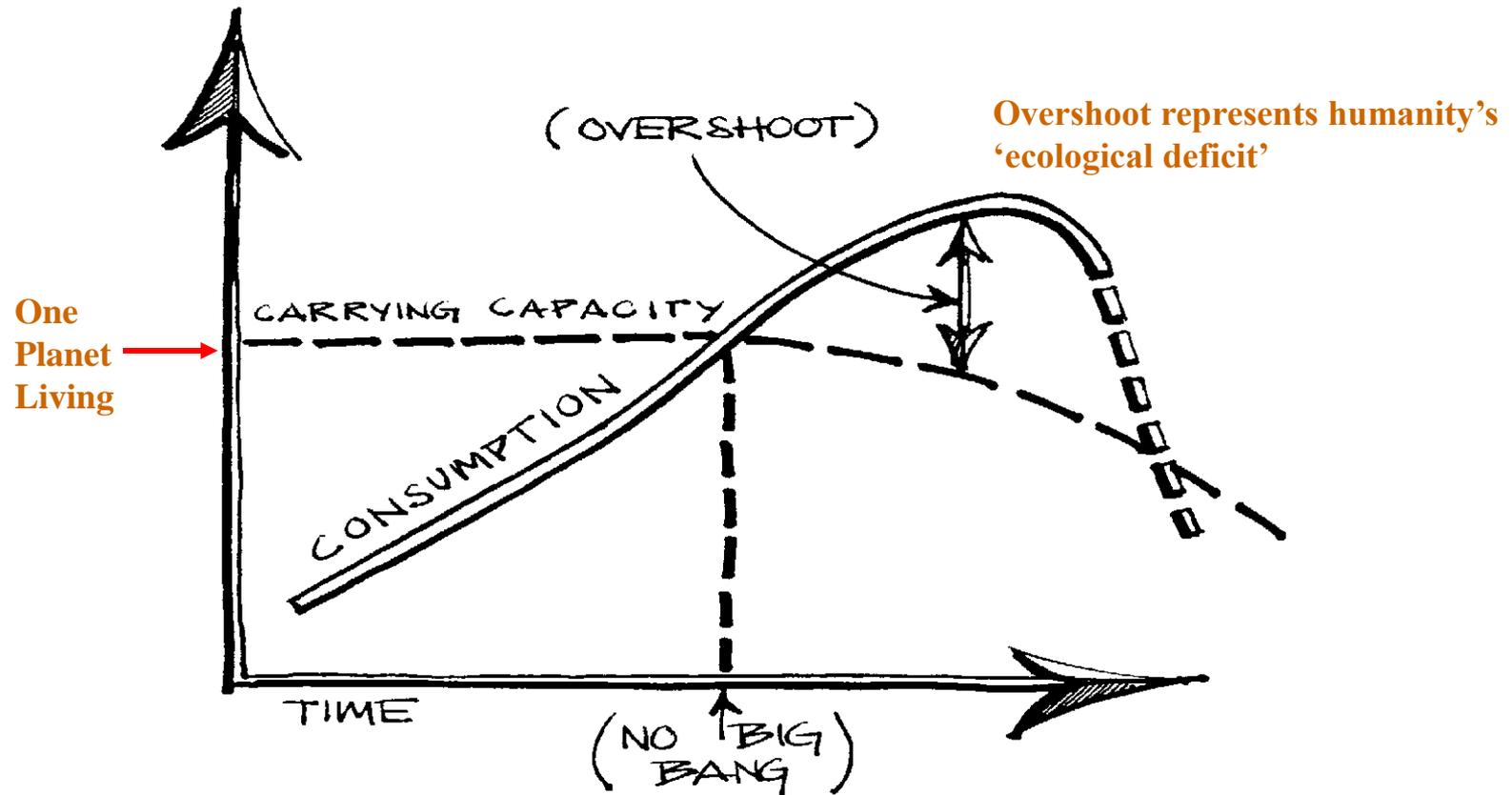
# Reality? A generation socially engineered to ignore reality





This is a new age  
of unreason,  
the 21<sup>st</sup> Century  
Endarkenment

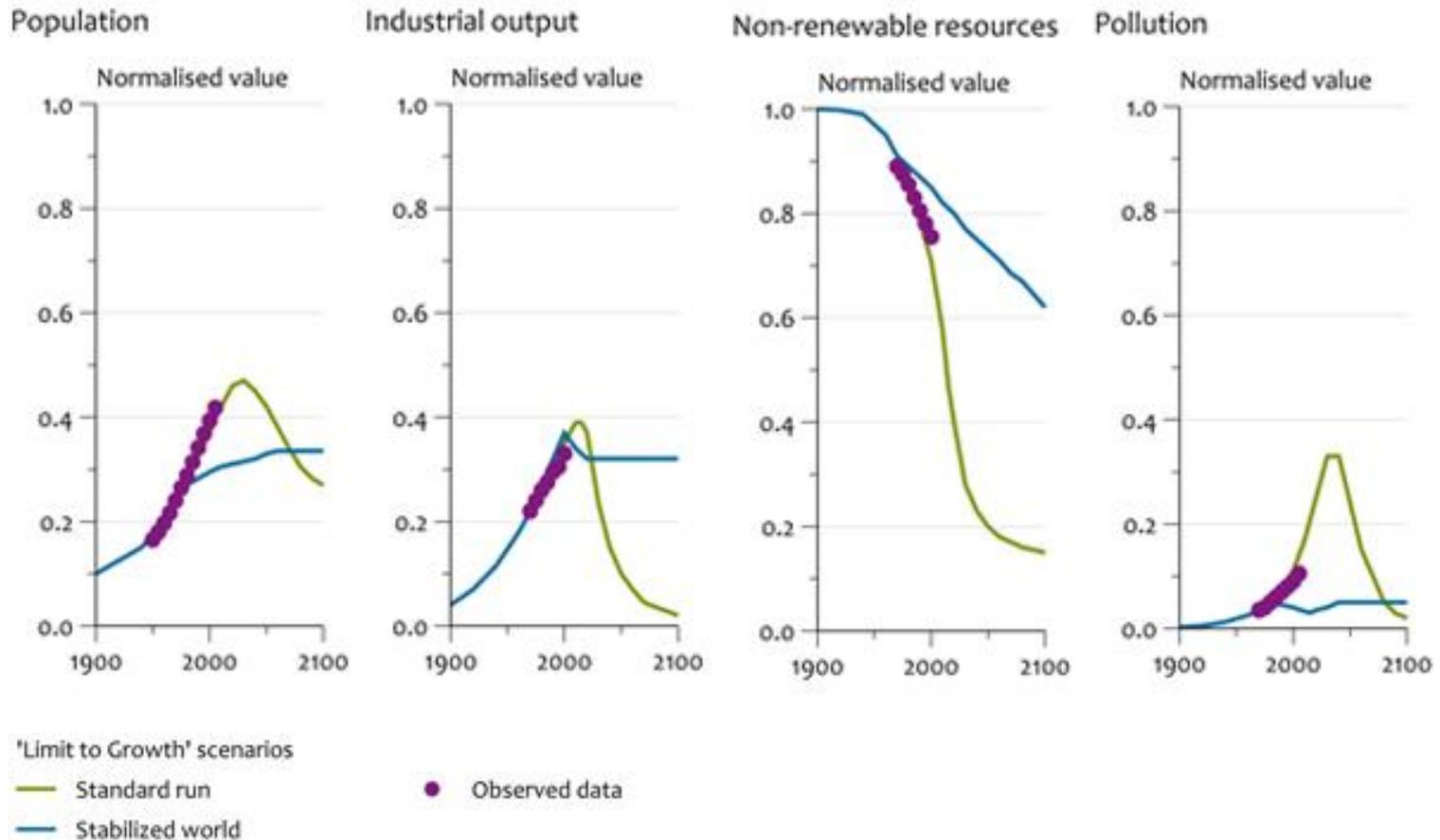
# Societies in overshoot invite catastrophic collapse



Whenever a population grows beyond carrying capacity, the environment is degraded. Think: climate change, ozone depletion, sea level rise, deforestation, fisheries collapses, land degradation, etc. This is uneconomic growth that makes us poorer, not richer.

# BAU: On course for collapse

Comparing 'Limit to Growth' scenarios to observed global data



Source: PBL Netherlands Environmental Assessment Agency

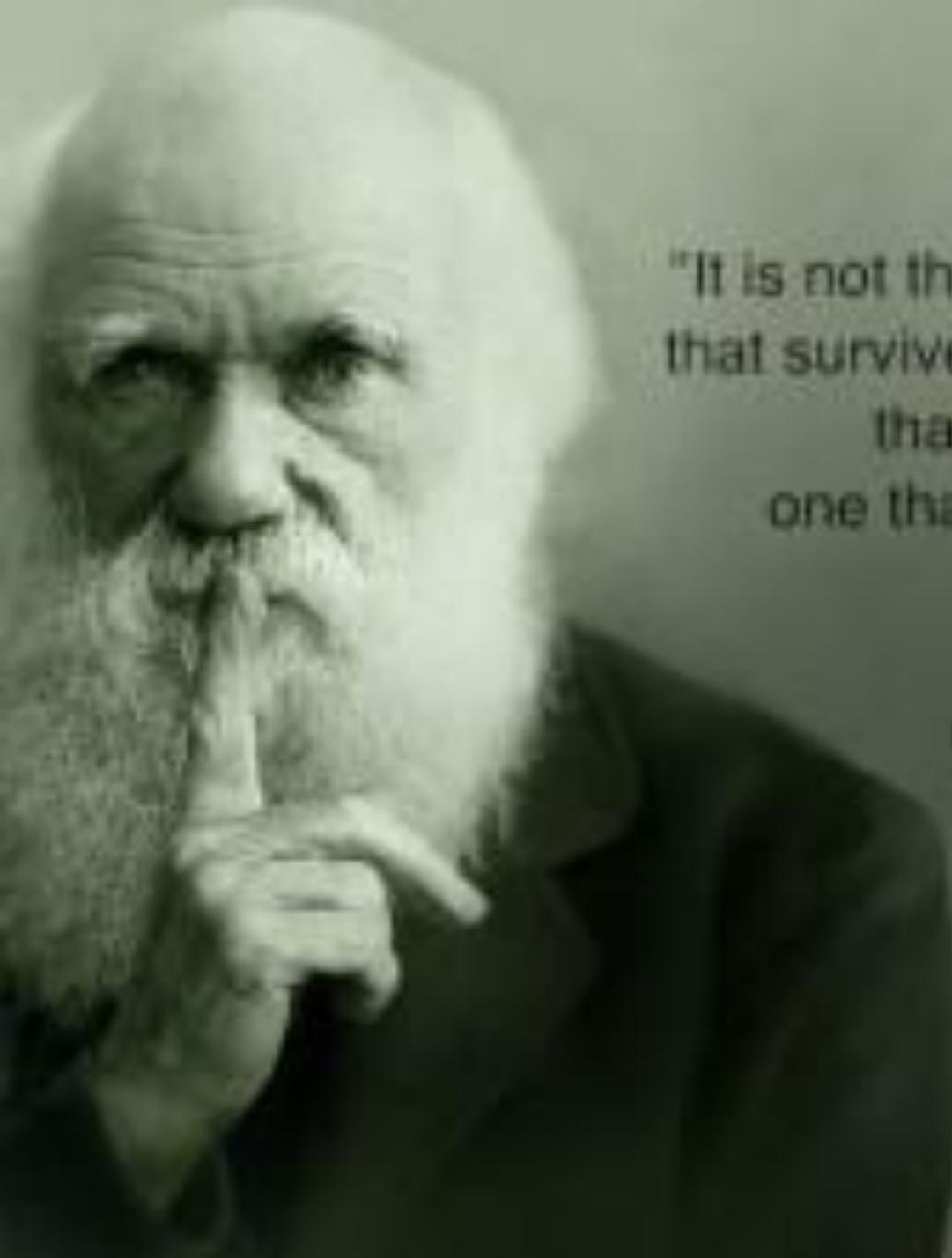
# Is societal collapse possible? It wouldn't be the first time!



Easter Island is history  
but is the industrial  
world far behind?

□ “...what is perhaps most intriguing in the evolution of human societies is the regularity with which the pattern of increasing complexity is interrupted by collapse...”

(Joseph Tainter 1995).



"It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is most adaptable to change".

Charles Darwin