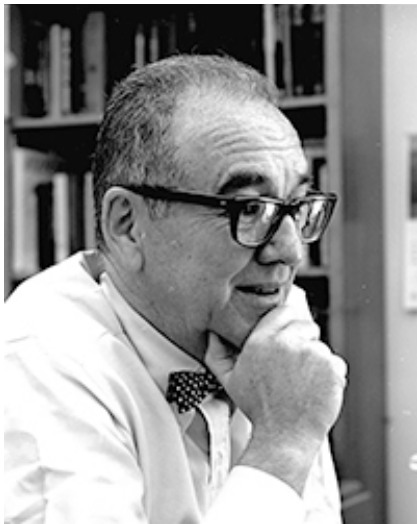


# National Center for Atmospheric Research





What is the state of our planet after Rio+20 and how can science inform the solutions needed in the decades to come?

Diana Liverman  
University of Arizona





# Stockholm Summit 1972

## United Nations Summit on the Human Environment





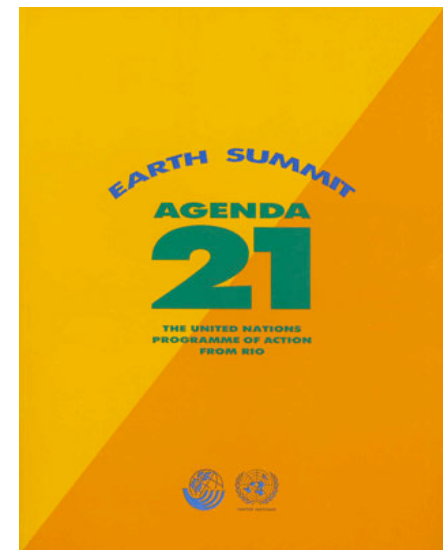
# Stockholm Declaration

## Stockholm Declaration- 1972





# Rio UN Conference on Environment and Development 1992



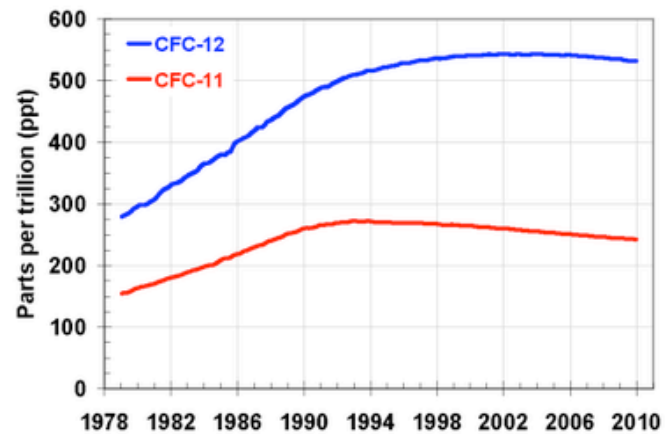
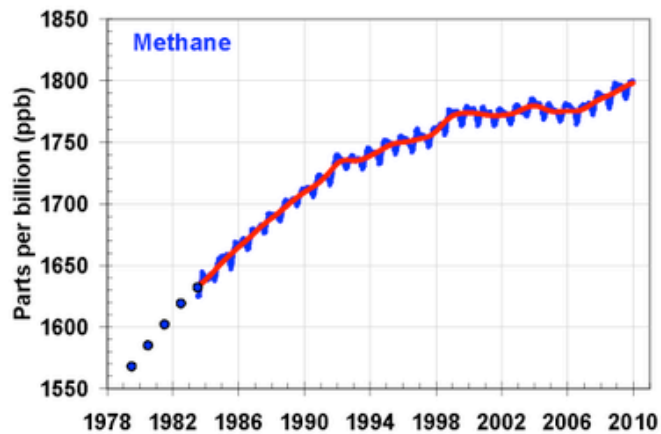
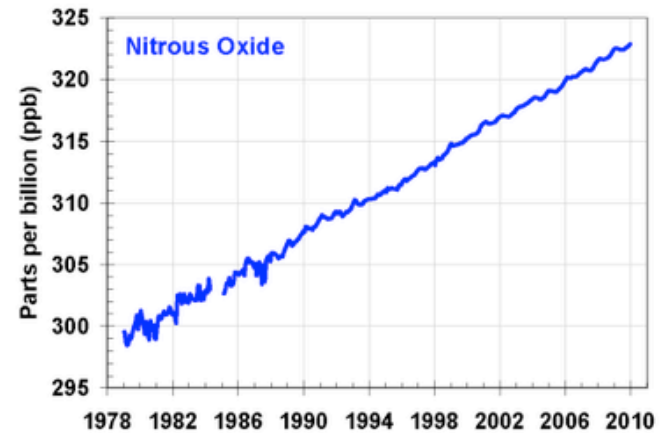
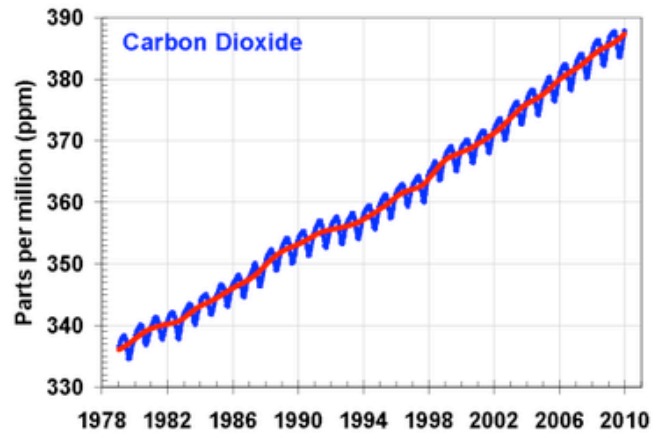


Rio Declaration-1992

[illegible]

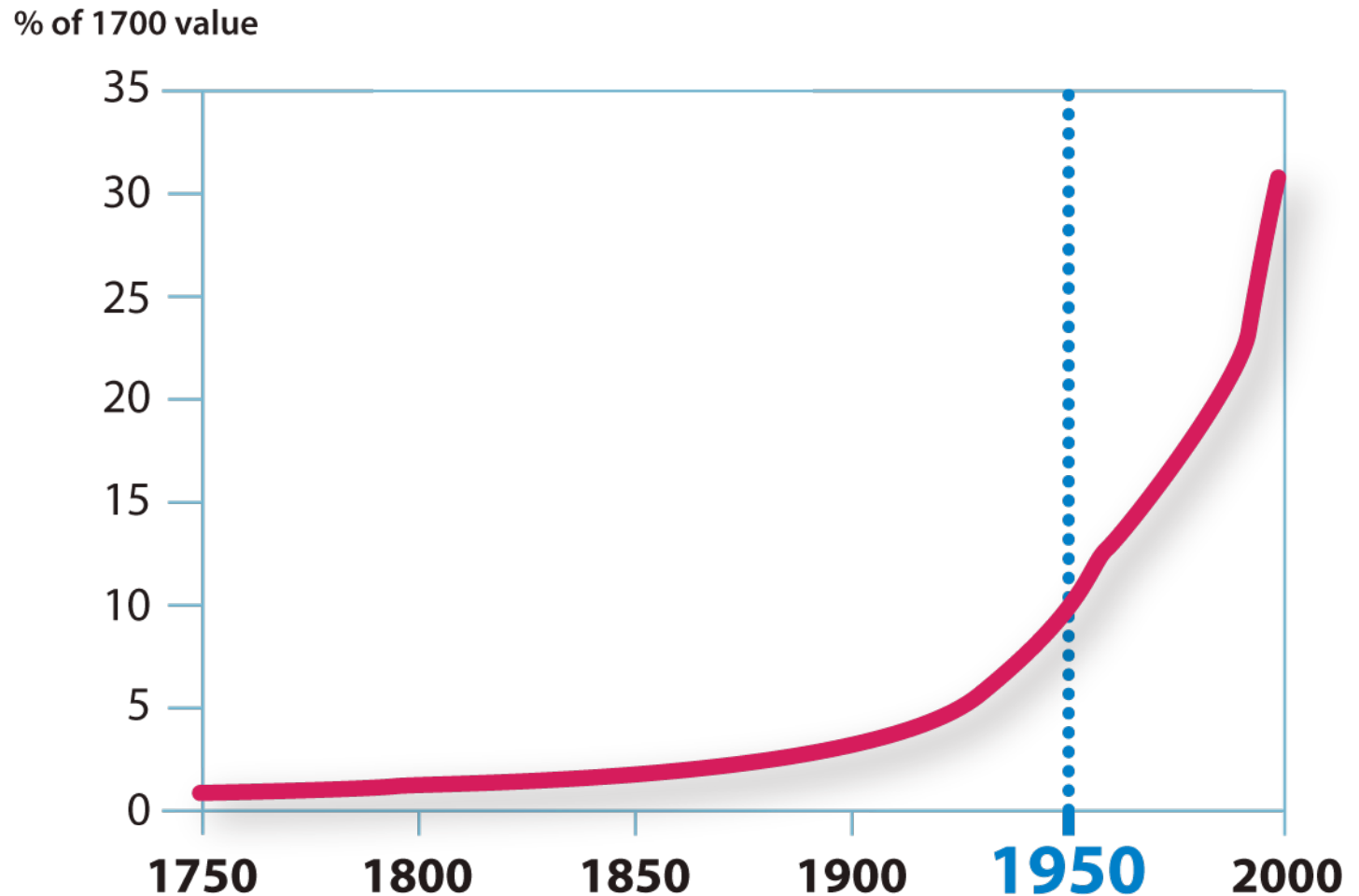


# Greenhouse gas emission trends





# Tropical rainforest and woodland loss

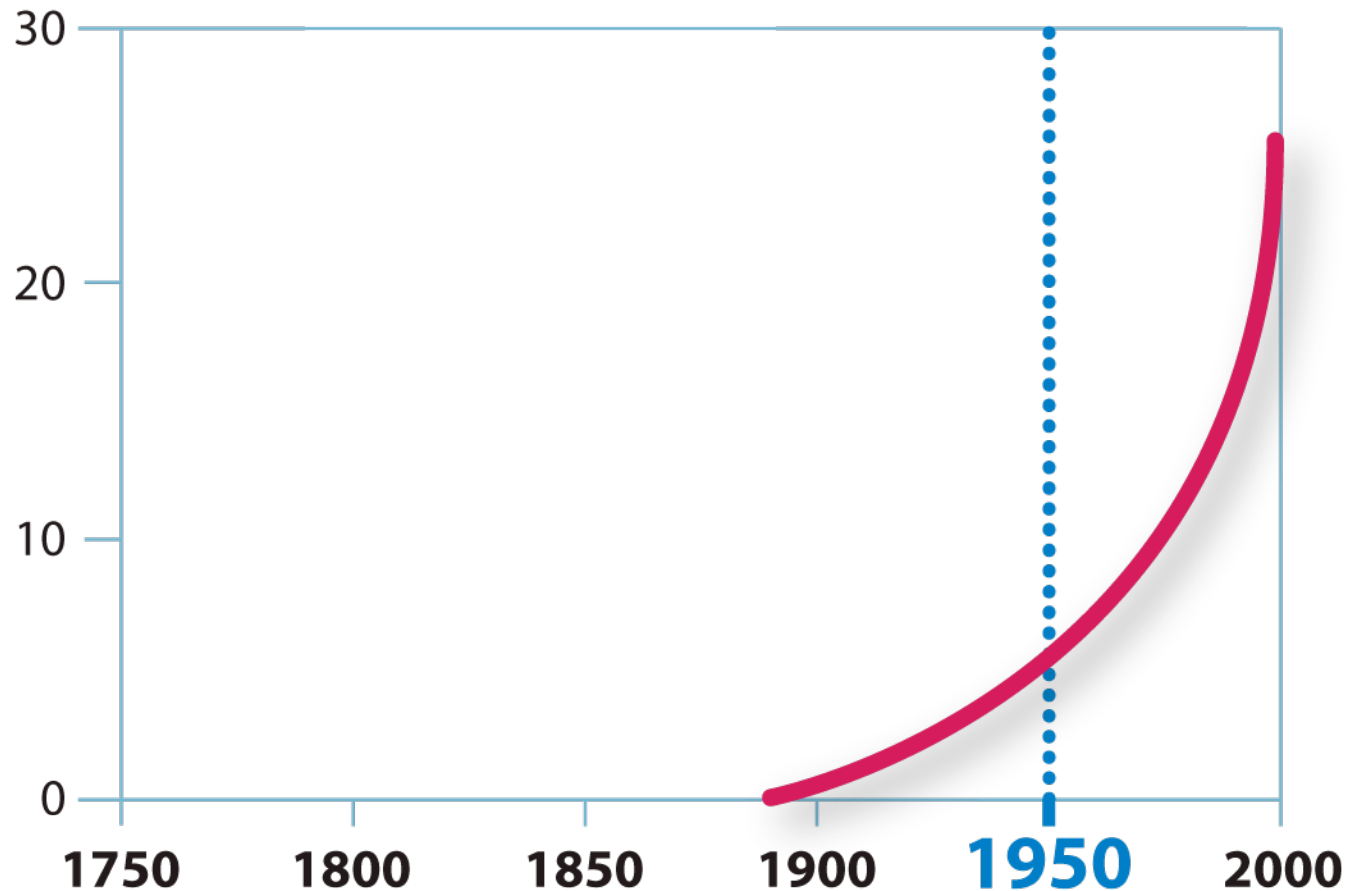


Loss of tropical rainforest and woodland, as estimated for tropical Africa, Latin America and South and Southeast Asia. Sources: Richards (1990) In: The Earth as transformed by human action, Cambridge University Press IGBP synthesis: Global Change and the Earth System, Steffen et al 2004



# Biodiversity loss – species extinctions

Species Extinctions  
(thousand)

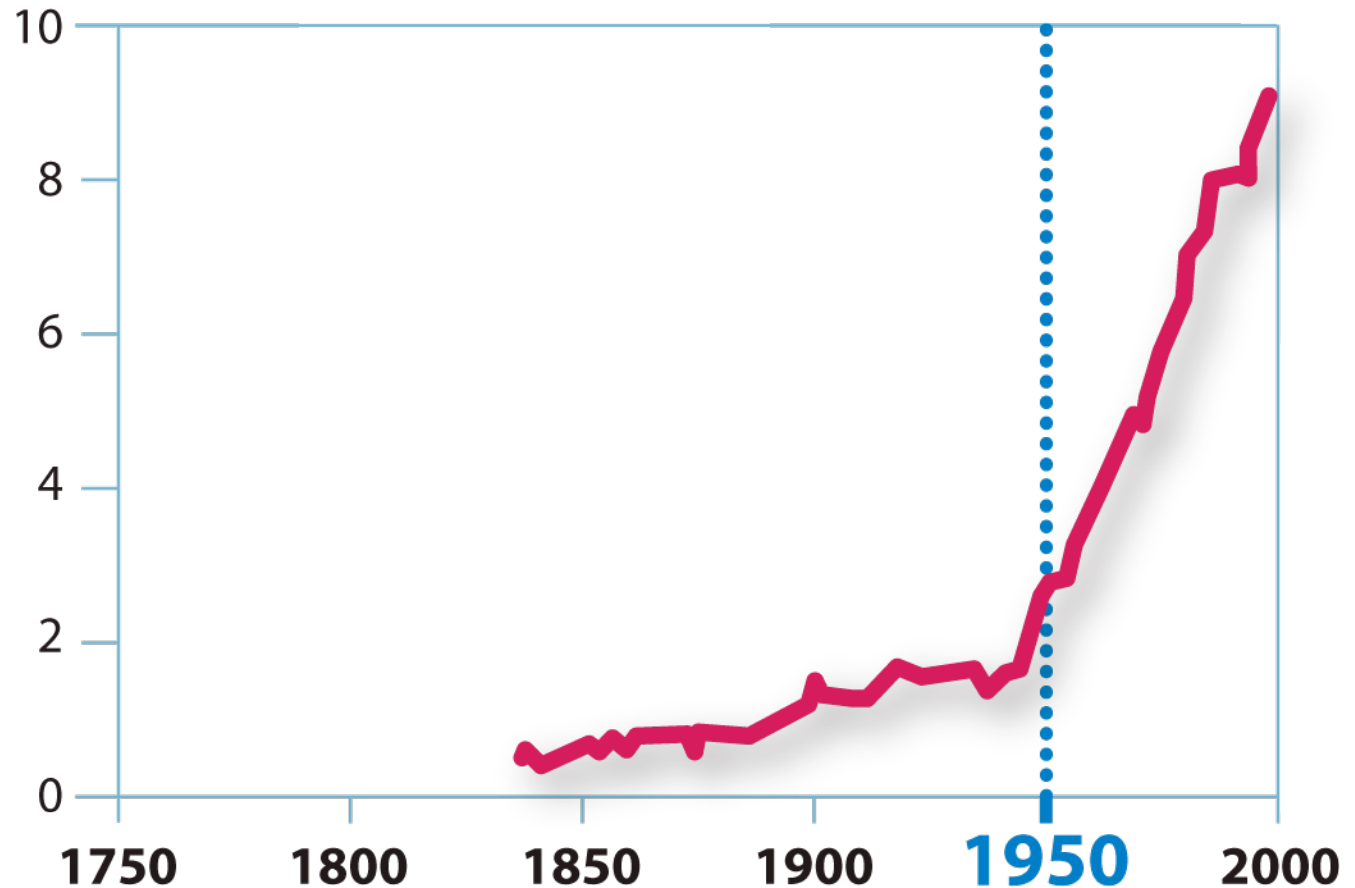


Mathematically calculated rate of extinction. Source: Wilson (1992) The diversity of life, the Penguin Press.  
IGBP synthesis: Global Change and the Earth System, Steffen et al 2004



# Pollution of coastal waters (creation of dead zones) from nitrogen (fertilizer)

(10<sup>12</sup> moles year<sup>-1</sup>)



Model-calculated partitioning of the human-induced nitrogen perturbation fluxes in the global coastal margin for the period since 1850. Source: Mackenzie et al. (2002) Chem. Geology 190:13-32

IGBP synthesis: Global Change and the Earth System, Steffen et al 2004



# Environment Scorecard 2012



This Scorecard's rating of progress on each issue (including ratings split between two categories) is explained in the text of this report.



We have entered the Anthropocene  
where humans dominate the planet -  
changing the climate, destroying  
biodiversity, overexploiting resources  
and polluting oceans

Many millions of people lack access to  
food, safe water, adequate energy....

How can research on global  
environmental change guide our future ?



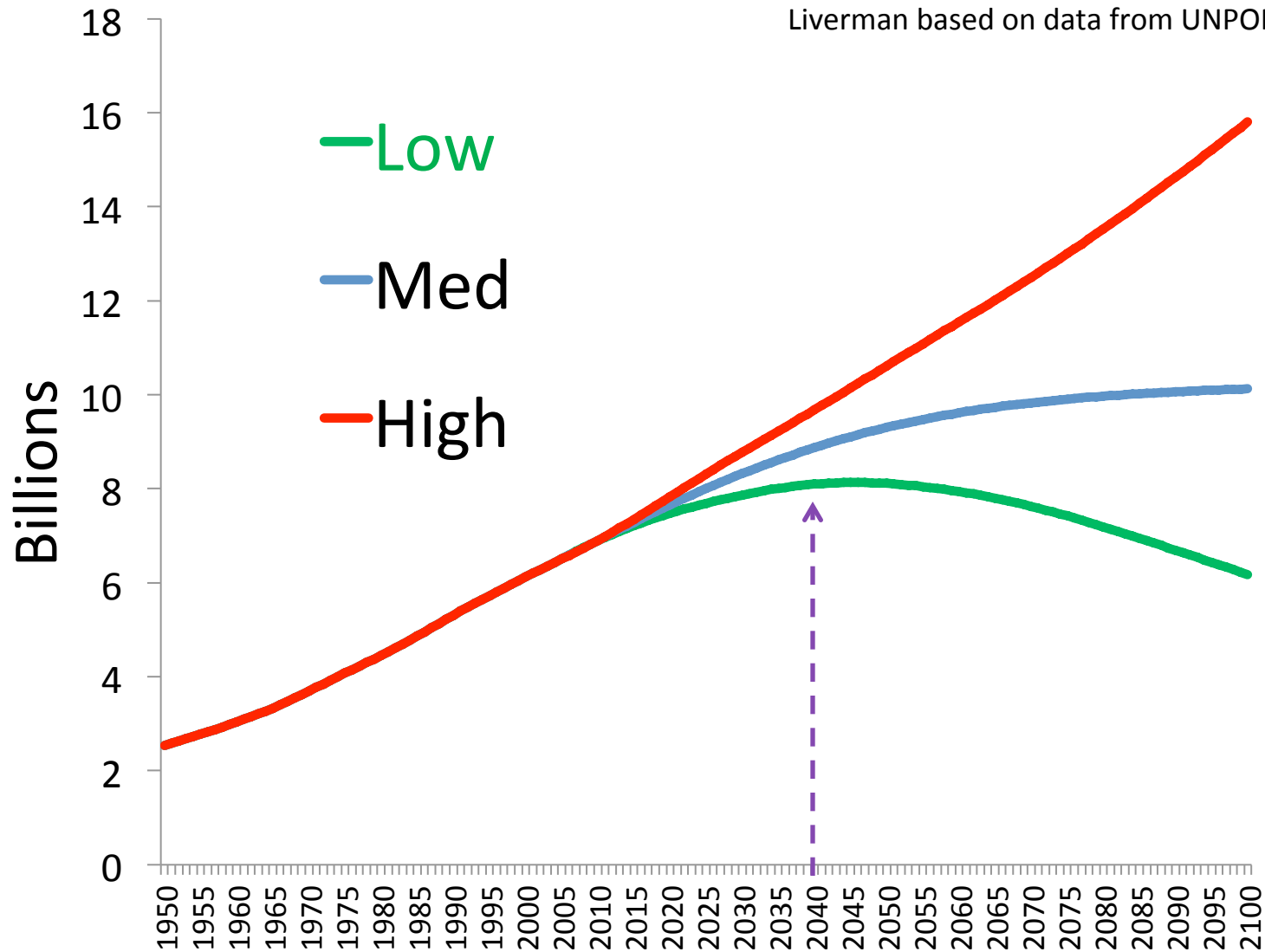


“Research now demonstrates that the continued functioning of the Earth system as it has supported the well-being of human civilization in recent centuries is at risk. Without urgent action, we could face threats to water, food, biodiversity and other critical resources: these threats risk intensifying economic, ecological and social crises, creating the potential for a humanitarian emergency on a global scale. In one lifetime our increasingly interconnected and interdependent economic, social, cultural and political systems have come to place pressures on the environment that may cause fundamental changes in the Earth system and move us beyond safe natural boundaries.”



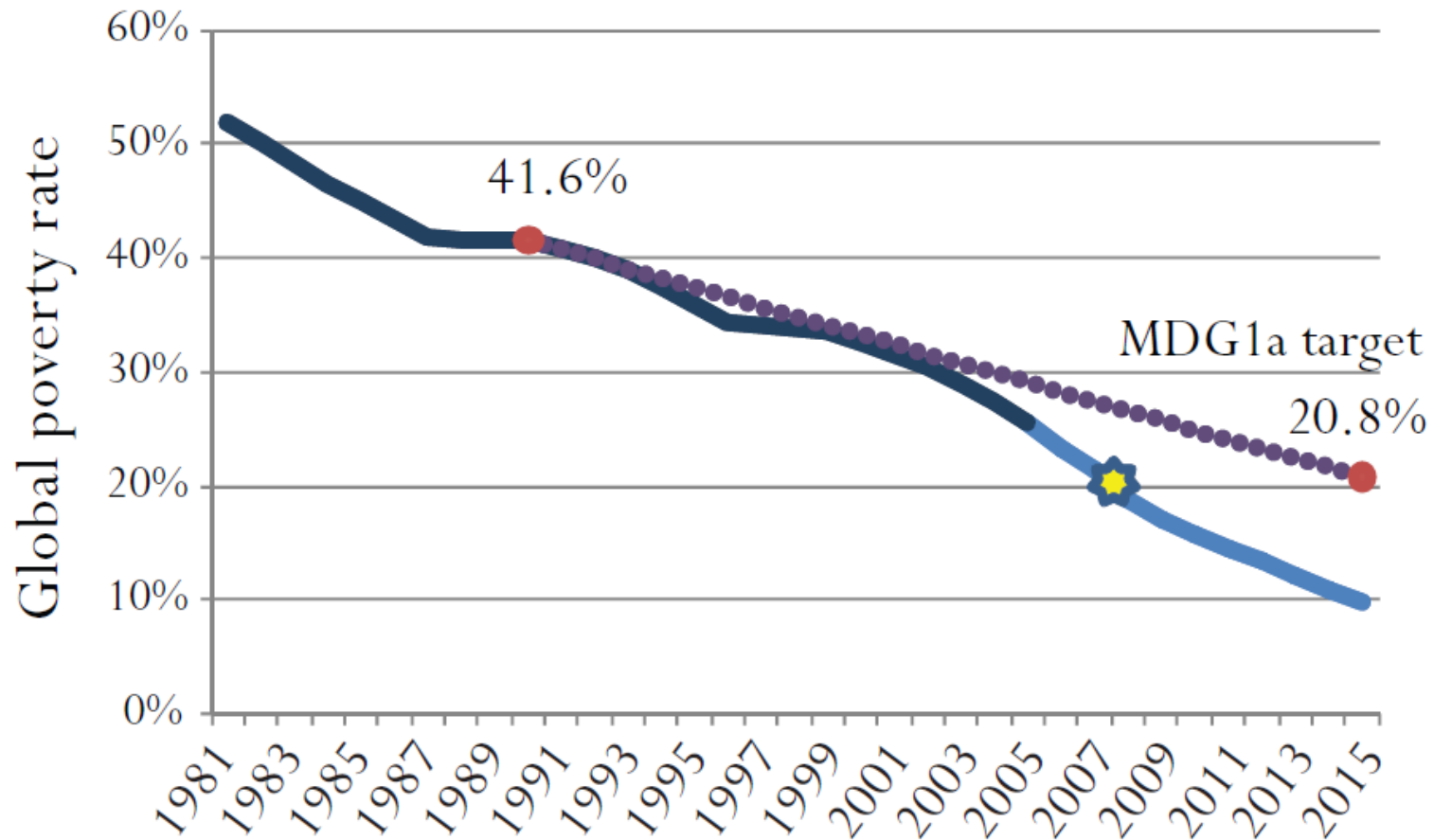
# World population growth is slowing

Liverman based on data from UNPOPIN, 2012





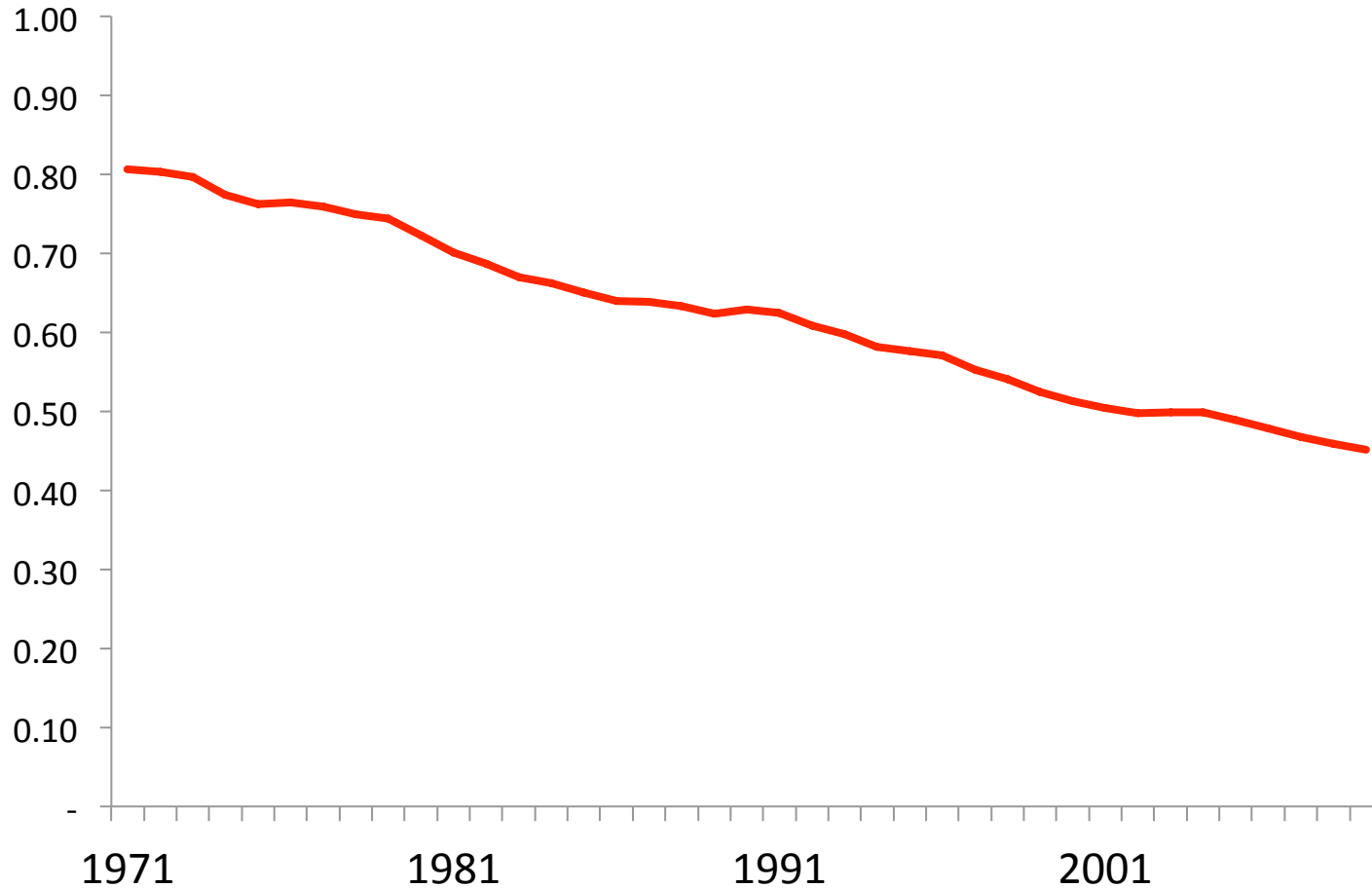
## Changes in poverty and inequality



Chandy and Gertz, 2011, The changing state of global poverty from 2005 to 2015, Brookings



# Decarbonization: Carbon dioxide emissions /GDP have fallen



Liverman based on data from IEA



## RIO+20 POLICY BRIEF

#1

### Water security for a planet under pressure

Transition to sustainability: interconnected challenges and solutions



Water is the common thread that links all aspects of human development. Water security is therefore vital to all development, and is the natural outcome of a sustainable world.

## RIO+20 POLICY BRIEF

#2

### Food security for a planet under pressure

Transition to sustainability: interconnected challenges and solutions



The challenge of achieving food security for all is a multi-lateral one. It will need to be increasingly impacted by strong focus on decision makers.

Rio+20 Policy Brief  
One of nine policy briefs  
Knowledge Towards

## RIO+20 POLICY BRIEF

#3

### Transforming governance and institutions for a planet under pressure

Revitalizing the institutional framework for global sustainability: Key Insights from social science research

Global environmental protection has featured high on the international political agenda since the United Nations (UN) Conference on the Human Environment in 1972. Yet, despite more than 900 environmental treaties coming into force over the past 40 years, human-induced environmental degradation is reaching unprecedented levels. Human societies must change course and steer away from critical tipping points in the earth system that might lead to rapid and irreversible change, while ensuring sustainable livelihoods for all. This requires a fundamental transformation of existing practices. If we are to achieve more sustainable development in the future, we have to reorient and restructure our national and international institutions and governance mechanisms. Incrementalism will not suffice to bring about societal change at the level required; the world needs structural change in global governance.

The 2012 UN Conference on Sustainable Development must become a major stepping stone towards introducing a stronger institutional framework for sustainable development. We urge decision makers to seize this opportunity to develop a clear and ambitious roadmap for institutional change and bring about fundamental reform of current sustainability governance within the next decade. This policy brief outlines the core areas needing most urgent action.

**Rio+20 Policy Briefs**  
One of nine policy briefs produced by the scientific community to inform the United Nations Conference on Sustainable Development (Rio+20). These briefs were commissioned by the international conference Planet Under Pressure: New Knowledge Towards Solutions ([www.planetunderpressure2012.net](http://www.planetunderpressure2012.net)).

## RIO+20 POLICY BRIEF

#4

### Biodiversity and ecosystems for a planet under pressure

Transition to sustainability: interconnected challenges and solutions



We share our basic negative, ecological and shifts towards

Rio+20 Policy Brief  
One of nine policy briefs  
Knowledge Towards

GLOBAL IGBP CHANGE

## RIO+20 POLICY BRIEF

#5

### Interconnected risks and solutions for a planet under pressure

Transition to sustainability in the context of a green economy and institutional frameworks for sustainable development

The 2012 United Nations Rio+20 Summit must be seen in the context of a significant expansion of the scientific knowledge base. We now know significantly more about the Earth system and the risks it poses to human development.

The urgent global crisis: economic climate change, interconnected risks and solutions. This policy brief examines the risk of cascading and compounding risks and the need for a shift to a green development.

Rio+20 Policy Brief  
One of nine policy briefs  
Knowledge Towards

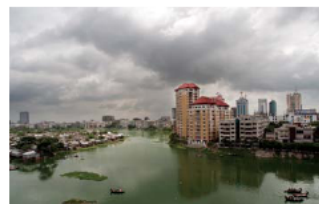
GLOBAL IGBP CHANGE

## RIO+20 POLICY BRIEF

#6

### Human well-being for a planet under pressure

Transition to social sustainability



Our rapidly increasing and urbanizing global population is facing unprecedented food, energy, economic and security crises, which are being compounded by climate change and extreme environmental events. As planetary boundaries are placed under increasing stress, so too are social bonds, relations and thresholds. This policy brief examines the need for urgent, innovative solutions and sets out key messages and recommendations that will guide humanity on the road to a more sustainable socioeconomic and ecological future.

**Rio+20 Policy Briefs**  
One of nine policy briefs produced by the scientific community to inform the United Nations Conference on Sustainable Development (Rio+20). These briefs were commissioned by the international conference Planet Under Pressure: New Knowledge Towards Solutions ([www.planetunderpressure2012.net](http://www.planetunderpressure2012.net)).

## RIO+20 POLICY BRIEF

#7

### A green economy for a planet under pressure



Humanity is facing a series of 'green' economic challenges: rapidly diminishing resources and changes to transform and monitor

Rio+20 Policy Brief  
One of nine policy briefs  
Knowledge Towards

GLOBAL IGBP CHANGE

## RIO+20 POLICY BRIEF

#8

### An energy vision for a planet under pressure

Transformation to sustainability: interconnected challenges and solutions



We are facing a series of 'green' economic challenges: rapidly diminishing resources and changes to transform and monitor

Rio+20 Policy Brief  
One of nine policy briefs  
Knowledge Towards

GLOBAL IGBP CHANGE

## RIO+20 POLICY BRIEF

#9

### Global health for a planet under pressure

Transition to sustainability: interconnected challenges and solutions



A female community health worker (CHW) supports mothers in the Mumbai community where she lives.

"Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature." Principle One of the Rio Declaration. Multiple environmental stresses and rapid social change reinforce the need for better evidence – evidence that is robust and the product of interdisciplinary and intersectoral collaboration. The potential benefits to health from sound environmental policies are significant. Human health is a key indicator of sustainable development. We need to monitor changes in human population health in order to evaluate progress on global sustainability.

**Rio+20 Policy Briefs**  
One of nine policy briefs produced by the scientific community to inform the United Nations Conference on Sustainable Development (Rio+20). These briefs were commissioned by the international conference Planet Under Pressure: New Knowledge Towards Solutions ([www.planetunderpressure2012.net](http://www.planetunderpressure2012.net)).



# Rio+20





## The objective of the UN Conference on Sustainable Development will be to

- secure renewed political commitment for sustainable development;
- assess the progress to date and the remaining gaps in the implementation of the outcomes of the major summits on sustainable development;
- address new and emerging challenges;

## The focus of the Conference, 2012 will include

- a **green economy** in the context of sustainable development and poverty eradication;
- reform the **institutional framework** for sustainable development;





# ICSU Science Technology and Innovation Forum





# UN High Level Panel on Sustainability



FINAL UNEDITED VERSION

## The Future We Choose

### Declaration from the High-level dialogue on Global Sustainability

17 June 2012, Rio de Janeiro

**We are concerned.** The scientific evidence is unequivocal. We are on the threshold of a future with unprecedented environmental risks. The combined effects of climate change, resource scarcity, loss of biodiversity and ecosystem resilience at a time of increased demand, poses a real threat to humanity's welfare. Such a future generates unacceptable risks that will undermine the resilience of the planet and its inhabitants. We have generated our own geological epoch, the Anthropocene. In this epoch, there is an unacceptable risk that human pressures on the planet, should they continue on a business as usual trajectory, will trigger abrupt and irreversible changes with catastrophic outcomes for human societies and life as we know it.

**We believe.** With bold and courageous leadership, determined action, a transition to a safe and prosperous future is possible. But both will be essential and time is running critically short. Every delay now closes off opportunities for progress and increases the burden of inequality and poverty, not only for future generations, but for those who are alive today. Yet, our generation is the first to have the privilege of understanding the full complexity of the challenges that confront us and we already have at hand the knowledge, technology and finance required to ensure a sustainable future. Indeed, the application of these tools and with a focus on addressing social and economic inequalities, empowering women and ensuring good governance, is a prerequisite to living within safe planetary boundaries.

**We Agree.** A fully integrated science-based approach is necessary to tackle the very real risks that confront us. This approach must be built upon a partnership between the public and private sectors and with civil society. It will require the full use of humanity's capacity for innovation and creativity at both global and local level and within new economic pathways that explicitly recognize the ecological limits of the planet. Such an integrated model, which reflects the scientific consensus and guided by the principles of responsibility and equity will and must provide a systemic solution that ensures the wise stewardship of the planet and its peoples.

A new narrative for a prosperous future is needed. The time to act is now!

**We call upon** world leaders to move beyond aspirational statements and exercise a collective responsibility, seizing the historic opportunity offered by the Rio 2012 summit to set our world on a sustainable path by:

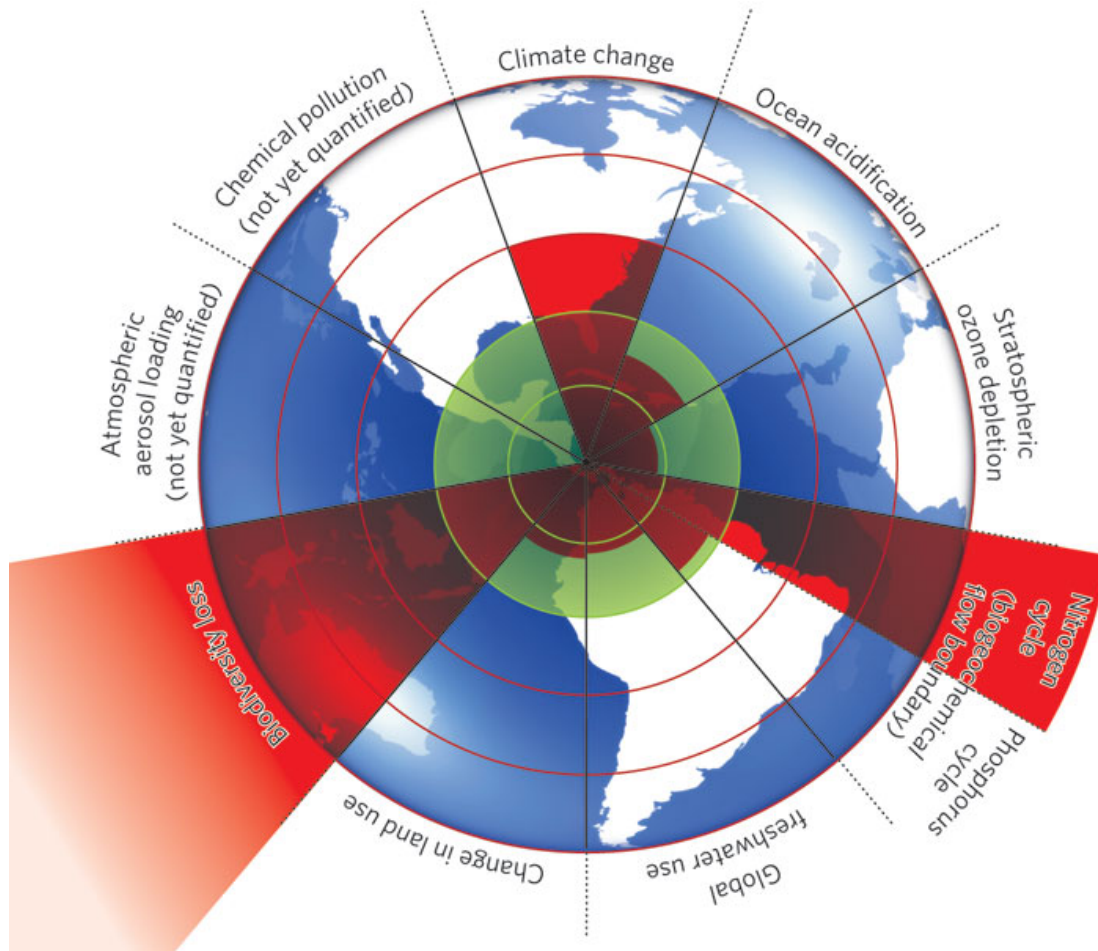
- **Ensuring responsible planetary stewardship** by strengthening the multilateral assessments and institutions for sustainable development at all levels, from global to local, including all stakeholders, and taking an integrated approach to equity, the economy and the environment.
- **Taking urgent action to meet the global needs** for food, water and energy in a sustainable manner, avoiding dangerous climate change, safeguarding biodiversity on Earth, and managing the oceans sustainably.
- **Rethinking the economic model**, as well as patterns of production and consumption, by decoupling growth and prosperity from resource use, moving beyond GDP as a measure of society's progress, encouraging innovation and sustainable long-term investments, and putting a price on natural resources including carbon.
- **Starting a global transformation** - The year 2015 marks a critical juncture and a roadmap of decisive action is now urgently required. We urge the fulfillment of the MDGs; the adoption of

the future





# Planetary Boundaries



## FEATURE

### A safe operating space for humanity

Identifying and quantifying planetary boundaries that must not be transgressed could help prevent human activities from causing unacceptable environmental change, argue **Johan Rockström** and colleagues.

Although Earth has undergone many periods of significant environmental change, the planet's environment has been unusually stable for the past 10,000 years<sup>1,2</sup>. This period of stability — known to geologists as the Holocene — has seen human civilisations arise, develop and thrive. Such stability may now be under threat. Since the Industrial Revolution, a new era has arisen, the Anthropocene<sup>3</sup>, in which human activities have become the main driver of global environmental change<sup>4</sup>. This could see human activities push the Earth system outside the stable environmental state of the Holocene, with consequences that are detrimental or even catastrophic for large parts of the world. During the Holocene, environmental change occurred naturally and Earth's regulatory capacity maintained the conditions that enabled human development. Regular temperatures, freshwater availability and biogeochemical flows all stayed within a relatively narrow range. Now, largely because of a rapidly growing reliance on fossil fuels and



#### SUMMARY

- New approach proposed for defining preconditions for human development
- Crossing certain biophysical thresholds could have disastrous consequences for humanity
- Three of nine interlinked planetary boundaries have already been overstepped

Industrialized forms of agriculture, human activities have reached a level that could damage the system that keeps Earth in the desirable Holocene state. The result could be irreversible and, in some cases, abrupt environmental change, leading to a state less conducive to human development<sup>5</sup>. Without pressure from humans, the Holocene is expected to continue for at least several thousands of years<sup>6</sup>.

#### Planetary boundaries

To meet the challenge of maintaining the Holocene state, we propose a framework based on 'planetary boundaries'. These

boundaries define the safe operating space for humanity with respect to the Earth system and are associated with the planet's biophysical subsystems or processes. Although Earth's complex systems sometimes respond smoothly to changing pressures, it seems that this will prove to be the exception rather than the rule. Many subsystems of Earth react in a nonlinear, often abrupt, way, and are particularly sensitive around threshold levels of certain key variables. If these thresholds are crossed, then important subsystems, such as a monsoon system, could shift into a new state, often with deleterious or potentially even disastrous consequences for humans<sup>7,8</sup>.

Most of these thresholds can be defined by a critical value for one or more control variables, such as carbon dioxide concentration. Not all processes or subsystems on Earth have well-defined thresholds, although human actions that undermine the resilience of such processes or subsystems — for example, land and water degradation — can increase the risk that thresholds will also be crossed in other processes, such as the climate system.

We have tried to identify the Earth-system processes and associated thresholds which, if crossed, could generate unacceptable environmental change. We have found nine such processes for which we believe it is necessary to define planetary boundaries: climate change; rate of biodiversity loss (terrestrial and marine); interference with the nitrogen and phosphorus cycles; stratospheric ozone depletion; ocean acidification; global freshwater use change in land use; chemical pollution; and atmospheric aerosol loading (see Fig. 1 and Table).

In general, planetary boundaries are values for control variables that are either at a 'safe' distance from thresholds — for processes with evidence of threshold behaviour — or at dangerous levels — for processes without

**Figure 1** Beyond the boundary. The inner green shading represents the proposed safe operating space for nine planetary systems. The red ring represents an estimate of the current position for each variable. The boundaries in three systems (rate of biodiversity loss, climate change and human interference with the nitrogen cycle), have already been exceeded.

472

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Johan Rockström, Will Steffen, Kevin Noone, Åsa Persson, F. Stuart Chapin, Eric F. Lambin, Timothy M. Lenton, Marten Scheffer, Carl Folke, Hans Joachim Schellnhuber, Björn Nykvist, Cynthia A. de Wit, Terry Hughes, Sander van der Leeuw, Henning Rodhe, Sverker Sörlin, Peter K. Snyder, Robert Costanza, Uno Svedin, Malin Falkenmark, Louise Karlberg, Robert W. Corell, Victoria J. Fabry, James Hansen, Brian Walker, Diana Liverman, Katherine Richardson, Paul Crutzen, Jonathan A. Foley 2009. Planetary Boundaries: Exploring the safe operating space for humanity in the Anthropocene (*Nature*, 461 : 472 – 475, Sept 24 - 2009)



- One of 9 policy briefs by scientific community to inform the Rio+20 summit



The conference should focus on assessing the governance reforms required to put the planet on a more sustainable path



**Environment**  
 Rio+20 Earth summit  
 Carbon emissions  
 Climate change  
 Sustainable development

**Global development**  
 Environmental sustainability

**More comment**



**A** larger | smaller

**Environment**  
Rio+20 Earth summit ·  
Carbon emissions ·  
Climate change ·  
Sustainable development

**Global development**  
Environmental  
sustainability

[More comment](#)



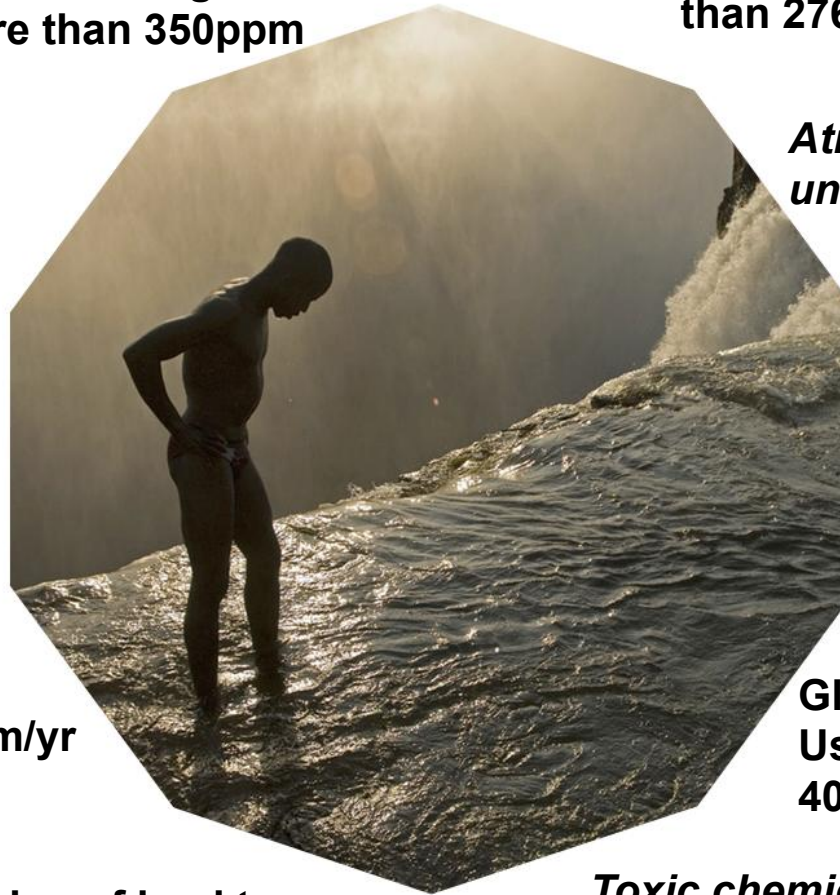
# A safe operating space for humanity: planetary boundaries

**Climate Change:**  
no more than 350ppm

**Ozone Depletion:** no less  
than 276 Du

**Atmospheric Aerosols:**  
*unknown as yet*

**Nitrogen pollution:**  
no more than 35 mt/y



**Ocean Acidification:**  
no more than 2.75

**Global Freshwater  
Use:** no more than  
4000 cu km/yr

**Biodiversity Loss:** no  
more than 10 species/m/yr

**Conversion of land to  
agriculture:** no more than 15%  
land

**Toxic chemicals:**  
*unknown as yet*



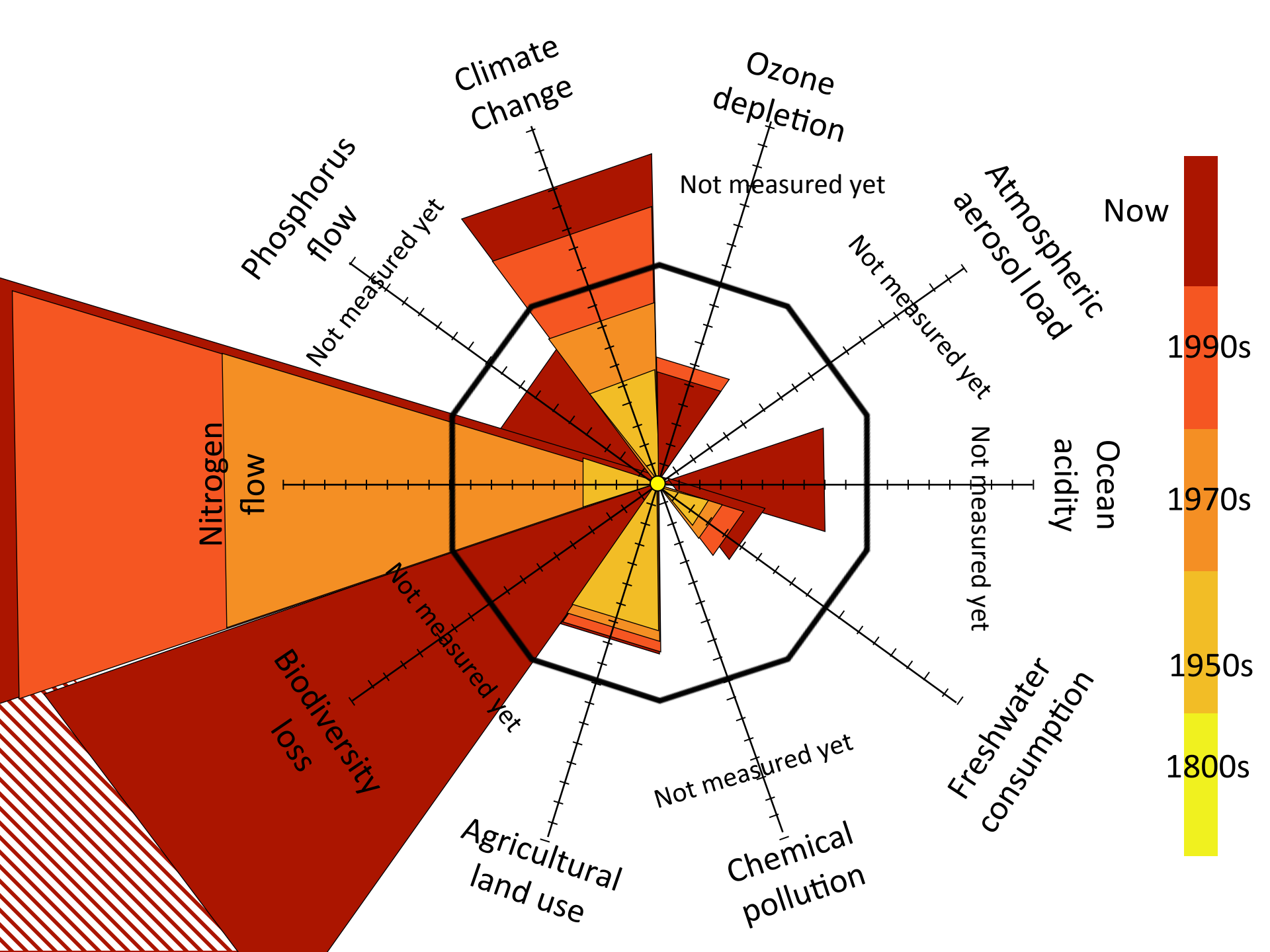
# Where do we set the planetary boundaries?

At a safe distance from the threshold

- To give us time to change
- Because some of the thresholds are still uncertain









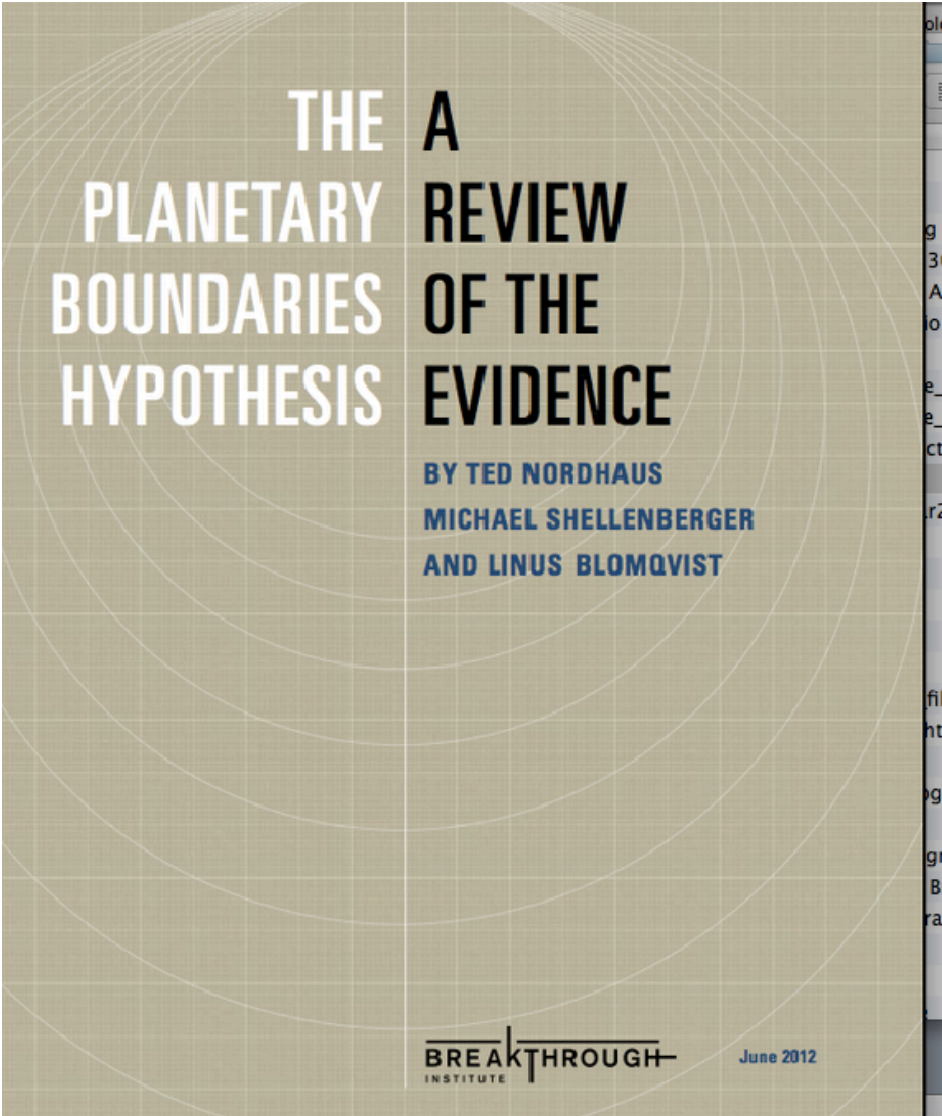




## Bracketed planetary boundaries

- EU proposes text on planetary boundaries, US and G77 oppose
- We recognize the important contribution of the scientific and technological community to sustainable development. We are committed to working with and fostering collaboration among academic, scientific and technological community, in particular in developing countries, to close the technological gap between developing and developed countries, strengthen the science-policy interface as well as to foster international research collaboration [including in the area of planetary boundaries – EU; US, G77 delete].
- *48. We recognize the important contribution of the scientific and technological community to sustainable development. We are committed to working with and fostering collaboration among academic, scientific and technological community, in particular in developing countries, to close the technological gap between developing and developed countries, strengthen the science-policy interface as well as to foster international research collaboration on sustainable development.*





# THE PLANETARY BOUNDARIES HYPOTHESIS

# A REVIEW OF THE EVIDENCE

BY TED NORDHAUS  
MICHAEL SHELLENBERGER  
AND LINUS BLOMQVIST

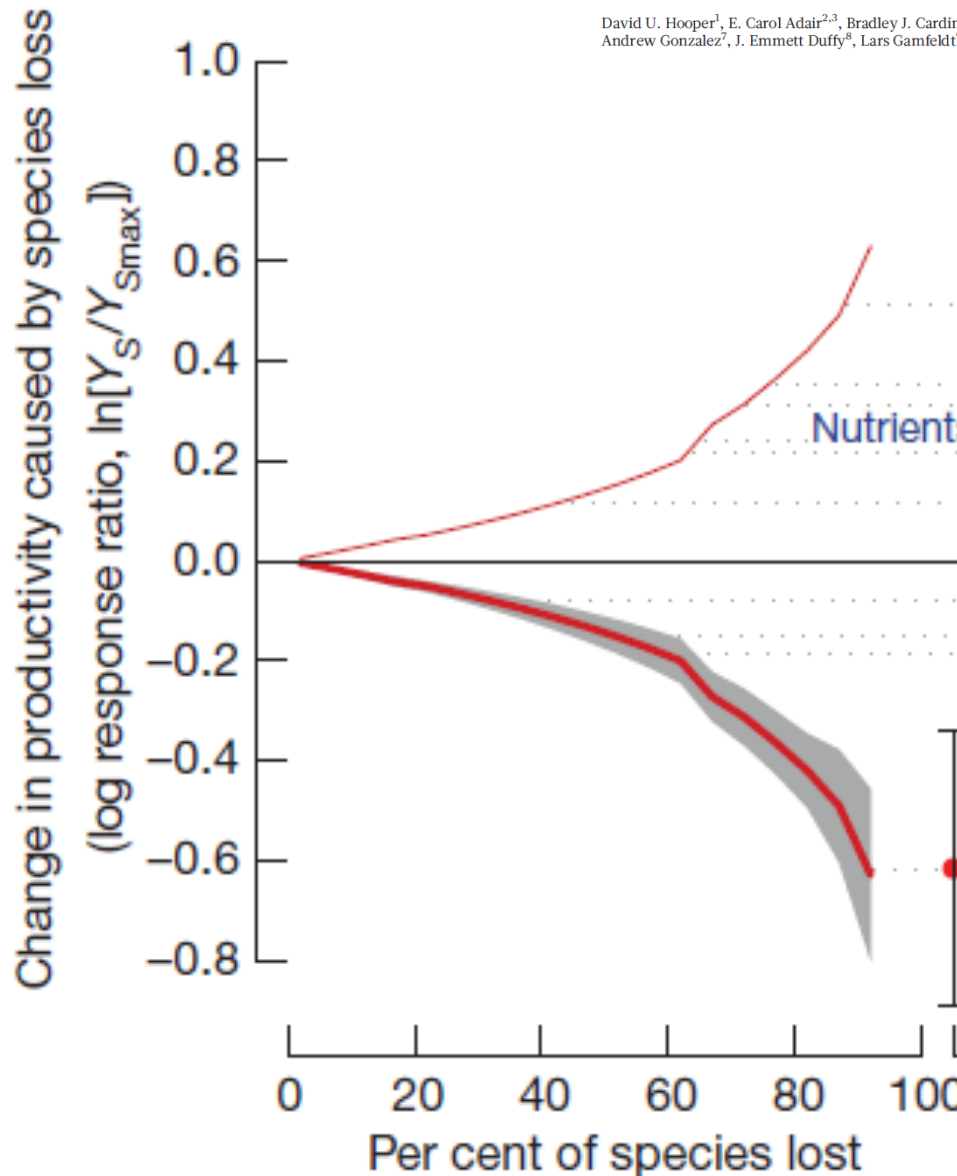
BREAKTHROUGH  
INSTITUTE

June 2012



## A global synthesis reveals biodiversity loss as a major driver of ecosystem change

David U. Hooper<sup>1</sup>, E. Carol Adair<sup>2,3</sup>, Bradley J. Cardinale<sup>4</sup>, Jarrett E. K. Byrnes<sup>2</sup>, Bruce A. Hungate<sup>5</sup>, Kristin L. Matulich<sup>6</sup>, Andrew Gonzalez<sup>7</sup>, J. Emmett Duffy<sup>8</sup>, Lars Gamfeldt<sup>9</sup> & Mary I. O'Connor<sup>2,10</sup>



## REVIEW

doi:10.1038/nature11148

## Biodiversity loss and its impact on humanity

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

Loss of species  
reduces  
ecosystem  
productivity



## Voices of youth in Rio



If these sheets of paper are our common future, then you have sold our fate and subsidised our common destruction. Where was our voice, the voice of our children and grandchildren in this? How can you listen to them in the future if you did not show the will to create the space now?

We have one planet. Our being, our thinking, and our action should not be constrained by national boundaries but by planetary ones. You failed to liberate yourself from national and corporate self-interest and recognise our need to respect a greater more transcendental set of boundaries.



## NGO response



You cannot have a document titled 'the future we want' without any mention of planetary boundaries, tipping points, or the Earth's carrying capacity. The text as it stands is completely out of touch with reality. Just to be clear, NGOs here in Rio in no way endorse this document. Already more than 1,000 organisations and individuals have signed in only one day a petition called "The Future We Don't Want" that completely refuses the current text. It does not in any way reflect our aspiration, and therefore we demand that the words "in full participation with civil society" are removed from the first paragraph.







# Earth System Governance

***Incremental change is not sufficient***

***Structural change is needed in global governance***

1. Reform and upgrade UN Environment agencies UNEP >Agency
2. Strengthen integration of sustainable development policies from local to global (UN SDC under UNGA with G20 emphasis)
3. Close key global regulatory gaps (emerging technologies such as geoengineering)
4. Greater protection of environment in economic governance (trade, finance)
5. Decisions through majority based not consensus
6. Increase accountability and transparency of intergovernmental institutions
7. Emphasis on equity and fairness

[Biermann et al. 2012a,b,c]











# Rio+20 Final Plenary





Word Cloud - Final Rio+20 Text





## Action Language in the Text





## Responses to Rio+20

- Oxfam:
  - Rio will go down as the hoax summit. They came, they talked, but they failed to act. Paralysed by inertia and in hock to vested interests, too many [world leaders] are unable to join up the dots and solve the connected crisis of environment, equality and economy.”
- Greenpeace:
  - We didn't get the Future We Want in Rio, because we do not have the leaders we need. The leaders of the most powerful countries supported business as usual, shamefully putting private profit before people and the planet. The approach that has been taken is to go for the lowest common denominator. The trick here is to look very carefully at the UN-ese language being used. If they use the word voluntary, it means it is not going to happen.
- WWF:
  - It's pathetic. If this text proposed by Brazil is accepted, then the last year of negotiations has been a colossal waste of time.



## What did we get

- An agreement.....that sustained 1992 commitments and vision
- Strengthened UNEP
- High Level Forum on Sustainable Development
- Sustainable Development Goals
- \$500 billion in voluntary pledges
- Energy for All initiative
- Framework on Sustainable Consumption
- UNCLOS and marine biodiversity
- Business Commitments
- Future Earth



# World Business Council on Sustainable Development



Peter Bakker

- You can go home from Rio totally frustrated and create absolutely nothing, but if you see the result as half full, despite the disappointment, you will see hooks for processes, dialogues and for agreements around targets.
- I will go back to the office and will write a positive and tough message to my members saying now it is time to kick into action. We need to create coalitions of the people who want to be good, who have plans to progress and make it attractive for other people to follow. The 20% of really bad guys we need to regulate out of existence.”
- I don't want self-satisfaction, which I saw at the corporate leaders forum in Rio, or people bringing me stories of CSR achievements. The truth is if you add up all the CSR programmes across the world and all the 200 plus commitments from this week, we are not nearly going to save the world.





photos: www.dawide.com

# A new contract between Science and Society: Future Earth





## Why Future Earth?

- The challenges of global environmental change and sustainable development require a new way of doing research:
  - *International*
  - *Interdisciplinary – natural, social ...*
  - *Collaborative*
  - *Co-designed*
  - *Responsive to society and grand challenges of sustainability*
  - *Builds on the success of current international research programs*



## Future Earth focuses on..

- Linking fundamental to actionable Earth system research for global sustainability and solutions
- Answers to complex questions that require international collaboration and coordination
- Co-design and co-production of knowledge
- Integration of natural, economic, engineering, arts, humanities and social sciences
- Regional to global scale







photos: [www.dawide.com](http://www.dawide.com)

# Future Earth

Will provide the knowledge required for societies in the world to face risks posed by global environmental change and to seize opportunities in a transition to global sustainability



# Future Earth

## ***Proposed Integrated Research Themes***

**A Changing Planet:** Understanding earth and societal system trends, drivers, processes, and projections

**Pivotal places:** Cities, regions, and critical biomes

**Global Responses:** Managing change and governing the environment

**Resources for development and wellbeing:** ensuring a sustainable future with secure and fair access to food, water, clean air, health, materials and ecosystem services

**Reducing the risk of catastrophes:** Global thresholds and disaster risk reduction

**Transformative Pathways:** Fundamental changes and innovations for a sustainable, inclusive and prosperous future earth

**Low Carbon Societies:** Linking climate change, energy and the economy

**Living with the Sea:** Oceans, coasts and blue societies

Other themes to be proposed and co-designed by the community.....



# For more information on Future Earth

[Who](#)[Vision](#)[What's new?](#)[Media centre](#)

Strengthening international science for the benefit of society

[Home](#)[Who](#)[Vision](#)[What's new?](#)[Media centre](#)

## Future Earth will be a global platform to deliver:

- **Solution-orientated** research for sustainability, linking environmental change and development challenges to satisfy human needs for food, water, energy, health;
- **Effective interdisciplinary collaboration** across natural and social sciences, humanities, economics, and technology development, to find the best scientific solutions to multi-faceted problems;
- **Timely information for policy-makers** by generating the knowledge that will support existing and new global and regional integrated assessments;
- **Participation** of policy-makers, funders, academics, business and industry, and other sectors of civil society in co-designing and co-producing research agendas and knowledge;
- **Increased capacity building** in science, technology and innovation, especially in developing countries and engagement of a new generation of scientists.

## Integrating existing endeavours

Future Earth will build on the success of existing global environmental change programmes ([Diversitas](#), [IGBP](#), [IHDP](#), [WCRP](#)), to help develop a stronger and broader community. The [Planet Under Pressure conference](#) (London, March 2012) was a step towards this goal, with wide support of Future Earth as one of its major outcomes.