

How to spin up  
research activity  
on sustainability  
issues in Future  
Earth?



Thorsten Kiefer  
Future Earth  
Secretariat

futureearth  
research for global sustainability

# futureearth

research for global sustainability

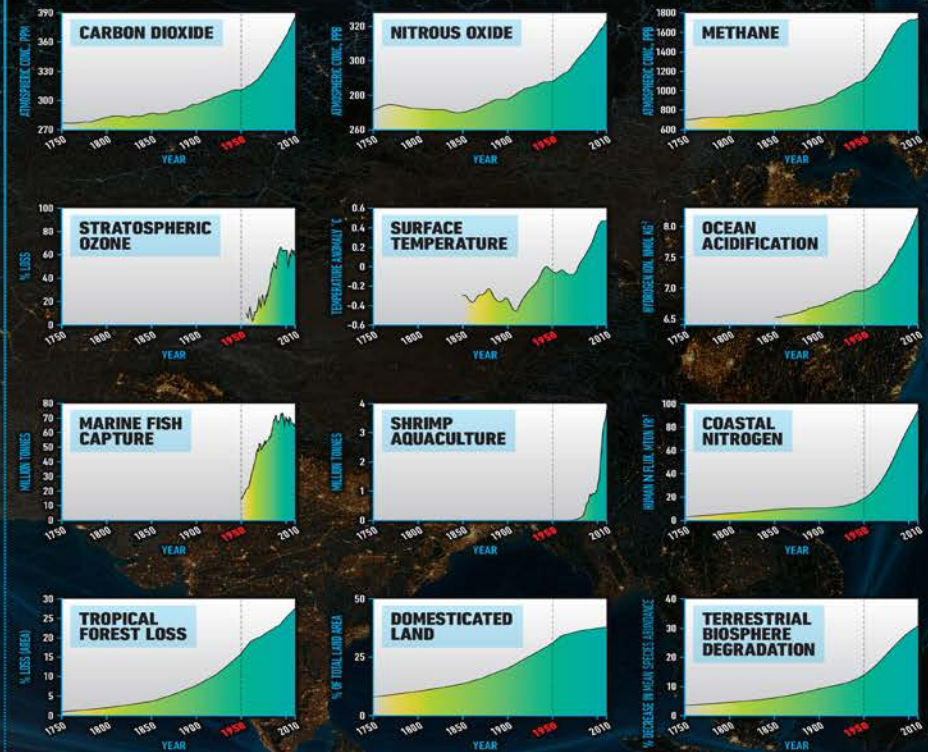
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# THE GREAT ACCELERATION

## SOCIO-ECONOMIC TRENDS



## EARTH SYSTEM TRENDS



REFERENCE: Steffen, W., W. Broadgate, L. Deutsch, O. Gaffney and C. Ludwig. The Trajectory of the Anthropocene: the Great Acceleration, *The Anthropocene Review*, 16 January 2015.

MAP & DESIGN: Félix Pharand-Deschênes / Globaia

# The Anthropocene

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**“It seems appropriate to assign the term ‘Anthropocene’ to the present, in many ways human-dominated, geological epoch.”**

Nobel Laureate Paul Crutzen  
Former IGBP Vice Chair 1998-2003  
Geology of Mankind, *Nature* 2002





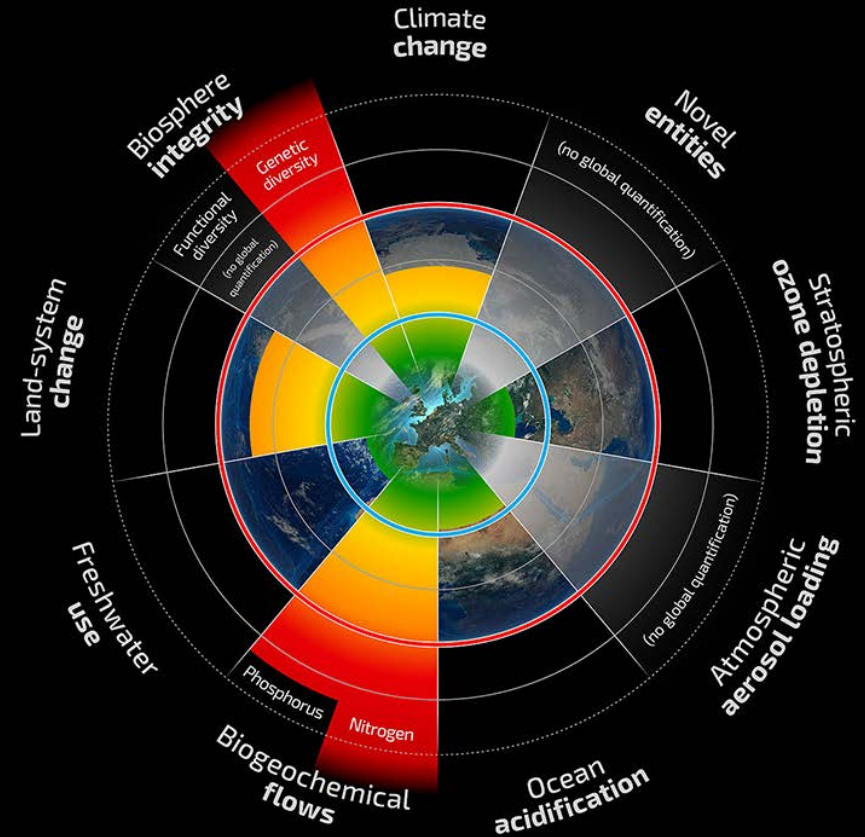
# Planetary Boundaries

A safe operating space for humanity

9 Boundaries identified

4 transgressed:

- Climate
- Biosphere integrity
- Land use (deforestation)
- Biogeochemical flows (fertiliser)



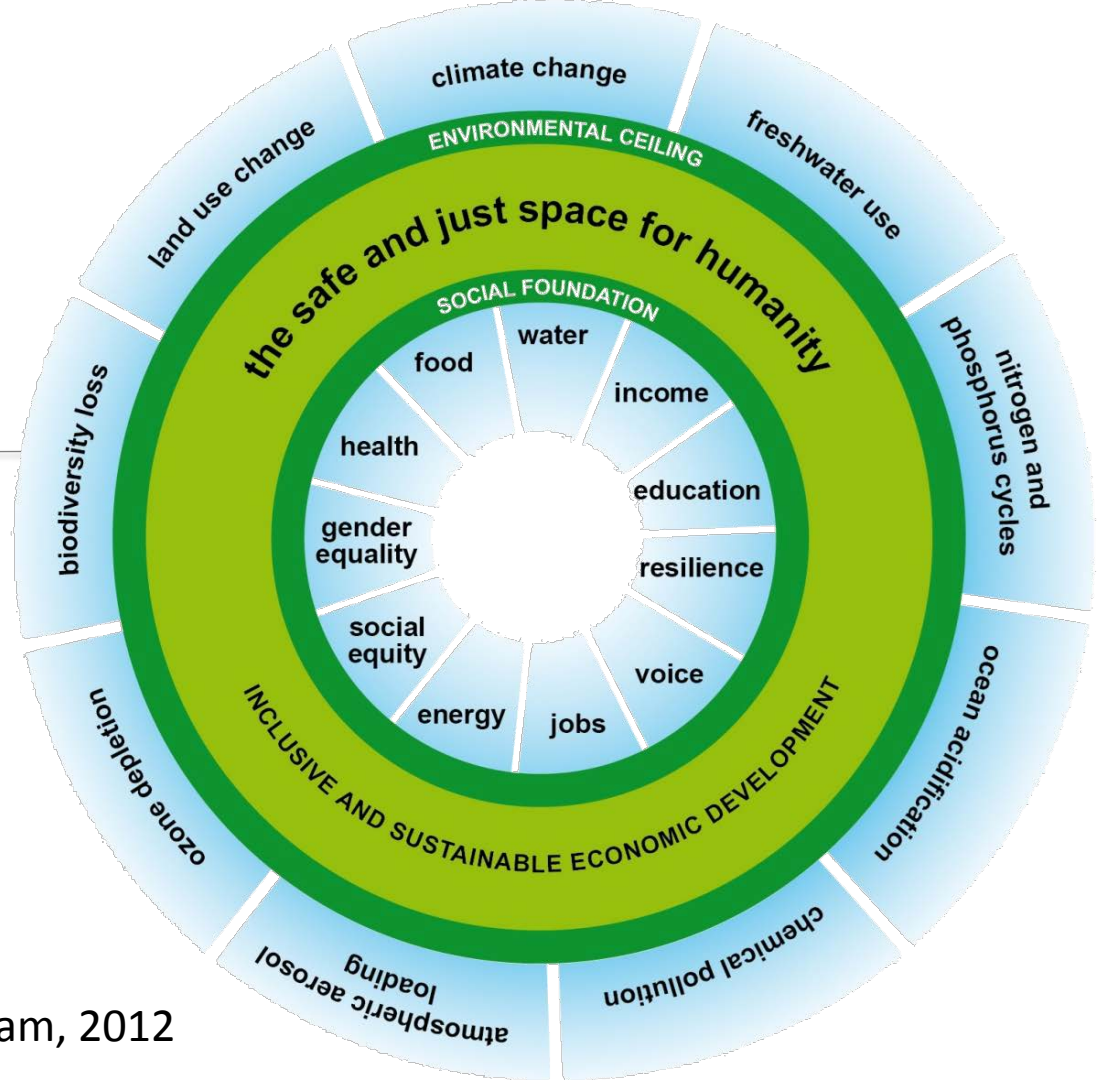
■ Beyond zone of uncertainty (high risk)  
■ In zone of uncertainty (increasing risk)  
■ Below boundary (safe)  
■ Boundary not yet quantified

Steffen et al.  
2015, *Science*

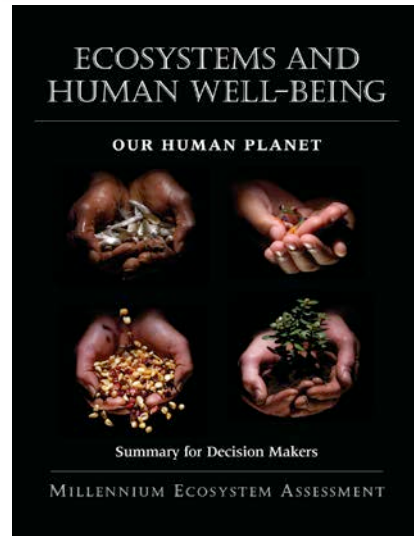
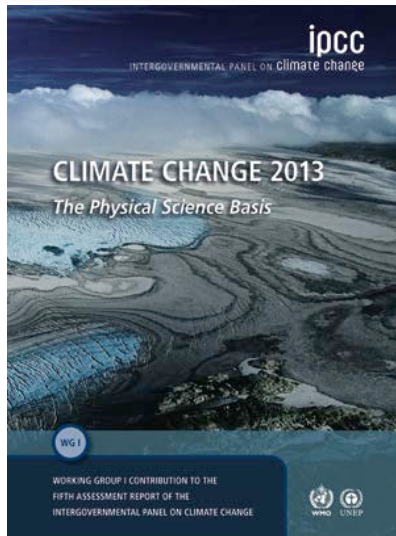
# The 'Doughnut'

A safe AND just operating space

Combining Earth system and social aspects



# Global assessments



# Sustainable Development Goals





# COP21: Paris Agreement



# Sendai Framework for Disaster Risk Reduction



United Nations



UN World Conference on  
Disaster Risk Reduction  
2015 Sendai



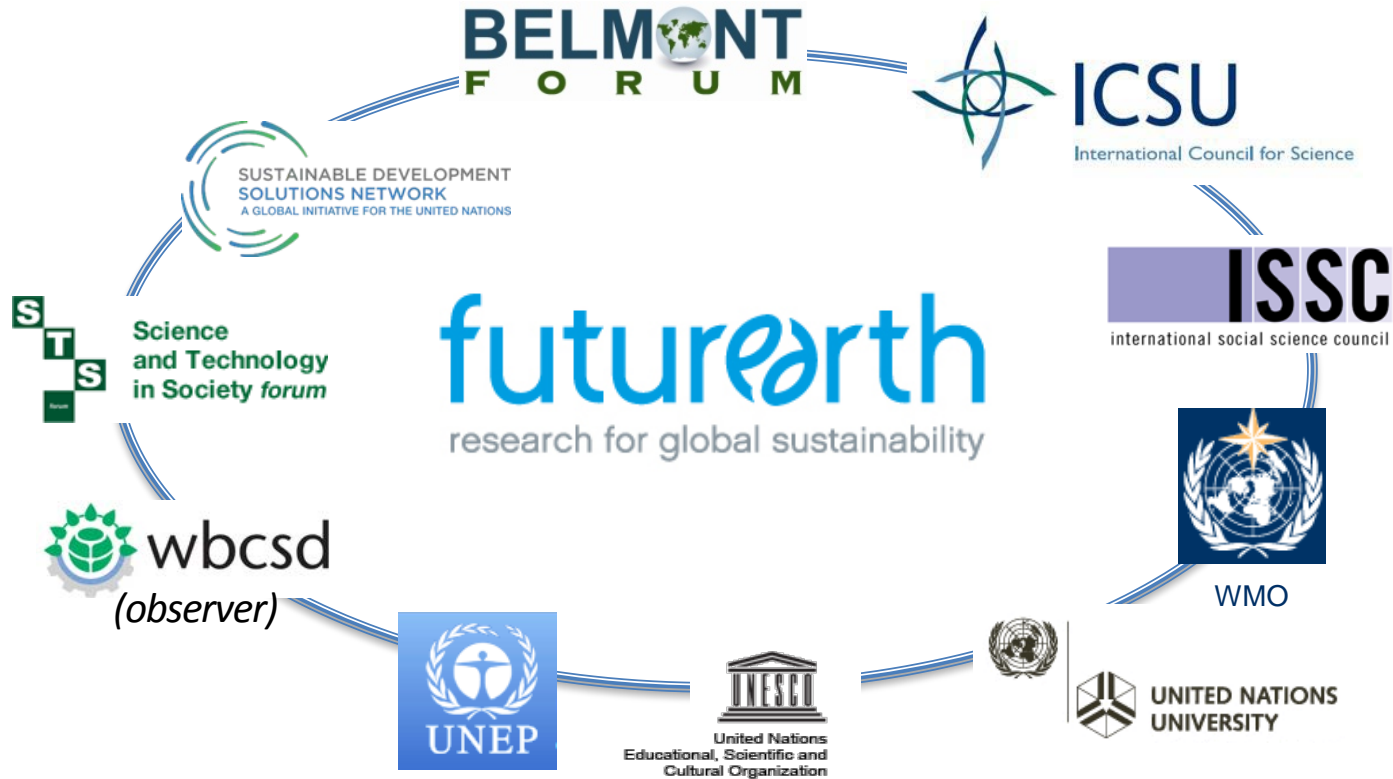
WCDRR Sendai

WCDRR Sendai

# Future Earth principles:

- Solutions
- Interdisciplinarity
- Stakeholder engagement

# Alliance creating Future Earth morphed into the Governing Council

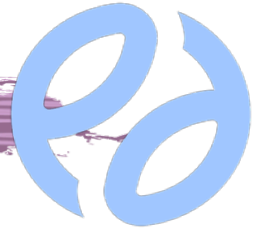




**Transition  
Team  
2011-2012**

**Future  
Earth  
Initial  
Design**

**Future Earth**



**2013**



**Earth System  
Science Partnership  
2001**

**WCRP**

World Climate Research Programme

**Established  
1980**

**GLOBAL  
IGBP  
CHANGE**

International  
Geosphere-Biosphere  
Programme

**1987**



**DIVERSITAS**

**1991**



**IHDP**

International Human Dimensions Programme  
on Global Environmental Change

**1996**



2012 Announcement at Rio+20

2013 Transition Plan

2014 Committees & Interim structures & FTIs/Clusters

2015 Secretariat

**2016 Launch of Activity**





# Research Agenda



# 8 Focal Challenges to society



Deliver water, energy, and food for all



Decarbonize socio-economic systems to stabilize the climate



Safeguard the terrestrial, freshwater and marine natural assets



Build healthy, resilient and productive cities



Promote sustainable rural futures to feed rising and more affluent populations



Improve human health through the improvement of human-environment interactions



Encourage sustainable and equitable consumption and production patterns



Increase social resilience to future threats





# 8 Focal Challenges to society





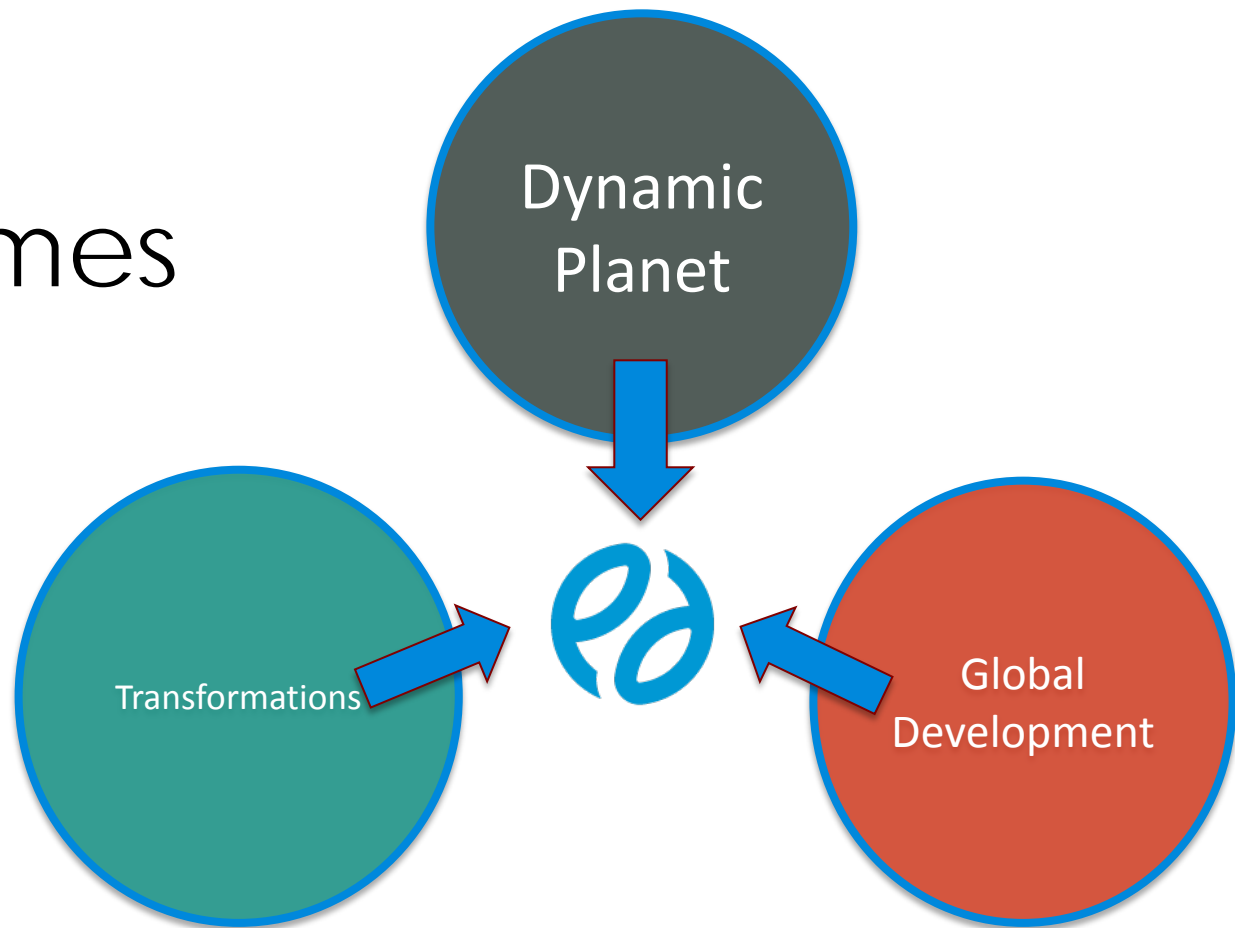
# Governance

*Increase social resilience to future threats by*

- building adaptive governance systems,*
- developing early warning of global and connected thresholds and risks,*
- and testing effective, accountable and transparent institutions that promote transformations to sustainability.*



3 themes



# Future Earth's thematic space



Future Earth Themes		Dynamic Planet	Sustainable Development	Transformations to Sustainability
2025 Vision Challenges				
1. Water, food, energy for all				
2. Decarbonise socioeconomic systems & adapt				
3. Safeguard natural assets				
4. Build healthy, resilient cities				
5. Sustainable rural futures				
6. Improve human health under GEC				
7. Sustainable consumption and prod'n				
8. Social resilience to future threats				



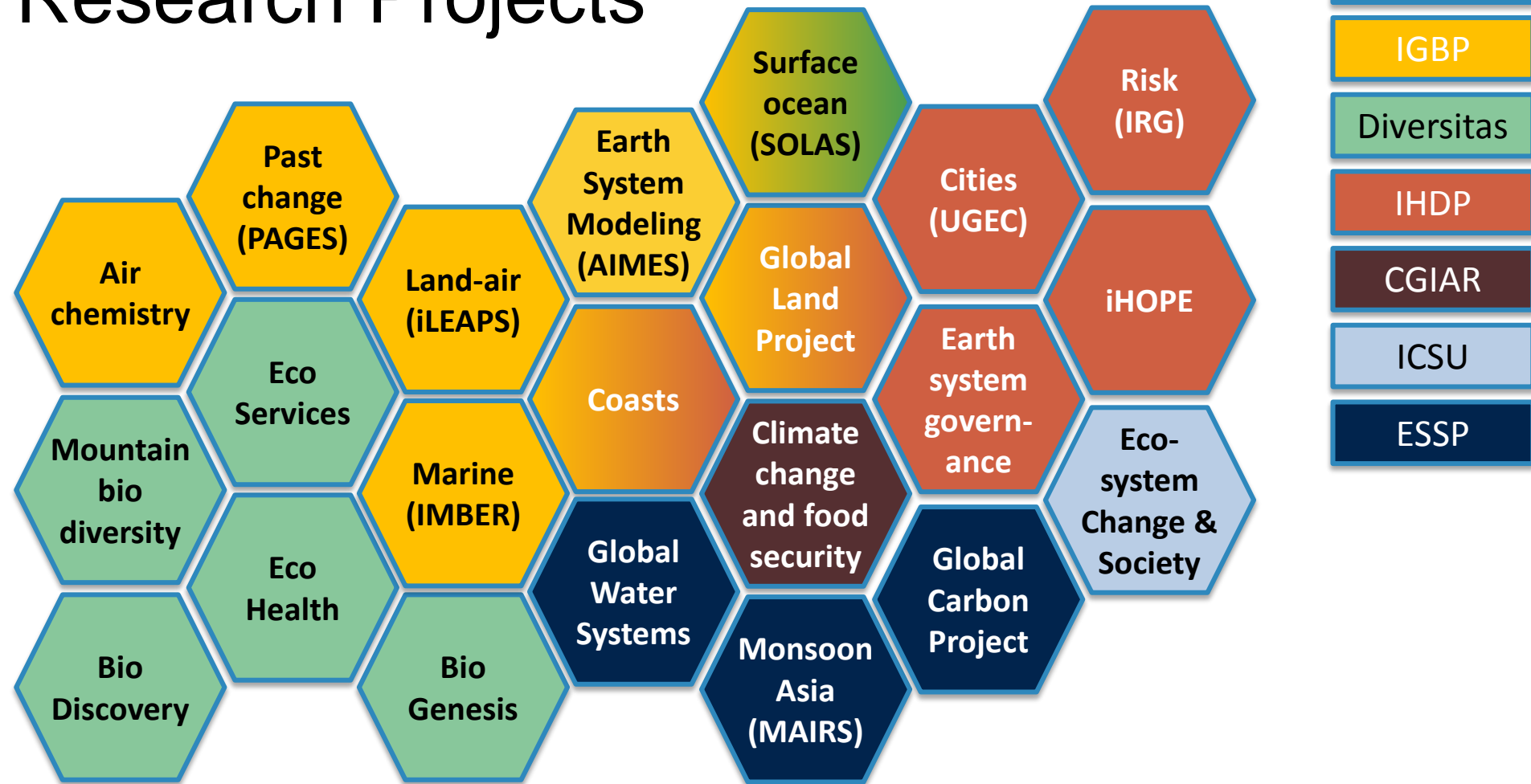


# Implementation (How?)

# Core elements of Future Earth

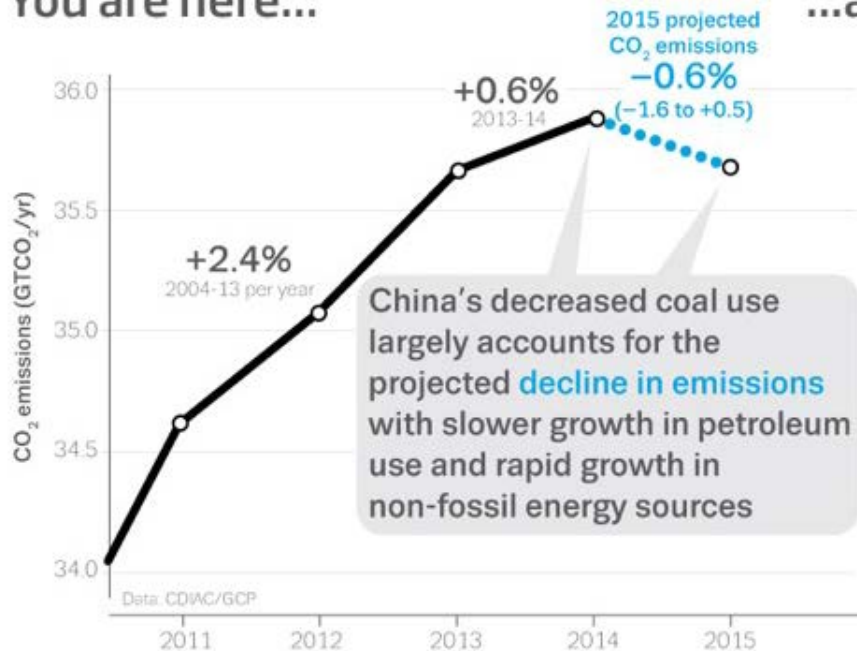
- Open Network of participants
- Core projects
- Fast-Track Initiatives
- Knowledge-Action Networks
- Regional and National structures

# Research Projects

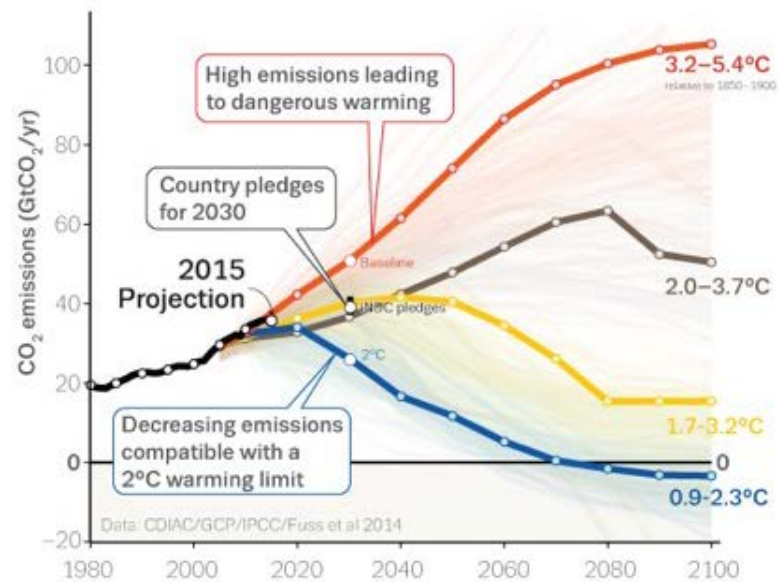


# 2015 Global Carbon Budget

You are here...

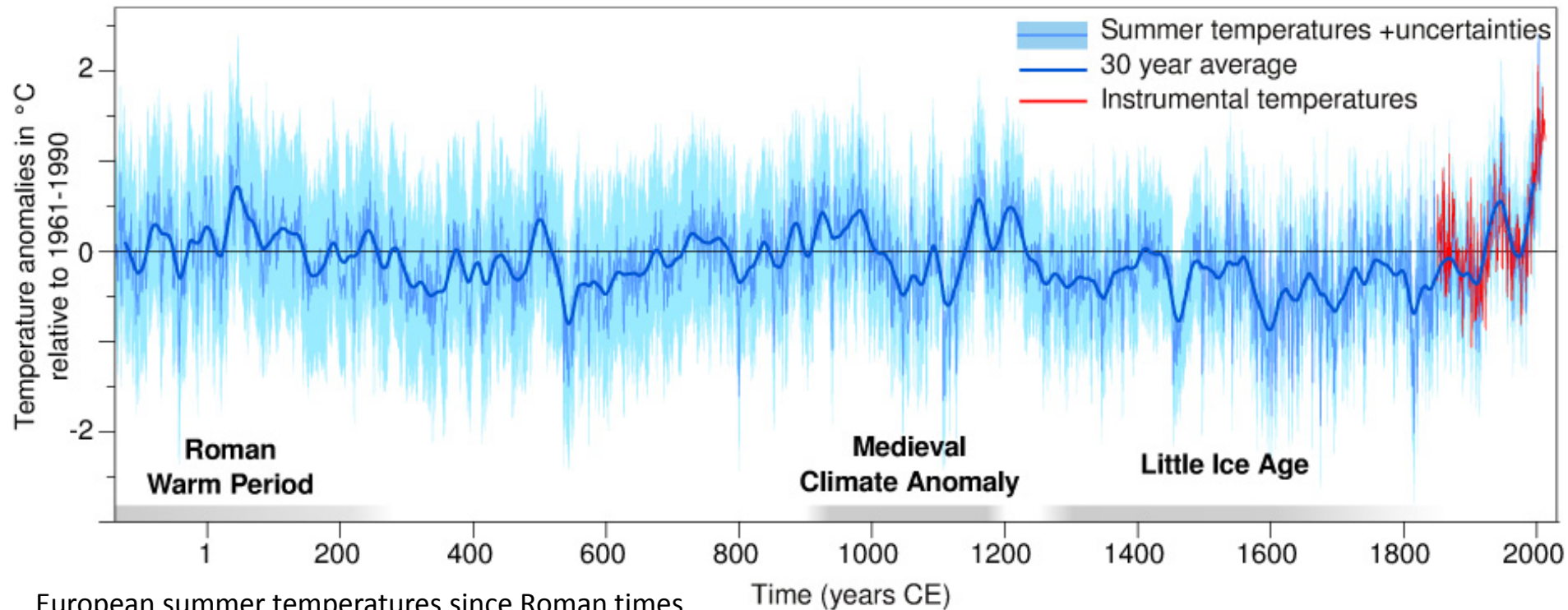


...a long way from near zero emissions...





# European climate vs historical developments



European summer temperatures since Roman times

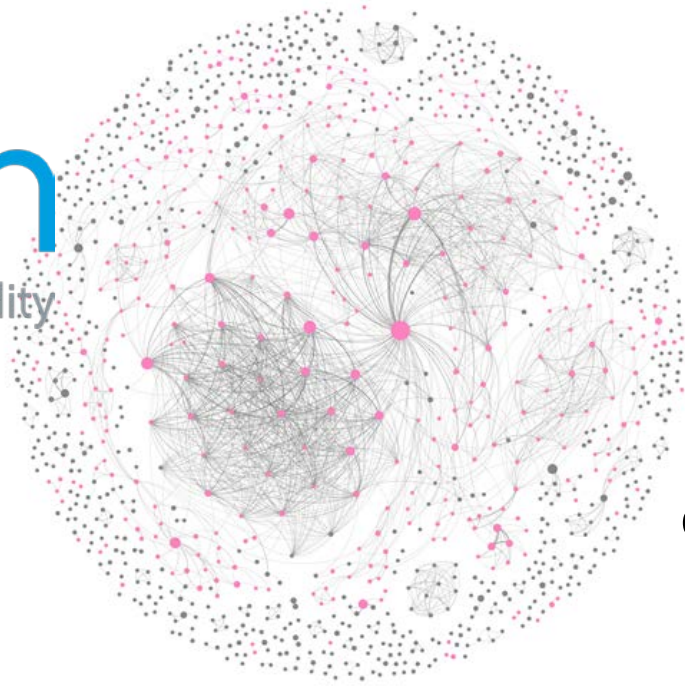
Luterbacher J *et al. Environmental Research Letters* 29 January 2016





# Future Earth Open Network

**futureearth**  
research for global sustainability



people  
projects  
events  
institutes  
organisations

# Fast-track initiatives / Cluster activities

Fast – collaborative – transdisciplinary – on synthesis / community mobilization

1. Exploring nitrogen in Future Earth
2. Global biodiversity monitoring, prediction and reporting
3. Liveable urban futures
4. Bright spots: Seeds of a good Anthropocene
5. Scientific support for IPBES knowledge generation
- 6. Extreme events and environments from climate to society**
7. Linking earth system and socio-economic models on land use and biodiversity
8. Integrated approach to sustainability for water, energy, and food
9. Solution-oriented, transdisciplinary research for a sustainable Arctic

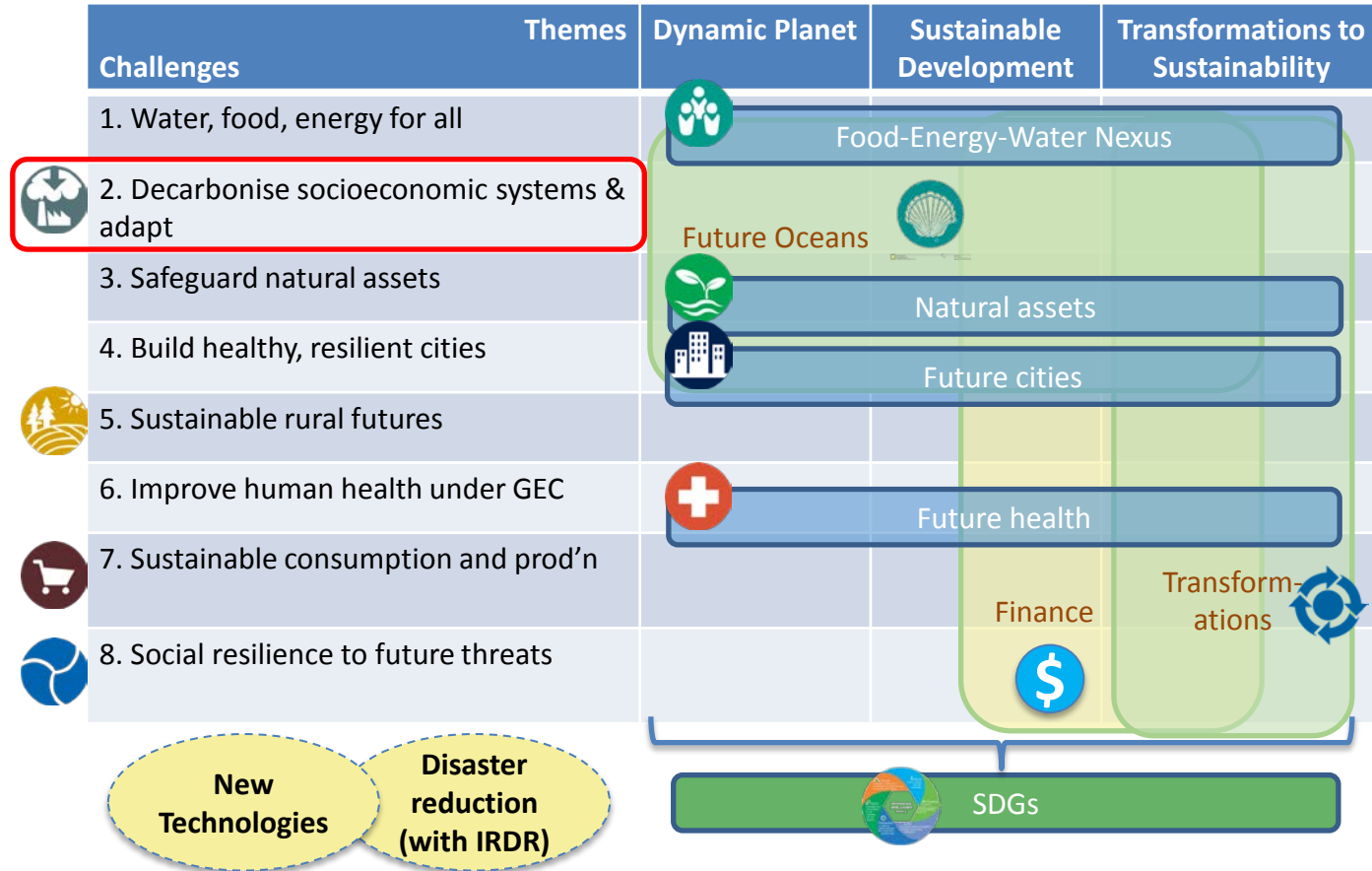
1<sup>st</sup> round supported by US NSF

# Knowledge-Action Networks

*Collaborative frameworks of Future Earth that facilitate highly integrative sustainability research to generate the multifaceted knowledge required to inform solutions for complex societal issues.*

- Identify and respond to society's needs for transformation
- Generate integrated knowledge for interfaces with decision makers
- Cultivate Future Earth-type research
- Add value to research already carried out
- Stimulate new research projects and allocation of funding

# Knowledge-Action Network initial set





# Elements in the development of Knowledge-Action Networks

**Expression of Interest**

**Conceptualisation**

**Scoping** (Mobilising communities, Co-designing work plan and products)

Allowing connected parallel streams —→ **Knowledge generation** (“Research”)

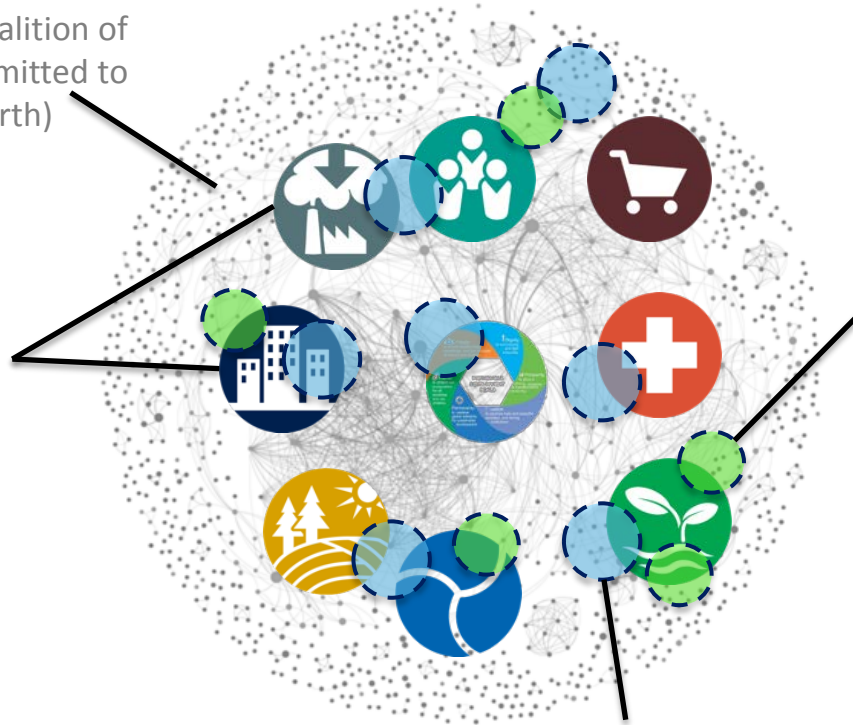
**Synthesis/products**

**User-engagement/dissemination**

# Research program: architecture

The international **Future Earth OPEN NETWORK** (a light-touch coalition of institutes and projects committed to the vision of Future Earth)

**KNOWLEDGE-ACTION NETWORKS** – structured networks catalysing new research and deep engagement with society



Rolling set of **Fast Track Initiatives** for innovation and synthesis

Existing **CORE PROJECT COMMUNITIES**, mostly contributing to one or more KANs

# Funding of Knowledge-Action Networks

## Internal Support:

- Seed workshop support possible from Future Earth
- Management support from Future Earth
- Communication support from Future Earth

## External funding:

- Belmont Forum
- National (regional) funders
- Workshop organisers
- Donors and Foundations



# Organisation

# Science Committee and Engagement Committee



# The Secretariat is organised along five core functions:

- Coordination - Montreal
- Capacity Building – Tokyo, Boulder, Paris
- Research Enabling – Boulder, Stockholm
- Synthesis & Foresight – Paris, Montreal
- Communication & Outreach – Stockholm, Paris, all





**50,000+**

Our networks reach 50,000 global sustainability researchers and people interested in this research



**>20**

National networks established, and many more in progress



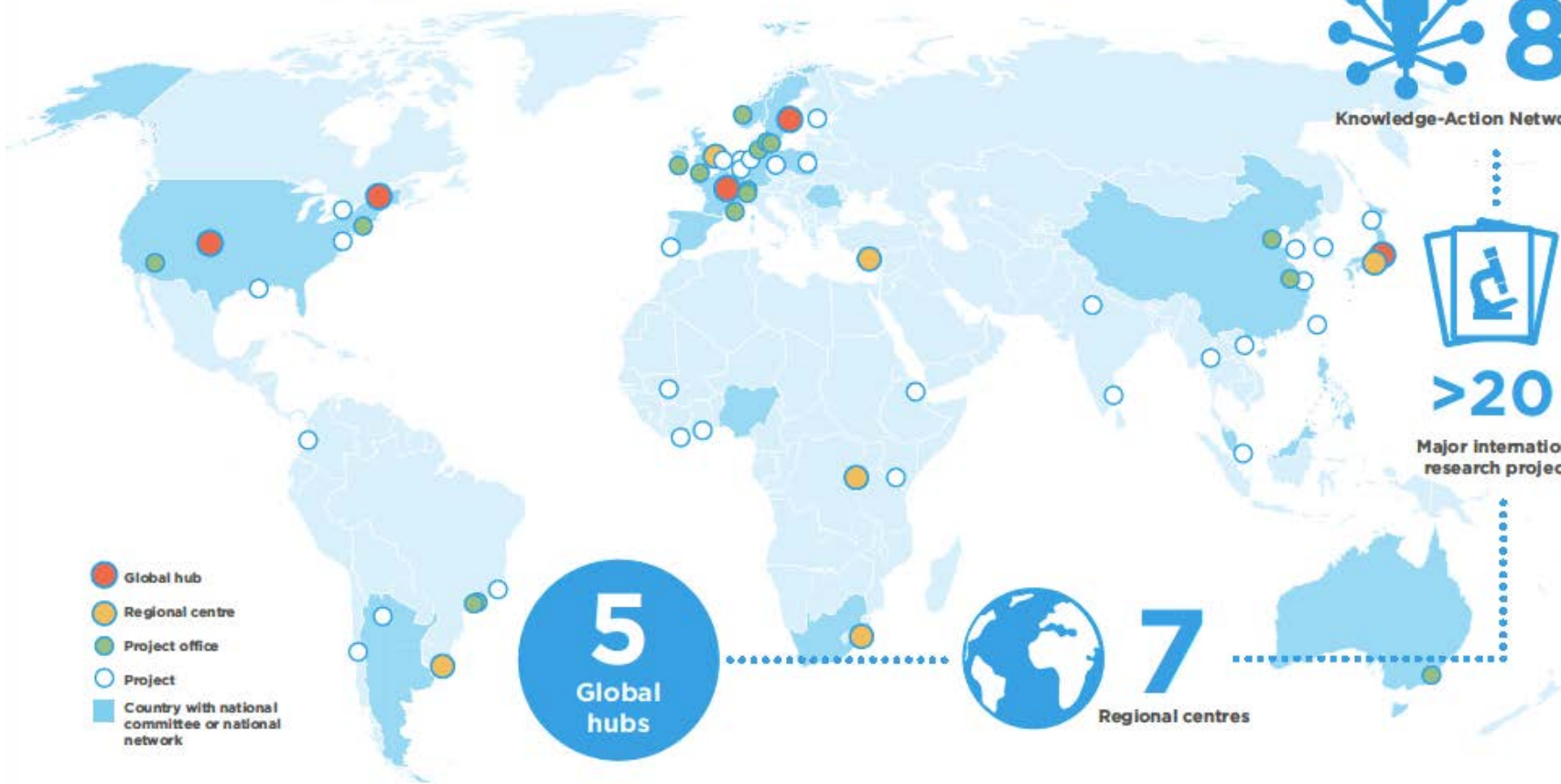
**8**

Knowledge-Action Networks



**>20**

Major international research projects



- Global hub
- Regional centre
- Project office
- Project
- Country with national committee or national network

**5**  
Global hubs



**7**

Regional centres


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research for global sustainability

Website [www.futureearth.org](http://www.futureearth.org)

Twitter @FutureEarth



	1960s	1970s	1980s	1990s	2000s	2010s
Research milestones	DDT Acid rain	Ozone Climate	Ozone hole Ice cores Ecosystem services	1990: 1 <sup>st</sup> IPCC report 1995: 2 <sup>nd</sup> IPCC 1999: 420,000 climate record	2000: Anthropocene 2001: 3 <sup>rd</sup> IPCC report 2004: Great Acceleration 2007: 4 <sup>th</sup> IPCC report 2009: Planetary Boundaries	2014: 5 <sup>th</sup> IPCC report 2015: Planetary boundaries update, Great Acceleration update
Network Evolution	Global Atmospheric Research Programme (GARP)	1979: <b>WCRP</b>	1987: <b>IGBP</b> – a study of Global Change 1988: <b>IPCC</b>	1991 <b>DIVERSITAS</b> 1996: <b>International Human Dimensions Programme</b>	2001: Amsterdam Declaration <b>Earth System Science Partnership</b>	<b>Future Earth</b> 
Political milestones		1972 UN Conference on the Environment, first environment ministers	1987: Montreal Protocol on Ozone Depleting Substances 1987: Brundtland Report	1992: Earth Summit 1992: UNFCCC, Convention on Biological Diversity	2002 UN Johannesburg (Rio+20) 2005: Millennium Ecosystem Assessment	2012: Rio+20 Sustainable Development Goals COP21 2014: IPBES

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## Research for Global Sustainability

### RESEARCH

Generate new  
knowledge through  
international research  
coordination



### SOLUTIONS

Catalyze transformation  
through a solutions  
agenda and greater  
societal engagement

# Co-design and co-production

