

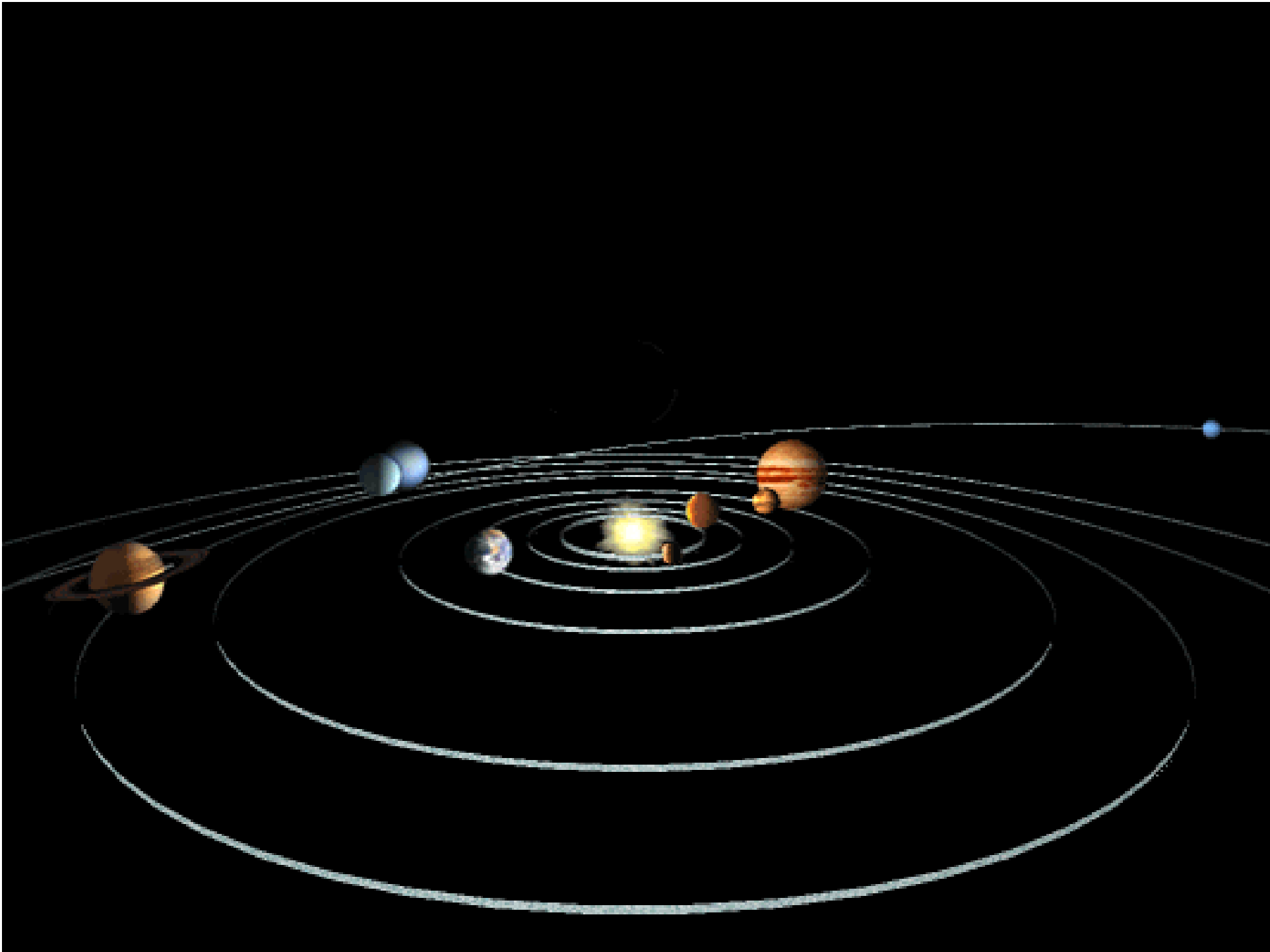
Food Security in a Low Carbon World

Yuan T. Lee

I. The Power of the Sun

The origin of all life
on earth, including
human civilization







2004 Transit of Venus
Ingress: 05:13 UT

F. Espenak, NASA's GSFC



Once upon
a time...

Man was
a part
of nature



II. The Great Divergence

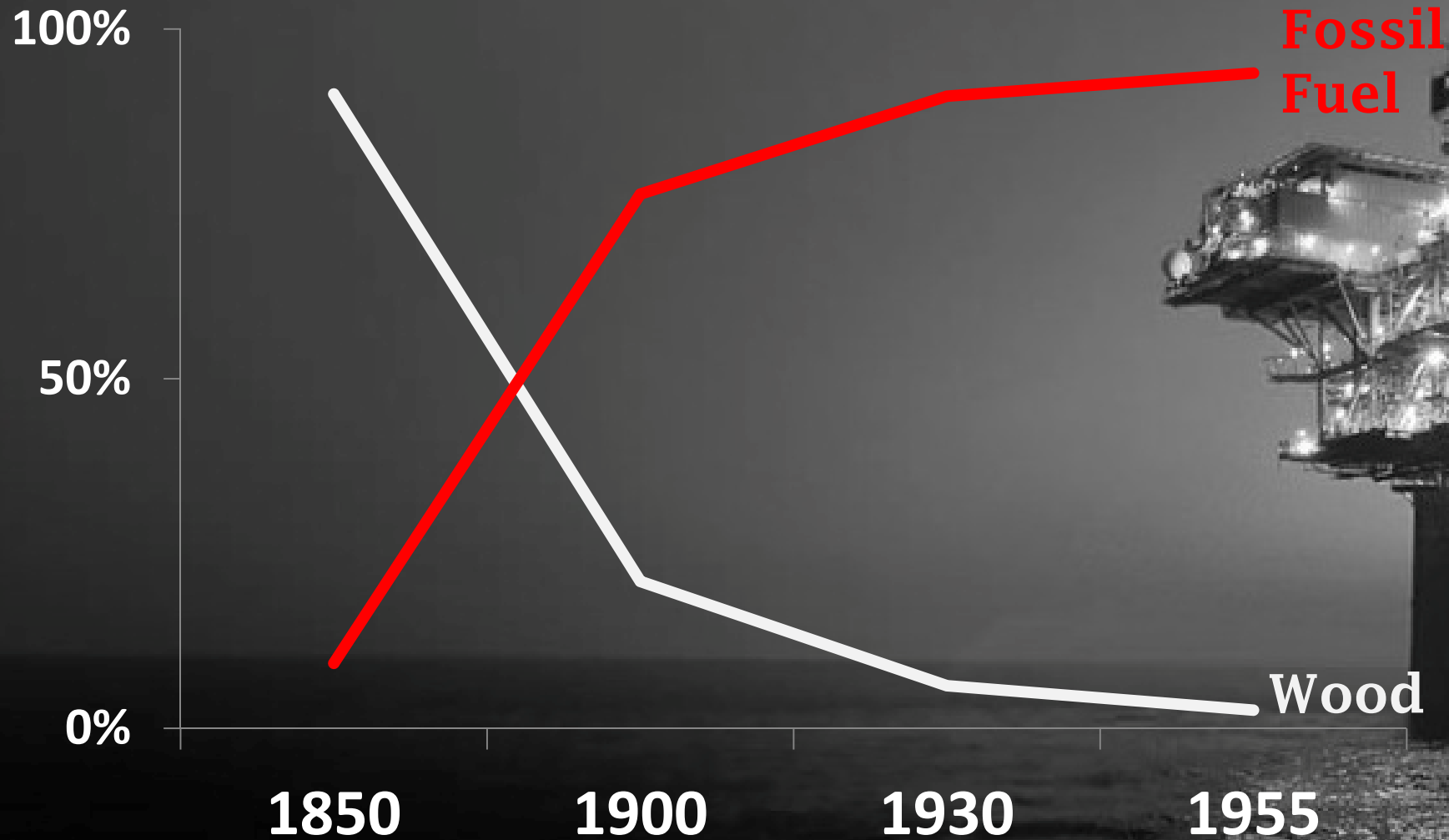
Away from Sunshine,
Away from Nature



The Industrial Revolution



Share of U.S. Energy



Data source: US Energy Information Administration

Industrialized Food



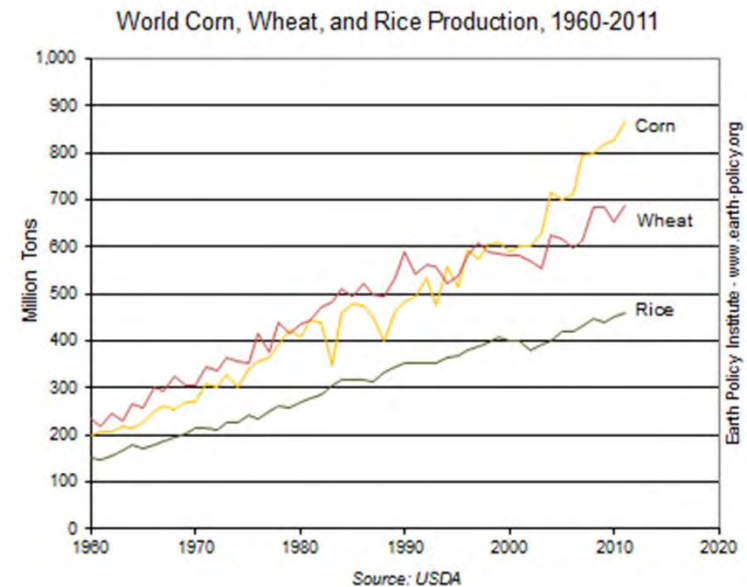
III. From Unlimited to Limited Earth

a. Exploding production & consumption





Exploding Grain & Meat Production





Esquire.com

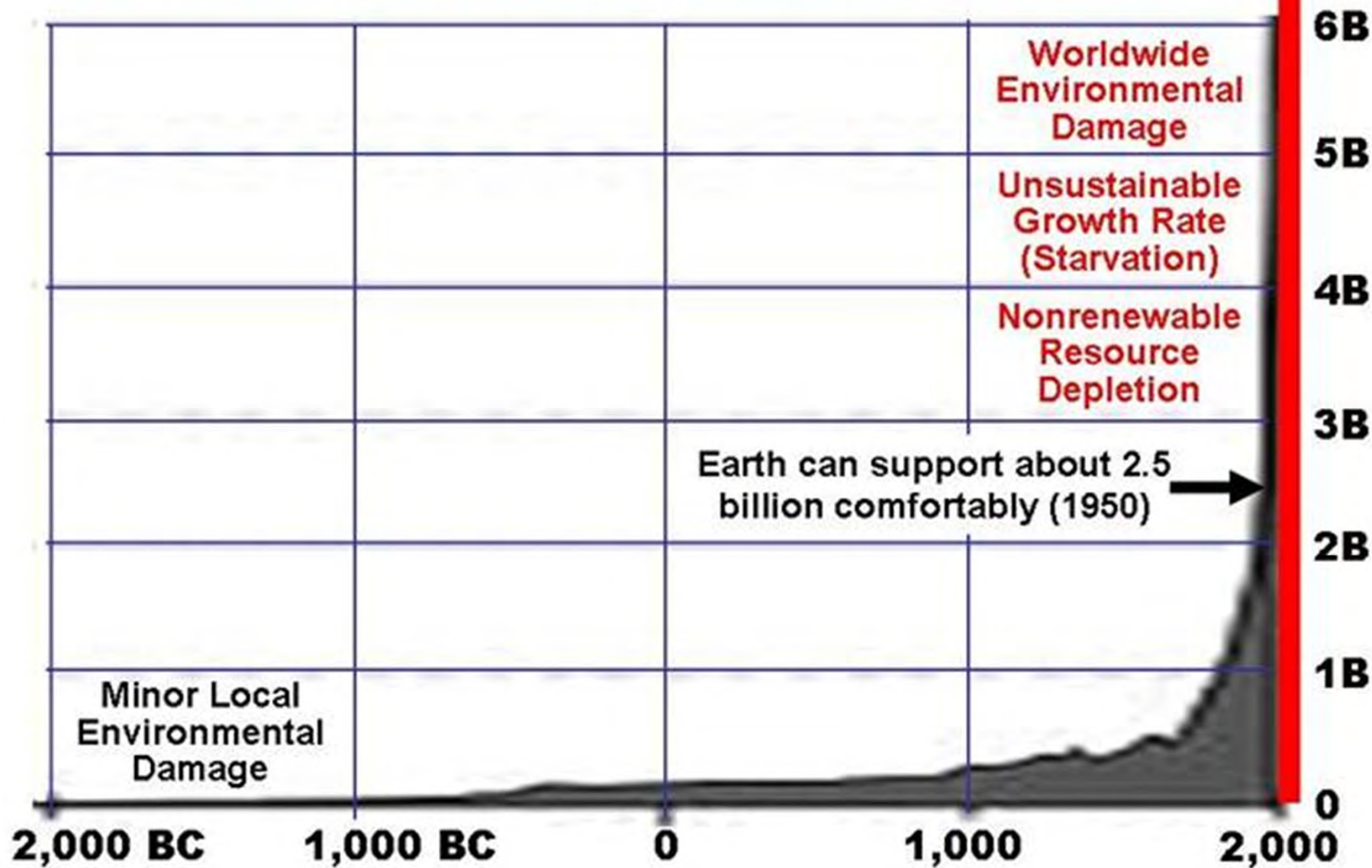
III. From Unlimited to Limited Earth

a. Exploding production &
consumption

**b. Exploding human
population**



Worldwide Human Population Explosion (Billions)

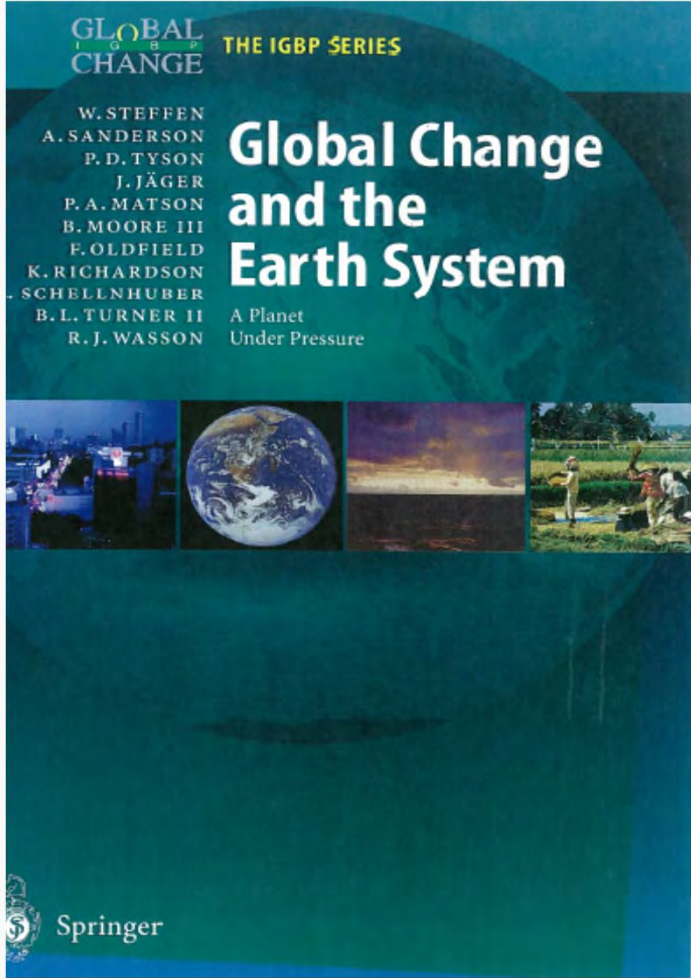
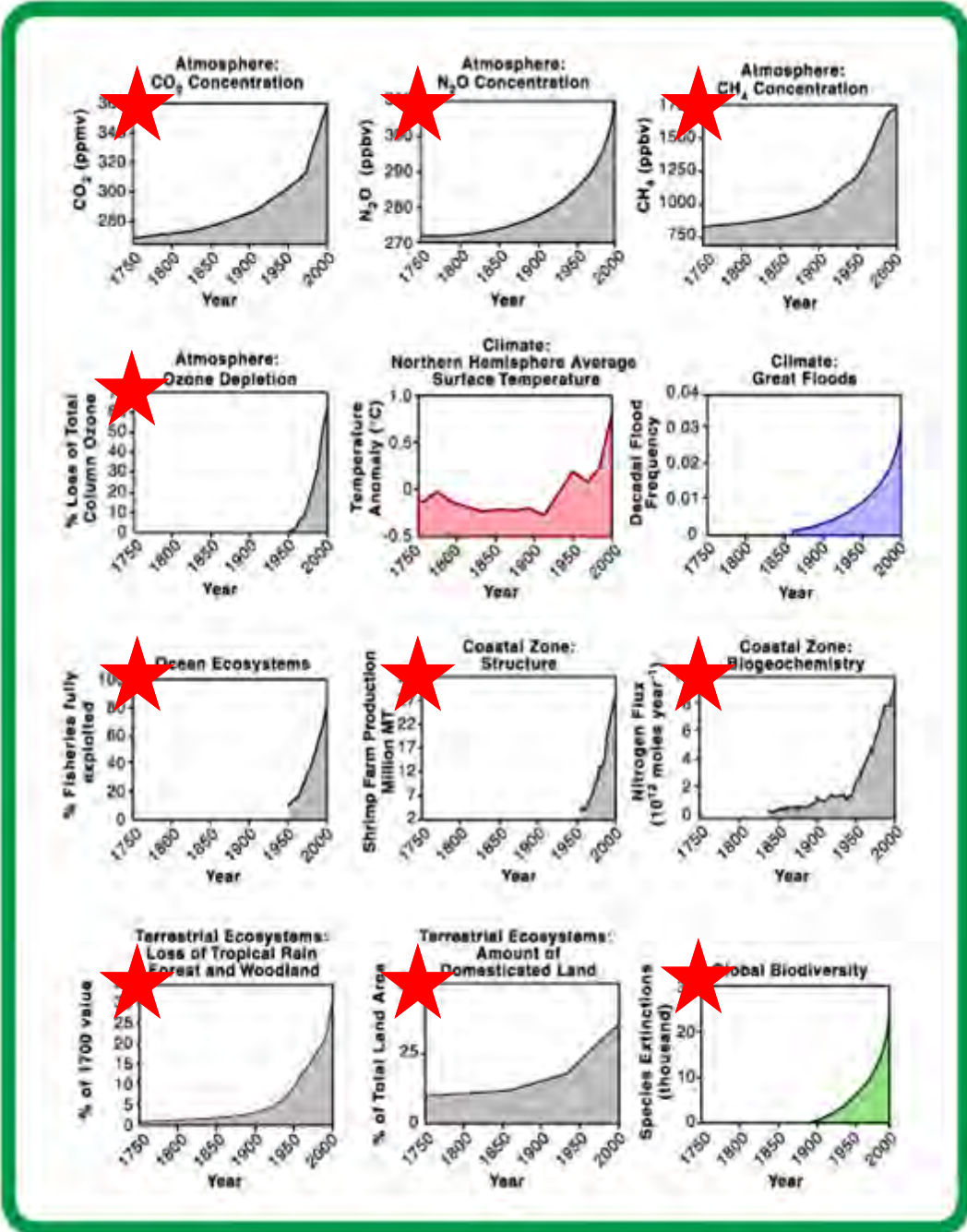


III. From Unlimited to Limited Earth

- a. Exploding production & consumption
- b. Exploding human population
- c. Exploding human footprint**



Spectacular Growth of Human Impacts on the Planet



Right now the
world consumes **1.5**

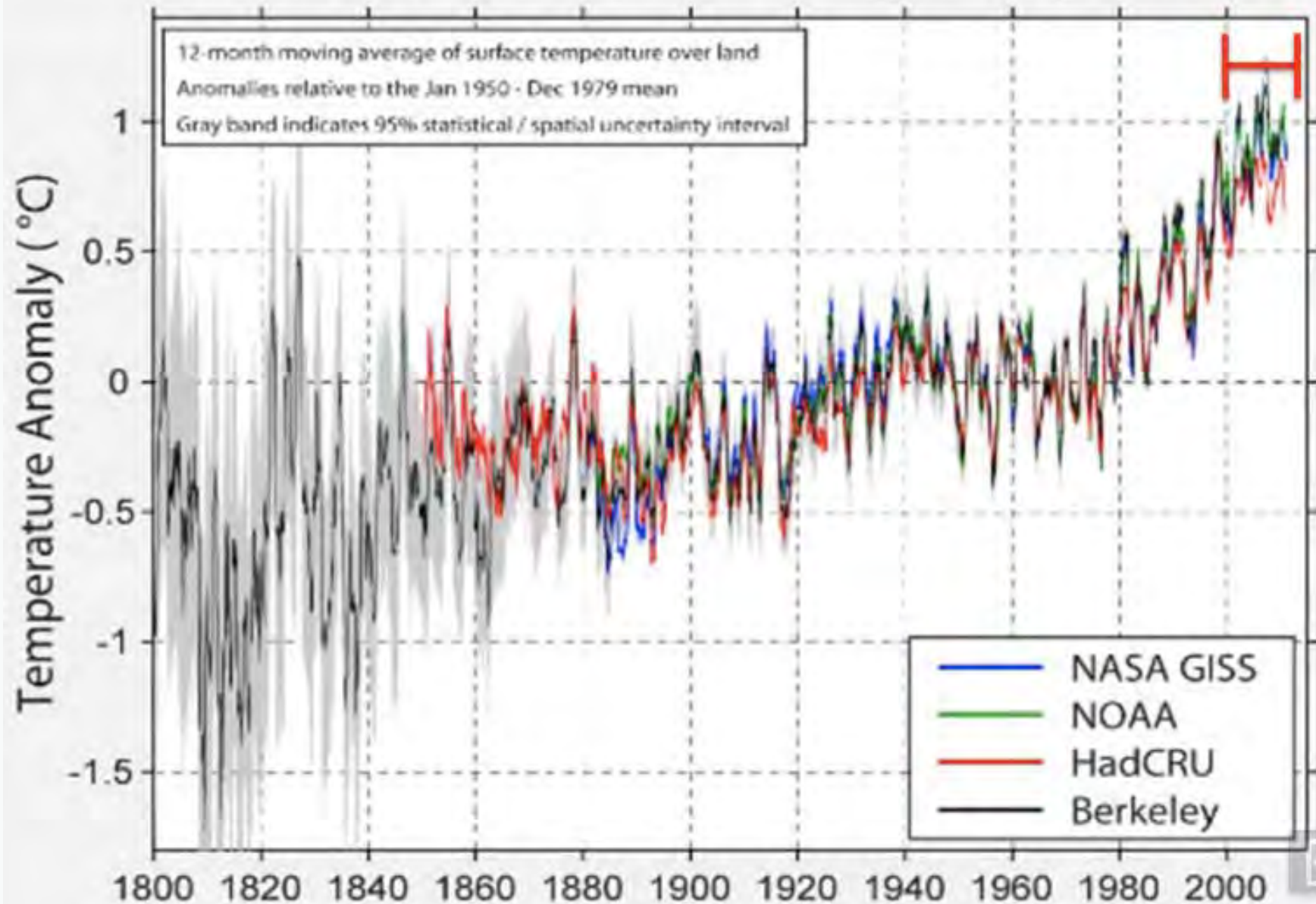


IV. A Crisis of Human Survival

- a. Rising temperature,
changing climate &
extreme weather**

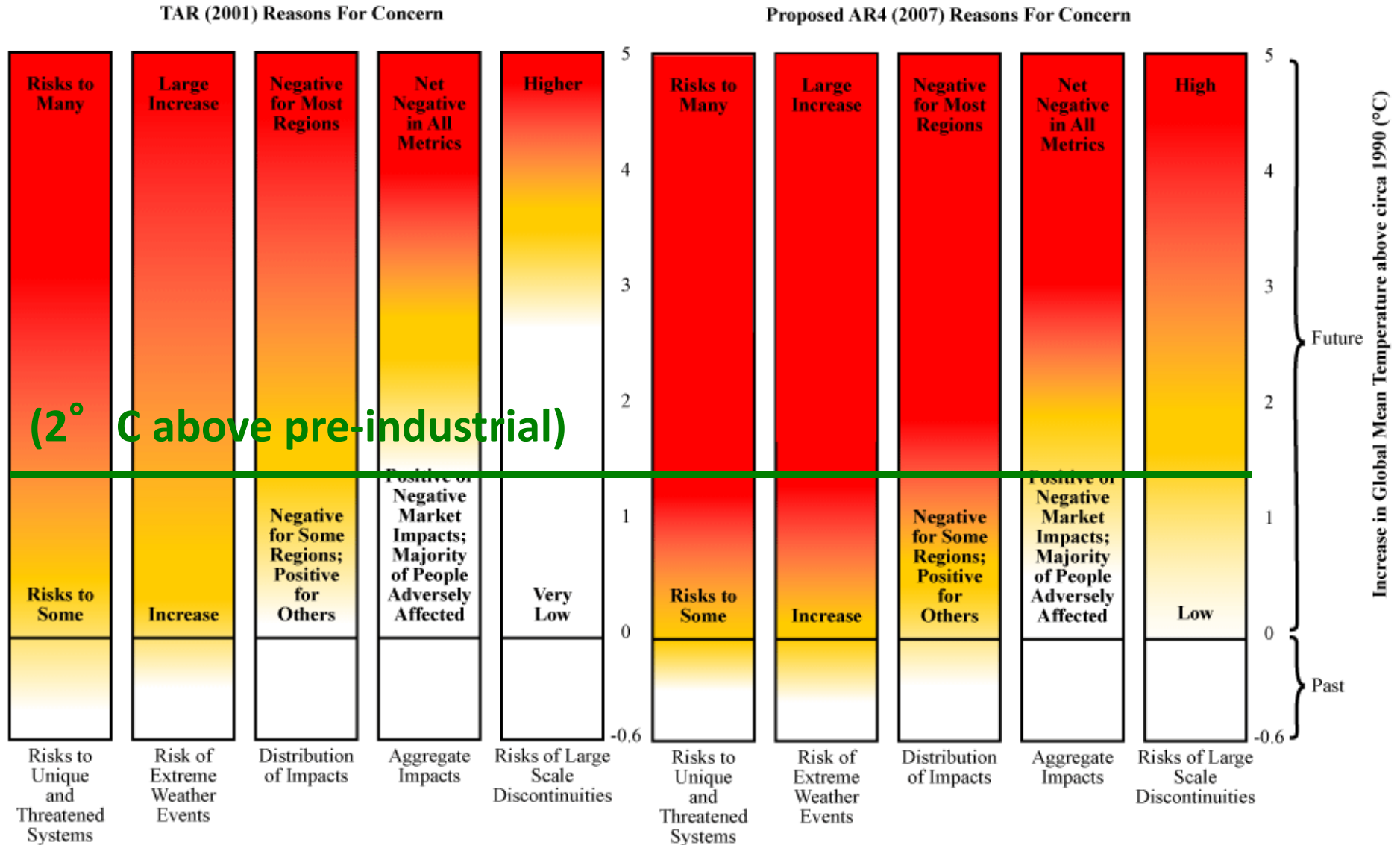


Annual Land-Surface Average Temperature



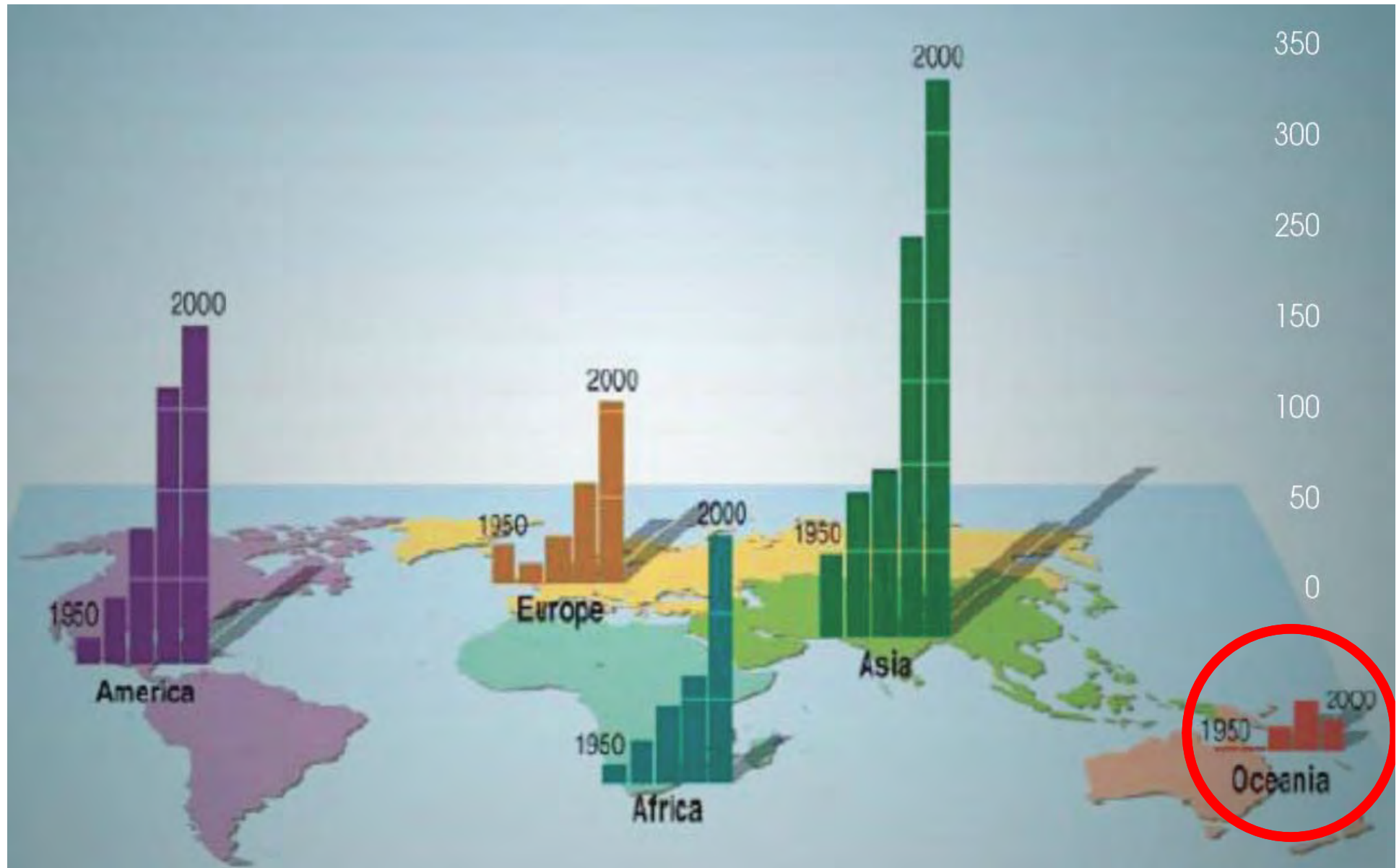
Excerpted from the Energy All-Stars presentation by Dr. Steven Chu, US Secretary of Energy

Updated Reasons for Concern

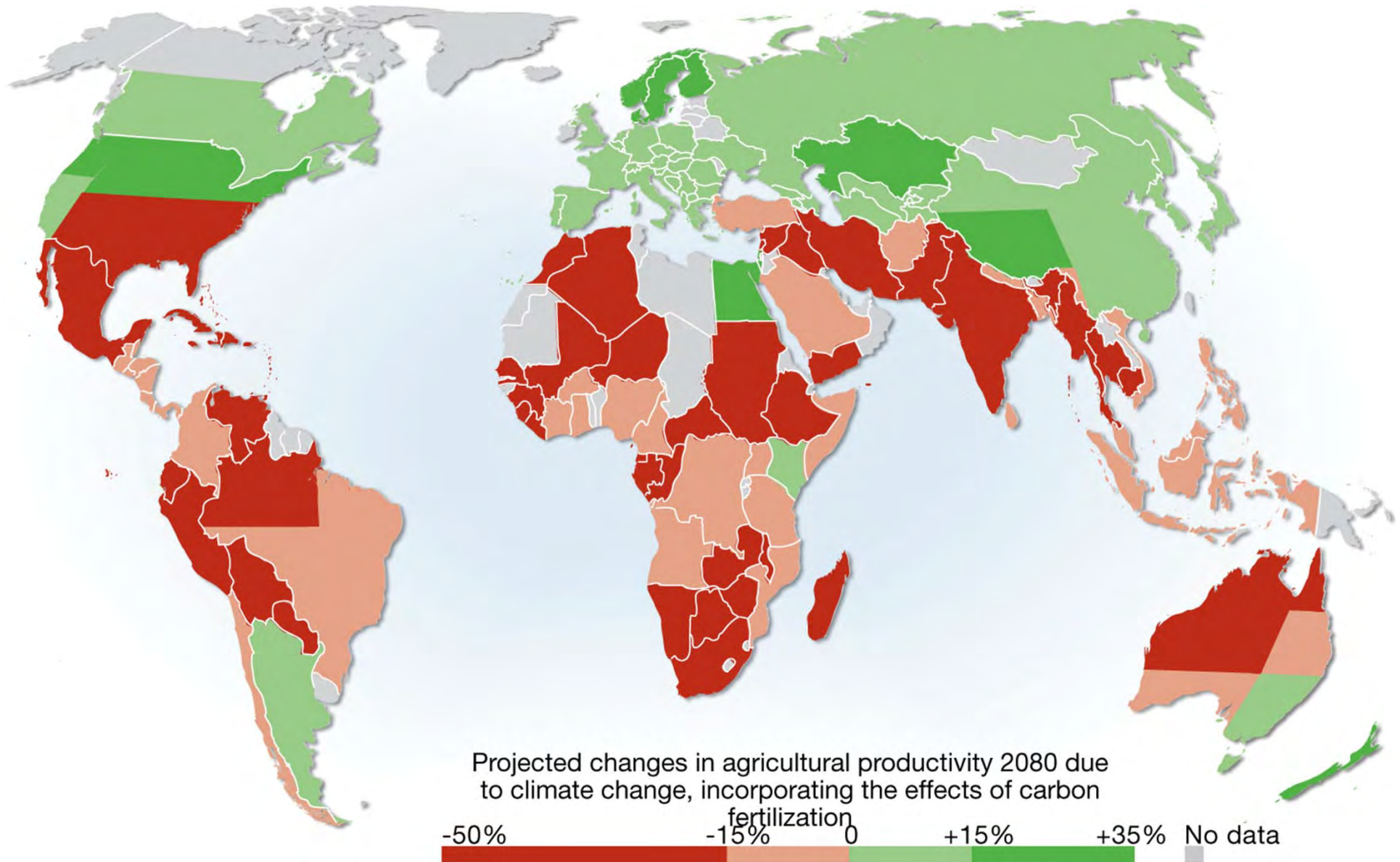


(Smith et al. 2009 PNAS)

Major Floods Per Decade



Impact on Agriculture (UNEP)





20% of the
world's topsoil and
agricultural land has
already been lost

A photograph of a harvested cornfield under a clear blue sky. The field is filled with golden-brown corn stalks and husks. A black rectangular text box is overlaid on the left side of the image, containing white and red text.

40-80% loss
of cropland in Sub-Saharan
Africa by 2030-2040
-- The World Bank (2012)

IV. A Crisis of Human Survival

- a. Rising temperature, changing climate & extreme weather
- b. Disappearing biodiversity, fading ecosystems**





1/3

of the food we eat
is pollinated by
wild insects, worth
over

**\$200
billion**



25%

of Marine Fish Species
are supported by
coral reefs, as are

30 million livelihoods

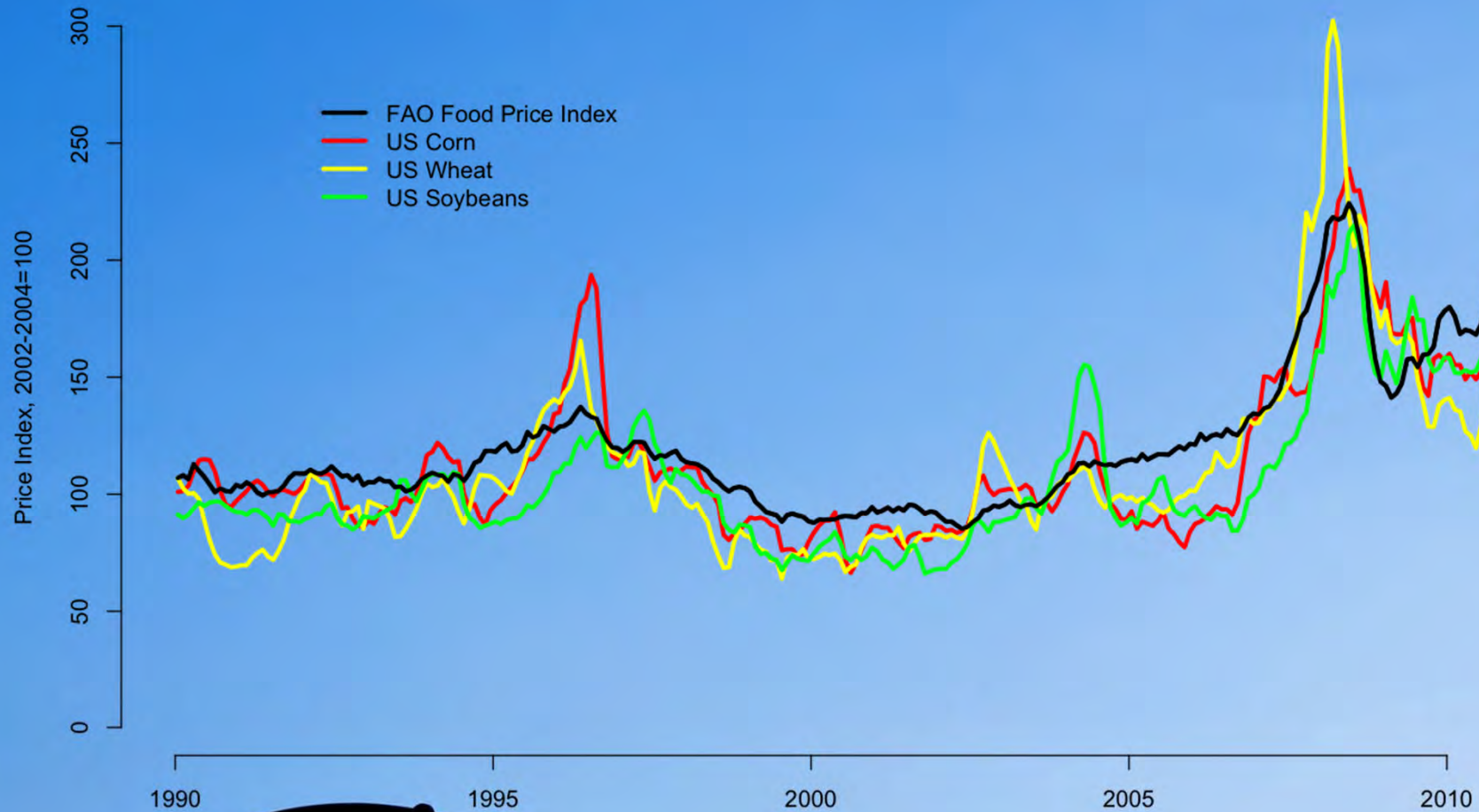
IV. A Crisis of Human Survival

- a. Rising temperature, changing climate & extreme weather
- b. Disappearing biodiversity, fading ecosystems
- c. Starving world, raging crises**



**Rising Demand +
Falling Supply =
Pressure Cooker
For Major Crises**

Rollercoaster Food Prices





9.6 billion by 2050?

70% more food needed?

V. Pathways to Global Sustainability

a. Global Responses to Global Problems





Can “**Global**
Problems” be
effectively
solved by
“**nation**”-based
systems and
approaches?

V. Pathways to Global Sustainability

a. Global Responses to
Global Problems

**b. Back to nature,
back to sunshine**





**Agriculture in accordance with
the principles of nature**

A composite image showing the Earth from space. The planet's curved horizon is visible, with a bright sun rising over it, creating a golden glow and lens flare effect. The sun is positioned in the center-right of the frame, and its light illuminates the Earth's surface. The background is a dark, starry space.


Back to Sunshine



V. Pathways to Global Sustainability

- a. Global Responses to
Global Problems
- b. Back to nature, back
to sunshine
- c. Live better...
for less**






Global obesity has
doubled since 1980,
with **500 million+**
people being obese

V. Pathways to Global Sustainability

- a. Global Responses to Global Problems
- b. Back to nature, back to sunshine
- c. Live better... for less
- d. Control population explosion**






A photograph of a dry, rocky landscape with people sitting on the ground, overlaid with a black text box. The background shows a vast, arid plain with scattered rocks and a few people in the distance. The text box is centered and contains a quote in white and green text.

“If current predictions of population growth prove accurate and patterns of human activity on the planet remain unchanged, science and technology may not be able to prevent **irreversible degradation** of the natural environment and **continued poverty** for much of the world.”

58 Academies of Sciences, 1994



Security for Parents
Education for Girls
Employment for Women
Sustainability for All

V. Pathways to Global Sustainability

- a. Global Responses to Global Problems
- b. Back to nature, back to sunshine
- c. Live better... for less
- d. Control population
- e. Greater Equality**





One week's food: Western Family



One week's food: African Family

VI. The International Council for Science (ICSU)

**Strengthening Inter-
national Science for the
Benefit of Society**



International Council for Science (ICSU)

- Founded in 1931
- The largest, oldest global organization of science
- 120 National Members representing 140 countries
- 31 Scientific Unions
- Secretariat in Paris, Regional Offices in Africa, Asia, and Latin America & Caribbean



ICSU's Mission

To Strengthen
International Science
for the Benefit of Society



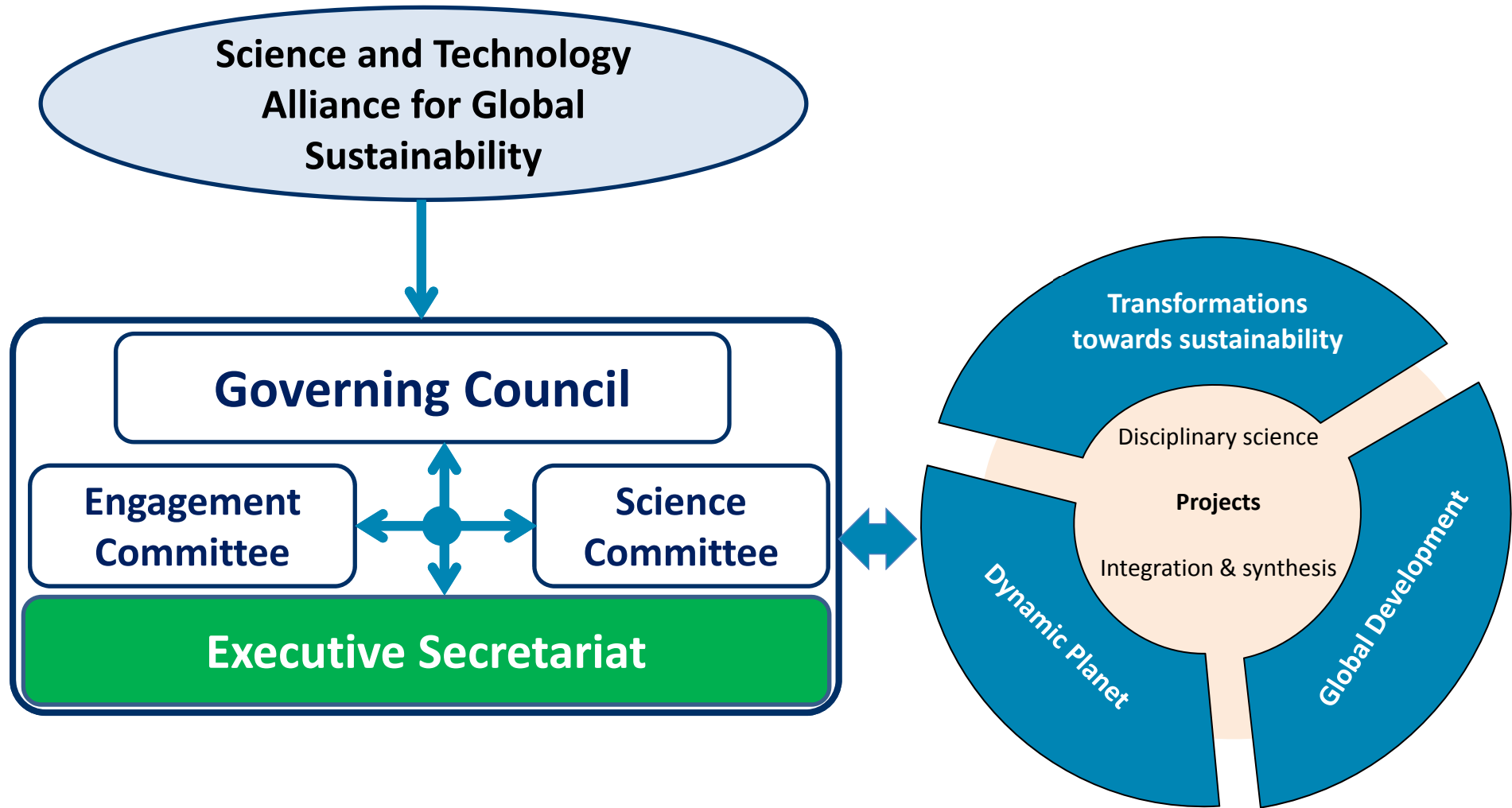
The Alliance



Future Earth's Objective

To 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

Governance



A sunset scene with a large tree silhouette on the right, a bright sun, and silhouettes of animals in the foreground.

**Thank you
very much!**