


Real-world Evidence that CO₂ Emissions and Fossil Energy Enhance the Human Environment

13TH INTERNATIONAL CONFERENCE ON CLIMATE CHANGE

Best Science, Winning Energy Policies

Dr. Craig D. Idso, Chairman
Center for the Study of Carbon Dioxide and Global Change
www.co2science.org

Some Recent Climate Change News Headlines

 Washington Post

Planet is entering 'new climate regime' with 'extraordinary' heat waves intensified by global warming, study says

Heat events like those last summer are predicted to occur two every three years for global warming of 2.7 degrees (1.5 Celsius) and every year ...

1 month ago



 The Conversation US

Climate change is affecting crop yields and reducing global food supplies

As climate change alters temperature and rainfall patterns, yields of some crops are increasing while others decline. The net result: less food, ...

6 hours ago



 New Atlas

UN report on global warming warns of "climate apartheid" between ...

The UN has published a new report detailing the dangers of climate change, with a particular focus on how it will shape the issue of poverty in ...

2 weeks ago



 Yale Climate Connections

How climate change is making hurricanes more dangerous

Major hurricanes are by far the world's costliest natural weather disasters, in some cases costing well over \$100 billion dollars. There's now ...

1 day ago



 NBCNews.com

Climate change is devastating Central America, driving migrants to the US border

Ravaged by climate change-driven drought, farmers in rural Honduras and Guatemala live on the edge of hunger, not knowing if the next ...

23 hours ago



 The Guardian

Sanders and Ocasio-Cortez move to declare climate crisis official emergency

Exclusive: Democrats to introduce resolution in House on Tuesday in recognition of extreme threat from global heating.

1 day ago



The False Narrative of Global Warming

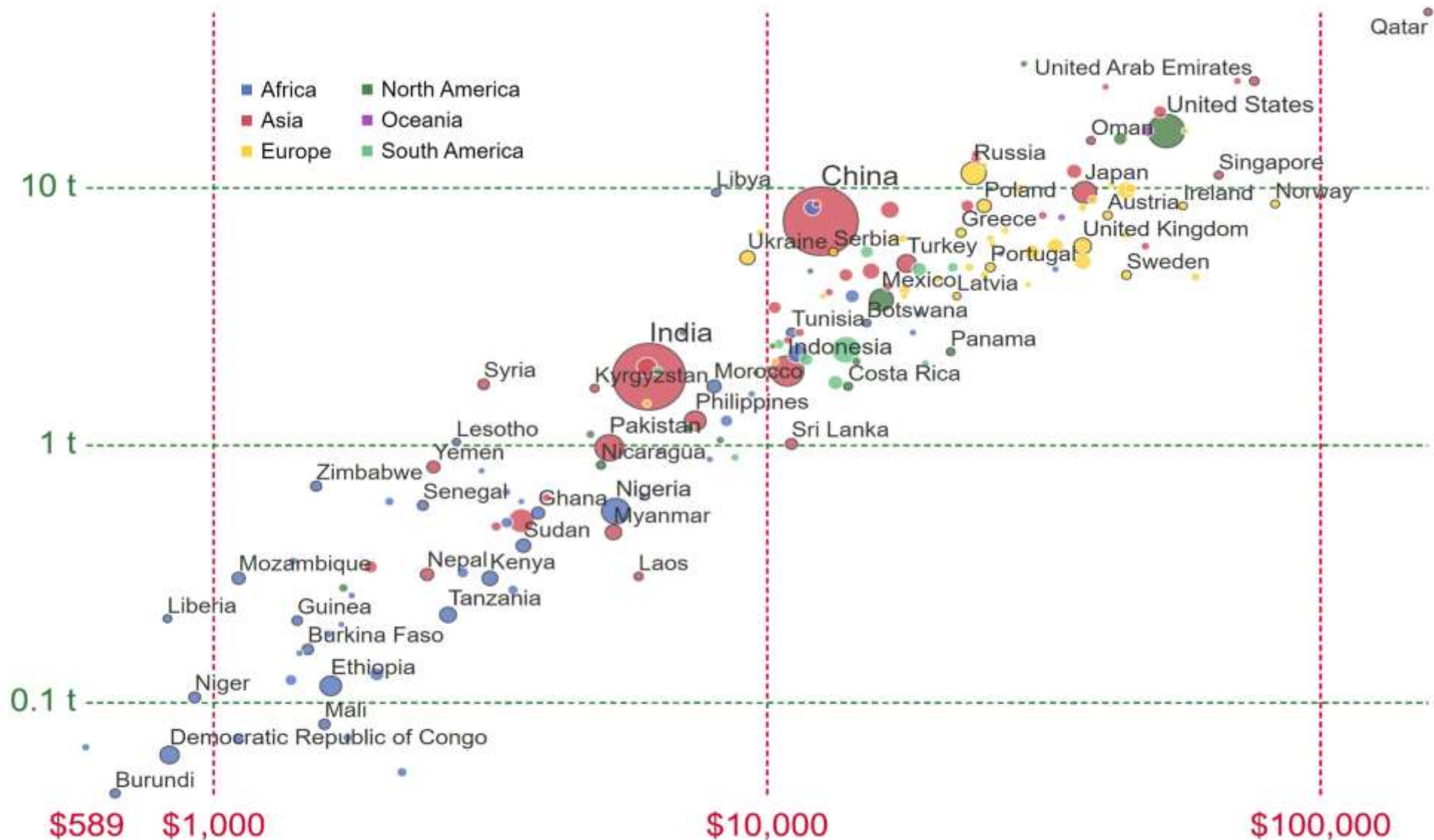
- Rising atmospheric CO₂ is presently causing dangerous climate change to the detriment and peril of humanity and the natural world
- Because the combustion of fossil fuels is the principal source behind the CO₂ rise, society must abandon all use of fossil energy
 - Activists seek to enforce government and private sector efforts to restrict fossil fuel use via tax, caps or fiat limits on CO₂ emissions

The Real Story

- There is no climate catastrophe and CO₂ emissions and fossil energy should be celebrated for *enhancing life* and *improving the standard of living* for humanity and the natural world
- Efforts to restrict CO₂ emissions or limit fossil energy should be avoided
 - Such actions will most certainly bring about adverse outcomes and unintended consequences that will harm humanity and nature

Consider the following four key examples of how CO₂ emissions and fossil energy improve human prosperity and benefit the natural world...

CO₂ Emissions per Capita (tonnes per person in 2016)



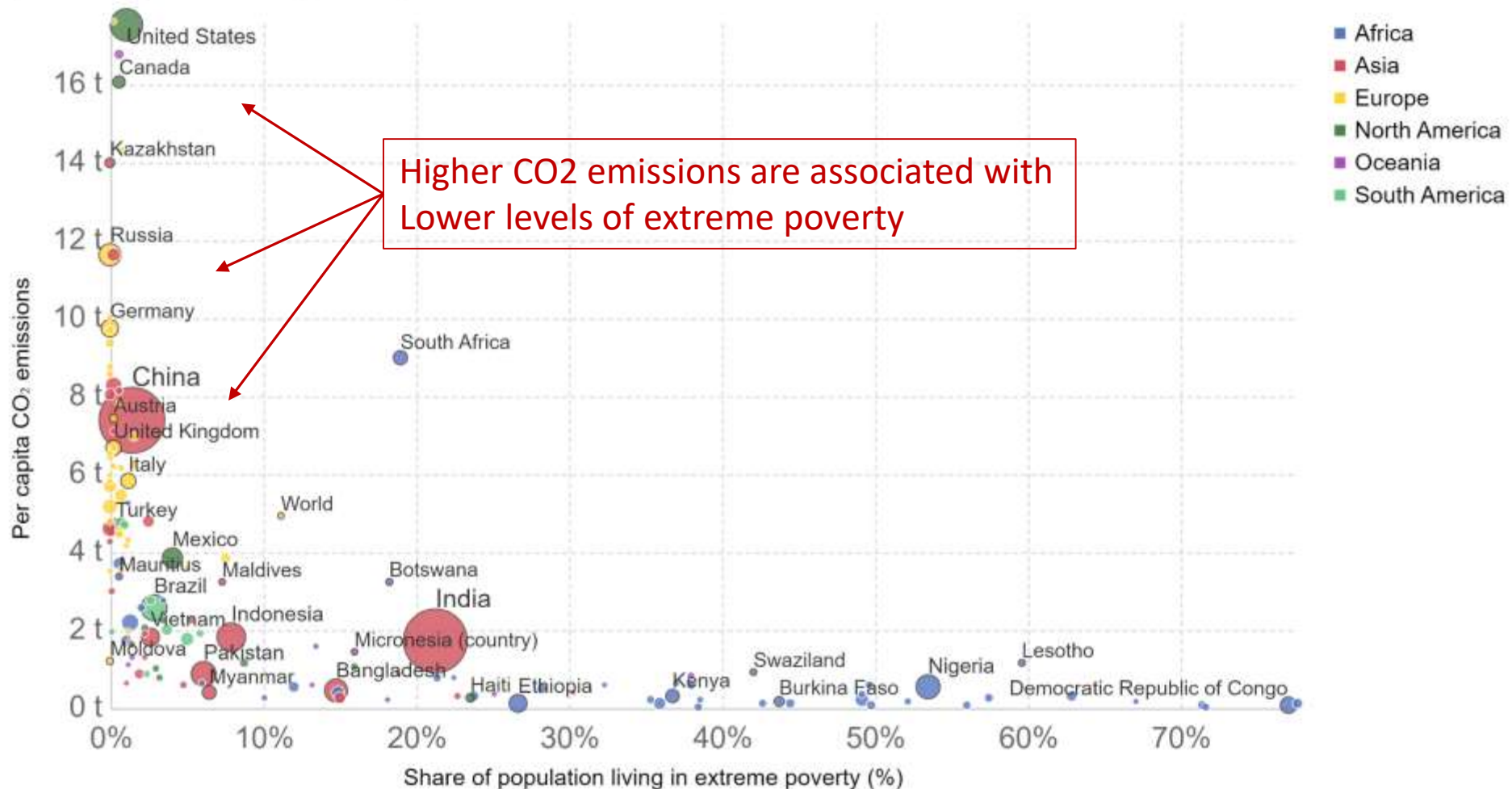
GDP per Capita

(international \$ adjusted for inflation & country price differences)

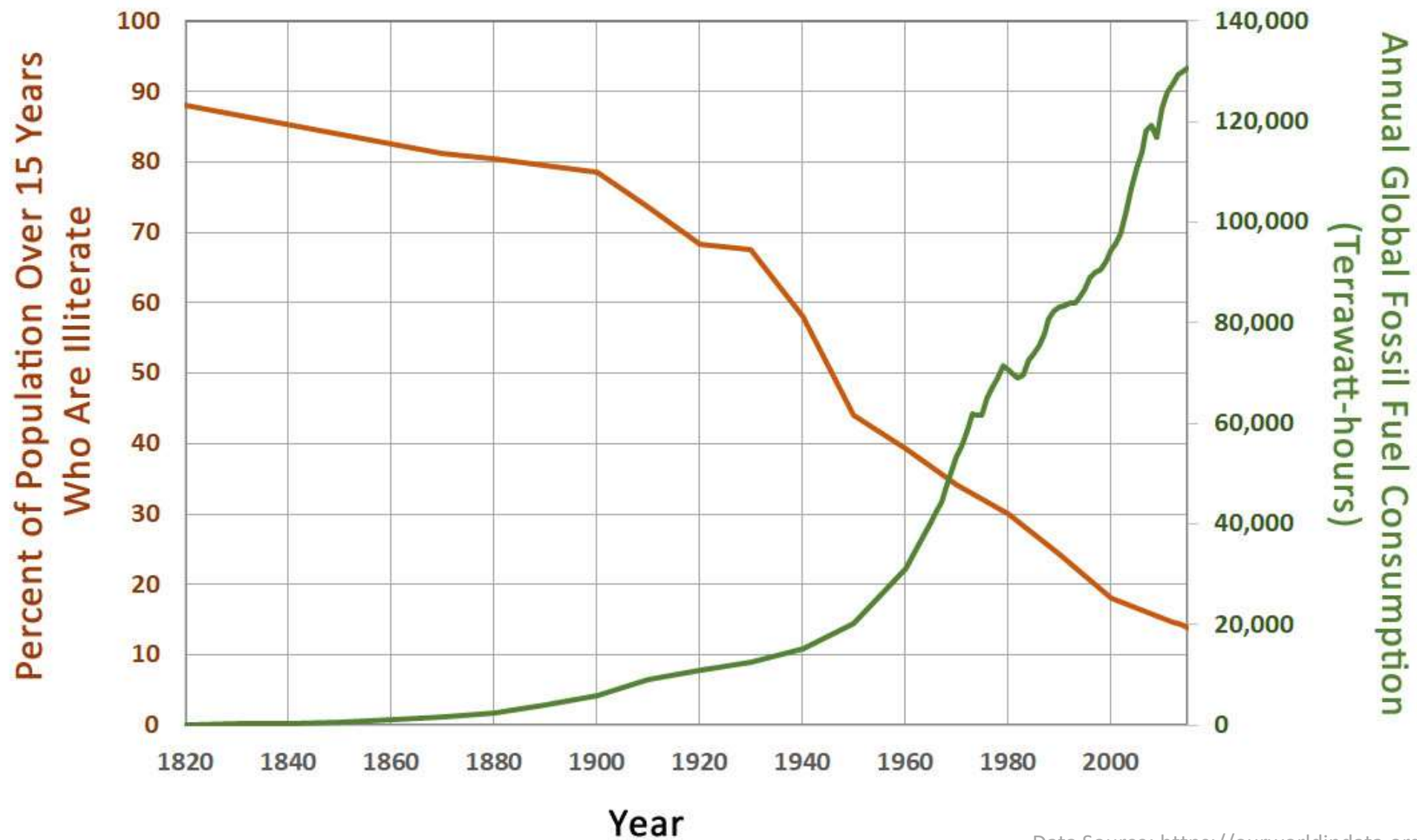
CO₂ emissions per capita vs. the share of people living in extreme poverty, 2014

Our World
in Data

Average CO₂ emissions per capita are measured in tonnes per year. Extreme poverty is defined as living at a consumption (or income) level below 1.90 "international-\$" per day. International \$ are adjusted for price differences between countries and price changes over time (inflation).

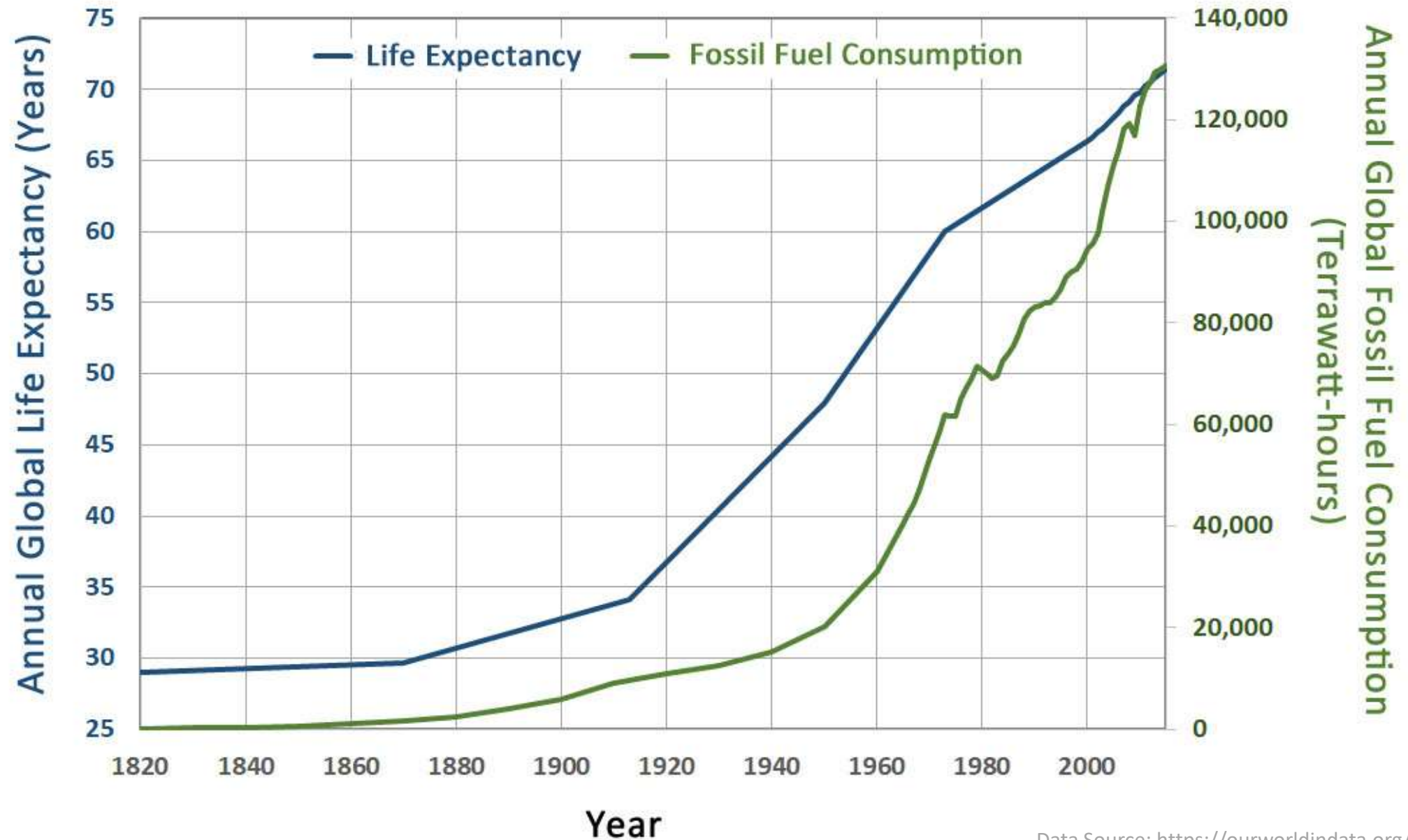


Two-century Trend in Global Illiteracy and Fossil Fuel Consumption



Data Source: <https://ourworldindata.org/>

Two-century Trend in Global Life Expectancy and Fossil Fuel Consumption



The *real* achievement of increasing life expectancy is in the number of total planetary human life years

1820

- Population = 1.06 billion
- Life expectancy = 29 years
- Total human life years on the planet = 30.7 billion
(1.06 billion x 29 years)

Today

- Population = 7.38 billion
- Life expectancy = 72 years
- Total human life years on the planet = 527 billion*
(7.38 billion x 72 years)

* This is a 17-fold increase!

Other Human Benefits from Fossil Energy Use

- Productivity enhancements
- Improvement/expansion of goods and services
- Development of new inventions and innovations
 - Cell phones, air travel, the Internet, CT scans, etc.
 - These products or benefits could not have possibly existed years ago
 - They only exist today thanks to decades of technological and economic progress made possible by fossil energy use

What about fossil energy benefits to nature?

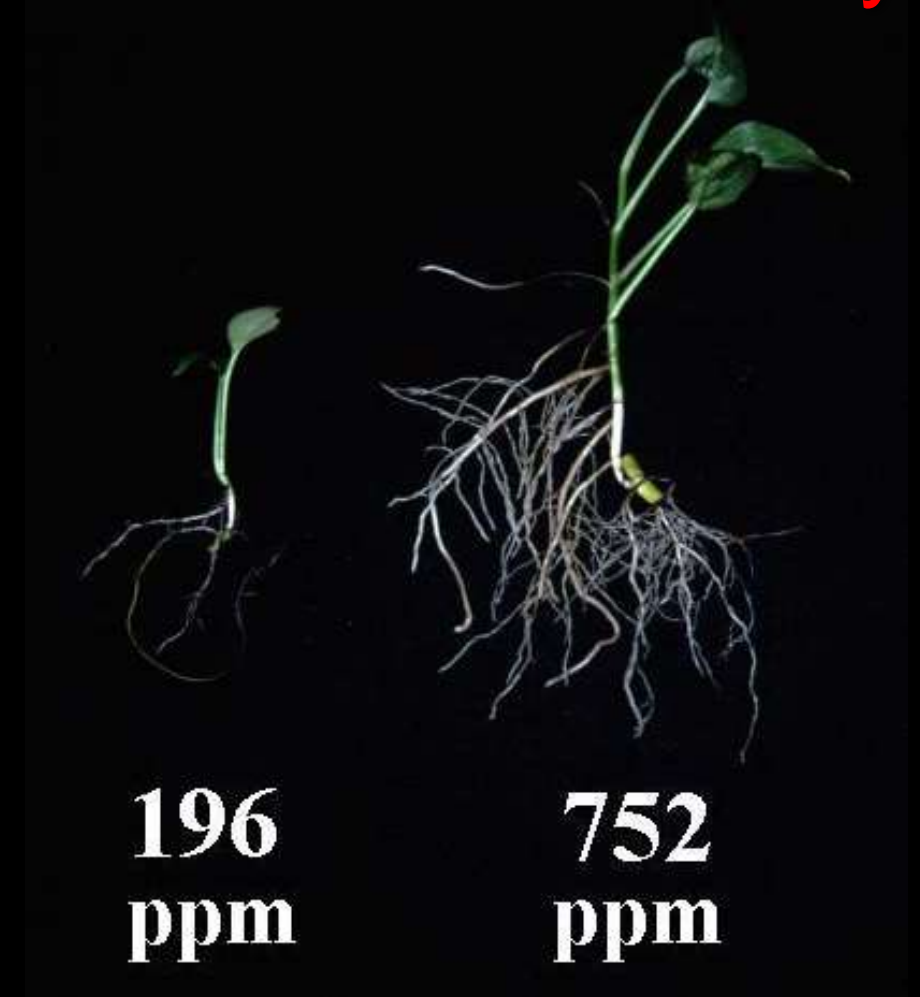
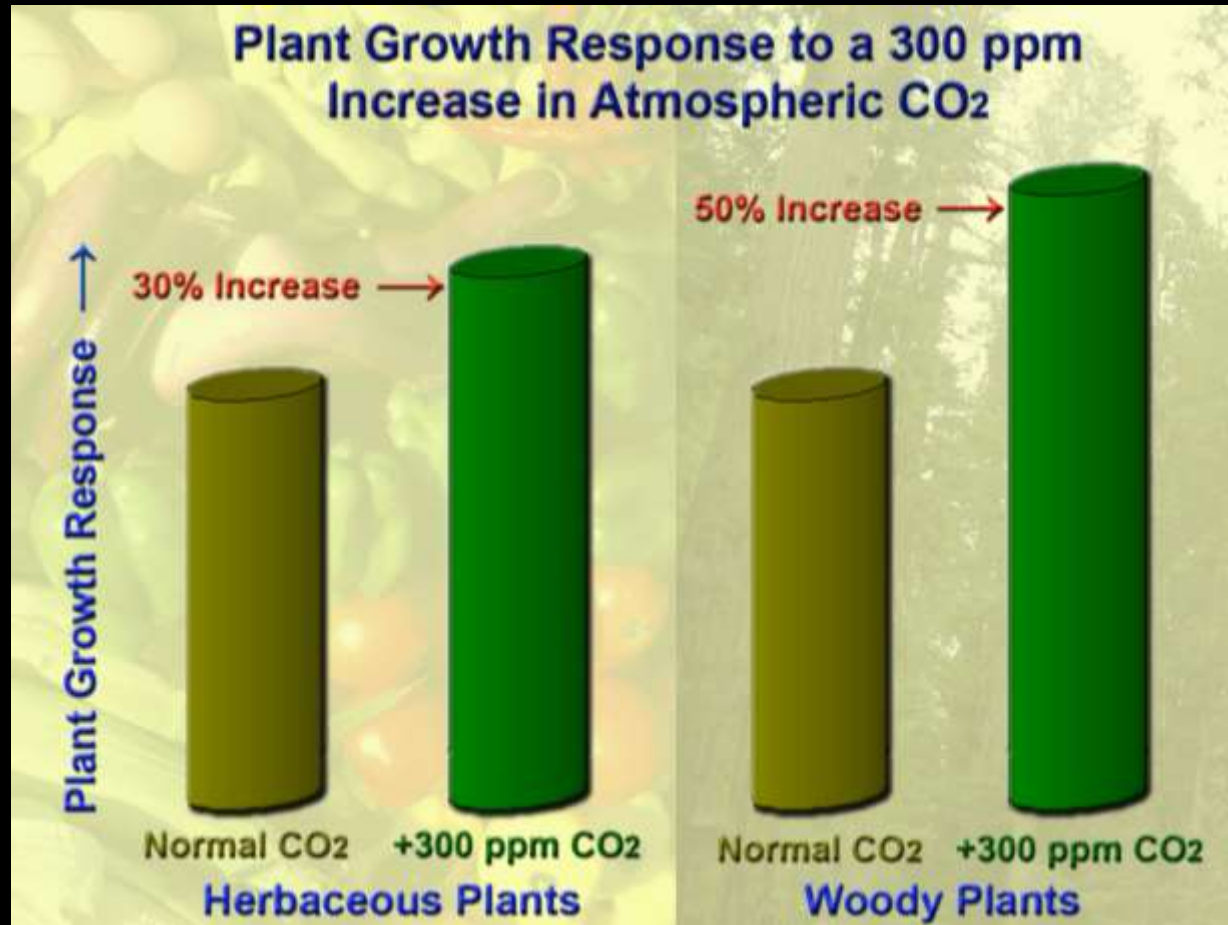
What about fossil energy-related benefits to the natural world?

- Such benefits generally have their origin in, or are linked to, the carbon dioxide concentration of the atmosphere, which has increased during the Modern Era primarily in response to humanity's combustion of fossil fuels and they include ...

Higher CO₂ Concentrations Increase Plant Productivity

- Atmospheric CO₂ is the basic food of plants
 - It is the primary raw material utilized by plants to construct their tissues
- Plants love CO₂
 - Thousands of laboratory and field experiments have demonstrated that higher atmospheric CO₂ concentrations increase plant productivity and growth
 - The better plants grow, the more food there is available to sustain the entire biosphere

Higher CO₂ Concentrations Increase Plant Productivity



What does this current and future growth-enhancing benefit of atmospheric CO₂ enrichment portend for the biosphere?

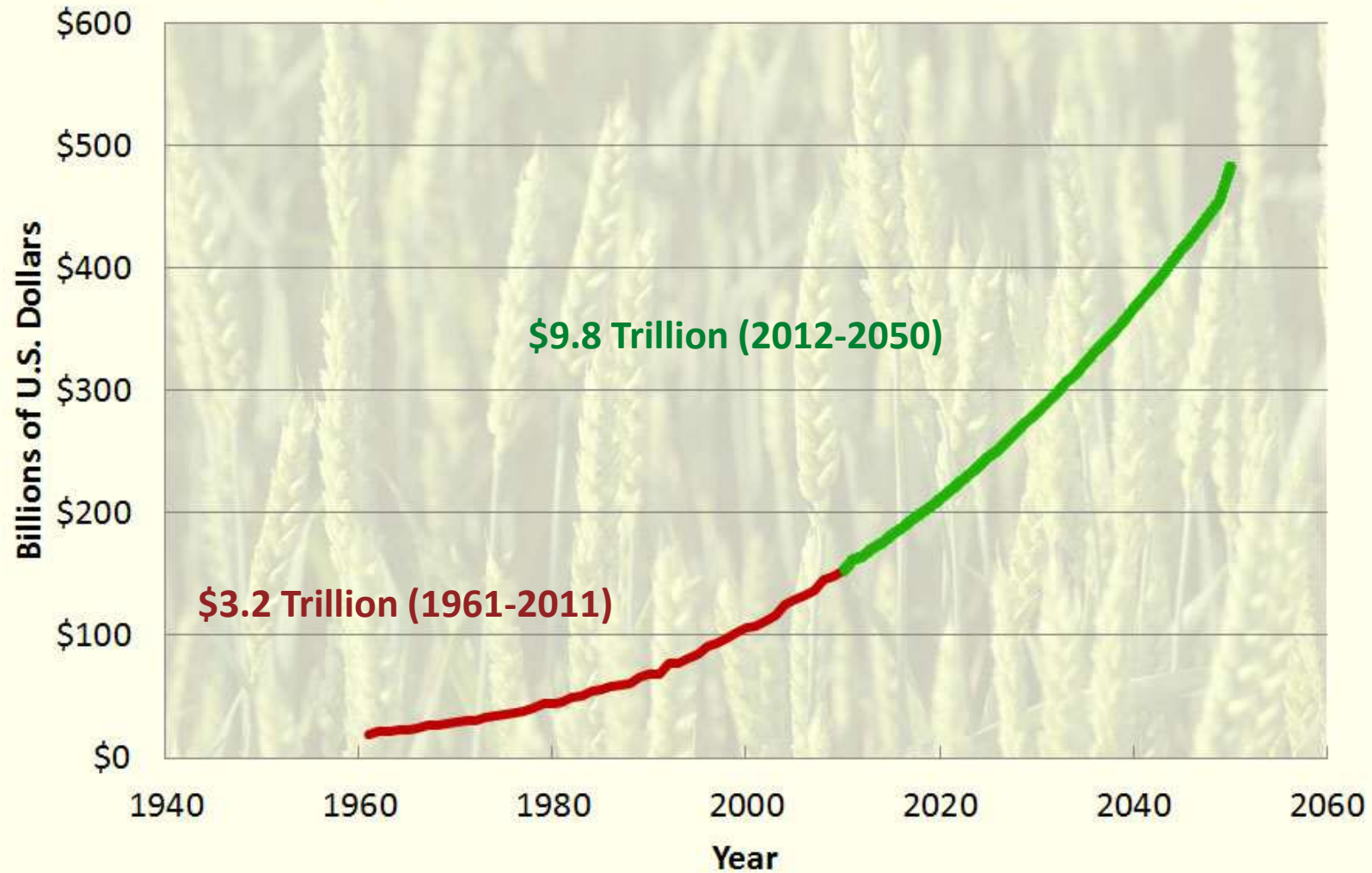
Benefits of Atmospheric CO₂ Enrichment

Enhanced Agricultural Productivity

- Increasing atmospheric CO₂ concentrations have increased past, present and future crop yields
- Without the benefits of CO₂ enrichment on agriculture, world food supply could fall short of world food demand by the year 2050



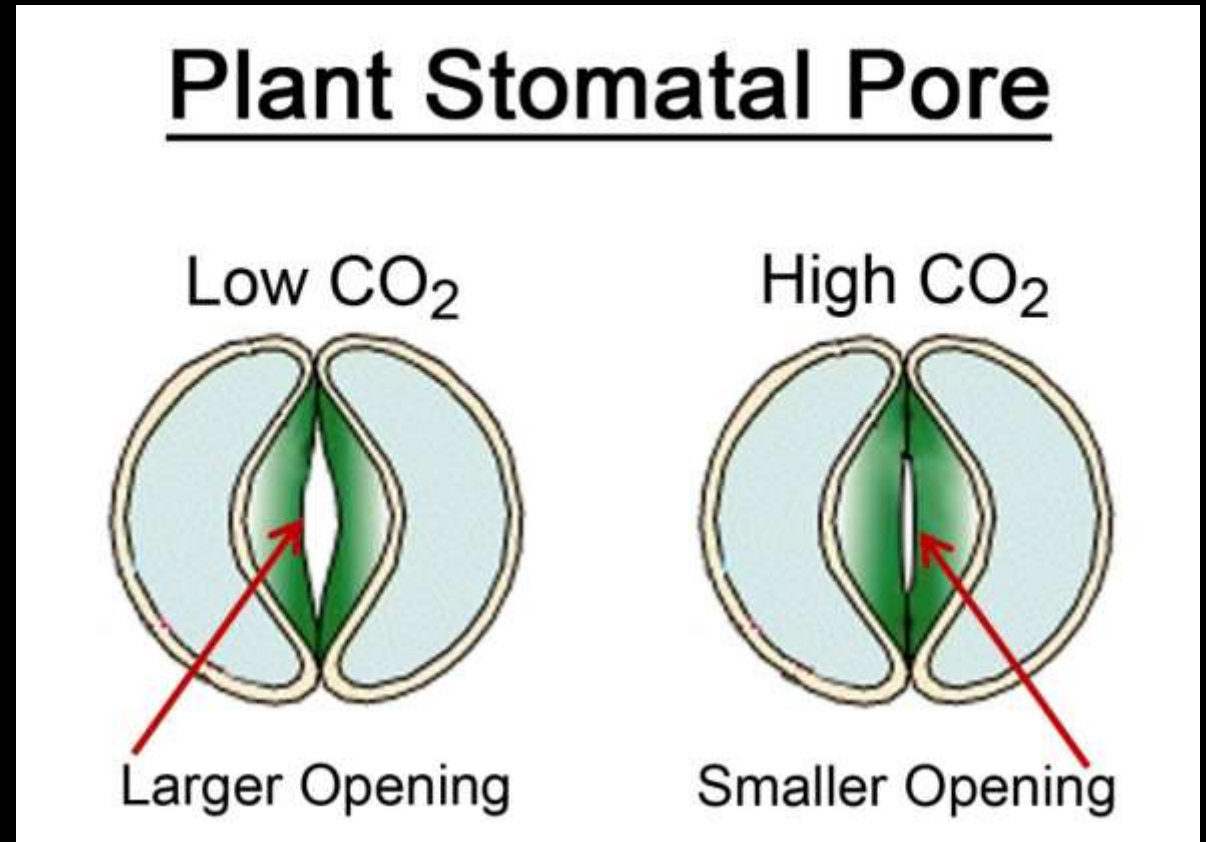
Observed (1961-2011) and Projected (2012-2050) Monetary Benefit of
Rising Atmospheric CO₂ on Global Crop Production



Source: Idso (2013). *The Positive Externalities of Carbon Dioxide: Estimating the Monetary Benefits of Rising Atmospheric CO₂ Concentrations on Global Food Production.*

Elevated Atmospheric CO₂ Enhances Plant Water Use Efficiency

- Plant water use efficiency (WUE) is the amount of biomass produced per unit of water lost
- The result is a reduction in water loss via transpiration, thus increasing plant WUE by as much as 70-100%



Elevated Atmospheric CO₂ Enhances Plant Water Use Efficiency

- Water Use Efficiency Benefits

- Can produce the same amount of crop yields using less water
- Less-susceptible to drought
- Plants will be able to grow and reproduce where it has previously been too dry to exist
- Win back lands lost previously to desertification
- Greater vegetative cover can reduce adverse effects of soil erosion
- Ample real-world evidence of these benefits

Elevated Atmospheric CO₂ Ameliorates Environmental Stresses

- Higher levels of atmospheric CO₂ reduce the deleterious effects of high soil salinity, high/low air temperature, high/low light intensity, low levels of soil fertility, oxidative stress, pathogen attack, macro and micro nutrient excesses/deficiencies, and the stress of herbivory
- The percentage growth enhancement produced by an increase in the air's CO₂ content is generally greater under stressful and resource-limited conditions than when growing conditions are ideal

Increasing Atmospheric CO₂ Benefits the Biosphere

$$\begin{array}{lcl} \text{Aerial fertilization effect} & & \\ + & & A \\ \text{Transpiration-reducing effect} & = & \text{Biospheric} \\ + & & \text{Bonanza!} \\ \text{Stress-alleviating effect} & & \end{array}$$

Atmospheric CO₂ is Greening the Earth!

- Observations from all across the globe indicate that the whole of the terrestrial biosphere is reaping incredible benefits from the approximate 45 percent increase in atmospheric CO₂ since the beginning of the Industrial Revolution – *Global Greening!*

The State of Earth's Terrestrial Biosphere:

*How is it Responding to Rising Atmospheric
CO₂ and Warmer Temperatures?*



Craig D. Idso, Ph.D.

Center for the Study of Carbon Dioxide and Global Change

5 December 2012

Concluding Comments


- These benefits to the human environment, which includes both humanity and the natural world, are undeniable
 - Without adequate supplies of low-cost centralized energy, few, if any, of the major technological and innovative advancements of the past two centuries that have enhanced and prolonged human life could have occurred
 - Without the increased CO₂ emissions from fossil fuel use over the past two centuries, Earth's terrestrial biosphere would be nowhere near as vigorous or productive as it is today

Concluding Comments

- It is scientifically and morally indefensible to demonize fossil energy and claim that CO₂ emissions are a current threat to human health and welfare
- *More, not less, fossil energy is needed to enhance the future human environment*
 - This is the critical message that must be shared with scientists, activists, policy makers, educators and the general public

The Institute for the Human Environment

- www.human-environment.org
- Non-profit organization advocating for the continued development and improvement of society and the natural environment
- Supports the unfettered use of fossil energy to enhance and protect the human environment
- Seeks to reverse the 2009 EPA Endangerment Finding & restore critical policy balance



Institute for the Human Environment

[Home](#) [About](#) [Fossil Fuel Benefits](#) [Policy](#) [Videos](#) [Contribute](#)

Welcome & Our Purpose

The *Institute for the Human Environment* is a non-profit educational organization advocating for the continued development and improvement of society and the natural environment. Its mission is to support the unfettered use of fossil fuels so that the industrial evolution of the human community can continue unoppressed by the heavy hand of government.

The concept of the Human Environment, which includes both the natural world and humanity's impact upon it, has its origin the U.S. [National Environmental Policy Act \(NEPA\)](#) of 1969, as more succinctly defined by the nations of the world -- including the United States -- in the [Stockholm Declaration on the Human Environment](#) in 1972. Among the principles set forth in this latter Declaration is the philosophy that protecting the human environment not only includes safeguarding the natural environment, it also includes defending a fundamental right of society to utilize and transform the natural environment so as to sustain and enhance the quality of *human* life.

George Soros, Michael Bloomfield, Al Gore, industrial, government and professional environmental groups that fund efforts to outlaw fossil fuel use have grown immensely in recent years. Their motives invariably include acquiring money and political power, whether for individuals, environmental groups, companies, politicians or governments. Their efforts enabled President Obama's EPA to declare in late 2009 that CO₂ emissions resulting from the combustion of carbon-based fossil fuels are a "current threat" to human health and welfare. This declaration has subsequently served as the foundation for numerous State and federal regulatory actions since.

Sadly, the entire narrative promulgated by the anti-fossil fuel movement is based on predictions of dangerous future global warming derived from computer model *projections* that have since been invalidated by real-world *observations*. When critically examined, there exists *no compelling evidence* that CO₂ emissions are significantly altering global climate or harming humanity in "current", real time. Furthermore, those who seek to regulate CO₂ emissions and control fossil fuel use almost always fail to conduct a realistic benefit-cost analysis; they rarely acknowledge, let alone incorporate, the numerous *benefits* fossil fuel use provides to society and nature alike. When such *positive* externalities are accounted for (many of which are noted and discussed under our heading [Fossil Fuel Benefits](#)), it becomes scientifically and morally indefensible to demonize fossil fuel use and continue to maintain that CO₂ emissions are a "current threat" to human health and welfare.

More, not less, fossil fuel use is needed to enhance the future human environment. Accordingly, our Institute seeks to bring these new facts to light for all regulators at the State level and to reverse the 2009 EPA Endangerment Finding,



Institute for the Human Environment

- Our message is simple:
 - Atmospheric CO₂ is an aerial *fertilizer*, not an airborne pollutant
 - Fossil energy *enhances* civilization and the human experience, it doesn't diminish it
 - *More*, not less, fossil energy is needed to enhance and protect the human environment
- Far too many regulations and laws have tilted the scales toward safeguarding the natural environment at the *expense* of humanity and it is time for that to change

Real-world Evidence that CO₂ Emissions and Fossil Energy Enhance the Human Environment

A horizontal banner with a background of overlapping geometric shapes in shades of yellow, green, and blue. The text is centered and reads:

13TH INTERNATIONAL CONFERENCE ON CLIMATE CHANGE

Best Science, Winning Energy Policies

Dr. Craig D. Idso, Chairman
Center for the Study of Carbon Dioxide and Global Change
www.co2science.org