

CLAIM: Manmade climate change from CO₂ emissions threatens agriculture and food security

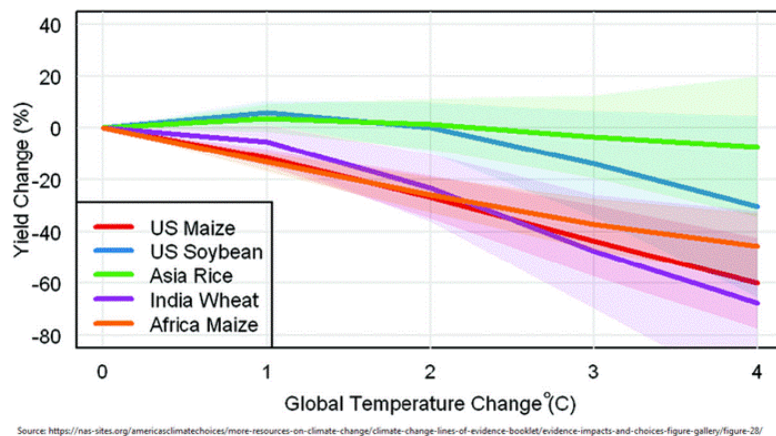
“One of the most pernicious examples of disinformation promoted by the Climate Industry is the claim that manmade climate change from CO₂ emissions threatens agriculture and “food security”.

That’s the exact opposite of the truth. CO₂ is a “plant fertilizer (and heat in growing areas has been declining not increasing)” and hundreds of agricultural studies have shown that **higher CO₂ levels are dramatically beneficial for agriculture**, to levels far above what we can ever hope for outdoors” ([Dave Burton](#) (2019)).

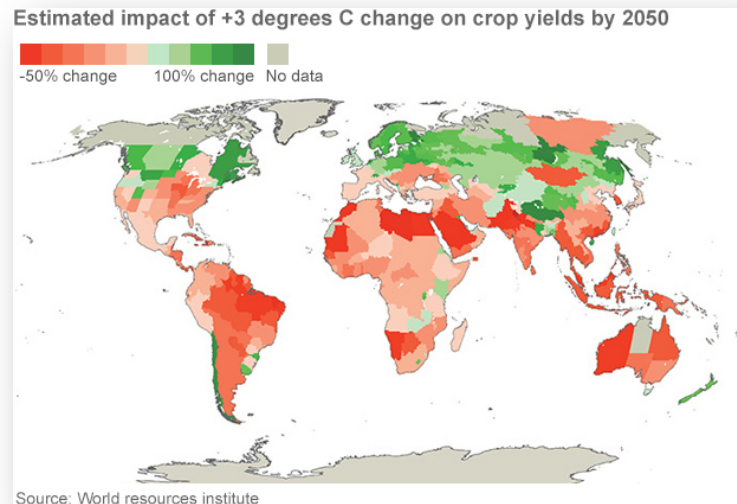
The statement in the quote above is true for the great majority of crops, nearly everywhere in the world. Yet the NAS has been promoting for years the anti-scientific argument that rising atmospheric CO₂ concentration levels and claimed associated warming are bad for agriculture.

Yields have reached record levels for both corn and beans in 4 of the last 5 years in part due to the increased fertilization by CO₂, but also improved hybrids and farming technology and a slow decline in average growing season maximum temperatures.

This 2011 NAS/NRC [propaganda graph](#) is a particularly outrageous example of junk science:



It parallels the IPCC projections:



It of course was parroted in the media. According to the *Los Angeles Times*:

One of the [IPCC] panel's most striking new conclusions is that rising temperatures are already depressing crop yields, including those of corn and wheat. In the coming decades, farmers may not be able to grow enough food to meet the demands of the world's growing population, it warns.

The studies intentionally ignored real world factors such as adaption, genetic improvement (hybrids) and CO₂ fertilization (and its' other benefits)... and spun into a narrative of failing crop yields."

ADAPTION

In the real world, farmers adapt to the seasons. In the tropics, simple adaption is used to grow temperate vegetables, which can't tolerate tropical summers. They plant them in autumn. The vegetables grow happily through the very mild winters, and bear fruit in spring, before the summer heat kills them. In the U.S. desert southwest, Arizona agriculture's Maricopa County farmers are planting corn in February and March to serve up delicious sweet corn by early summer before the heat peaks.

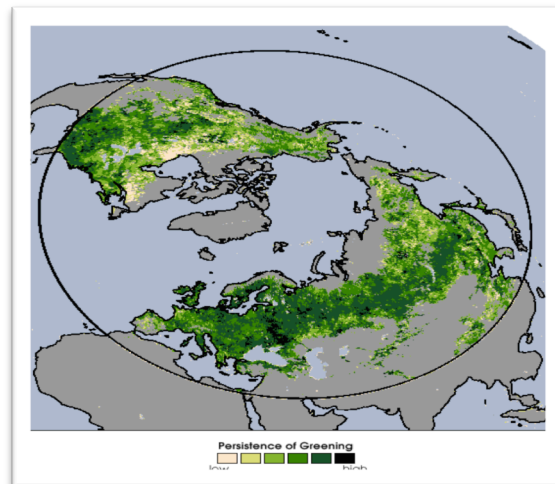
THE GREENING OF THE WORLD THANKS TO CO₂

Most plants grow best with daytime atmospheric CO₂ levels of at least about 1500 ppmv. That's about what CO₂ levels are thought to have averaged during the Cretaceous Period. It's 1090 ppmv higher than the current average outdoor level of about 410 ppmv.

In other words, most plants would grow best if CO₂ levels were much higher.

In 1920, *Scientific American* reported the results of German greenhouse and F.A.C.E. experiments with CO₂ supplementation. The experiments were so spectacularly successful that *SciAm* called anthropogenic CO₂ "the precious air fertilizer."

Indeed, the minor warming over the last century and increases in CO₂ emissions have resulted in a greening and polar expansion of the prime growing regions. The growing areas have expanded and have not been displaced, with more production from Canada and Russia.



*Greening persistence based on vegetation indices from 1981-1999.
Image from the NASA Earth Observatory (Zhou, et al., 2001).*

NASA reported that researchers confirm that plant life seen above 40 degrees north latitude, which represents a line stretching from New York to Madrid to Beijing, has been growing more vigorously since 1981.

Over this same time period, parts of the Northern Hemisphere have become greener and the growing season has increased by several days (Zhou, 2001). Furthermore, Eurasia appears to be greening more than North America), with more lush vegetation for longer periods of time. Experiments in the field have shown a doubling of CO₂ levels leads to much greater growth and increased biomass.

Is CO₂ Plant Food? Here is what happens with more CO₂



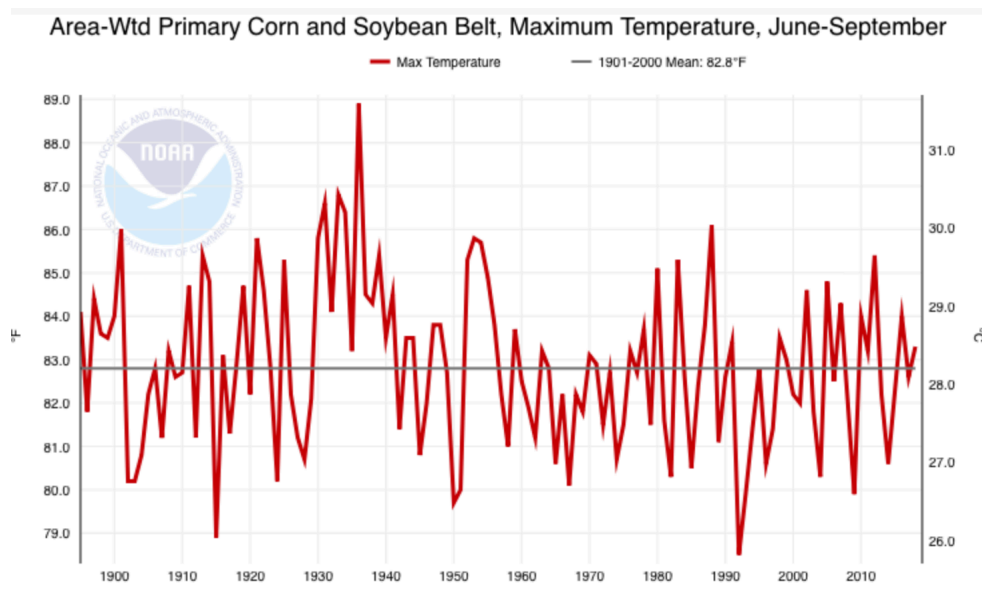
Commercial greenhouses utilize this. They burn vast quantities of natural gas and discard the heat, just to produce enough CO₂ for their plants to maximize growth – usually around 1000 ppm, more than double current atmospheric levels.



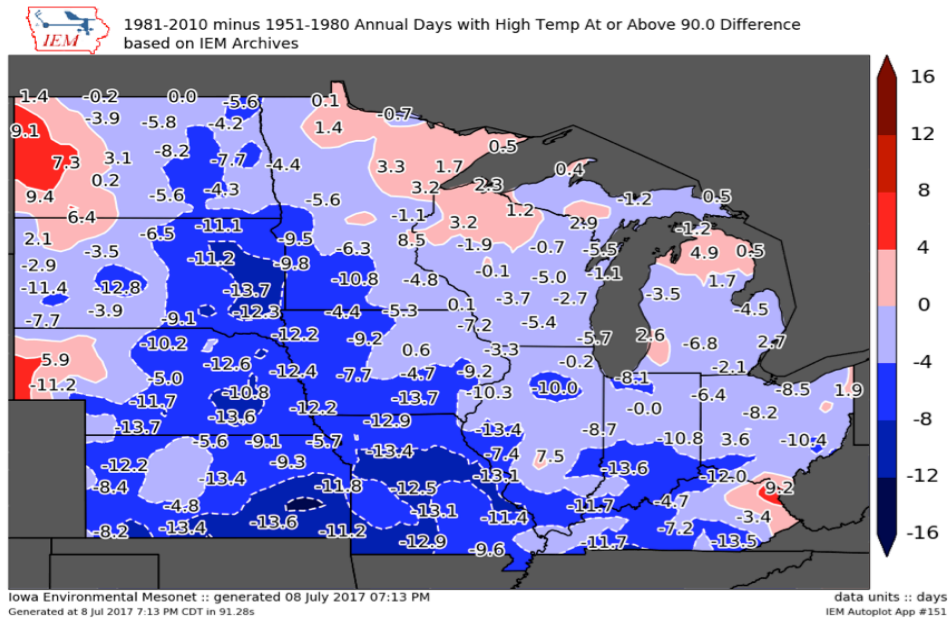
Hundreds of laboratory and field studies have demonstrated that elevated levels of atmospheric CO₂ stimulate plant productivity and growth and foster certain water-conserving and stress-alleviating benefits. These benefits likely persist throughout the plants' lifetimes ([Idso & Idso, 2011](#)).

In the U.S., corn, wheat and soybean production have increased from a combination of better hybrids, improved farming practices, beneficial precipitation patterns in the Corn Belt and the increased availability of CO₂ for photosynthesis and the other benefits.

The claims of increased heat in the growing areas are contradicted by actual data. The average daily maximum temperature during the growing season in the US Corn and Bean belts has declined and then stabilized since the peak in the 1930s.



Iowa State University did a study of 90F days in the growing areas of the Midwest, comparing the three decades 1981 to 2010 to the prior three decades 1951 to 1980. They found in most areas of the heartland there was a decline, as many as 14 days.



The nighttime temperatures have been elevated slightly due to the heat island warming in urban centers in the region and elevated moisture from irrigation and transpiration from more vigorous crops and natural vegetative growth in rural areas.

CROP YIELDS HAVE BEEN INCREASING AT A REMARKABLE PACE

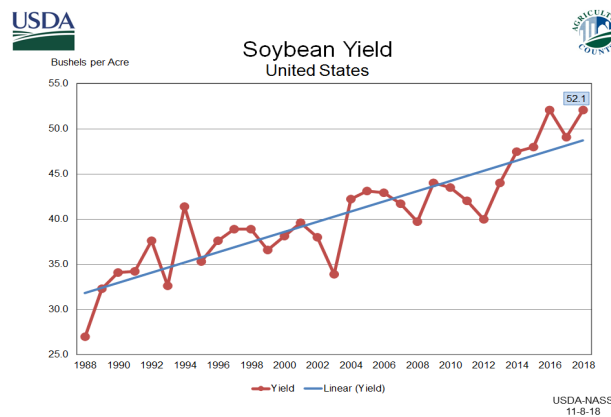
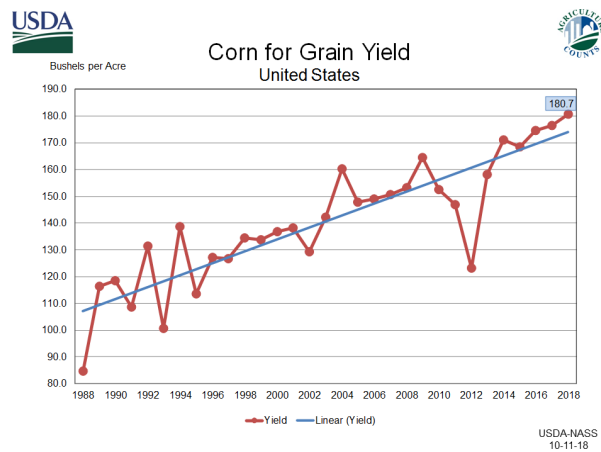
Since the 1930's, corn yields have increased six-fold and are expected to double by 2030 according to Mark J. Perry (2011), a professor of economics and finance at the University of Michigan.

Another major benefit of atmospheric CO₂ enrichment is that plants exposed to elevated levels of CO₂ have a greatly increased ability to withstand drought.

As described in Wittwer (1997), in many cases a doubling of the atmospheric CO₂ concentration actually *doubles* leaf-water use efficiency. More extensive plant canopies also shield the soil and limit soil moisture loss.

In 2012, despite a heat wave and drought as serious as in 1988, production of corn was 50% higher than in 1988 thanks, at least in part, to the reduction of drought stress through elevated levels of CO₂ and advancements in technology.

Yields for corn and beans have set new records in 4 of the last 5 years in the United States.



With modest nighttime warming and a continued suppression of extreme daytime heat continue, the growing season would get longer, which would provide opportunities for farmers to grow new crops or do more double cropping. Along with CO₂'s enrichment and drought-mitigating benefits, crop yields very likely will continue to improve.

SUMMARY

In conclusion, other things equal, there is no science-based reason to believe that continued increases in atmospheric CO₂ concentration levels would not **further enhance worldwide agriculture and food security.**