



American Farmers Save the Environment

Data to Accompany Testimony to the House Agriculture Committee



by Michael Shellenberger :: February 25, 2021

What's the TL;DR?



1. Emissions peaking and declining
2. Impact of climate declining
3. American farmers are world leaders
4. Low-efficiency farming bad for environment
5. American farmers can help farmers in poor nations
6. Climate change compared to other problems

Michael Shellenberger & Environmental Progress



THE ACTIVISTS WHO
EMBRACE NUCLEAR
POWER



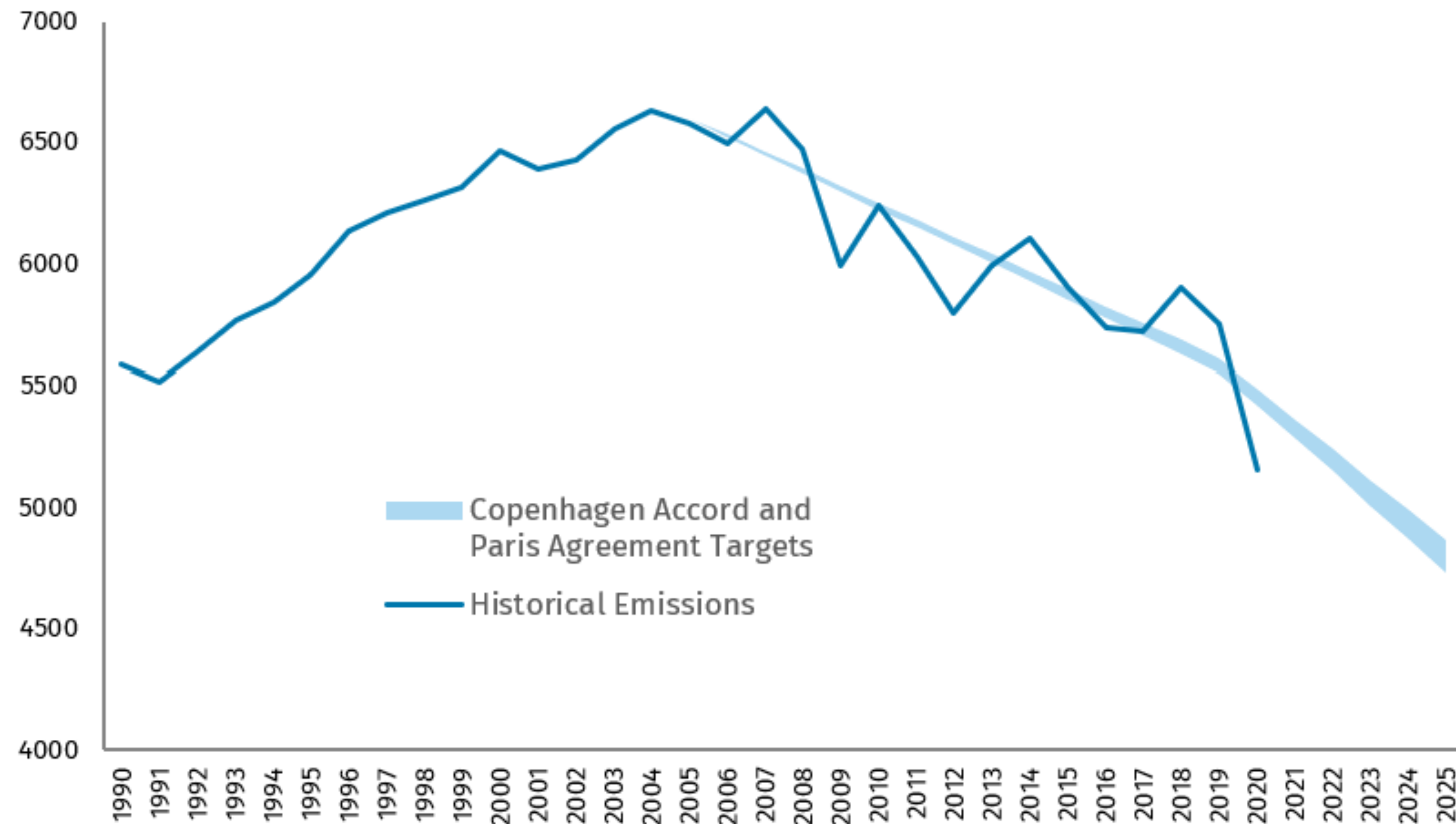
- Time Magazine, "Hero of Environment" and Green Book Award Winner
- Author of best-selling and critically-acclaimed new book *Apocalypse Never: Why Environmental Alarmism Hurts Us All*
- Environmental activist for 30 years, founder of Berkeley-based Environmental Progress, & co-founder Breakthrough Institute
- Subject of Feb. 2021 *New Yorker* article, "The Activists Who Embrace Nuclear Power"
- Working with climate scientists James Hansen, Tom Wigley, and Kerry Emanuel to prevent premature closure of America's nuclear plants
- Contributor to *New York Times*, *Washington Post*, *Forbes*

1. Emissions peaking and declining

U.S. Is World Climate Leader

“The U.S. saw the largest decline in energy-related CO₂ emissions in 2019 on a country basis... US emissions are now down almost 1 Gt from their peak in the year 2000, the largest absolute decline by any country over that period.” – International Energy Agency, 2020

Net US GHG emissions relative to international commitments
Million metric tons CO₂e, IPCC definitions, excludes international bunkers



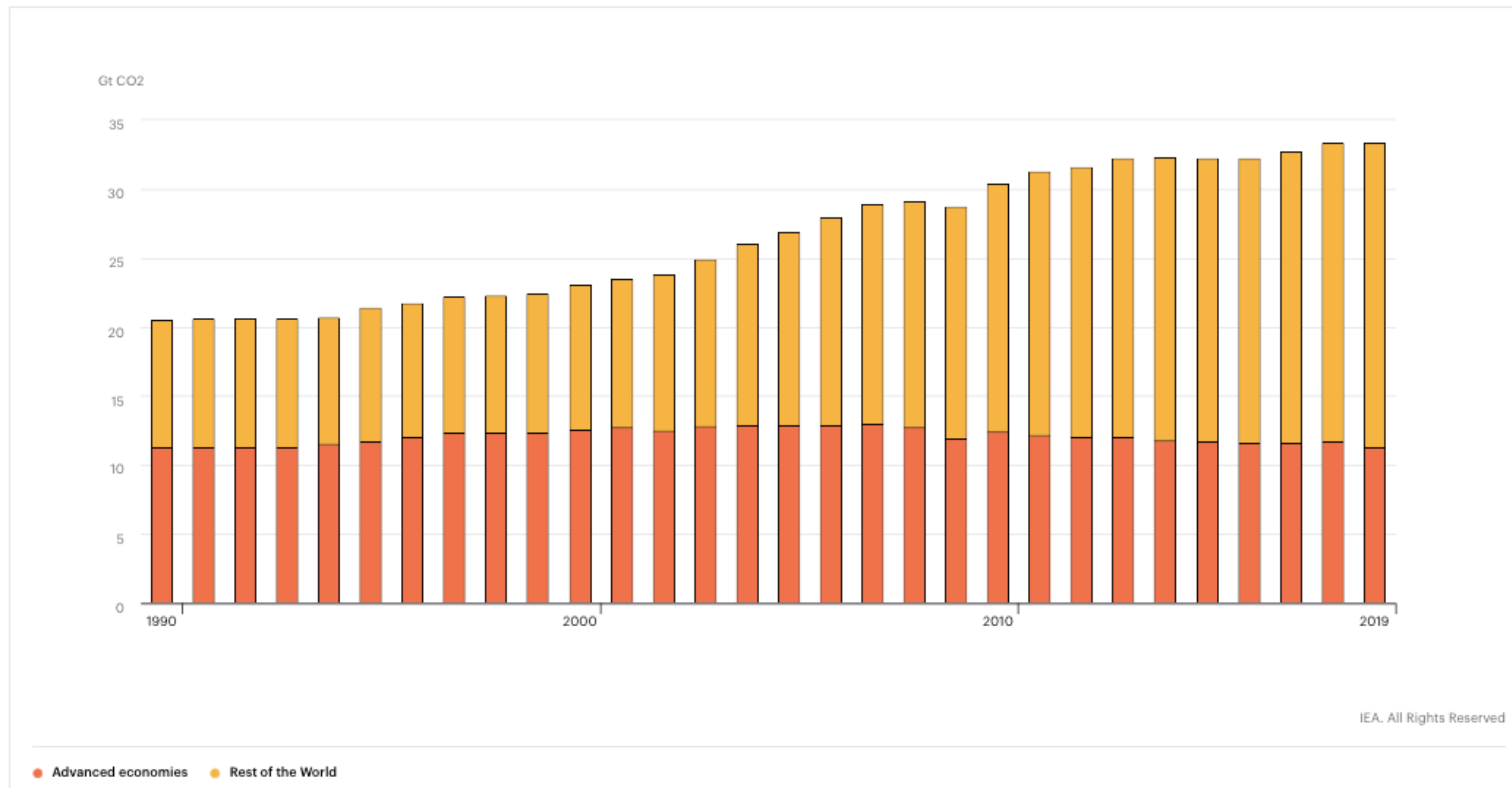
Source: ClimateDeck

World at or near peak emissions

Energy related CO2 emissions, 1990-2019

Last updated 11 Feb 2020

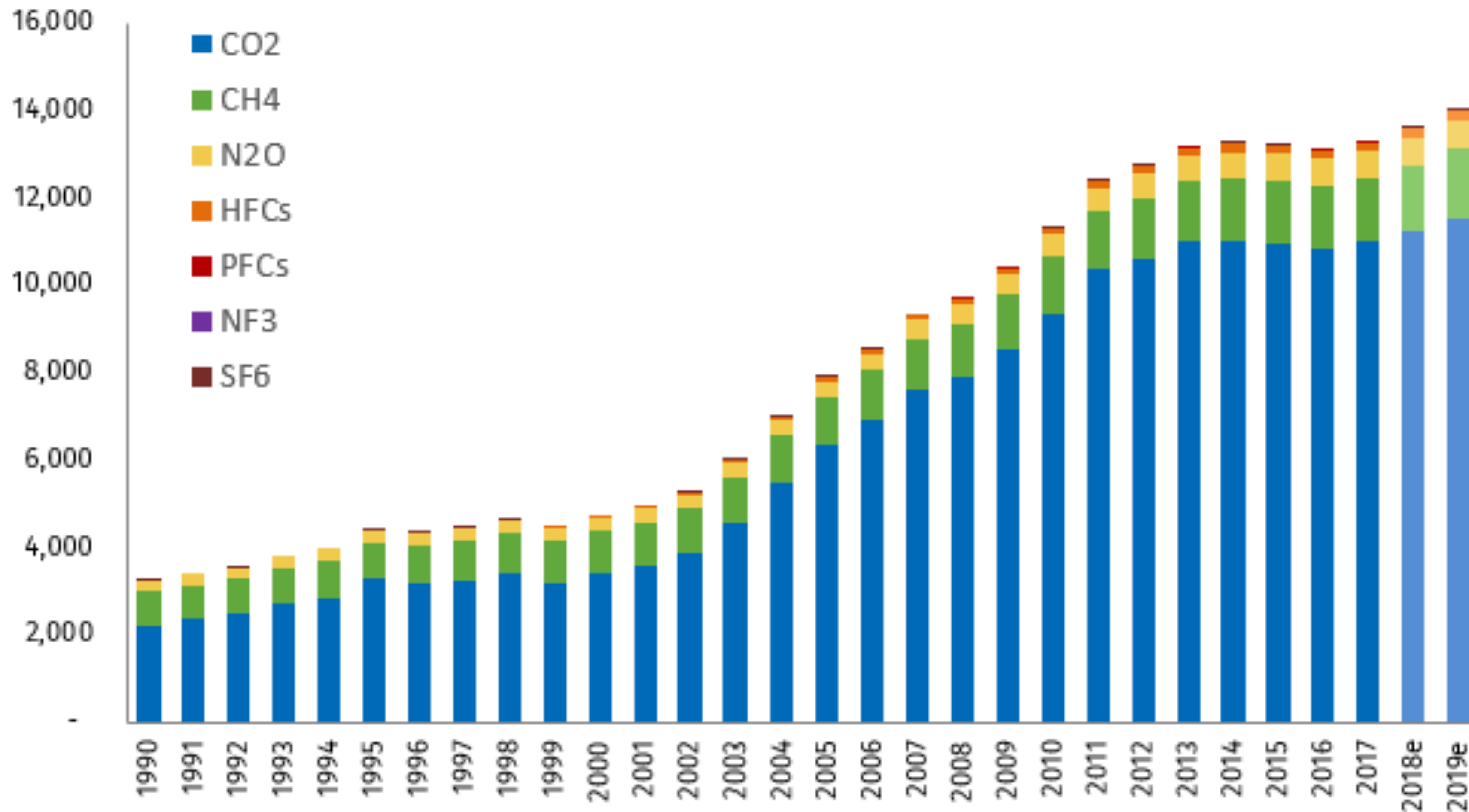
[Download chart](#) ↓



But China emissions rapidly rising

Net emissions in China by greenhouse gas, 1990-2019e

Million metric tons CO₂e, 2018 and 2019 emissions are preliminary estimates

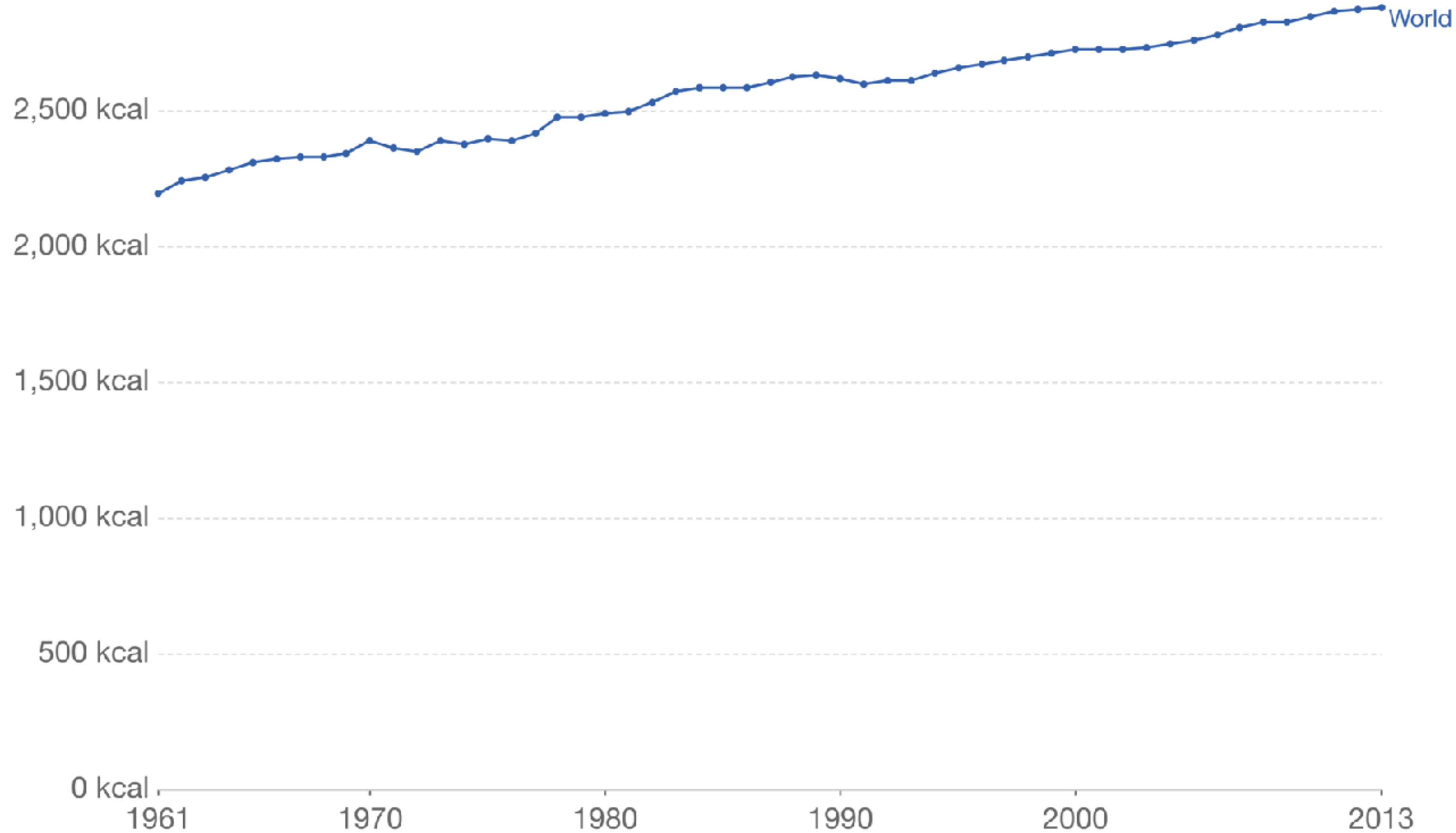


Source: Rhodium Climate Service

2. Impact of climate declining

Daily supply of calories, 1961 to 2013

Caloric supply is measured in kilocalories per person per day.



We produce enough food for **10 billion** people, a **25% surplus**, largest in history



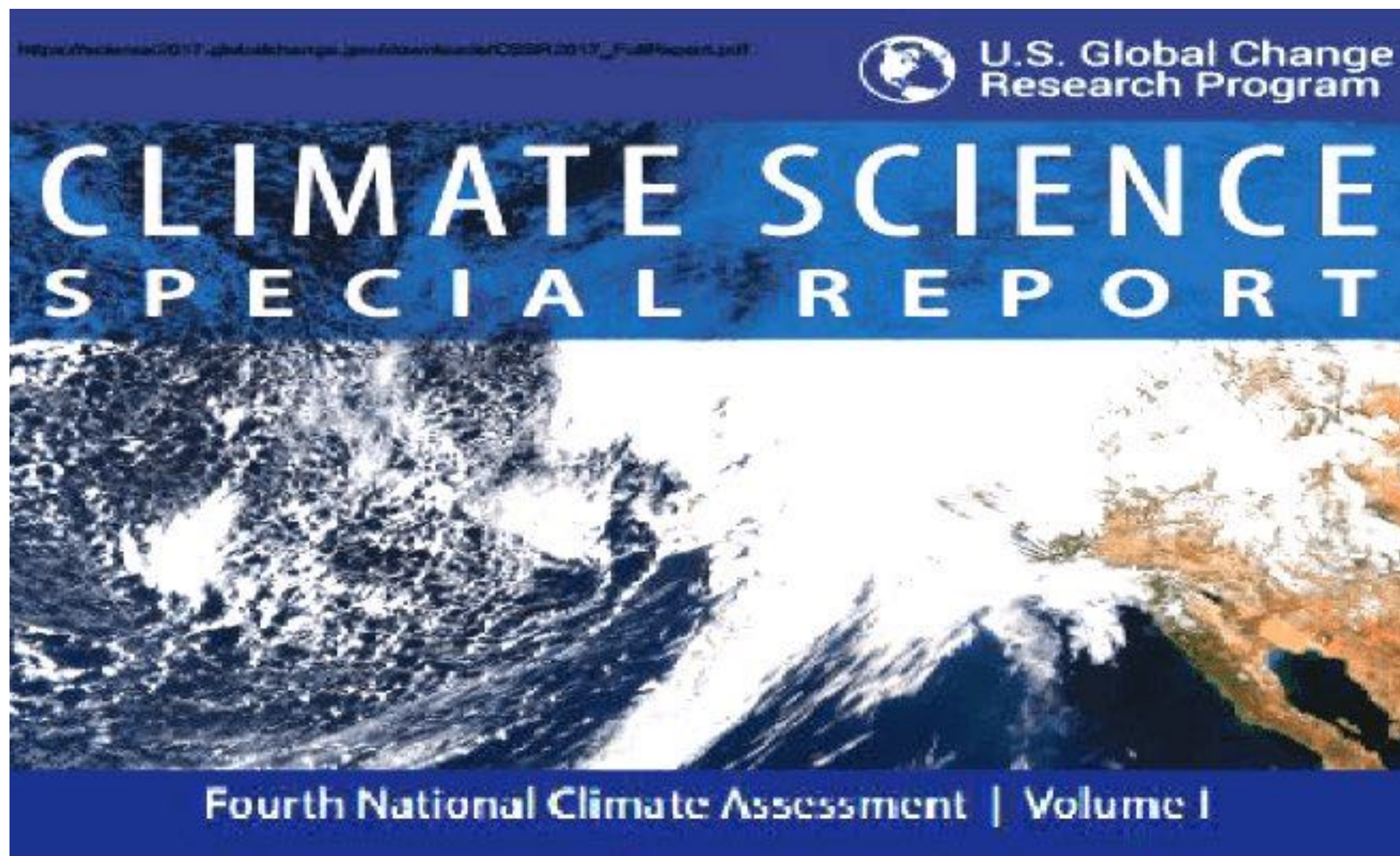
Source: OurWorldInData.org/food-supply; UN Food and Agriculture Organization (FAO)

American farmers adapting to climate



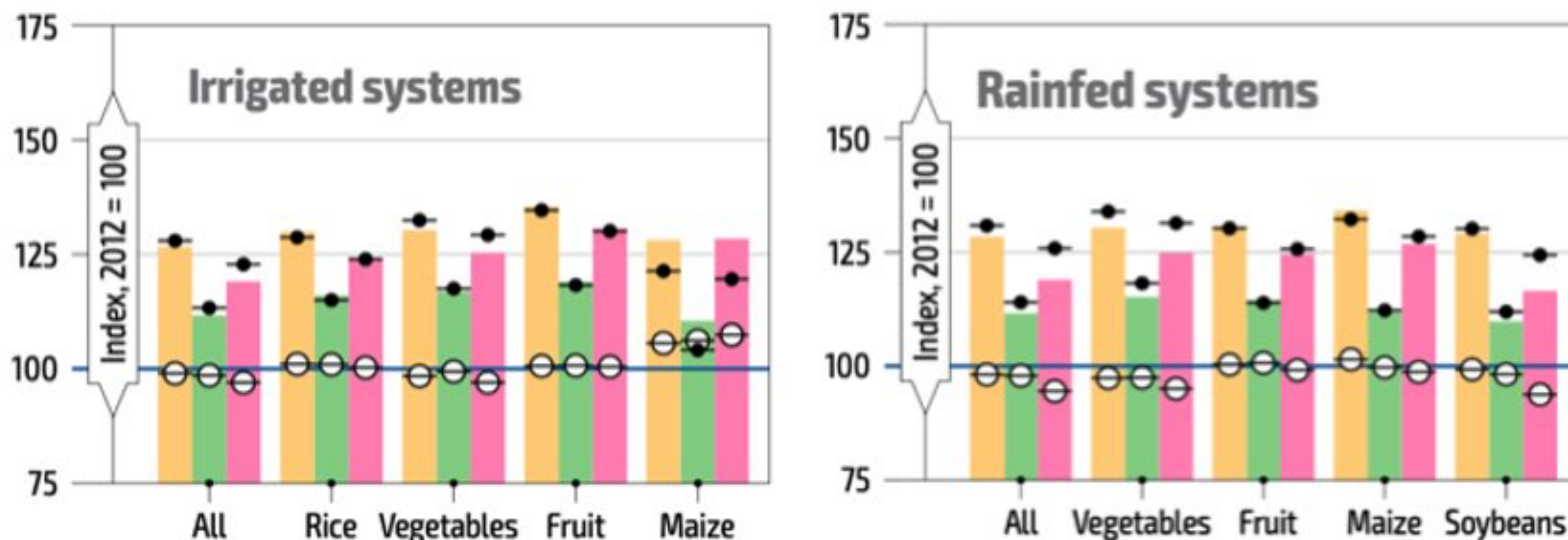
The U.S. Government's Fourth National Climate Assessment concludes that the risks of climate change to U.S. farmers can be mitigated by innovation and adaptation. Farmers can:

1. Change seeds, rotate crops, and deploy irrigation.
2. Manage heat stress among life stock by changing breeds and diets, providing shade, and altering patterns of feeding and reproduction.
3. Use pest and disease management, climate forecasting tools, and crop insurance as proven effective ways to reduce risk and increase productivity and efficiency.



Gowda, P., J.L. Steiner, C. Olson, M. Boggess, T. Farrigan, and M.A. Grusak, 2018: Agriculture and Rural Communities. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 391-437. doi: 10.7930/NCA4.2018.CH10

Tech Change Outweighs Climate Change in Food Production

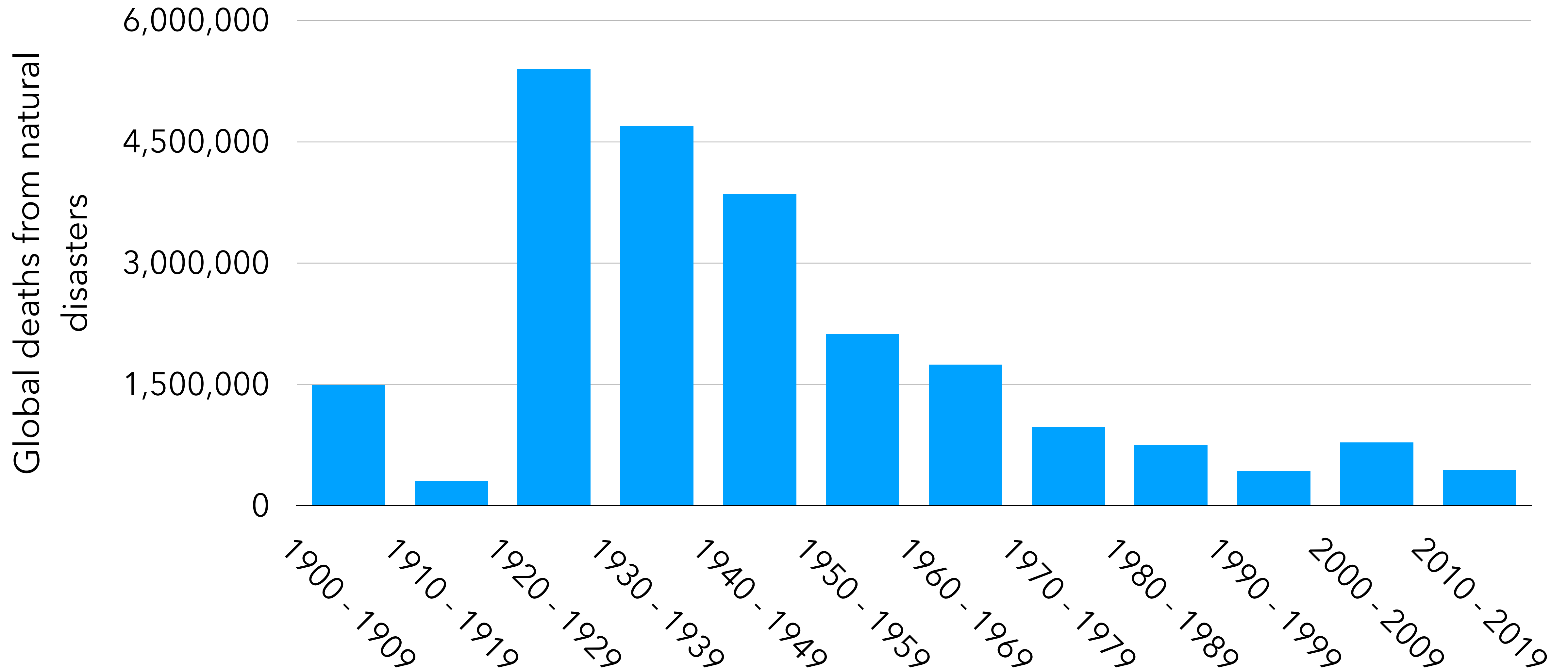


Note: Coloured bars indicate price-independent changes in yields attributed to both technical progress and climate change. The white circles indicate changes in yields arising from climate change, while the black barred dots indicate changes arising from technical progress. Climate change impacts are computed based on FAO-IIASA GAEZ v4 (scenario without CO₂ fertilization, median value for five climate models). Changes in yields are shown for the four top commodities, as classified in the FAO GAPS model, in each region, and production system, ranked by value of production in 2012. In this figure, "Citrus" and "Other fruit" are aggregated into "Fruit". "All" refers to the aggregated change in production over the total harvested areas for all crops. Note that the results of research into the impacts of climate change on fruit trees are not conclusive (Ramírez and Kallarackal, 2015).

Sources: FAO Global Perspectives Studies, based on FAOSTAT (various years) for historical crop yields and value of production; FAO-IIASA GAEZ v4 for climate change shifters; and FAO expert judgement for technical shifters.

- Technical change
 - ⊖ Climate change
- Combined effects by scenario
- Business as usual
 - Towards sustainability
 - Stratified societies

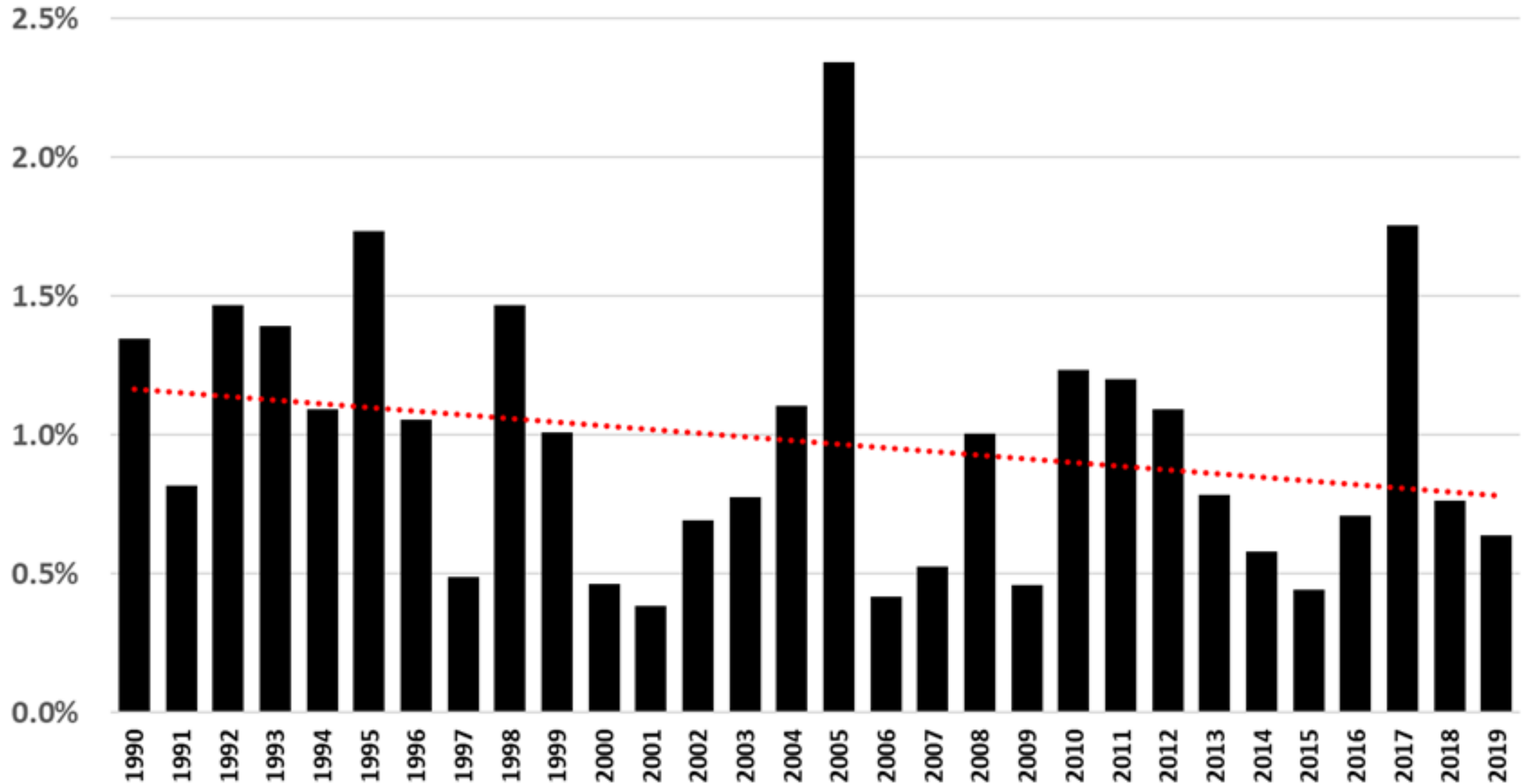
Decadal Deaths from Natural Disasters



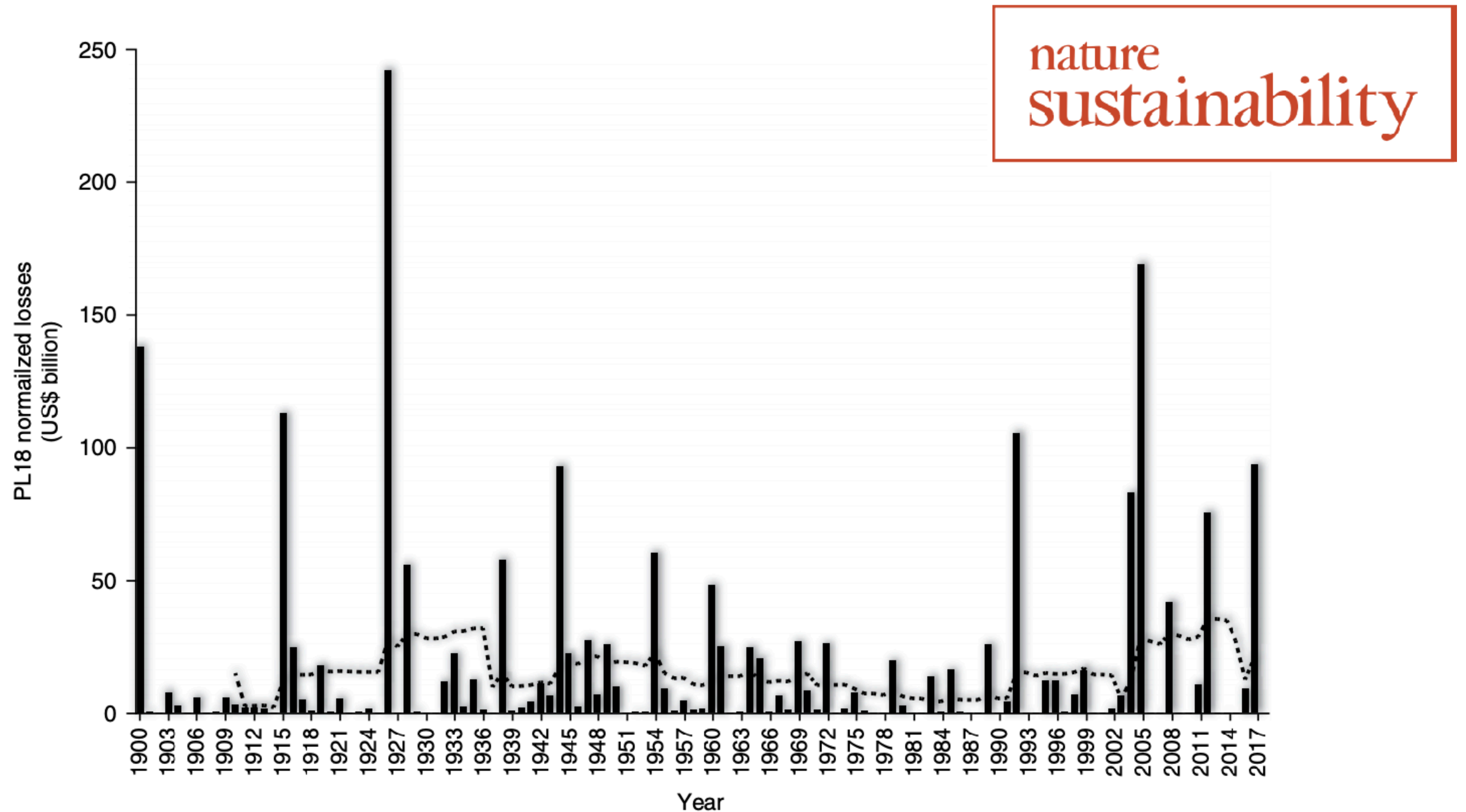
@RogerPielkeJr
16 July 2020

North America Weather-Related Castastrophe Losses as Percent of US GDP: 1990-2019

Sources: Swiss Re, OMB



Normalized hurricane damage in the continental United States, 1900-2017



Source: Jessica Weinkle, Chris Landsea, Douglas Collins, et al., "Normalized Hurricane Damage in the Continental United States 1900-2017," *Nature Sustainability* 1 (2018): 808-813, <https://doi.org/10.1038/s41893-018-0165-2>

Forest management outweighs the climate

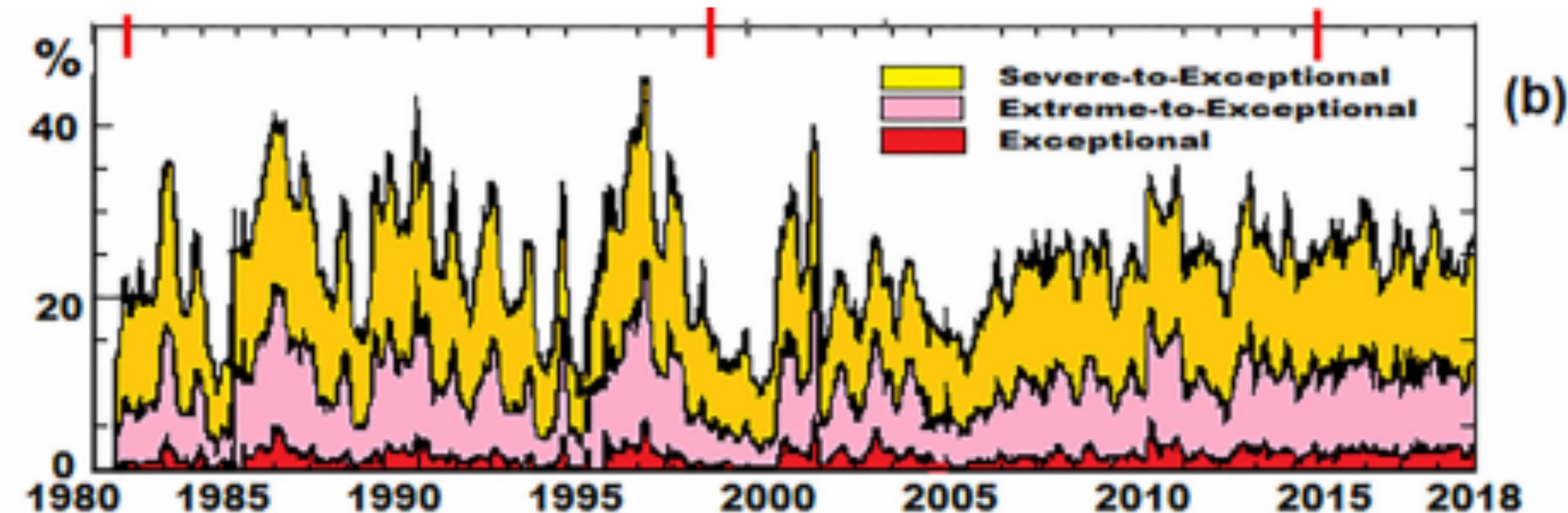
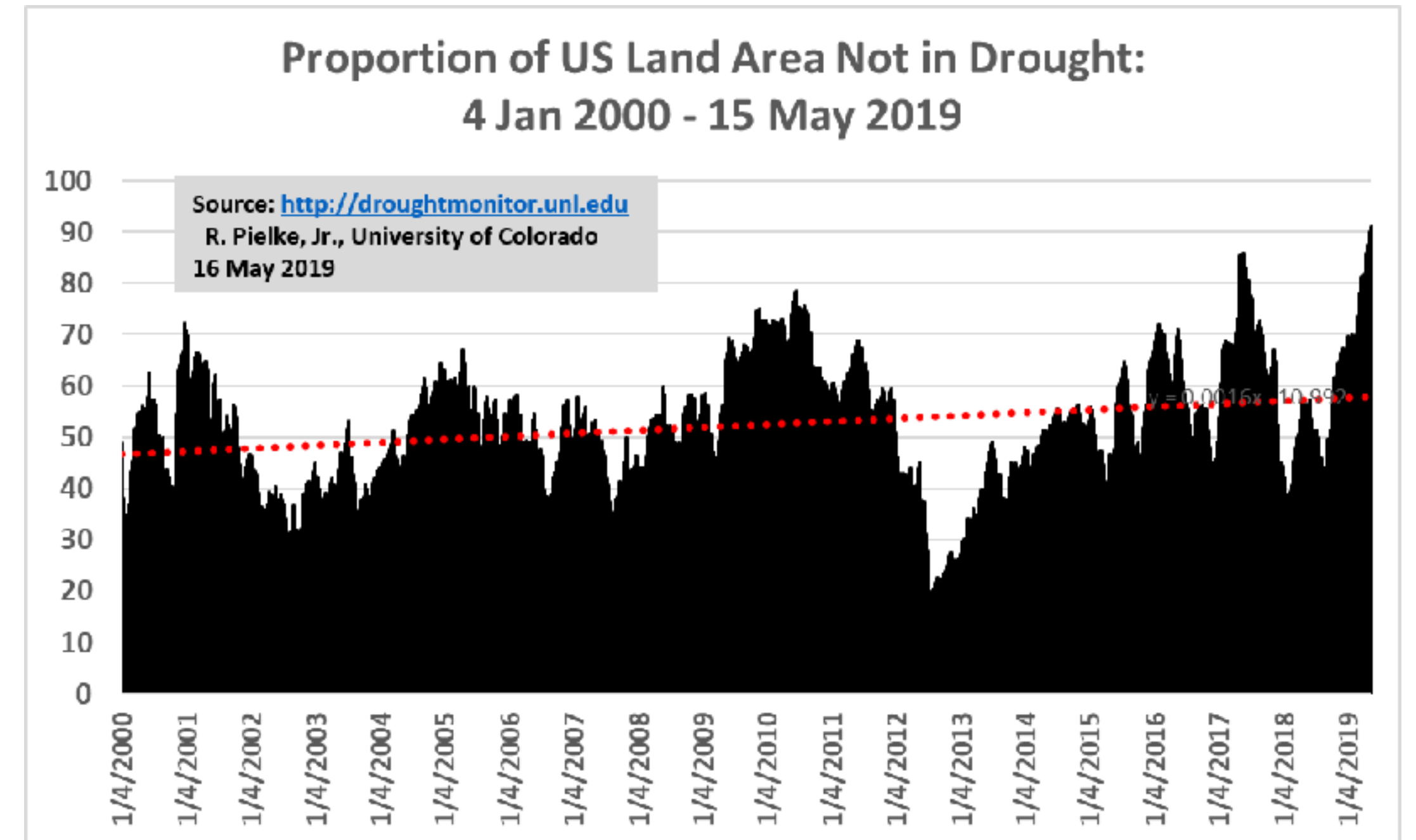


Source: Michael Shellenberger, "Forests That Survive Megafires Prove Good Management Trumps Climate Change," Forbes, September 13, 2020

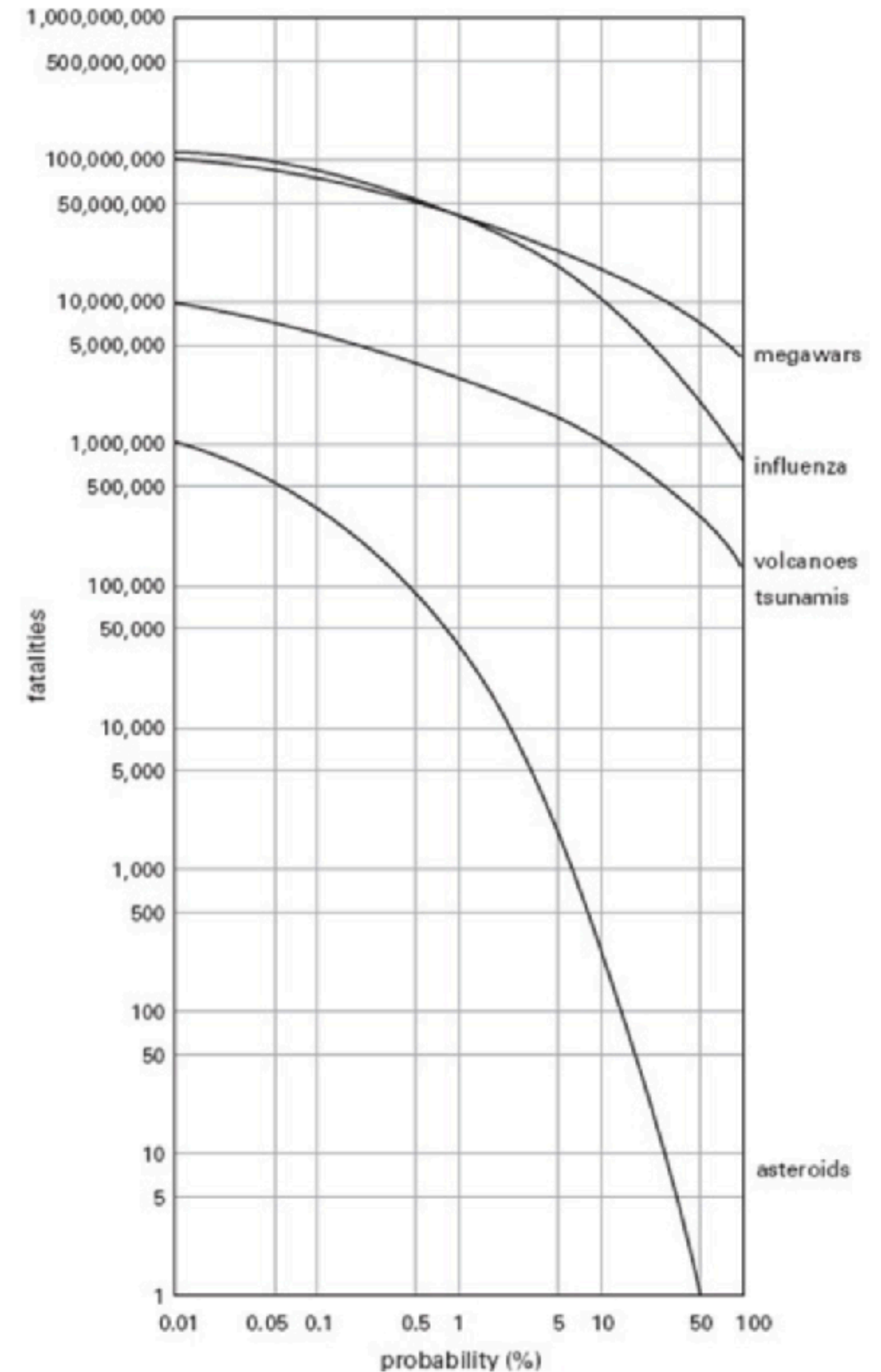
Droughts Not Increasing

"Global and main grain countries' drought area and intensity trends have not been following global climate warming since 1980's"

Felix Kogan , Wei Guo & Wenzhe Yang (2020) Near 40-year drought trend during 1981-2019 earth warming and food security, Geomatics, Natural Hazards and Risk, 11:1, 469-490, DOI: 10.1080/19475705.2020.1730452

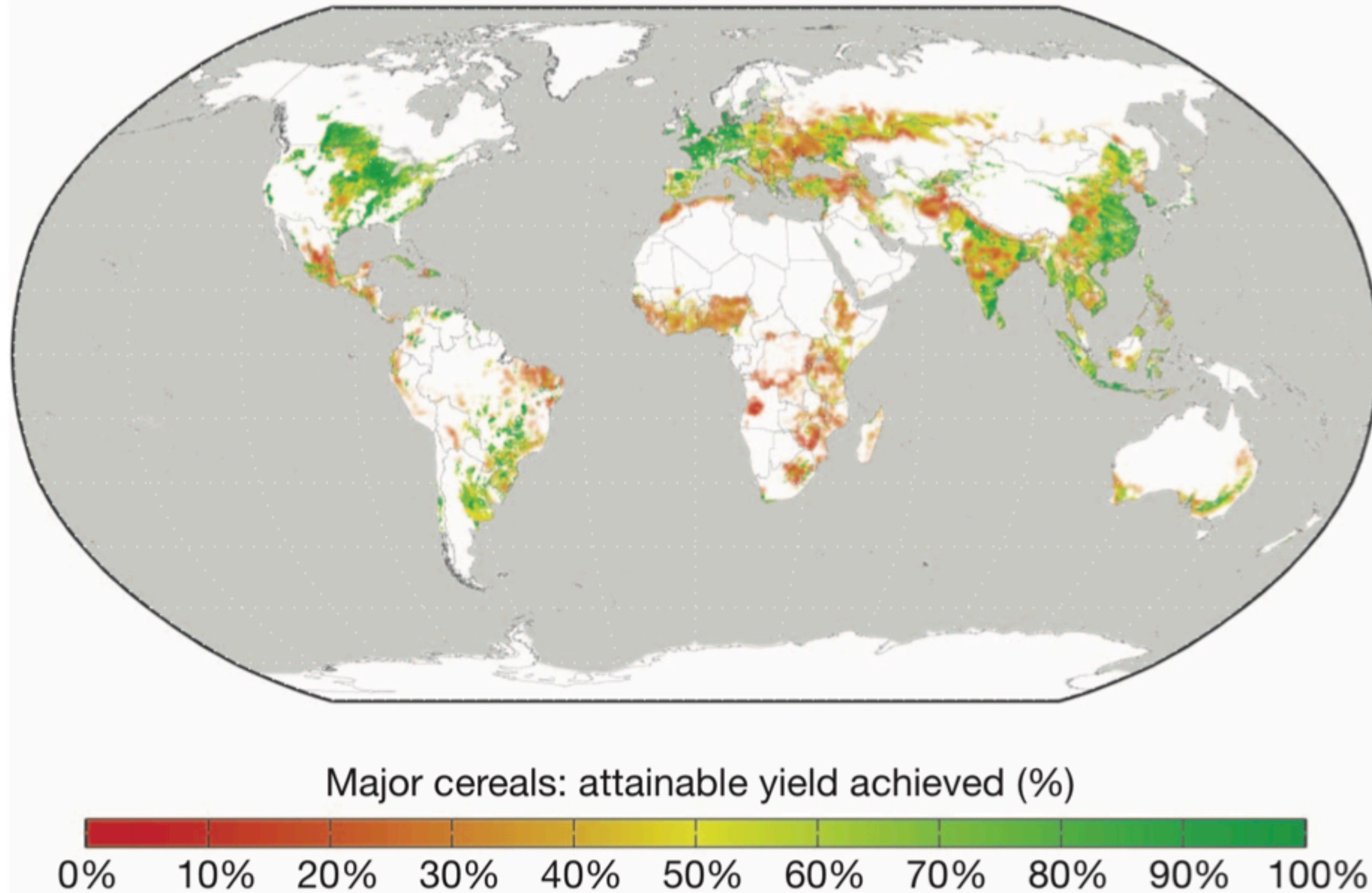


Wars, disease, volcanoes, tsunamis and asteroids, not climate change, pose the highest risk of catastrophe



Source: Vaclav Smil, "Global Catastrophes and Trends: The Next 50 Years," MIT Press (2008).

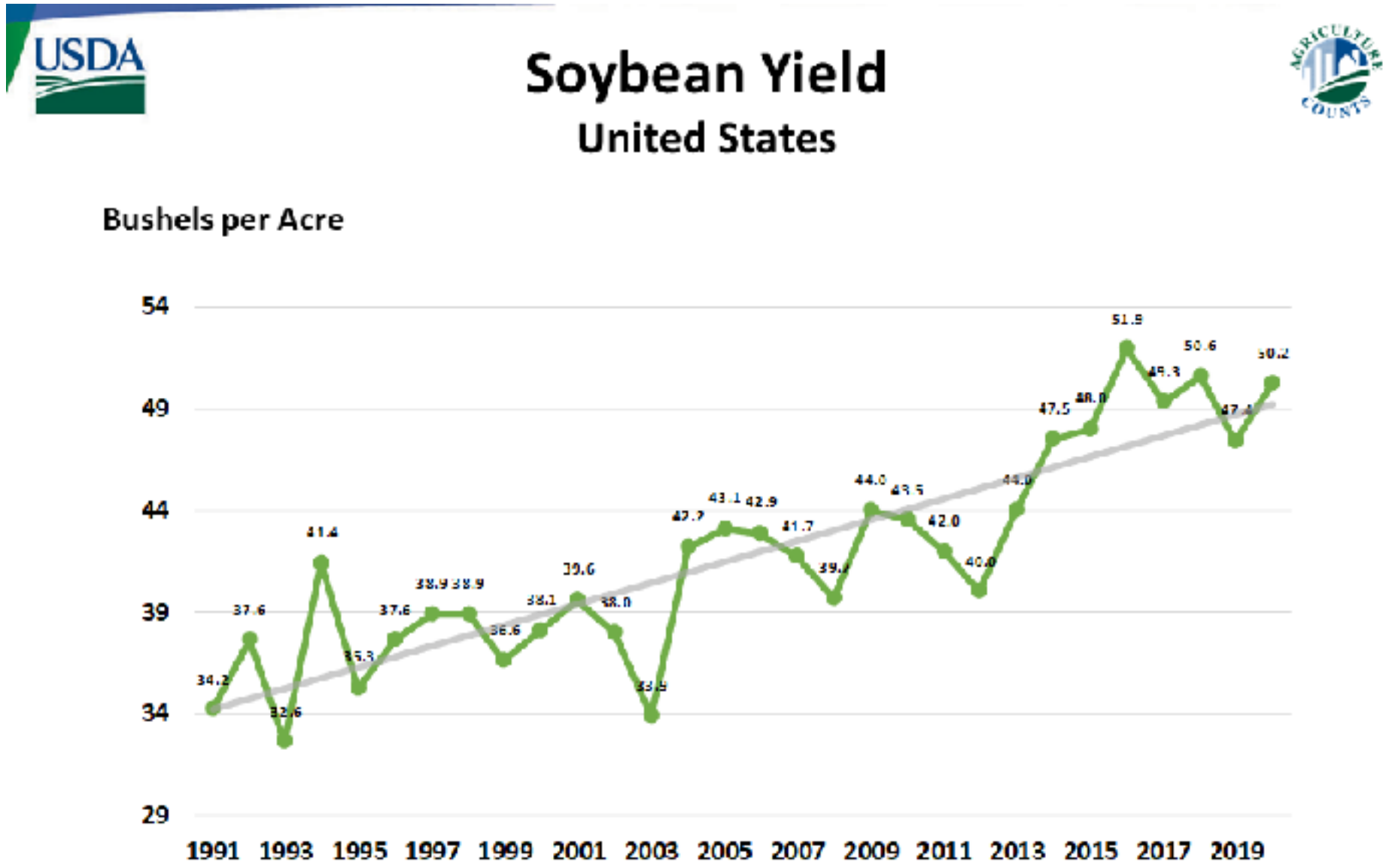
If every nation raised its agricultural productivity to the levels of its most successful farmers, global food yields would rise as much as **70%**



Yields could rise an additional **50%** if nations increased number of crops per year to their full potential

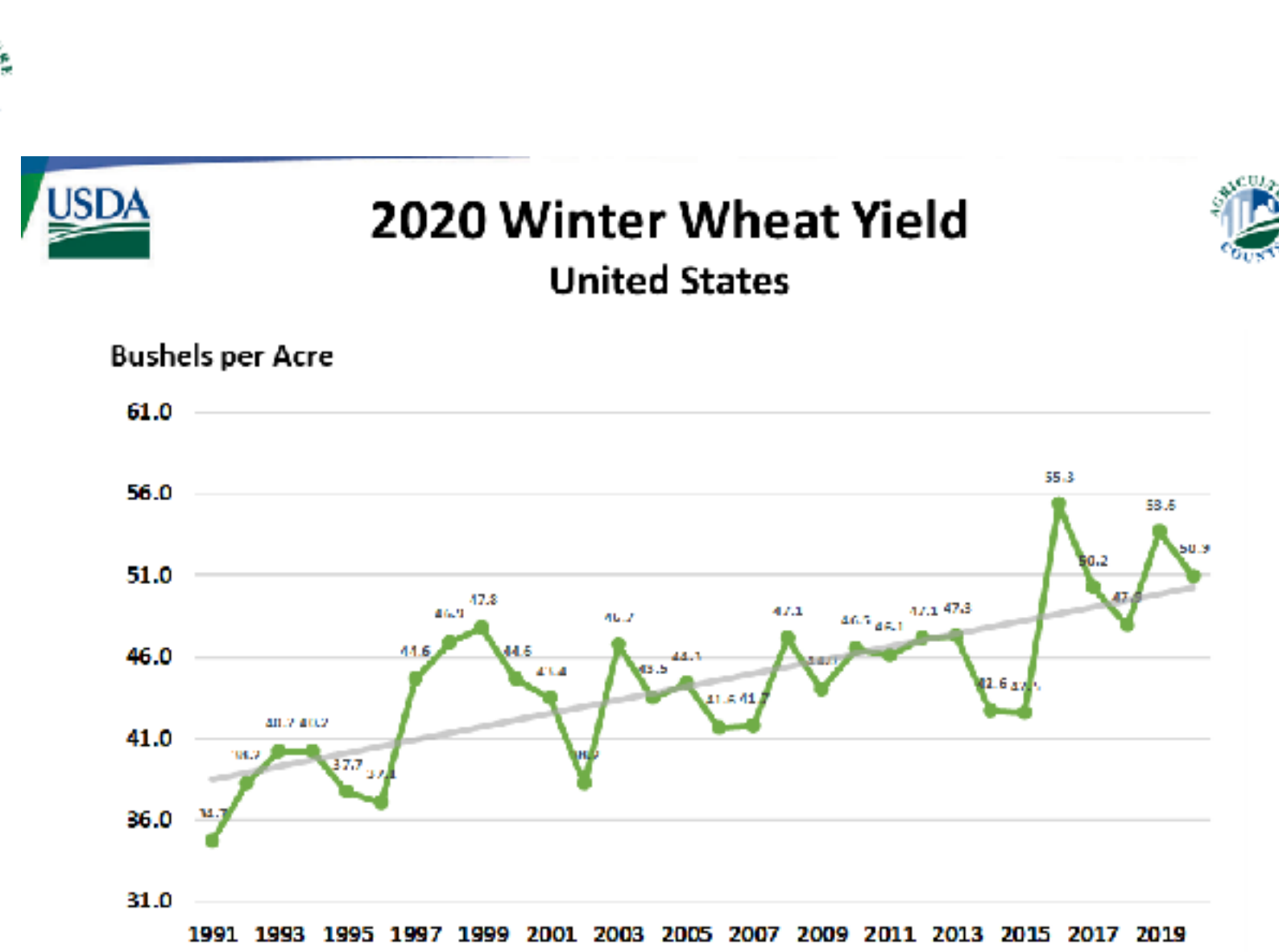
3. American farmers are world leaders in innovation, productivity, and environmental protection.

Yields Rising



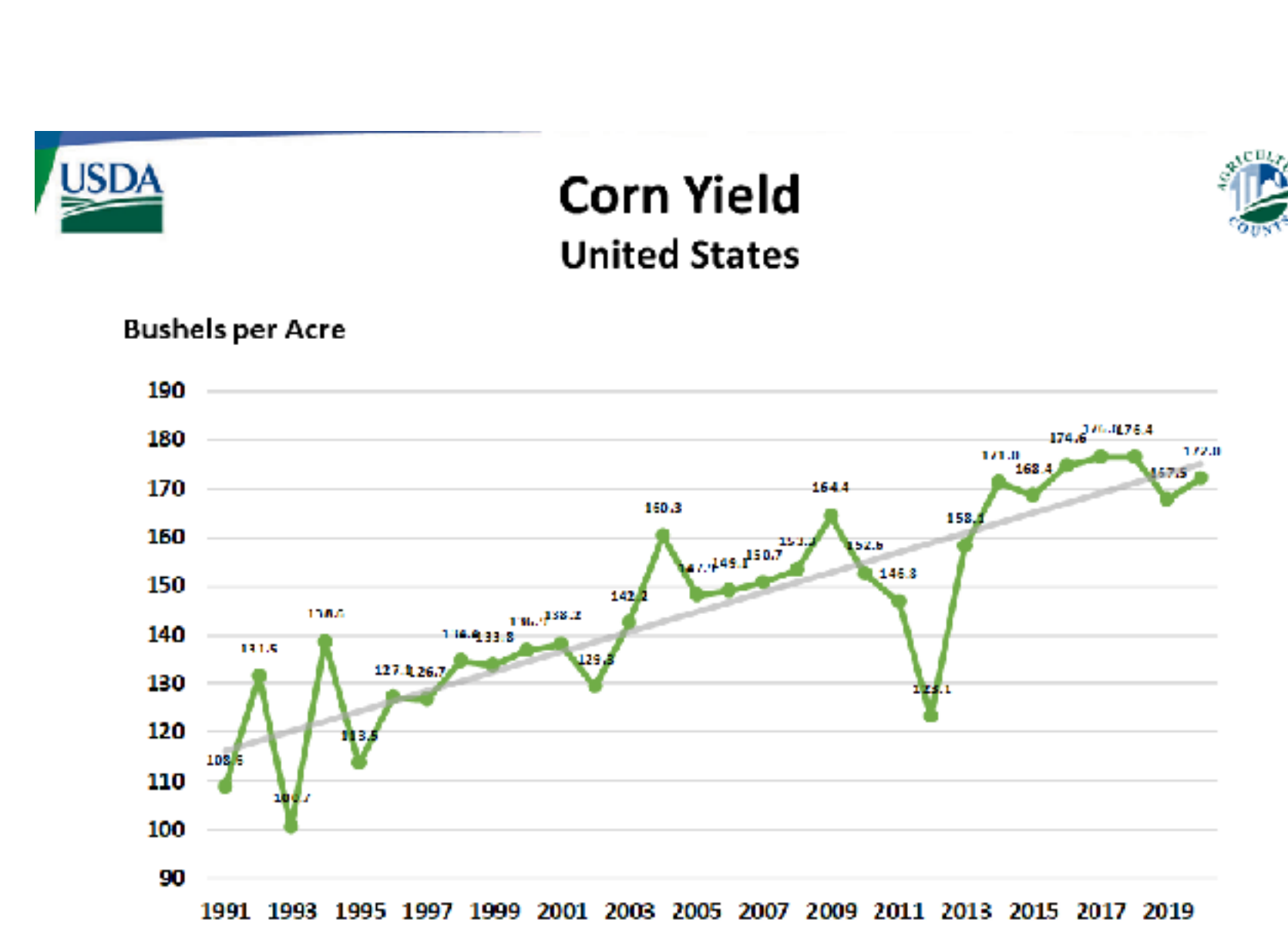
United States Department of Agriculture
National Agricultural Statistics Service

January 12, 2021



United States Department of Agriculture
National Agricultural Statistics Service

September 30, 2020



United States Department of Agriculture
National Agricultural Statistics Service

January 12, 2021

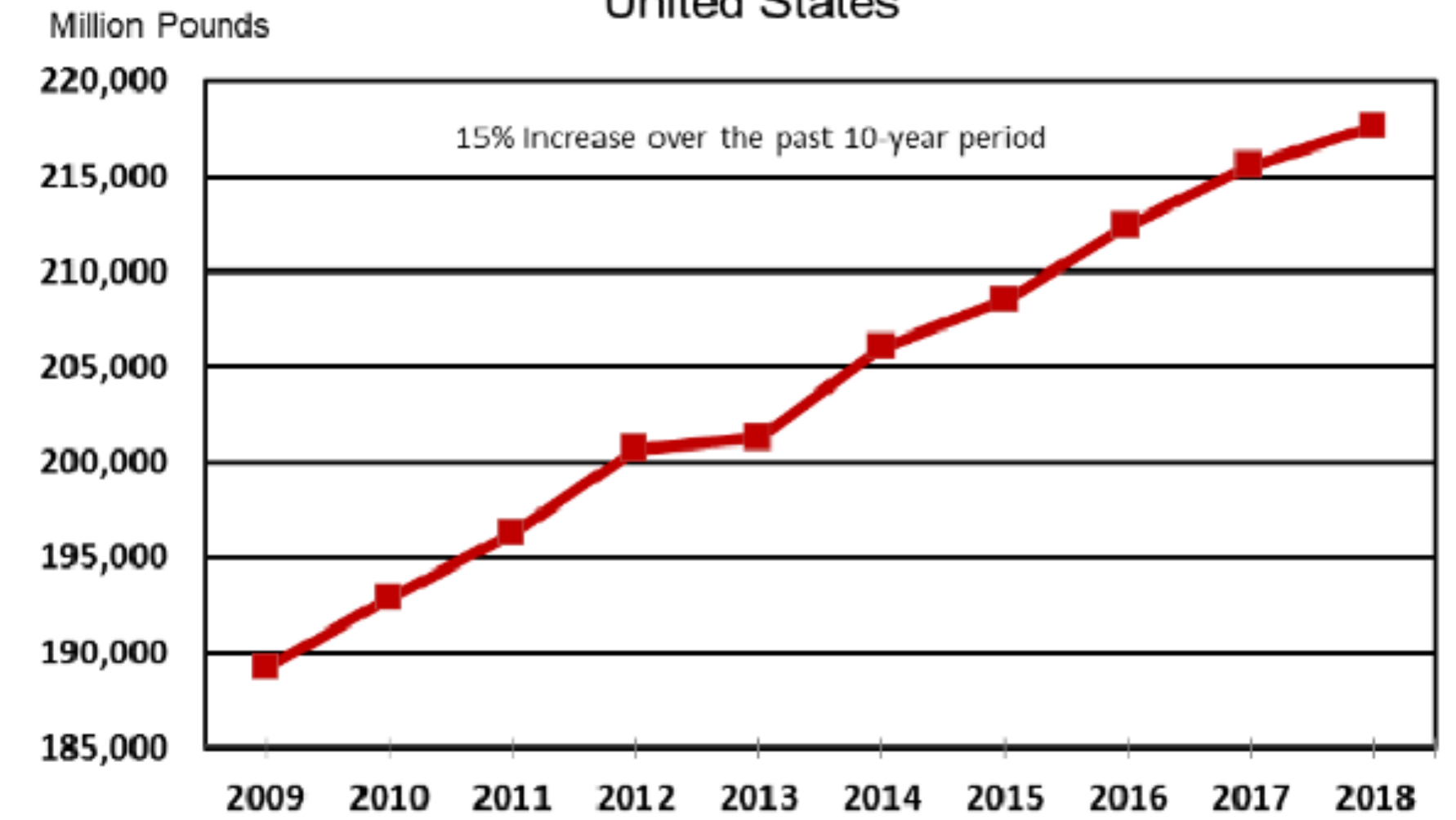
Happy Cows, More Milk



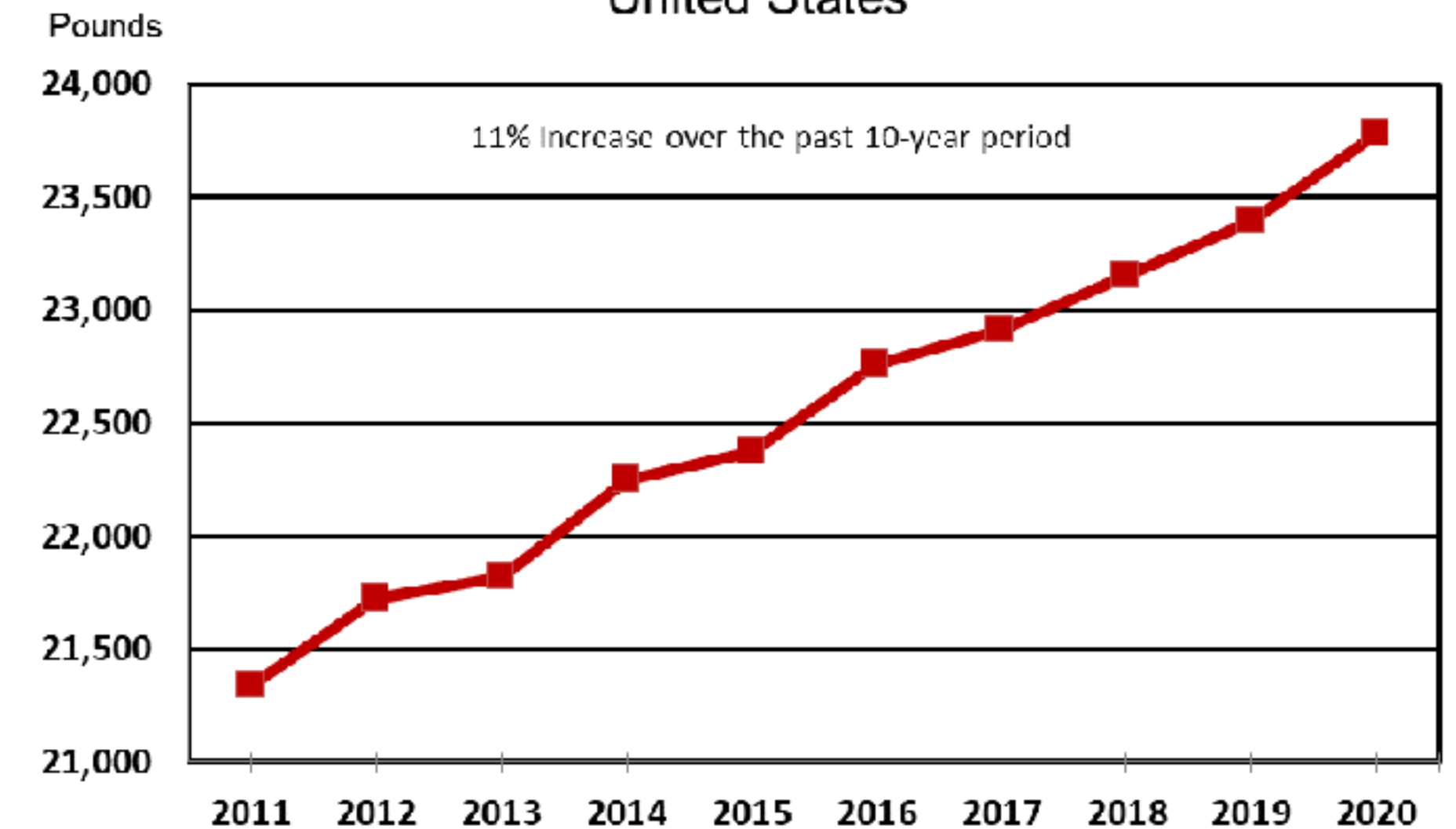
Matt & Jack Swanson, Associated Feed, Vierra Dairy, Hilmar, California, 2020



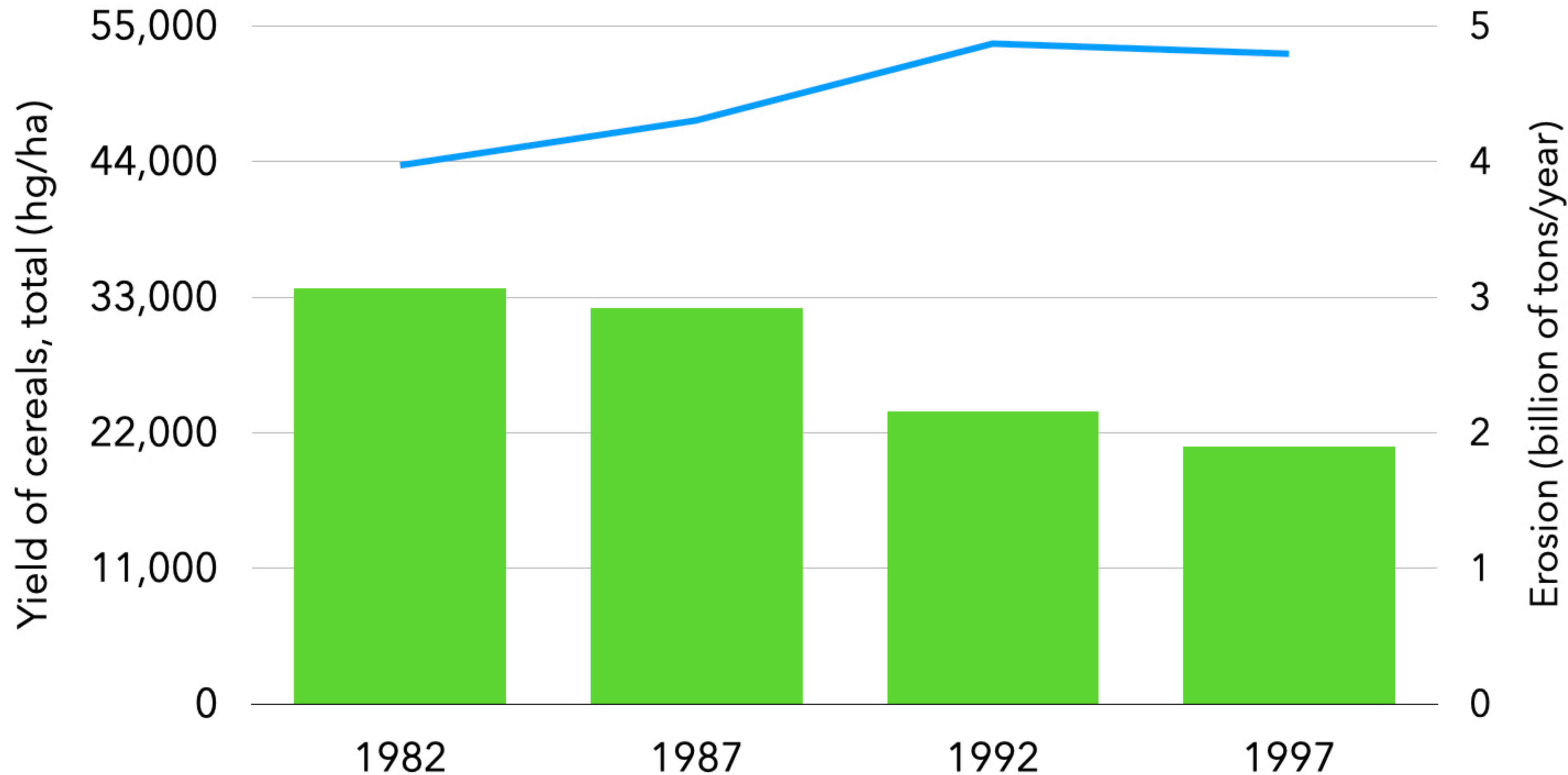
Milk Production, 2009-2018 United States



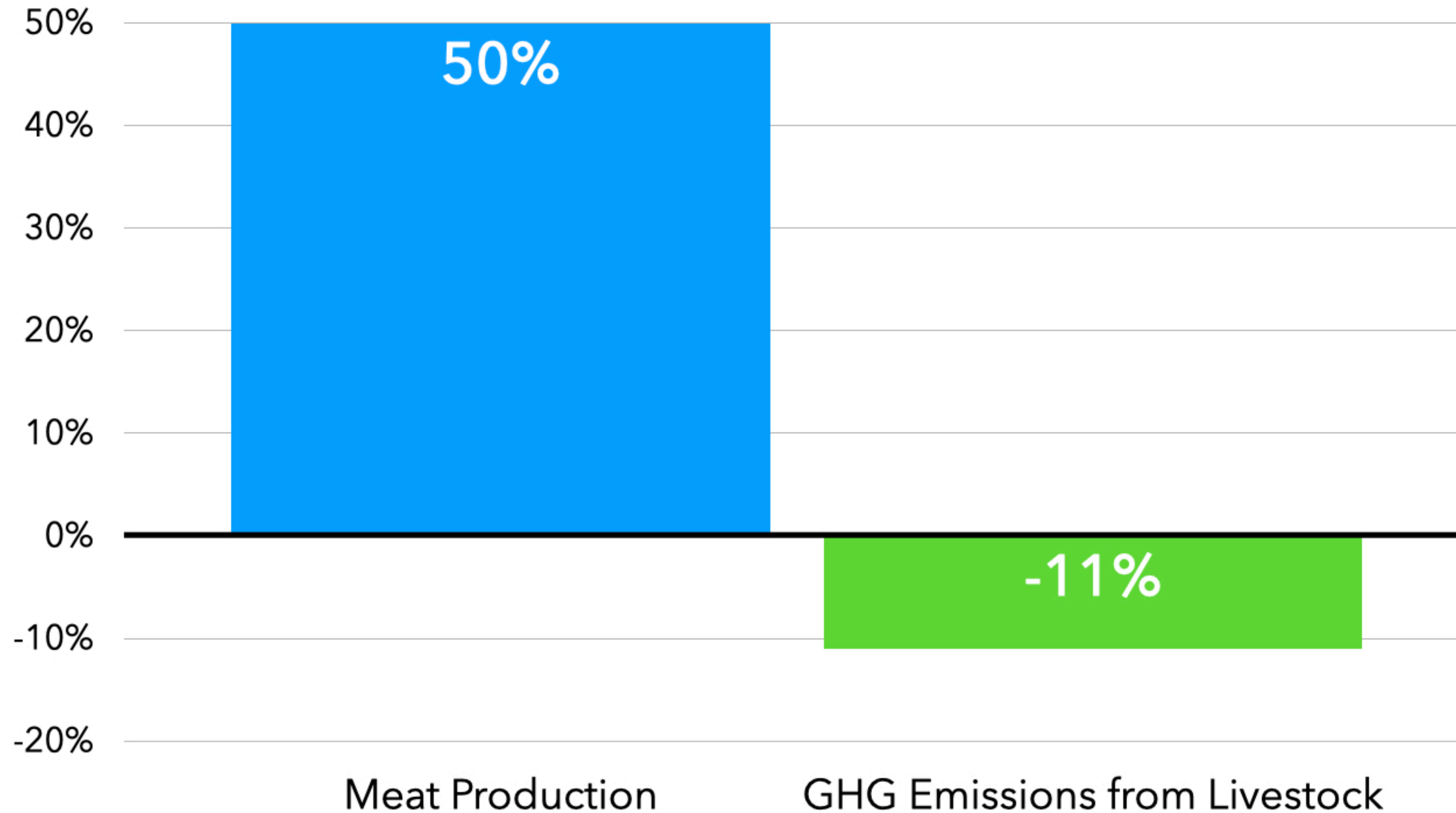
Production per Cow, 2011-2020 United States



In the United States, soil erosion declined **40%** in just 15 years while yields rose

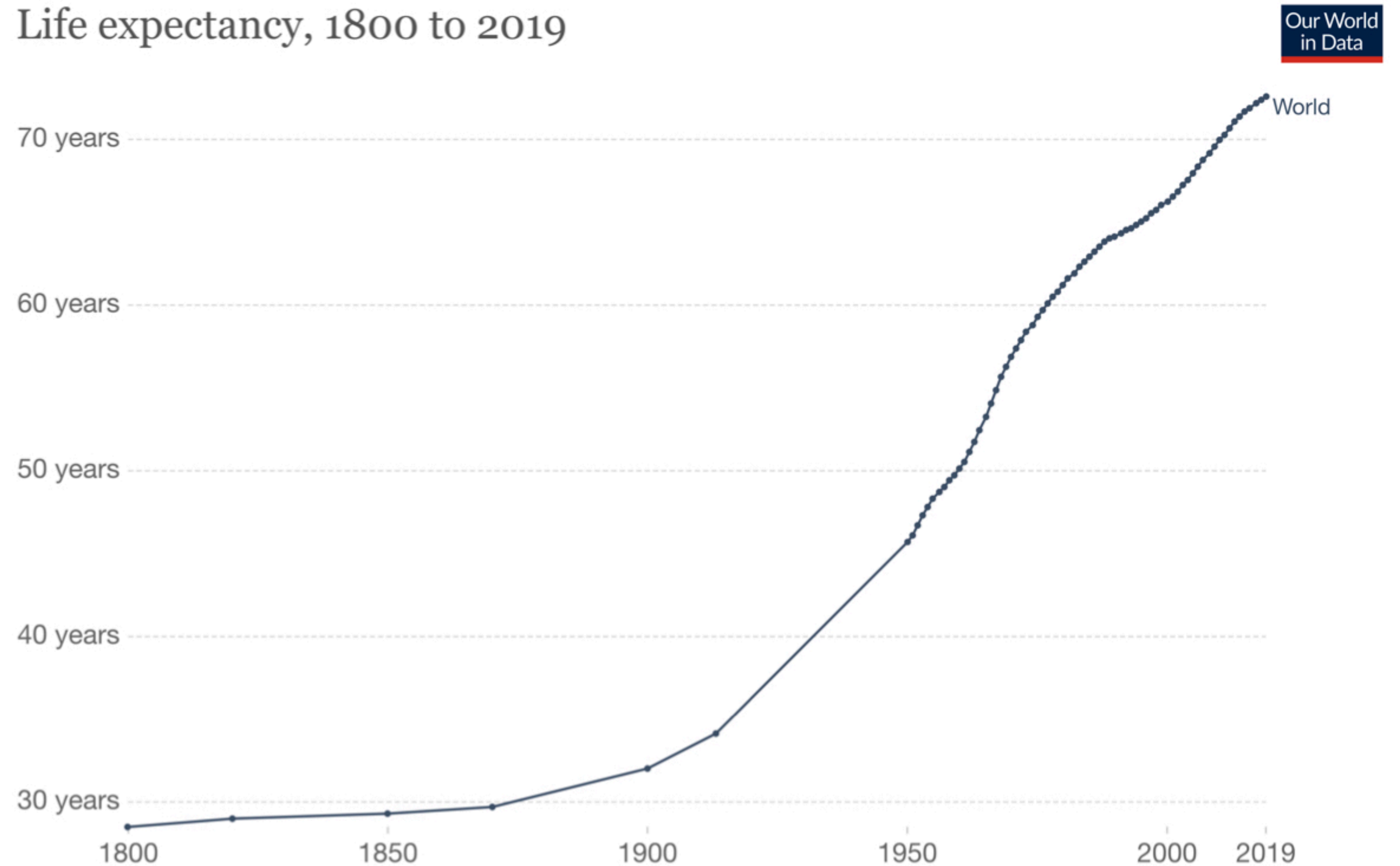


Meat production in the U.S. roughly **doubled** since the early 1960s, yet greenhouse gas emissions from livestock declined by **11%**



Urbanization,
industrialization,
and energy
consumption have
contributed to an
extension of life
expectancy of
over 40 years...

Life expectancy, 1800 to 2019



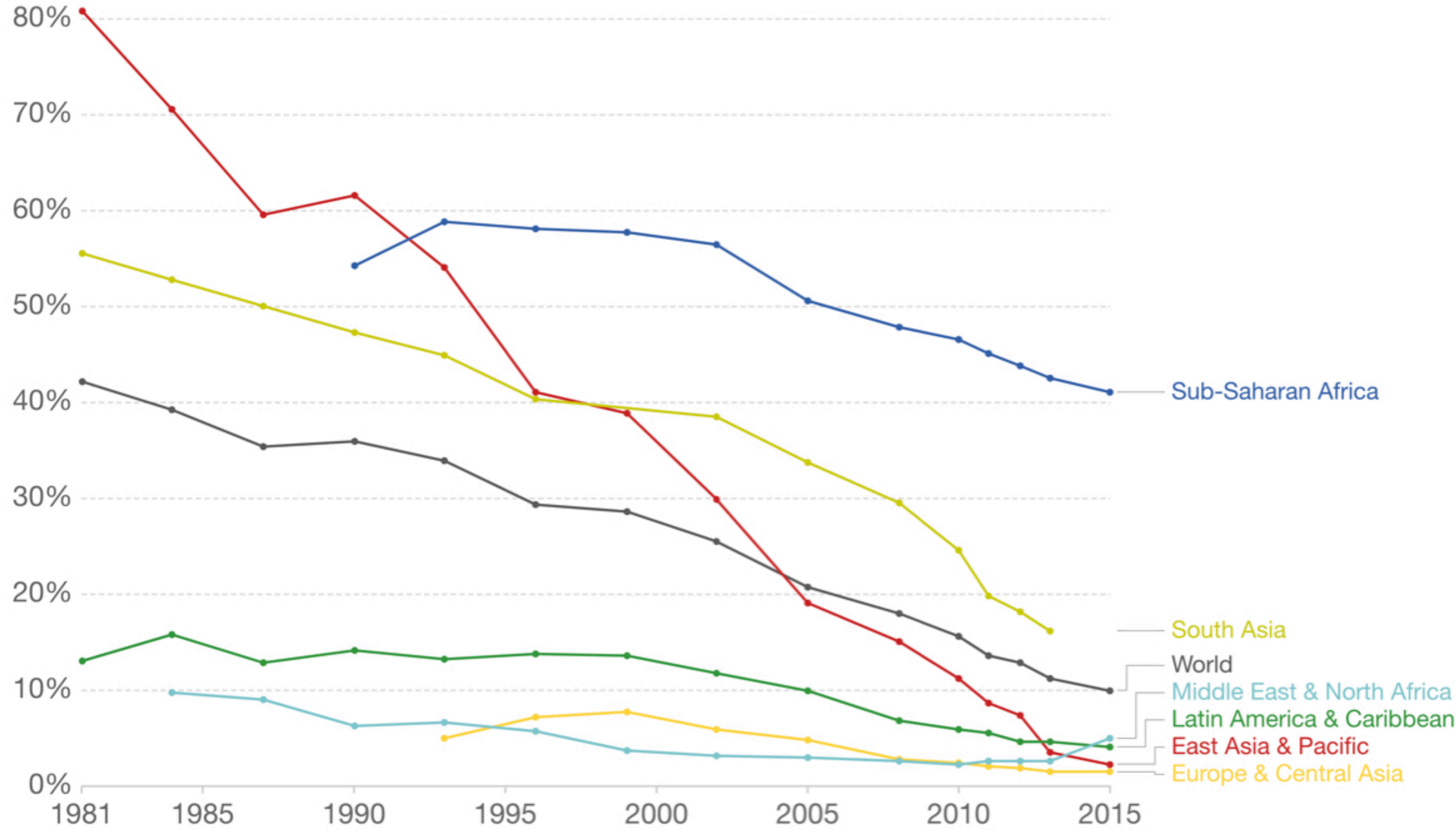
Source: Riley (2005), Clio Infra (2015), and UN Population Division (2019)

OurWorldInData.org/life-expectancy • CC BY

Note: Shown is period life expectancy at birth, the average number of years a newborn would live if the pattern of mortality in the given year were to stay the same throughout its life.

Share of population living in extreme poverty by world region

Extreme poverty is defined as living with less than 1.90\$ per day (in 2011 International Dollar). International dollars are adjusted for price differences across countries and across time.



Source: World Bank

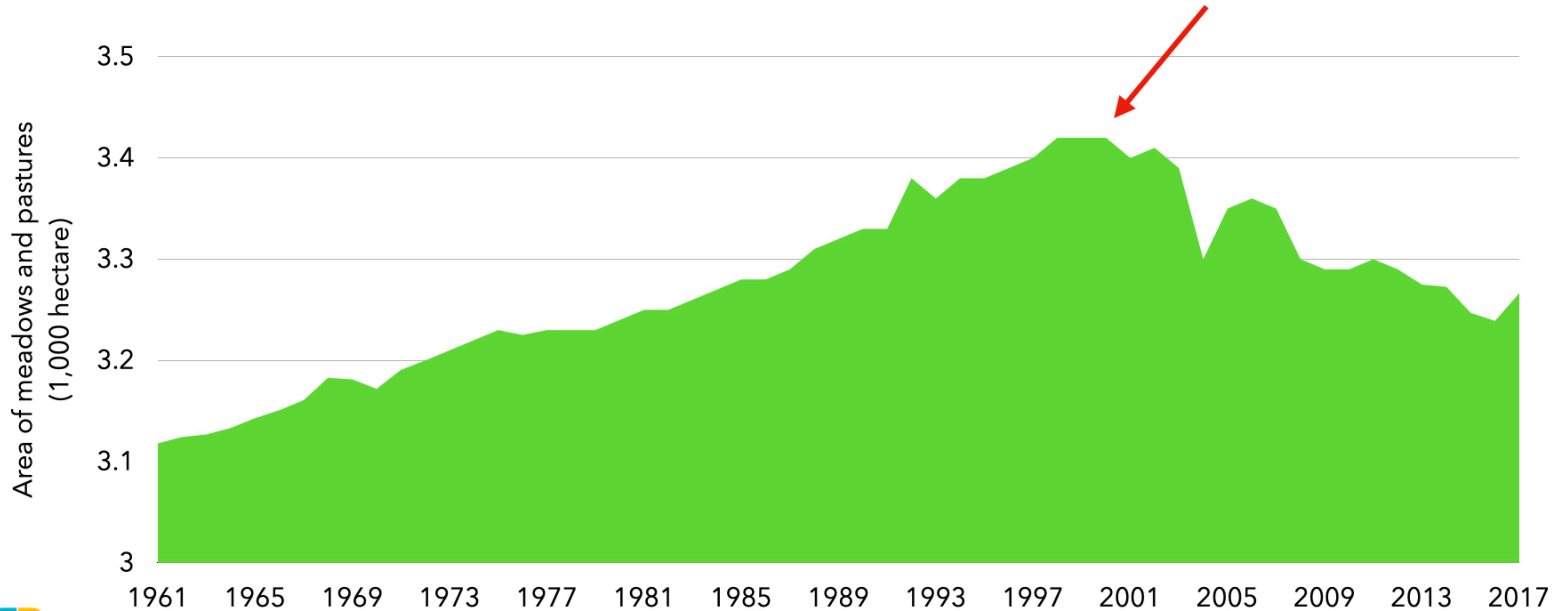
OurWorldInData.org/extreme-poverty/ • CC BY

From 1981 to 2015,
the global
population living in
extreme poverty
fell from
44% to 10%



Source: Oxford University's Our World in Data

The total amount of land humankind uses to produce meat peaked in the year 2000. Since then, land used for livestock and pasture has decreased by an area **80% the size of Alaska**

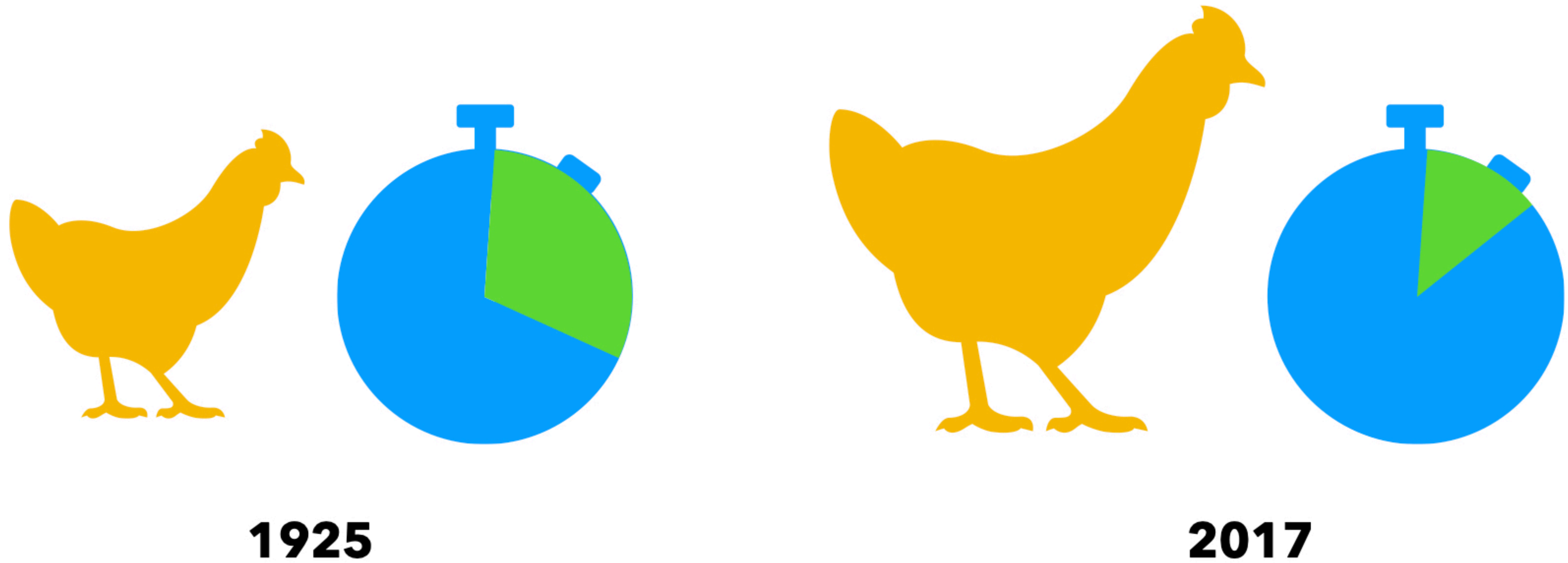


Africa

The most efficient meat production in North America requires **20x less land** than the most efficient meat production in Africa

■ **North America**

Between 1925 and 2017, U.S. breeders cut feeding time by **more than half** while **more than doubling** the weight



4. Low-efficiency
farming is bad for the
environment

Pasture beef

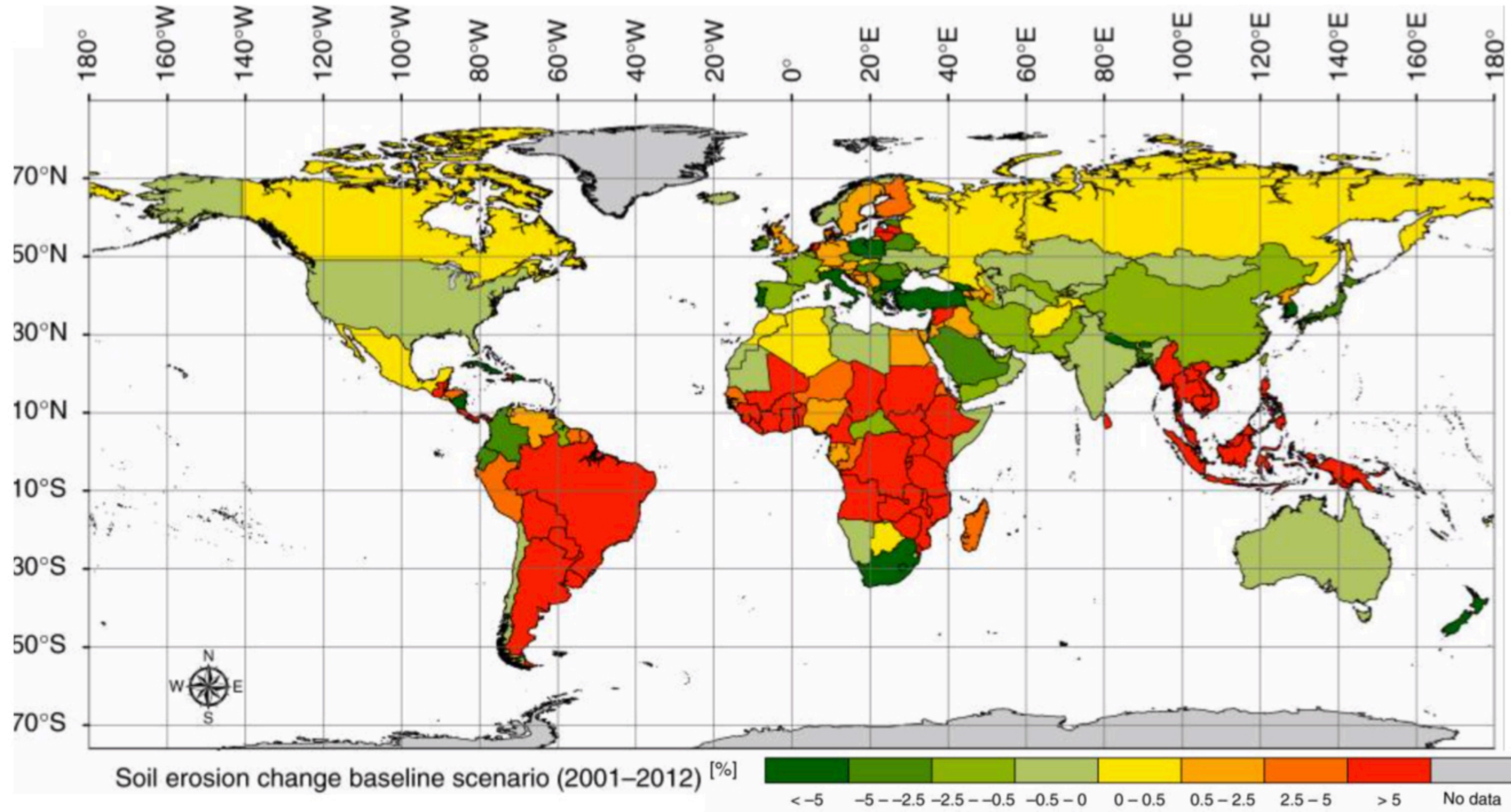


Pasture beef generates
300 - 400% more
carbon emissions per
kilogram than industrial
beef



Industrial beef

80% of all degraded soils are in developing and poor nations, which experience soil loss at **twice** the rate of developed nations



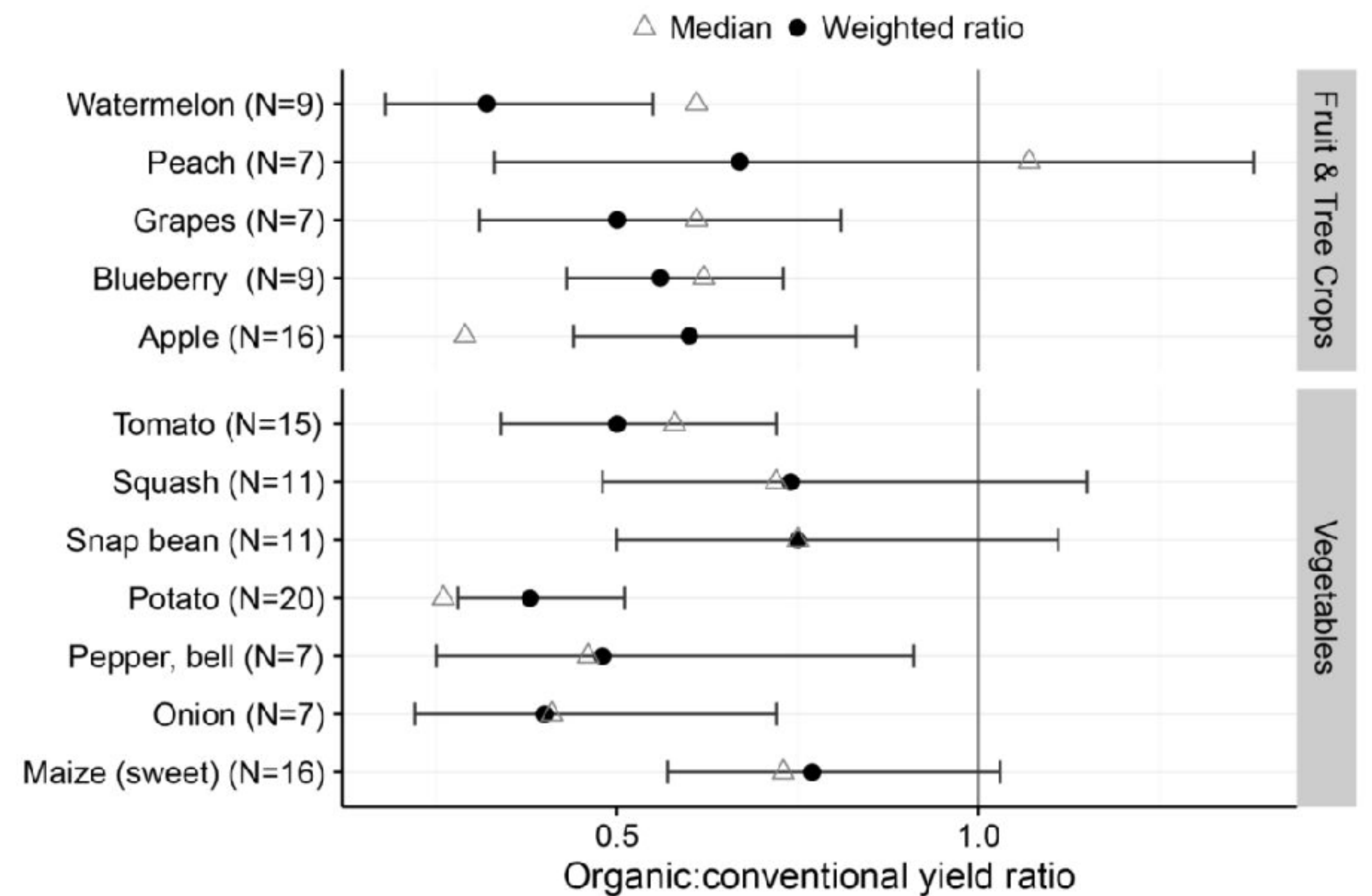
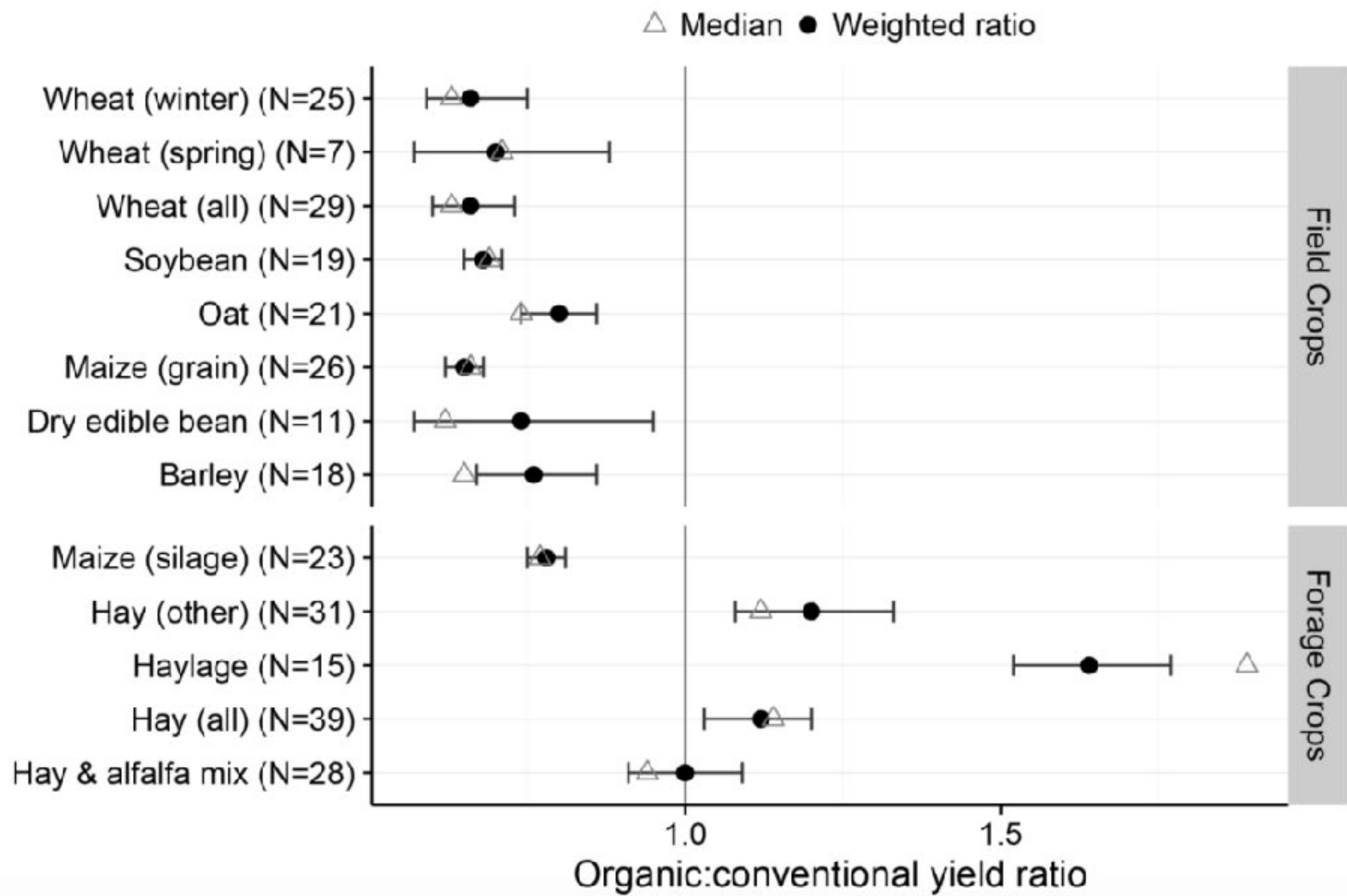
Pasture beef



Pasture beef requires
14 - 19x more land per
kilogram than industrial
beef

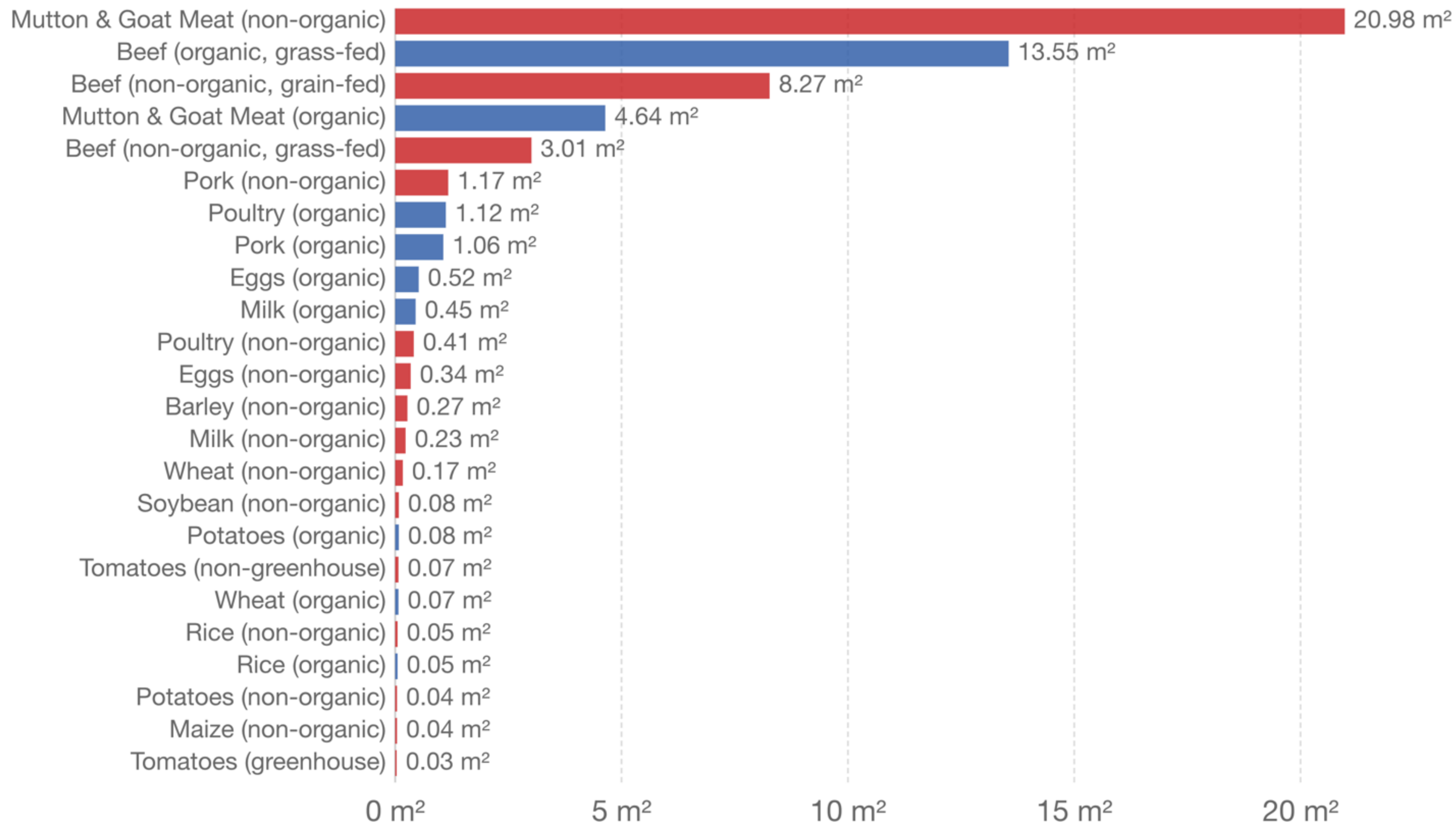
■ **Industrial beef**

Organics require more land than conventional

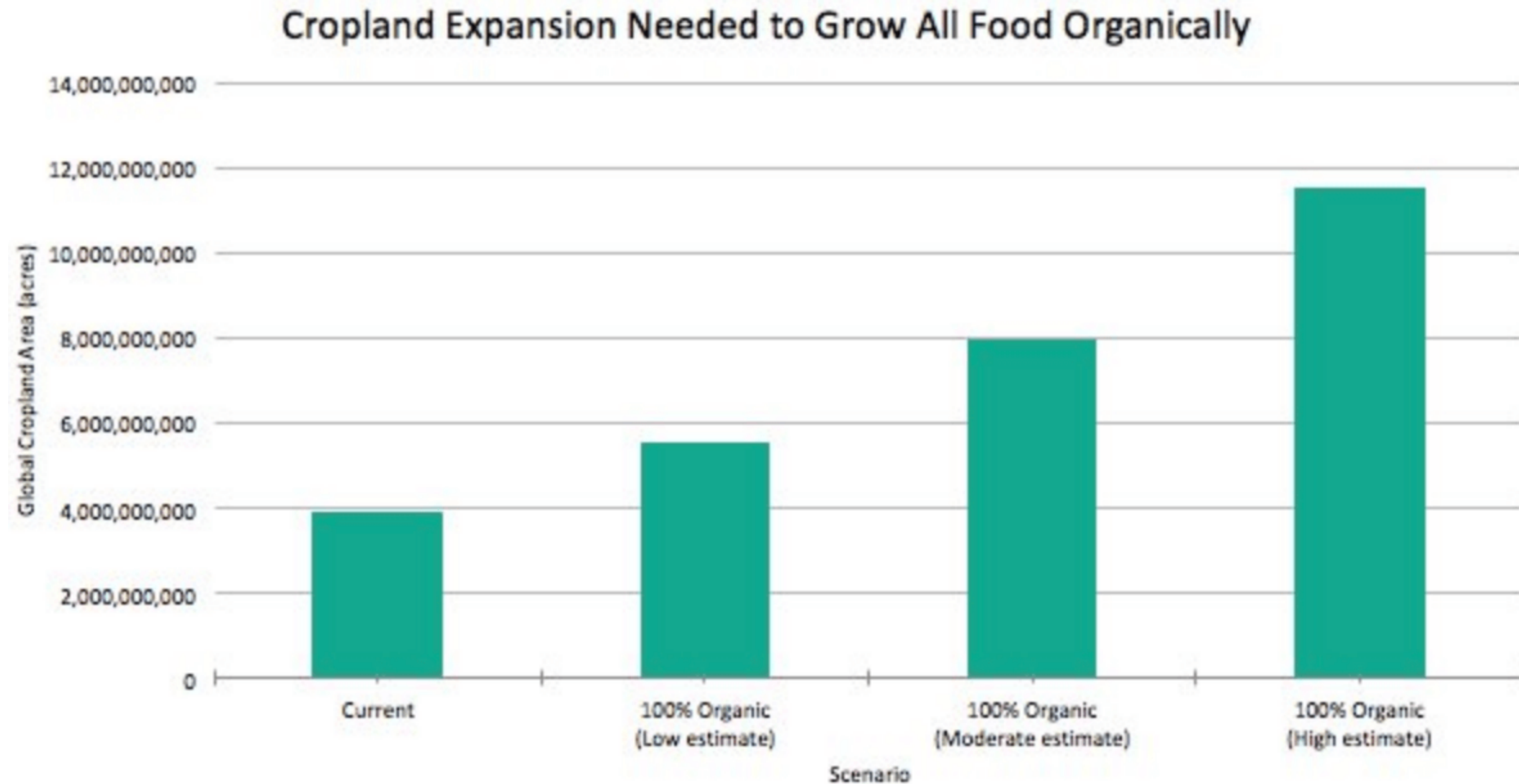


Land use per 100 kilocalories by food and production type

Average land use per 100 kilocalories of food production, by food type and production system measured in metres squared (m^2) per 100 kilocalories. Average values are based on a meta-analysis of studies across 742 agricultural systems and over 90 unique foods.

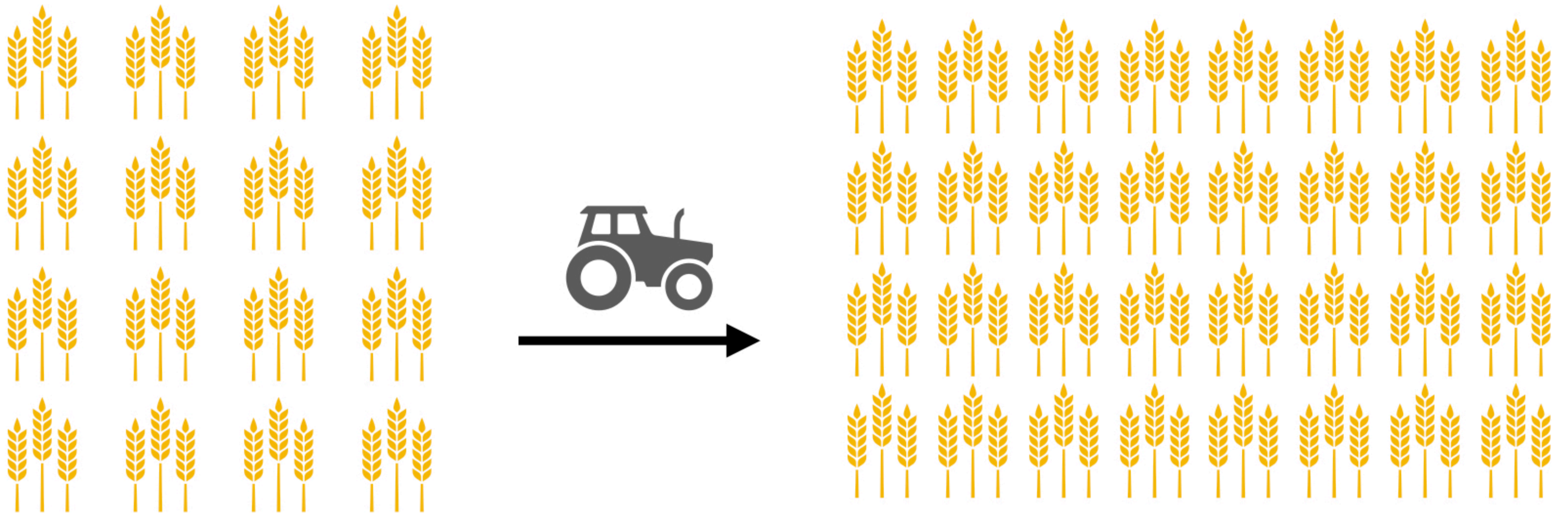


Increasing Organic Would Require More Land



5. American farmers can
help farmers in poor
nations

Experts say Sub-Saharan African farms can increase yields by nearly 100% by 2050 simply through access to irrigation, fertilizer, and farm machinery



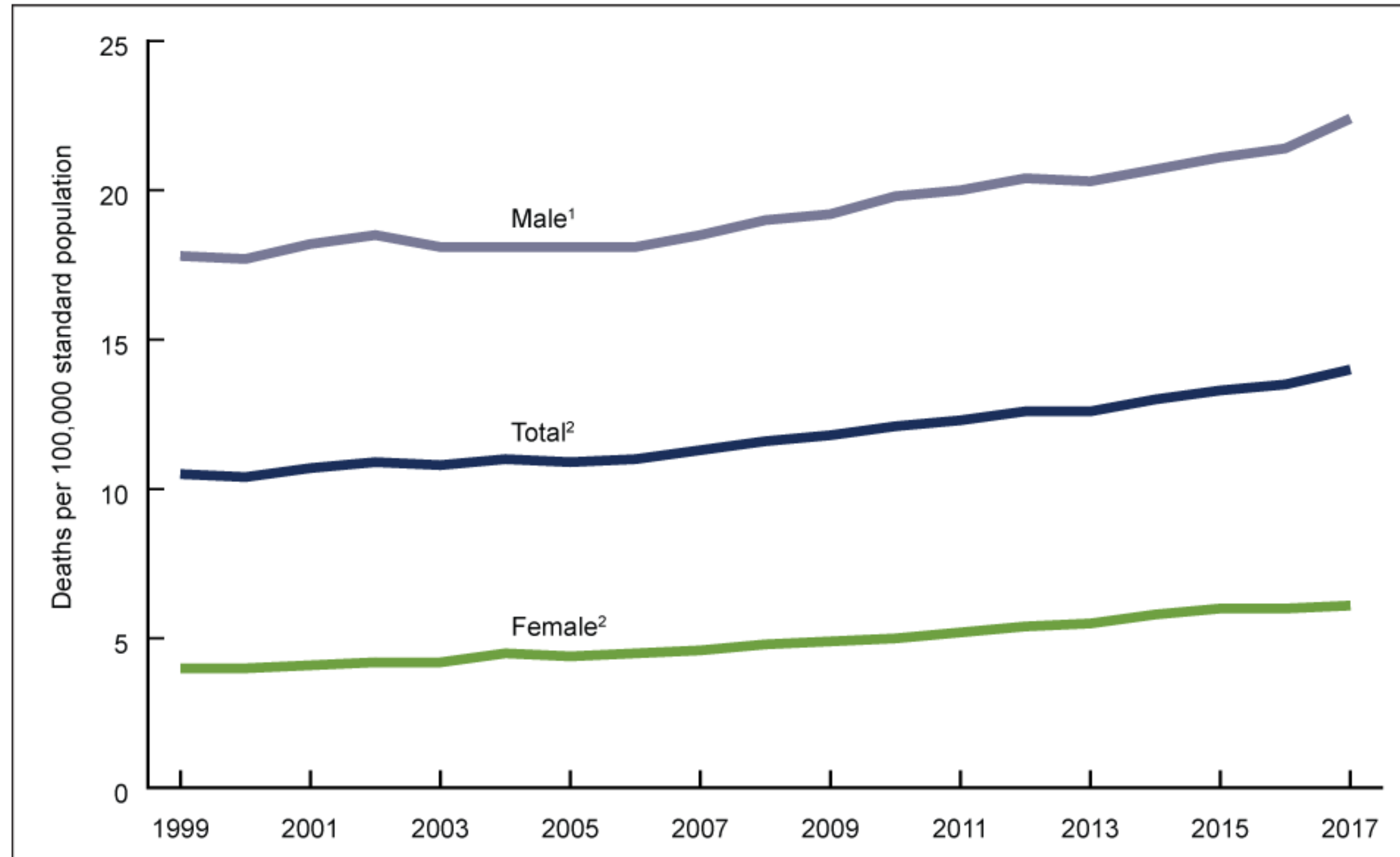


In Brazil, an area of land **twice the size of Portugal** could be restored to rainforest without impeding national agricultural expansion

6. Is climate change really the biggest problem facing the U.S. right now?

CDC: Suicides Rising

Figure 1. Age-adjusted suicide rates, by sex: United States, 1999–2017



¹Stable trend from 1999 through 2006; significant increasing trend from 2006 through 2017, $p < 0.001$.

²Significant increasing trend from 1999 through 2017 with different rates of change over time, $p < 0.001$.

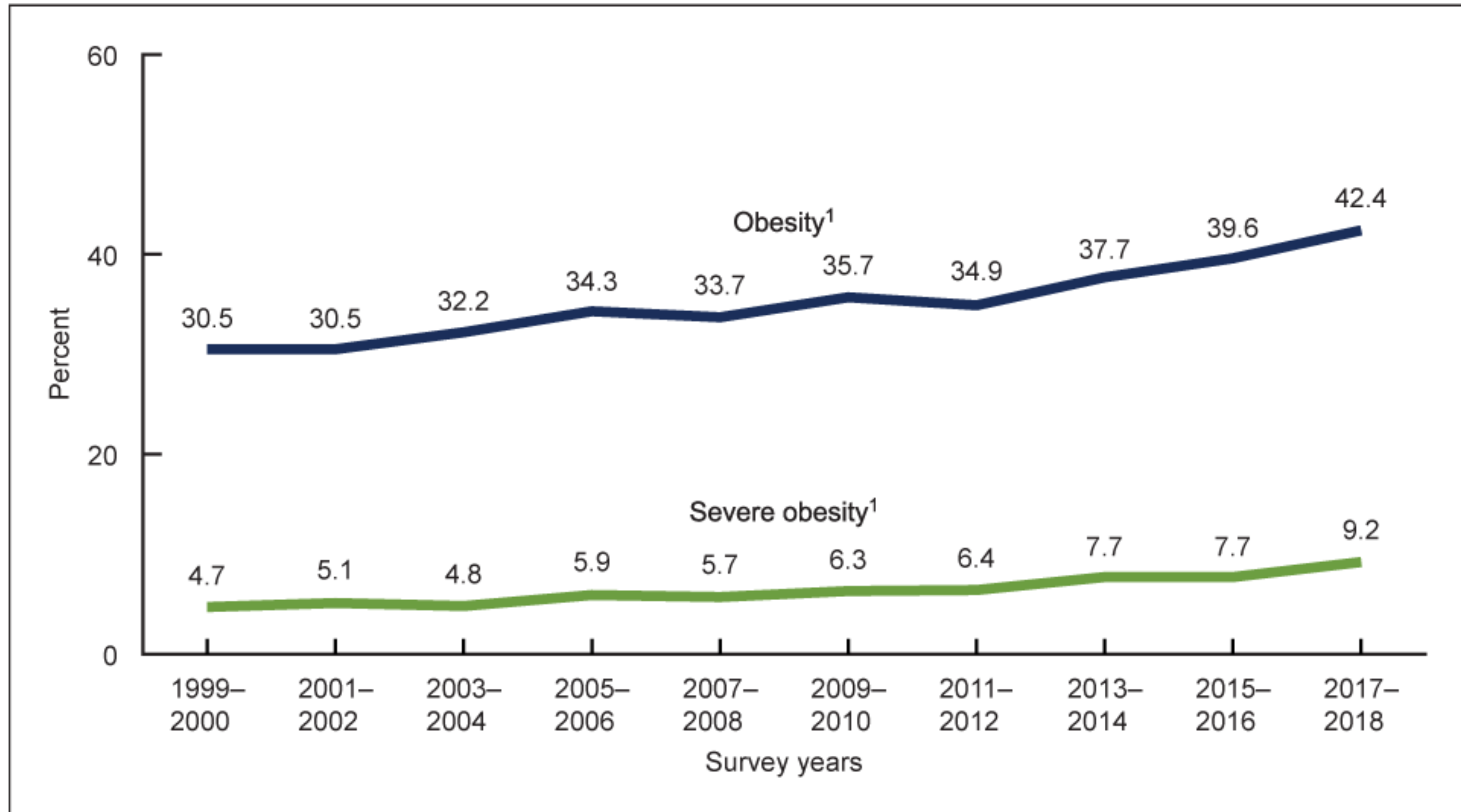
NOTES: Suicides are identified using *International Classification of Diseases, Tenth Revision* underlying cause-of-death codes U03, X60–X84, and Y87.0.

Age-adjusted death rates were calculated using the direct method and the 2000 U.S. standard population. Access data table for Figure 1 at:

https://www.cdc.gov/nchs/data/databriefs/db330_table-508.pdf#1.

SOURCE: NCHS. National Vital Statistics System. Mortality.

CDC: Obesity rising

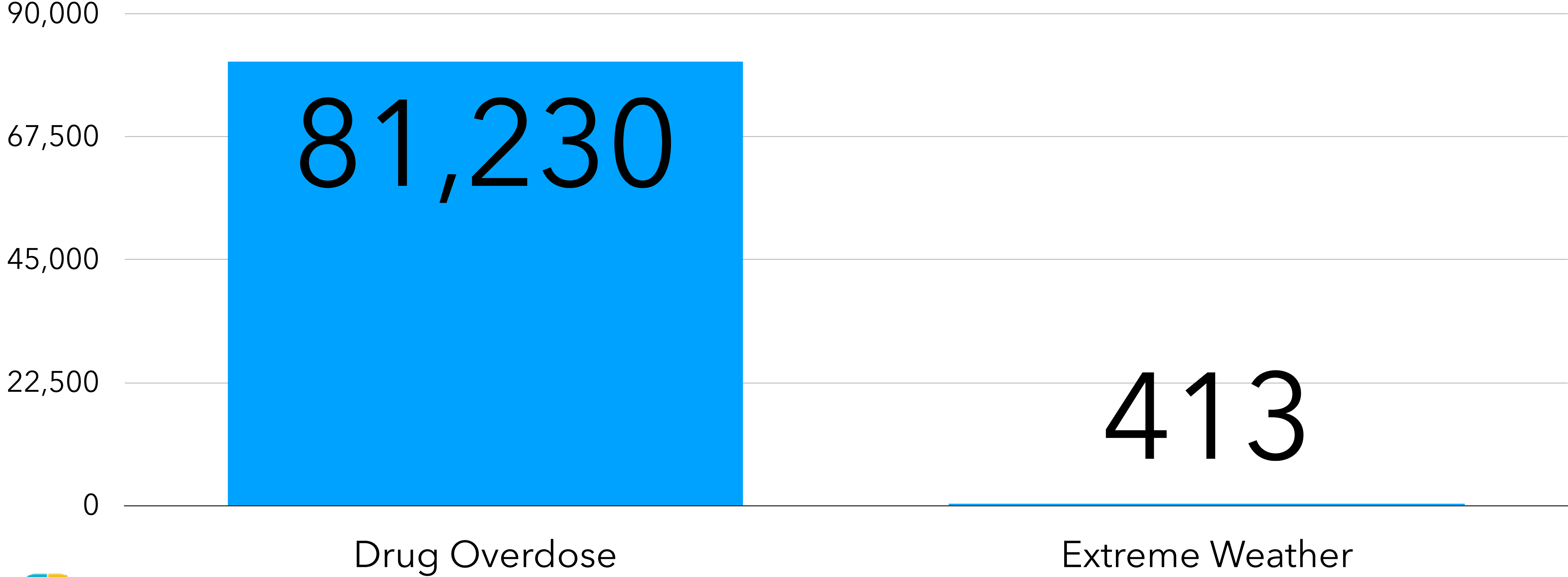


¹Significant linear trend.

NOTES: Estimates were age adjusted by the direct method to the 2000 U.S. Census population using the age groups 20–39, 40–59, and 60 and over. Access data table for Figure 4 at: https://www.cdc.gov/nchs/data/databriefs/db360_tables-508.pdf#4.

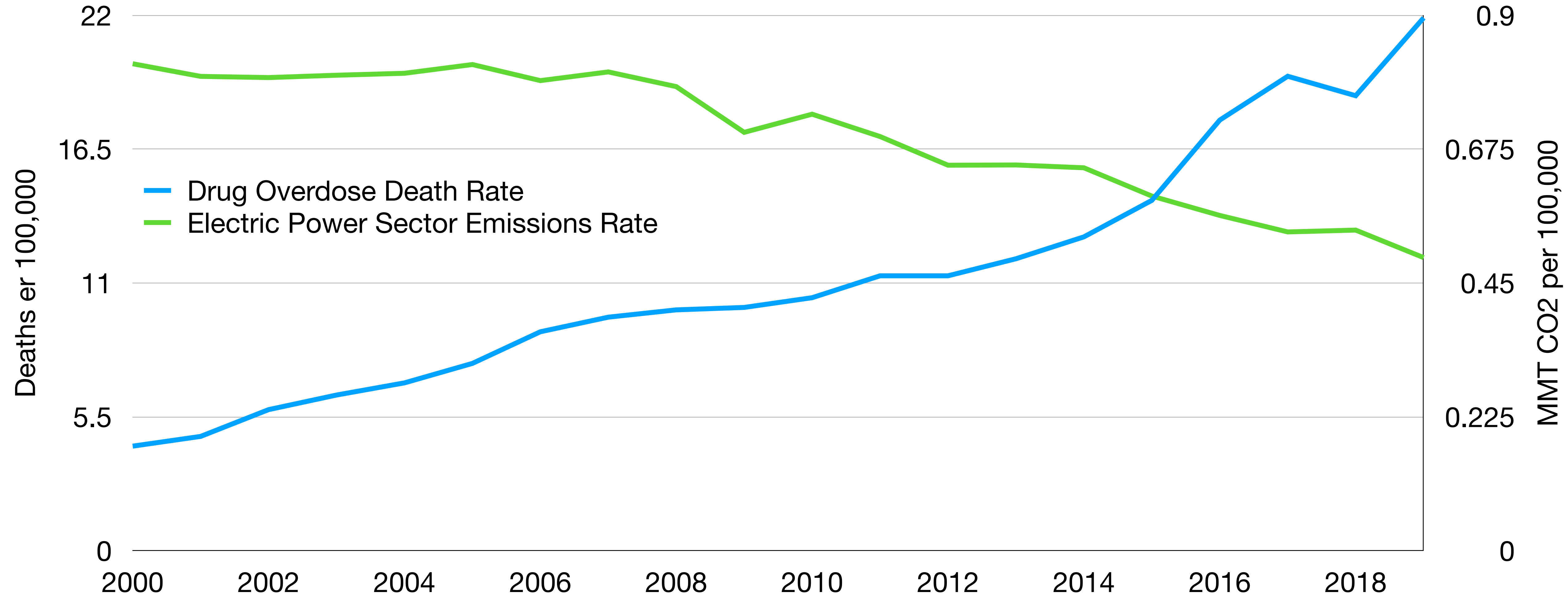
SOURCE: NCHS, National Health and Nutrition Examination Survey, 1999–2018.

Deaths from drug overdose compared to deaths from extreme weather in U.S.



Sources: CDC, *Wide-ranging online data for epidemiologic research (WONDER)*. National Center for Health Statistics; 2020. <http://wonder.cdc.gov>. National Climatic Data Center, *Storm Events Database*, National Oceanic and Atmospheric Administration, 2020. May 2019 - May 2020

U.S. emissions and OD deaths



Thank You