



National Farmers Union

BACKGROUND

Climate Change

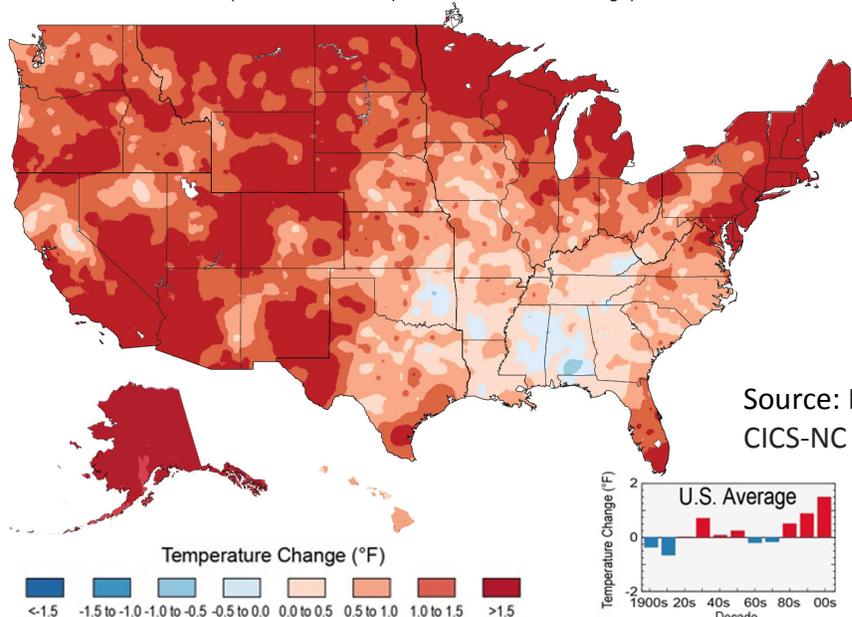
Issue Summary: *Earth's climate is changing. Temperatures are rising, snow and rainfall patterns are shifting, and more extreme climate events - like heavy rainstorms and record high temperatures - are already taking place. America's family farmers and ranchers are already feeling the impact of extreme weather volatility and are dealing with it on a daily basis. The U.S. must enhance efforts to both mitigate climate change and encourage adaptation for family farmers and ranchers in order to ensure domestic and global food security.*

Climate Change is Occurring

- According to the U.S. Department of Agriculture, “evidence exists that the U.S. is already experiencing an increased incidence of extreme weather events.”
 - Average temperatures have risen across the contiguous 48 states since 1901, with an increased rate of warming over the past 30 years.
 - Many extreme temperature conditions are becoming more common. Record-setting daily high temperatures have become more common than record lows, and the decade from 2000 to 2009 had twice as many record highs as record lows (USDA).
- Worldwide, net emissions of greenhouse gases from human activities increased by 35 percent from 1990 to 2010 (EPA).
 - CO₂ emissions (75% of GHG emissions) increased by 42% over this time (EPA).

U.S. Temperature Change

(1991-2012 as compared to 1901-1960 average)

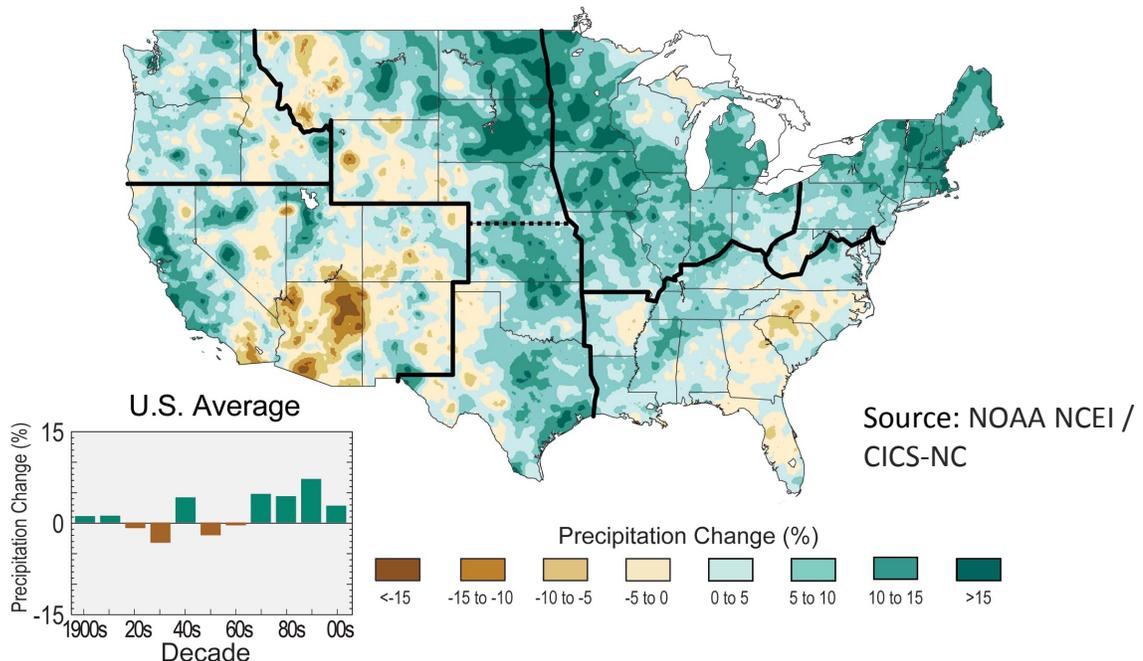


Source: NOAA NCEI /
CICS-NC

Climate Change Impacts Family Agriculture and Global Food Security

- Increased weather volatility associated with climate change results in fewer workable days, increased potential for soil erosion, and increased crop insurance claims.
- Between 2000 and 2013, 20 to 70 percent of the United States experienced drought at any given time (EPA).
- For each 1 degree Celsius temperature increase, grain yields decline by about 5 percent (UN).
- Maize, wheat and other major crops have experienced significant yield reductions at the global level of 40 megatonnes per year between 1981 and 2002 due to a warmer climate (UN).
 - These major crops are important food sources for much of the world.
- Livestock production systems are vulnerable to temperature stresses. An animal's inability to adjust its metabolic rate to cope with temperature extremes can lead to gestational complications, stunted development, reduced productivity and, in extreme cases, death (USDA).
 - Prolonged exposure to extreme temperatures will also further increase production costs and productivity losses associated with all animal products, e.g., meat, eggs, and milk (USDA).
 - In 2013, a freak winter storm hit western South Dakota after days of temperatures in the 70s and 80s, leaving ranchers completely unprepared to deal with the feet of snow, ice and high wind gusts that wiped out thousands of their cattle. Some producers lost their entire herd.
- Fluctuations in availability of surface water, rainfall and ground water affect irrigation practices (USDA).

Observed U.S. Precipitation Change



- Rising temperatures and increased extreme weather events like drought or intense precipitation can affect pollination, plant growth and size, plant reproduction, and the amount of water required by plants. Perennial crops unable to reach their chilling temperature requirements produce reduced yields and can be adversely affected by fluctuating winter temperatures which cause early budding or blooms that are susceptible to frost damage (USDA).
- Increased atmospheric CO₂ stimulates weed growth (USDA). Weed abundance devastates crop health, as weeds leach resources and contribute directly to plant death.
- Changing climate conditions affect “feed-grain production, availability and price; pastures and forage crop production and quality; animal health, growth and reproduction; and disease and pest distributions” (USDA).

There are Means for Adaptation and Mitigation of Climate Change

The climate changes being experienced today are mainly the consequence of past emissions, and today’s emissions will continue to exacerbate climate change in the future. Even if atmospheric concentrations of greenhouse gases are stabilized (which would require large decreases from current emissions levels), land surface temperatures will continue to rise for decades, while ocean temperatures and sea level will continue to rise for centuries (USDA). However, good public policy can offer great opportunities for climate change mitigation and adaptation to help farmers ensure domestic and global food security.



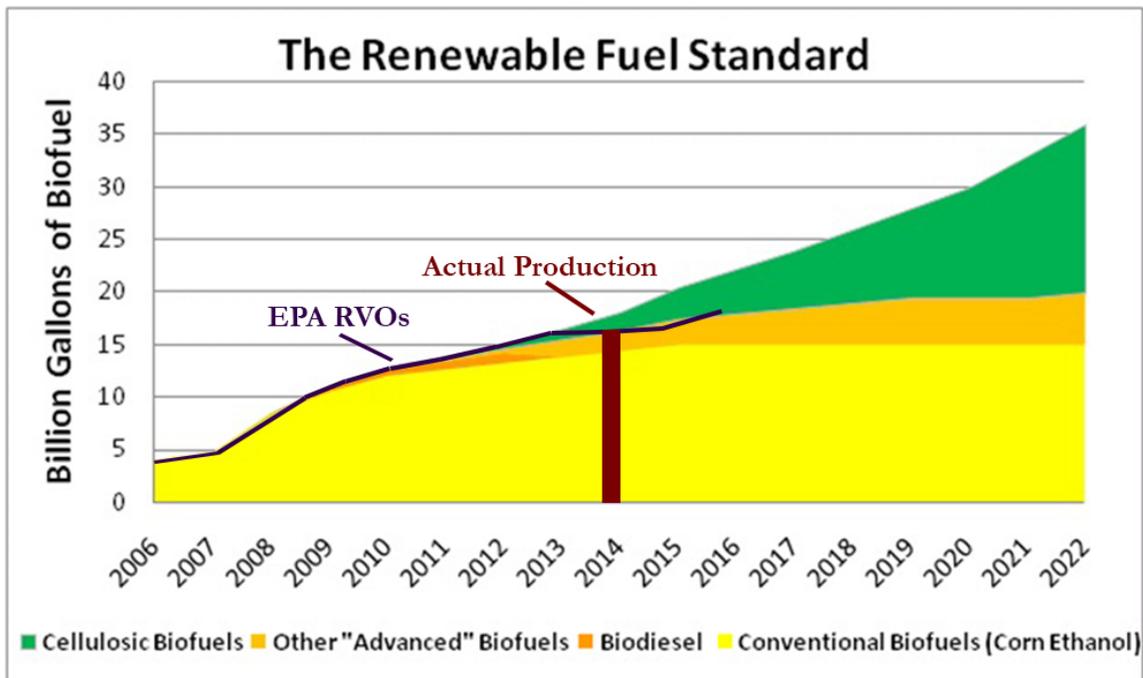
Sequestering carbon in soil can help remove CO₂ from the atmosphere and improve soil health

- USDA’s building blocks strategy aims to “reduce net emissions and enhance carbon sequestration by over 120 million metric tons of CO₂ equivalent (MMTCO₂e) per year – about 2% of economy-wide net greenhouse emissions – by 2025. That’s the equivalent of taking 25 million cars off the road, or offsetting the emissions produced by powering nearly 11 million homes last year.”
- USDA building blocks include: soil health, nitrogen stewardship, livestock partnerships, conservation of sensitive lands, grazing and pasture lands, private forest growth and retention, stewardship of federal forests, promotion of wood products, urban forests, and energy generation and efficiency. The building blocks strategy includes the following programs:
 - Field to Market-aims to reduce greenhouse gas emissions from US croplands
 - Fertilizer Institute-optimizes fertilizer application
 - Trust for Public Land and the Forest Climate Working Group-executes state-level carbon reductions

- **The Renewable Fuel Standard (RFS)**

The RFS is a program requiring the displacement of petroleum-based fuels in the U.S. transportation sector by renewable fuels that curb GHG emissions. The RFS is intended to break the petroleum monopoly on the transportation fuels market and allow consumers to choose lower-carbon renewable biofuels.

- If RFS statutory volume obligations are followed, the RFS will reduce greenhouse gas emissions by 138 million metric tons by 2022; equivalent to taking about 27 million vehicles off the road (C2es).
- Conventional biofuels such as corn ethanol are required to produce at least 20 percent fewer greenhouse gases than regular gasoline, and are considered to achieve 32 percent in GHG reductions (FOE).
- "Advanced" biofuels (biofuels not produced from corn starch) are required to reduce greenhouse gas emissions by at least 50 percent (FOE).
- Cellulosic biofuels are required to reduce greenhouse gas emissions by at least 60 percent (FOE).



Sources

(EPA) U.S. Environmental Protection Agency. 2014. Climate change indicators in the United States, 2014. Third edition. EPA 430-R-14-004.
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