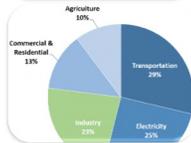


Carbon & Climate Smart Practices

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Topics we'll cover today

- Why are we here?
- Climate policy
- Carbon markets/programs
- Examples/considerations
- Digester work



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Why are we here?



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The Paris Climate Accords

- Legally binding international treaty on climate change
 - Adopted by 200 countries
- Goal is to limit global warming to below 2 degrees Celsius, compared to pre-industrial levels
- Each country sets emission-reduction targets, known as National Determined Contributions (NDCs)

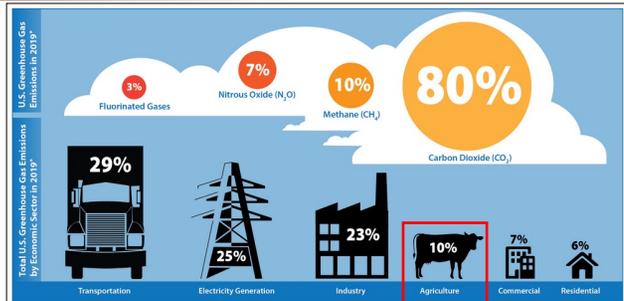


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U.S. Emissions



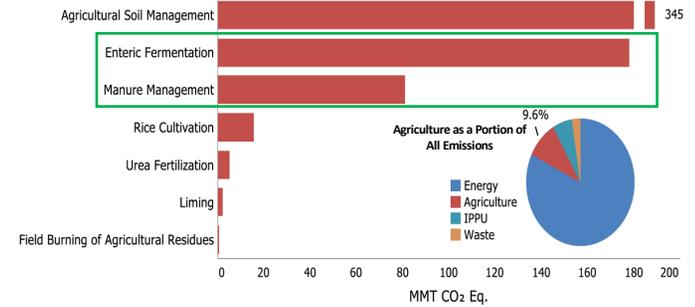
* Percentages may not add to 100% due to independent rounding and the way the inventory quantifies U.S. territories (not shown) as a separate sector.

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U.S. Agricultural Emissions



Source: Inventory of U.S. Greenhouse Emissions and Sinks, 1990-2019 the U.S. Environmental Protection Agency

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Existing Climate Policy

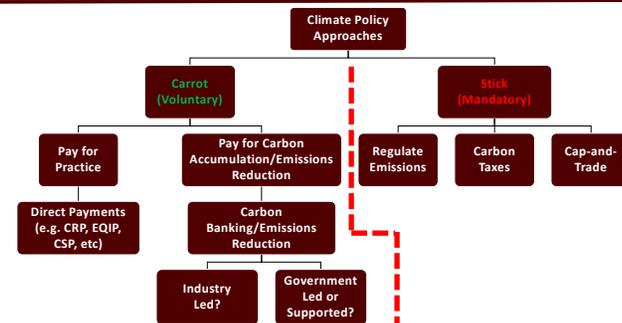


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Two Approaches to Climate Policy



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Climate 21 Project



TOP RECOMMENDATIONS: KEY PROGRAM OPPORTUNITIES

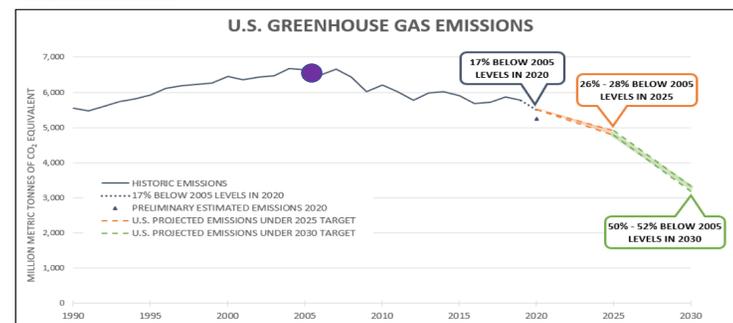
- Issue a Secretarial Order on Climate Change and Rural Investment to signal climate change as a top priority of the department, frame USDA's interest in investing in agriculture, forestry, technology, innovation, and rural economies, and to set agendas for policy and programmatic actions needed to act on climate. (Day 1)
- Invest in natural climate solutions by establishing a Carbon Bank using the Commodity Credit Corporation to finance large-scale investments in climate smart land management practices; prioritizing climate smart practices in implementation of Farm Bill conservation programs; and identifying opportunities to invest in natural infrastructure. (100 Days)
- Incentivize climate smart agriculture and rural investment through financial tools including crop insurance, rural development grants and loans, and USDA procurement. (100 Days)
- Decarbonize rural energy and promote green energy and smart grids through the vast reach of Rural Development grants and loans to rural utilities and by dramatically increasing use of methane digesters, biofuels and wood energy and wood product innovation. (100 Days)
- Prioritize federal investment to address wildfire by establishing a Wildfire Commission, co-chaired by the Secretaries of Agriculture and Interior and a Democratic and Republican governor, to offer recommendations to increase the pace and scale of ecologically-sound forest restoration on federal, state, tribal and private forest lands, modernize firefighting response in the U.S., address development in the wildland-urban interface, and increase the use of prescribed fire. (100 Days)

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Rejoining Climate Accords

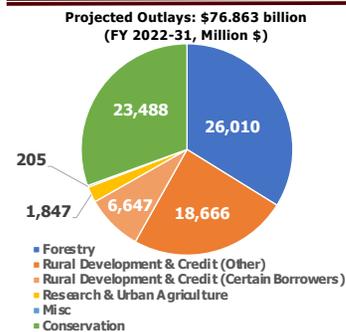


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Build Back Better Act: Agriculture Title



- Significant appropriations considered for agriculture
- Will portions of bill move forward?
- Est. cost of 2018 Farm Bill = \$428 billion
- Budget authority and est. outlays run out in 2026

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Source: <https://www.cbo.gov/publication/57618>

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Paying for Practice: Existing Conservation Programs

- Conservation Reserve Program (CRP), Conservation Stewardship Program (CSP), Agricultural Conservation Easement Program (ACEP), Regional Conservation Partnership Program (RCPP) all pay for practices targeting conservation and/or environmental quality
- USDA is using existing programs to incentivize climate-smart practices
 - \$10 million to support climate smart ag. through targeted "Climate-Smart Agriculture & Forestry EQIP"; nationwide 2022
 - Providing \$300 million for 85 climate-smart projects through RCPP
 - Expanding CRP enrollment by 4 million acres, enhancing other aspects of CRP

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Paying for Practice: EQIP

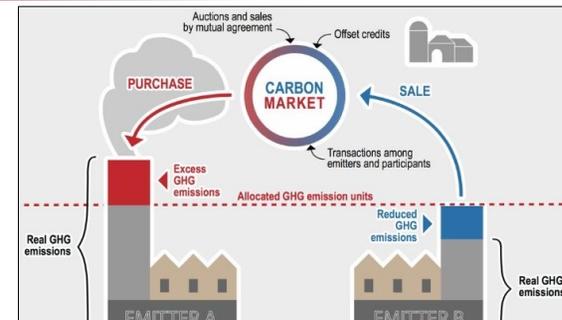
- In FY2019, 41,471 EQIP applications were funded (27.7%) of the 149,574 applications received. 49,443 applications (or 46% of the remaining applications) were determined to be valid, but unfunded.
- The 2018 Farm Bill established EQIP Incentive Contracts which blend EQIP and CSP to provide financial assistance to producers for adopting conservation activities.
- First available in FY2021 in Arizona, California, Colorado, and Oregon, available nationwide in FY2022.
- Contracts 5- to 10-years in length with \$200,000 payment limit over the life of the 2018 Farm Bill (expires 2023).
- Would the list of qualifying practices need to be narrowed?

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Private Carbon Payments



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Current Value of Private Carbon Programs

- Range in value, payment structure (measurement vs. practice), contract length
 - Current payments ~ \$15 - \$20 per mt CO₂e
- U.S. average estimates of 0.31 mt per year for no-till and 0.37 mt per year for cover crops (Thompson et al., 2021); Texas High Plains estimates of 0.1-0.14 mt potential (Lewis, 2021)
- Example High Plains grain farm
 - Converting to no-till sequesters 0.14 mt per acre = \$2 - \$2.80 per acre

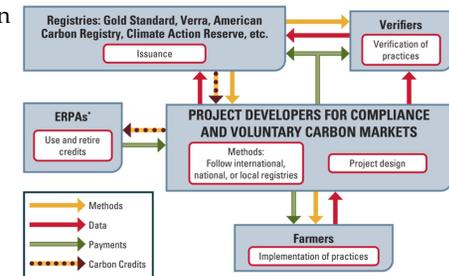
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Structure of Private Carbon Markets

- Farmer sequesters carbon or reduces emissions
- Entity pays for that practice change
- Entity registers 'credit' for lowering global emissions



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Source: How Do Data and Payments Flow Through Ag Carbon Programs? Iowa State Extension

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Private Contracts: The Good

- **Voluntary** private carbon markets; include new 'aggregators', and traditional agricultural firms (Cargill, Corteva, etc.)
- No rush to sign up
- Would generate revenue; need to be sure it's the right price
- A positive in the Court of Public Opinion

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Private Contracts: The Bad

- Uncertainty Regarding Potential Policies
 - Conservation programs likely to get a BIG boost in next farm bill; Could you somehow miss out on these programs?
- Need to have contracts reviewed by a lawyer
 - Provisions include who pays penalties, measurement regimen, ownership transfer, price setting, walk away provisions, suit settlement provisions, etc.
- The price is NOT right; Biden administration estimates social cost of carbon damage at \$51/MT emitted and European report estimates \$250/MT paid to lower emissions

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Policy and Private Market Challenges

- Measurement. Difficult to quantify impact individual practice and accumulation
- Volatility. Practices are reversible. Sequestered carbon can be released by soil disturbance, changed tillage, etc. Property rights? Long-term commitments?
- Additionality. Programs incentivizing behavior to reduce GHG emissions or sequester carbon exist. However, these efforts ignore the costs internalized by early adopters along with the costs incurred in maintaining conservation measures over time.
- Regional Equity. One size does NOT fit all.

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Farming Example



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Conventional Tillage vs. Strip Tillage, Corn

- Converting High Plains production from conventional to strip till corn
- Maintain yields
- Lower cost of tillage
- Increased cost of herbicide and herbicide application; added recommended regimen of 2 pre and post plant herbicide treatments plus 2 burndown treatments

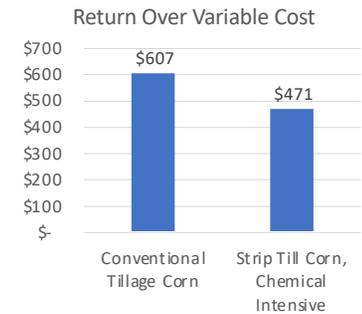
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Conventional Tillage vs. Strip Tillage, Corn

- Net loss from enterprise change
 - Sequester 0.14 MT CO₂E/acre
 - \$2.80 carbon payment/acre
 - Change in input cost outweighs revenue increase
- \$136/acre net profit difference
- Breakeven carbon sequestration is approximately 6.95 MT/acre
- Breakeven carbon payment is approximately \$1,000/MT CO₂E



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Thoughts on these estimates

- Only measuring direct and indirect costs; don't forget potential yield change, potential penalty costs, loss of other revenue streams
- Agronomics are incredibly complicated, and site specific. Research needs remain. These estimates do not include
 - Additive impacts of conversion plus best management (or non-best management) practices over time
 - Changes in soil moisture capture and crop utilization
 - Impacts of water drawdown over time
- Are there other, creative marketing opportunities?
 - Cover crops grown in low input systems marketed as silage/forage

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Livestock Considerations



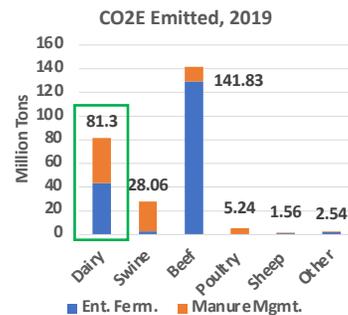
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Livestock Emissions

- What are our two major emission sources from livestock?
 - Enteric Fermentation
 - Rotational grazing
 - More efficient production
 - Manure Management
 - Methane capture



Anaerobic Digesters

- Infrastructure and technical knowledge exists to implement
 - May find different from field crop payments; even if carbon market collapses physical asset funded by carbon offset dollars remains
 - Revenue streams from digesters exist outside of the carbon marketplace



Anaerobic Digesters

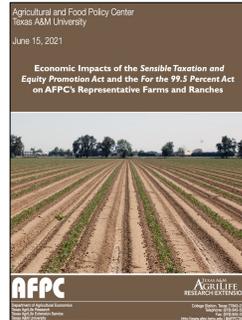
- Research conducted in 2019 using AFPC representative farms
 - Does not include value of emissions reduction
 - Estimates the need for 50%-75% installation subsidies to provide profitability for installation of biogas capture on dairies in Texas
 - Includes value of 'co-products' (bedding, digestion of other bio-waste)
 - Energy in Texas is relatively inexpensive compared to other dairy states
- New research forthcoming on value/feasibility of digester construction
- Are there upstream and/or downstream changes to be made in meat production to lower emissions per pound of protein grown?

The Big Questions

- Is this right for YOUR land? Economically? Environmentally?
- Administration measured the social cost of carbon as \$51/ MT CO2E emitted in 2020; where is the other \$31/MT CO2E going?
- The agronomics and results of practice change vary from region to region and even field to field; a host of local and national research remains to be conducted
- Why are these companies paying you to make changes instead of making them themselves?
- If you haven't adopted these practices historically, why not, and why now?

Representative Farms

- The foundation of AFPC's work
- Network of operations utilized to estimate policy impacts on 'representative' operations across the country
- Regional representative farms are created by assembling a group of 3-4 local producers who sit for an interview once every 3-5 years to provide input on current circumstances



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29

Thanks!

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30