Solutions from the Agriculture Sector

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Why Agriculture?

% of Land Area Devoted to Farming by U.S. County (2003)

Legend
- 0 - 20%
- 20 - 40%
- 40 - 60%
- 60 - 80%
- 80 - 100%
Why Agriculture?

https://www.bloomberg.com/graphics/2018-us-land-use/
Why Agriculture?

https://www.bloomberg.com/graphics/2018-us-land-use/
$330 billion per year in agricultural commodities
Impacts of climate change

Hsiang et al. 2017 Estimating economic damage from climate change in the United States
Solutions from the agricultural sector
SOLUTIONS IN THIS SECTOR

- COASTAL WETLAND PROTECTION
- CONSERVATION AGRICULTURE
- FARM IRRIGATION EFFICIENCY
- FOREST PROTECTION
- GRASSLAND PROTECTION
- IMPROVED RICE PRODUCTION
- INDIGENOUS PEOPLES' FOREST TENURE
- NUTRIENT MANAGEMENT
- PEATLAND PROTECTION ANDREWETTING
- PLANT-RICH DIETS
- REDUCED FOOD WASTE
- REGENERATIVE ANNUAL CROPPING
- SUSTAINABLE INTENSIFICATION FOR SMALLHOLDERS
- SYSTEM OF RICE INTENSIFICATION

PROJECT DRAWDOWN
Conservation Agriculture

- 9.43-13.4 gigatons of CO$_2$ equivalent reduced/sequestered
- 78-113 billion $US net profit

No-till farming  Cover Crops  Crop Rotations
Potential of adoption in 10 years

Integration in today’s agriculture

- Biological pest control
- Drip irrigation
- Reduced tillage
- Split fertilisation
- Cultivar choice
- Biofertilizer
- Intercropping
- Organic fertilisation
- Natural pesticides
- Allelopathic plants
- Integration of semi-natural landscape elements at field and farm scale
- Direct seeding into living cover crops or mulch
- Integration of semi-natural landscape elements at landscape scale
- Agroforestry

Agroecological practices for sustainable agriculture - DOI: 10.1007/s13593-013-0180-7
Regenerative Annual Cropping

• **14.5-22.3** gigatons of CO₂ equivalent reduced/sequestered

• **$136-206** billion net profit
Farm Irrigation Efficiency

• 1.13-2.07 gigatons of CO₂ equivalent reduced/sequestered
• $540-930 billion savings
Agroforestry

- Silvopasture at Greenbrier Farms
- https://www.fs.usda.gov/nac/

Figure 1: Major carbon sinks and sources that can be affected by a field windbreak. Image credit: Schoenberger 2008.

At the same time farmers mitigate climate change through agroforestry practices, they can also get other benefits.
Scale of interventions

Agroecological practices for sustainable agriculture- DOI:10.1007/s13593-013-0180-7
Grassland Protection & Conservation Reserve Program

While overall enrollment in the CRP is declining, continuous program acreage is increasing

Source: USDA, Economic Research Service, based on CRP contract data maintained by USDA’s Farm Service Agency.
WASHINGTON, April 21, 2021 — Agriculture Secretary Tom Vilsack announced today that USDA will open enrollment in the Conservation Reserve Program (CRP) with higher payment rates, new incentives, and a more targeted focus on the program's role in climate change mitigation. Additionally, USDA is announcing investments in partnerships to increase climate-smart agriculture, including $330 million in 85 Regional Conservation Partnership Program (RCP) projects and $25 million for On-Farm Conservation Innovation Trials. Secretary Vilsack made the announcement today at the White House National Climate Task Force meeting to demonstrate USDA’s commitment to putting American agriculture and forestry at the center of climate-smart solutions to address climate change.

The Biden-Harris Administration is working to leverage USDA conservation programs for climate mitigation, including continuing to invest in innovation partnership programs like RCPP and On-Farm Trials as well as strengthening programs like CRP to enhance their impacts.

"Sometimes the best solutions are right in front of you. With CRP, the United States has one of the world's most successful voluntary conservation programs. We need to invest in CRP and let it do what it does best—preserve topsoil, sequester carbon, and reduce the impacts of climate change," said Vilsack. "We also recognize that we can't do it alone. At the White House Climate Leaders Summit this week, we will engage leaders from all around the world to partner with us on addressing climate change. Here at home, we're working in partnership with producers and local organizations through USDA programs to bring new voices and communities to the table to help combat climate change."

Conservation Reserve Program

USDA’s goal is to enroll up to 4 million new acres in CRP by raising rental payment rates and expanding the number of incentivized environmental practices allowed under the program. CRP is one of the world’s largest voluntary conservation programs with a long track record of preserving topsoil, sequestering carbon, and reducing nitrogen runoff, as well providing healthy habitat for wildlife.
USDA budget outlays, fiscal years 2006-15

$ billion

2006 07 08 09 10 11 12 13 14 15

*Includes rural development, food safety, marketing and regulatory programs, rese
and departmental activities. Note: Nominal dollars.
Source: USDA, Economic Research Service using data from FY2008-FY2016 USDA
Budget Summary and Annual Performance Plan.
Agroecology funding in the 2014 USDA budget

https://www.ucsusa.org/resources/counting-agroecology
• Research and Science Information Synthesis
• Tool Development, Technology Exchange, and Implementation Assistance
• Stakeholder Education, Outreach, and Engagement
The importance of relationships for change

Allen et al. 2017
Riechers et al. 2020
Chapman et al. 2019
What About Consumers?
Lifecycle GHG emissions (CO$_2$-C$_{eq}$) for 22 different food types.
Solutions for a cultivated planet

Foley et al. 2011
Thank You &
Questions?

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