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Thank you, Chairwoman Castor, Ranking Member Graves, and all the Members of this Committee for the opportunity to provide testimony. I am honored to share with you my perspective on the role of the financial system in supporting climate resilient agriculture.

At EDF, we are proud to collaborate with farmers, farmer organizations, land grant universities, and companies throughout the supply chain to advance climate resilient agriculture. Our farmer advisory board informs all our agriculture work and was instrumental in shaping my research into the agricultural financial system.

To start, it's important to note that, like any business, a farm's success relies on access to finance. Farmers go to agricultural lenders for a variety of lending products, including real estate loans, equipment loans and operating loans. Farmer and lender relationships often span many years and are rooted in a shared community. Aside from the farmer him- or herself, the agricultural lender has the most holistic view of a farm's financial health. If our goal is to decrease the risk of financial harm to America's agriculture sector caused by climate change, the role of agricultural lenders cannot be ignored.

U.S. agriculture is financed by a few different categories of credit providers. The Farm Credit System is a government-sponsored enterprise established to enhance the flow of credit to U.S. agriculture. Farm Credit accounts for 41% of farm debt and is the largest lender for farm real estate.[1] Commercial banks are the other primary category of agricultural lenders, holding slightly more than the Farm Credit System with 42% of total farm debt, and the most farm operating loans.[2] This segment includes large, diversified banks, financial divisions of major agriculture companies, as well as many regional and community banks. Finally, the Farm Service Agency (FSA), part of the U.S. Department of Agriculture, issues direct loans to farmers who cannot qualify for other sources of credit and guarantees the repayment of loans made by other lenders. FSA represents a small portion of overall farm debt, but it is also a lender of first opportunity because it targets loans or reserves funds for farmers defined as "socially disadvantaged" due to their race, gender and/or ethnicity.[3]

A proactive approach to managing climate risk includes both climate risk assessment by agricultural lending institutions as well as programs designed to support farmer adoption of resilient practices. There are substantial opportunities for agricultural lenders to support their farmer clients in building climate resilience into their farming

[1] Monke, Jim. (2018, March 26.) Agricultural Credit: Institutions and Issues. Congressional Research Service. Retrieved July 2020 from: https://fas.org/sgp/crs/misc/RS21977.pdf
[2] Ibid.
[3] Ibid.

operation. At scale, this would also reduce overall climate risk to the agricultural lending sector. It is the combination of these two approaches — assessing and mitigating climate risk at the lending institution level, while supporting agriculture to become more resilient — that will be required to successfully navigate the challenges posed to agriculture and agricultural lending institutions by climate change.

Climate Risk and Agriculture Financial Markets

Farmers are on the front lines of a changing climate. The Fourth National Climate Assessment, a congressionally mandated report by the U.S. Global Change Research Program, describes how increased temperatures, more frequent droughts and extreme precipitation events threaten crop productivity across the United States.[4] In 2020 alone, we have seen ample evidence of these impacts, including destructive storms in the Midwest, hurricanes along the coast, and wildfires and smoke in the West. I have personally witnessed the damage while visiting farmers in my home state of North Carolina after several hurricanes devastated the Coastal Plain agricultural region in the past five years. In addition to intensifying natural disasters, farmers must also contend with increased variability in temperature and rainfall, as well as changes in natural cycles such as pollination and pest suppression.[5] These challenges, compounded by poor economic conditions, trade disruptions, and the Covid-19 pandemic have caused the farm economy to experience its worst downturn since 2001.[6]

A recent report from the Commodity Futures Trading Commission (CFTC) Climate-Related Market Risk Subcommittee and my own research at EDF make it clear that climate change poses severe risks to both farmers and the financial system that finances and insures agriculture in the U.S., including agricultural lending and crop insurance. However, there are also opportunities for the agricultural sector to incorporate farming practices that build resilience, reduce risk and provide multiple environmental benefits. This committee underscored those opportunities in its Majority Staff Report, *Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America*. Two building blocks of the report focus on agricultural lending and crop insurance, offering a valuable path forward for Congress on these topics.

The report released last month by the Commodity Futures Trading Commission (CFTC) Climate-Related Market Risk Subcommittee, which included input from my EDF colleague Nat Keohane, deftly links the physical risks of climate change to financial market risks across the U.S. economy. The report has a significant focus on the agriculture sector and describes how climate change poses threats to both farmers and

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[4] USGCRP, 2018: 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, 1515 pp. doi: 10.7930/NCA4.2018.

[5] Ibid.

[6] U.S. Department of Agriculture Economic Research Service. 2020 Farm Sector Income Forecast. (2020, February 05). Retrieved July 2020, from https://www.ers.usda.gov/topics/farm-economy/farm-sector-income-finances/farm-sector-income-forecast/

their finance providers, including agricultural lenders. Nearly half of all agricultural loans are held by lenders with at least one-quarter of their portfolio concentrated in farm-related areas, such as operating loans or real estate loans. Many of these lenders also have correlated risks because of loan concentrations in particular geographies or related agricultural businesses. Following severe flooding in the spring of 2019, lenders in the Midwest reported to the Federal Reserve Bank of Chicago that 70% of their borrowers were moderately or severely affected by extreme weather events. That year, the portion of the region's agricultural loan portfolio reported as having "major" or "severe" repayment problems hit the highest level in 20 years.[7]

The CFTC Subcommittee report highlighted the possibility that climate-related risks may well produce "sub-systemic" shocks, which are defined as those that affect financial markets or institutions, or a particular sector, asset class or region, but without threatening the stability of the financial system as a whole. Agriculture, as a sector that is particularly vulnerable to climate change, is at risk of sub-systemic shocks to its financial institutions. A credit-stressed agricultural lending system would decrease farmers' access to affordable credit and increase the difficulty in recovering from climate-related shocks.[8]

Crop insurance is an important shock absorber for farmers and their lenders, but it is not sufficient to protect farmers, lenders or the broader agricultural economy from climate risk over the long-term. The U.S. Department of Agriculture's Economic Research Service estimates that without farmer adaptation to climate change, the cost of the Federal Crop Insurance Program could increase by nearly 40% in the second half of this century.[9] The CFTC Subcommittee report notes that a key challenge will be the future capacity of the U.S. government to provide actuarially sound crop insurance, based on best available data, to support changes in underwriting and pricing attributable to climate change and natural variability.[10] In addition, while insurance coverage is currently high for the major field crops and 75% of large farms participate in Federal Crop Insurance, only 15% of all U.S. farms have crop insurance.[11] This leaves the majority of U.S. farms and their production left unprotected by crop insurance and vulnerable to weather shocks. This vulnerability can affect the entire value chain, including the lenders that finance it.

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[7] Climate-Related Market Risk Subcommittee, Market Risk Advisory Committee of the U.S. Commodity Futures Trading Commission. (2020.) "Managing Climate Risk in the U.S. Financial System." Retrieved from: https://www.cftc.gov/PressRoom/PressReleases/8234-20

[8] Ibid.

[9] Crane-Droesch, Andrew et al. (2019, July.) Climate change and agricultural risk management into the 21st century. U.S. Department of Agriculture Economic Research Service. Retrieved from: https://www.ers.usda.gov/webdocs/publications/93547/err-266.pdf?v=9932.1

[10] Climate-Related Market Risk Subcommittee, Market Risk Advisory Committee of the U.S. Commodity Futures Trading Commission. (2020.)

[11] U.S. Department of Agriculture Economic Research Service. (2017, December.) America's Diverse Family Farms. Retrieved from: https://www.ers.usda.gov/webdocs/publications/86198/eib-185.pdf

There are encouraging signs that the broader financial sector is moving to address climate risk. A 2019 survey of 20 banks and seven other financial institutions found that more than half of major financial institutions now take a strategic approach to climate risk.[12] However, research and interviews I conducted with agricultural lending institutions indicate that the U.S. agricultural lending sector currenting lags in assessing climate risk and incorporating it into risk mitigation strategies – as evidenced by lenders citing their largest risks as commodity prices, production costs, farmland values and global market issues.[13] Most agricultural lenders do not specifically assess climate risk. The longer the agricultural lending sector waits to assess and address climate risks, the greater the likely severity of economic consequences — for lenders, for farmers and for all Americans who rely on our nation's farmers to put food on the table.

The CFTC Subcommittee report makes several recommendations that would represent substantial steps forward in assessing climate risk to agriculture and its financial institutions. These include recommending that the research arms of federal financial regulators undertake research on the financial implications of climate-related risks, including the potential for and implications of climate-related "sub-systemic" shocks in the agriculture sector. The report also recommends that relevant federal regulators assess the exposure to and implications of climate-related risks for the portfolios and balance sheets of the government-sponsored enterprises (GSEs), such as Farm Credit, and strongly encourage the GSEs to adopt and implement strategies to monitor and manage those risks. Another key recommendation is for regulators to work with financial institutions, including agricultural and community banks, to pilot climate risk stress testing that will enable stakeholders to better understand institutions' exposure to climate-related physical and transition risks, as well as to explore climate-related financing opportunities.[14]

The CEO of CoBank, which is part of the Farm Credit System, recently wrote that "Concerns about climate change are now a permanent part of the operating environment for rural America."[15] Agricultural lenders are critical financial institutions in a sector that is already experiencing substantial climate impacts. That fact should be reflected in risk assessment and management in order to prepare for and mitigate financial impacts to lenders and their farmer borrowers.

Opportunities to Finance Resilient Agriculture

[12] GARP Risk Institute. (2019.) Climate Risk Management At Financial Firms: A good start, but more work to do. Results from a global survey. Retrieved from: https://www.garp.org/newmedia/gri/climate-risk-management-survey/AGoodStart_052919_PDF.pdf

[13] Board of Governors of the Federal Reserve System. (2011, October 26.) SR 11-14: Supervisory Expectations for Risk Management of Agricultural Credit Risk https://www.federalreserve.gov/supervisionreg/srletters/sr1114.htm

[14] Climate-Related Market Risk Subcommittee, Market Risk Advisory Committee of the U.S. Commodity Futures Trading Commission. (2020.)

[15] CoBank. (2019.) Rural Industries and Climate Change. Retrieved from: https://www.cobank.com/-/media/files/ked/general/rural-industries-climate-change.pdf?la=en&hash=234B62A18E2E279D82C84222C1E62DB343E9F816

Two approaches are required to successfully navigate the challenges posed to agriculture and agricultural lending institutions by climate change: assessing and mitigating climate risk at the lending institution level and supporting agriculture to become more resilient. EDF published a report in September 2020 that addresses both topics, titled *Financing Resilient Agriculture: How agricultural lenders can reduce climate risk and help farmers build resilience.*[16] The report was informed by extensive interviews with agricultural lenders and other experts, and included major contributions from the AGree Economic and Environmental Risk Coalition, agricultural accounting and consulting firm KCoe Isom, The Nature Conservancy and Scott Marlow of Long Rows Consulting.

While agriculture faces major risks from climate change, it also has the capacity to adapt and build resilience to protect long-term productivity and profitability. Many well-known conservation practices that improve soil health, such as no-till, cover crops and diverse rotations, can build resilience. Healthy soils increase the sponginess of the soil, allowing it to absorb water during wet periods and retain it during dry periods, improving field trafficability and improving the resilience of crop yields.[17] Along with edge-of-field practices such as buffers and wetlands, agriculture can also contribute to resilience at the watershed scale by holding excess water and reducing the magnitude of flooding.[18] The practices that build soil health also have the potential to generate multiple environmental benefits, including reduced erosion, improved water quality, reduced water use, improved biodiversity, and reduced greenhouse gas emissions and improved carbon sequestration.[19,20,21,22,23]

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[16] Monast, Maggie. (2020, September.) Financing Resilient Agriculture: How agricultural lenders can reduce climate risk and help farmers build resilience. Retrieved from: https://edf.org/aglending

[17] Basche, A.D. and M.S. DeLonge. 2019. Comparing infiltration rates in soils managed with conventional and alternative farming methods: A meta-analysis. PLOS ONE 14(9):e0215702. doi: 10.1371/journal.pone.0215702.

[18] Walters, K. M., Babbar-Sebens, M. (2016). Using climate change scenarios to evaluate future effectiveness of potential wetlands in mitigating high flows in a Midwestern U.S. watershed. *Ecological Engineering.* pg 80-102. DOI: http://dx.doi.org/10.1016/j.ecoleng.2016.01.014

[19] Hunt, N.D., J.D. Hill and M. Liebman. 2019. Cropping System Diversity Effects on Nutrient Discharge, Soil Erosion, and Agronomic Performance. Environmental Science & Technology 53(3):1344-1352. doi: 10.1021/acs.est.8b02193

[20] Mhazo, N., P. Chivenge and V. Chaplot. 2016. Tillage impact on soil erosion by water: Discrepancies due to climate and soil characteristics. Agriculture, Ecosystems & Environment 230:231-241. doi: https://doi.org/10.1016/j.agee.2016.04.033.

[21] Morton, L.W., J. Hobbs, J.G. Arbuckle and A. Loy. 2015. Upper Midwest Climate Variations: Farmer Responses to Excess Water Risks. Journal of Environmental Quality 44(3):810-822. doi: 10.2134/jeq2014.08.0352.

[22] Eagle, A.J. and L.P. Olander. 2012. Greenhouse gas mitigation with agricultural land management activities in the United States—A side-by-side comparison of biophysical potential. Advances in Agronomy 115:79–179.

[23] Kim, N., Zabaloy, M. C., Guan, K., & Villamil, M. B. (2020). Do cover crops benefit soil microbiome? A meta-analysis of current research. *Soil Biology and Biochemistry*, *142*, 107701.

EDF and many other organizations and universities are collaborating with farmers to quantify the financial value of these practices. These analyses show that resilient farm management practices support risk reduction and farm financial viability by stabilizing crop yields, lowering costs of production, diversifying revenue streams and preserving the long-term value of the land. Examples include:

- Practices that improve soil health can allow farmers to reduce input costs over time, as biological processes are able to replace some synthetic nutrients, herbicides and pesticides.[24]
- No-till has well-documented cost savings in fuel, labor, and equipment due to fewer passes over fields and the ability to invest in less machinery or machinery with lower horsepower.[25]
- Diverse crop rotations and the integration of livestock diversify farm revenue sources and protect farmers from both price and yield swings.[26]
- Grain farmers who used cover crops for five consecutive years experienced a 3% increase in their corn yield and a 5% increase in soybean yield. In the drought year of 2012, farmers reported even greater yield increases when they used cover crops: nearly 10% in corn and 12% in soybeans.[27]

Despite these benefits, farmers still must overcome multiple obstacles to adoption. Short-term costs and risks during the transition period may be a deterrent, especially in economically challenging times.[28] Common lending practices also create disincentives. Lenders often lack information on the farm budget impacts of conservation practices and may not be able to assist borrowers in projecting their returns. Lenders also typically focus on the short-term repayment of the operating loan, which can come at the detriment of long-term profitability and financial stability. Finally, loan terms often do not align with the transition period needed to adopt conservation practices or accord value to them. This disconnect between credit requirements and lender practices and the financial transition to farming practices that build resilience can prevent farmers from adopting new conservation practices.

The agricultural lenders interviewed for the *Financing Resilient Agriculture* report expressed a strong interest in improving their understanding of the farm budget impacts of conservation practices. Such information can be translated to lender decision-making, lending programs and products that better serve farmers who adopt, or want to adopt, practices that build resilience. While lenders cannot require their clients to adopt

[24] Rob Myers, Alan Weber, and Sami Tellatin. (2019). Cover Crop Economics: Opportunities to Improve Your Bottom Line in Row Crops. Sustainable Agriculture Research & Education. Retrieved from: https://www.sare.org/Learning-Center/Bulletins/Cover-Crop-Economics

[25] Monast, Maggie and KCoe Isom AgKnowledge. (2018.) Farm Finance and Conservation: How stewardship generates value for farmers, lenders, insurers and landowners. Retrieved from: https://edf.org/farm-finance

[26] Roesch-McNally, Gabrielle, Arbuckle, J., and Tyndall, John. "Barriers to implementing climate resilient agricultural strategies: The case of crop diversification in the U.S. Corn Belt." Global Environmental Change 48 (2018) 206–215.

[27] Rob Myers, Alan Weber, and Sami Tellatin. (2019).

[28] Monast, Maggie and KCoe Isom AgKnowledge. (2018.)

specific practices, there are several existing examples of lender programs or products that support farmers in navigating similar financial barriers or transitions. For example, the Farm Credit system has a longstanding history of supporting lending programs for young, beginning and small farmers, which often include credit enhancements and business counseling to help farmers grow their operations.[29] In addition, Rabobank AgriFinance and Compeer Financial recently launched organic transition loans that help bridge the gap between a farmer beginning organic practices and when the farm achieves organic certification and receives a market premium.[30,31] These examples show how lenders can develop new or modified loan programs or products that can help farmers navigate transitions to different farm management systems. Agricultural lenders could approach farmer transitions to more resilient farming practices in the same way.

New lending programs that finance resilient agriculture will realign lending structures to better match the needs of farmers who adopt practices that improve resilience. Ultimately, this will benefit both the farmer and the overall risk of a lender's portfolio. Where initial programs and products do not meet current credit standards, loan support from partners (e.g. USDA, foundations, food companies, or impact investors) can help bridge the gap. The public sector is well positioned to de-risk initial programs or collect the data needed to allow loans for resilient agricultural practices to stand on their own. Ultimately, the objective is to accurately reflect the value of resilient agriculture in credit pricing and structures.

Equity Considerations in Financing Resilient Agriculture

The U.S. Department of Agriculture (USDA) defines socially disadvantaged farmers and ranchers (SDFRs) as members of certain racial and ethnic minority groups and women. A study of agricultural credit services provided to SDFRs conducted by the Government Accountability Office in 2019 found that they represented an average of 17% of primary producers in the survey, but they accounted for only 8% of total agricultural debt.[32] This demonstrates the challenges that farmers of color and women farmers face that restrict their ability to obtain private agricultural credit. According to the GAO report, they are more likely to operate smaller, lower-revenue farms; have weaker credit histories; or

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[29] Pellett, Nancy. (2007, August 10.) Revised Bookletter 040 - Providing Sound and Constructive Credit to Young, Beginning, and Small Farmers, Ranchers, and Producers or Harvesters of Aquatic Products. Retrieved from: https://ww3.fca.gov/readingrm/Handbook/_layouts/15/WopiFrame.aspx?sourcedoc={788991C0-7E8B-43AC-ADB4-55C500B85A94}&file=BL-040%20REVISED.docx&action=default

[30] Rabo AgriFinance. (2019, October 24.)"Rabo AgriFinance Designs Industry's First Organic Transition Loan Offering." Retrieved from: https://www.raboag.com/news/rabo-agrifinance-designs-industrys-first-organic-transition-loan-offering-54

[31] Compeer Financial. (2020, February). New Organic Bridge Loan. Retrieved from: https://www.compeer.com/Utility/Support/About/Newsroom/Press-Releases/February-2020/New-Organic-Bridge-Loan

[32] U.S. Government Accountability Office. (July 2019). Agricultural Lending: Information on Credit and Outreach to Socially Disadvantaged Farmers and Ranchers is Limited. Retrieved July 2020 from https://www.gao.gov/assets/710/700218.pdf

lack clear title to their agricultural land, which can make it difficult for them to qualify for loans. Farmers of color and advocacy groups also report unfair treatment and discrimination in lending.[33]

There is a critical intersection between considerations of equity and resilience in agriculture and agricultural credit. Due to the history of discrimination in access to credit, risk management and other services,[34] the economic impacts of climate change on agriculture are likely to fall disproportionately on farmers of color and small farmers. There are many opportunities to improve both the resilience and equity of agriculture through inclusion of the expertise of organizations led by farmers of color, women farmers and small farmers. Strengthening support for farmers of color, women farmers and small farmers within the agriculture sector can establish paths toward long-term prosperity while helping to secure the future of resilient food systems.[35]

The Path Forward

Given the increasing severity and frequency of weather events projected to continue affecting farmers across the country, a major shift in the agricultural lending sector's approach to climate risk and resilience is overdue. As farmers' closest financial partners, agricultural lenders have a critical role to play in supporting climate-resilient agriculture. This role is highlighted in the House Select Committee on the Climate Crisis' Majority Staff Report, *Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America* through the building block to "Provide Lending, Credit, and Land Valuation Incentives for Improving and Maintaining Soil Health and Carbon Sequestration."[36]

We agree with the report's recommendation for Congress to incentivize data collection to demonstrate the reduced risk and profitability benefits of conservation practices. While many studies analyze farmer budgets and other relevant data sources, there is a critical need to expand such analysis and connect it to the type of information required by agricultural lenders and crop insurers for decision-making and risk analysis. An important caution in this area is to avoid relying entirely on data sources that exclude small farmers or farmers of color. For example, farm management software is much

[33] Ibid.

[34] Tyler, Shakara S. and Moore, Eddie A. (2013) "Plight of Black Farmers in the Context of USDA Farm Loan Programs: A Research Agenda for the Future," Professional Agricultural Workers Journal: Vol. 1: No. 1, 6. Available at: http://tuspubs.tuskegee.edu/pawj/vol1/iss1/6

[35] Union of Concerned Scientists and HEAL Food Alliance. (2020.) Leveling the Fields: Creating Farming Opportunities for Black People, Indigenous People, and Other People of Color. Retrieved July 2020 from: https://www.ucsusa.org/sites/default/files/2020-06/leveling-the-fields.pdf

[36] House Select Committee on the Climate Crisis. (2020, June.) Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America. Page 340. Retrieved from: https://climatecrisis.house.gov/sites/climatecrisis.house.gov/files/Climate%20Crisis%20Action%20Plan.pdf

more commonly available to and used by large-scale farmers; small farmers and farmers of color are not as likely to utilize this technology.[37]

The path forward to demonstrate the reduced risk and profitability benefits of resilient agriculture will require methods to assess the financial performance and resilience of farms of all types and sizes, and an openness to learn from a variety of different operations. This will also require clear protections for all farmers in terms of how their data will be used and secured. Opportunities to support and simplify farm recordkeeping for farms of all sizes would help overall farm management as well as the assessment of farming practices that build resilience.

This committee's recommendations related to the Federal Crop Insurance Program are also noteworthy. Crop insurance is a trusted risk management tool used by many farmers; it is also complex and potential changes require careful consideration. Congress has the opportunity to work cooperatively with farmers, the U.S. Department of Agriculture's Risk Management Agency, and the crop insurance industry to systematically assess how climate change is likely to impact farmers and how crop insurance can mitigate those risks by incentivizing resilience in agriculture.

Thank you again for the opportunity to testify today and to address this important issue. Farmers are already experiencing the impacts of climate change, and these risks flow through to the financial system that finances and insures agriculture. To address these risks, greater efforts must be made both in climate risk assessment and in fostering resilient agricultural practices and production systems. Agriculture financial institutions have a critical role to play in supporting this transition, one that will ultimately benefit farmers, the financial system, and the U.S. economy. EDF looks forward to continuing to work with you on efforts to build resilience in agriculture.

[37] McDonald, J., Korb, P., Hoppe, R. (2013, August.) Farm Size and the Organization of U.S. Crop Farming. U.S. Department of Agriculture Economic Research Service. Retrieved from: https://www.ers.usda.gov/webdocs/publications/45108/39359_err152.pdf