Financing Resilient Agriculture

How agricultural lenders can reduce climate risk and help farmers build resilience

EDF
ENVIRONMENTAL
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September 2020

Authors and acknowledgements

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Environmental Defense Fund, a leading international nonprofit organization, creates transformational solutions to the most serious environmental challenges. EDF links science, economics, law and innovative private-sector partnerships. EDF's agricultural finance work includes farm budget analyses, financial solutions and agricultural finance policy. To learn more, visit www.edf.org/farm-finance.

Major contributors:

The Nature Conservancy, with thanks to Greg Fishbein for his partnership and expertise in agricultural lending.

K•Coe Isom, with thanks to Laura Sands, Kala Jenkins and Brad Mohrmann for their research on the Farm Credit System.

Scott Marlow of Long Rows Consulting, for his guidance on the intersection of equity and agriculture finance.

The AGree Economic and Environmental Risk Coalition, with thanks to Deborah Atwood, Heather Lair and Rex Raimond of Meridian Institute, as well as Jonathan Coppess and Bruce Sherrick of the University of Illinois, for their extensive research on crop insurance and agricultural lending.

In addition to the major contributors above, we would like to thank the following individuals who reviewed the report and provided important feedback:

- Farmers Dick Wittman of Idaho, Kristin Weeks Duncanson of Minnesota, and Scott Henry of Iowa.
- Marcia DeLonge, Union of Concerned Scientists.
- David Beck, Self-Help Credit Union.
- Kavita Koppa, agricultural finance and equity consultant.
- Vincent Gauthier, Environmental Defense Fund.
- Agricultural lenders who prefer to remain anonymous.

About this report

This report is for agricultural lenders and lending institutions, as well as others interested in understanding the climate risks faced by the agricultural lending sector and the role of agricultural lenders in financing resilient agriculture.

The report is based on extensive research and interviews with a variety of food and agricultural lenders, including Farm Credit and commercial lenders, as well as multiple other relevant experts. Many of the agricultural lenders who contributed their perspectives wish not to be identified. They are cited using initials.

This report provides a path forward for lenders to mitigate climate risks and finance resilient agriculture. Our hope is that it is useful to all those who are invested in the future of U.S. farms.

Contents

Foreword

Farmers and their lenders must look at both risks and opportunities in order to survive in a globally competitive and constantly changing industry. Climate change impacts are already making production harder and threatening livelihoods. Together, farmers and their lenders have an opportunity to mitigate this risk, enhance operational resilience and ensure agriculture remains economically and environmentally sustainable.

Farmers need a wide variety of tools and support to adopt conservation practices like no-till, cover crops and diverse crop rotations that can boost climate resilience and reduce production risk. Programs that reduce the costs of adopting new practices can help, but agricultural lenders can and should play a stronger role in addressing this challenge.

As a farmer who produces grain, cattle and timber in Idaho and as a business consultant with an early career in banking — working for the Farm Credit System and the Farm Credit Administration — I have witnessed how collaborations with agricultural lenders and environmental organizations help farmers implement better conservation strategies.

For years, Farm Credit has supported conservation and soil health in my region, the Pacific Northwest, by sponsoring conferences and peer breakfast groups for farmers interested in no-till and direct seed cropping systems. Through participation in those breakfast groups, my fellow farmers and I were able to share ideas and learn from each other's experiences as we implemented conservation practices on our farm.

Environmental Defense Fund, which I've advised for over 20 years, has collaborated with farmers to help them better understand how conservation practices improve soil and water quality and deliver positive returns on investment.

Historically, lenders have placed the heaviest weight on farmers' financial strength and repayment ability. Little consideration has been given in credit scoring models to farmers' conservation strategies or exposure to climate risk. That needs to change.

In the future, climate impacts will challenge lenders to change their thinking and give increased weight to how their customers farm, mitigate climate risk, and position themselves to be resilient and sustainable for the long term.

Financing Resilient Agriculture offers fresh thinking about how the agricultural finance sector can better understand and mitigate climate risks and be a partner in advancing conservation. The sector needs innovation in lending products and program delivery to better understand the relationships between conservation and financial success. This will in turn affect how lenders price credit and reward risk mitigation.

This report makes a clear and compelling case that long-term farm profitability is not undermined by near-term investments in conservation and climate resilience — it depends on it.

Dick Wittman, farmer, business consultant and member of EDF farmer advisory board

Executive summary

The agriculture sector is on the front lines of climate change. Production depends on access to healthy soil, adequate water supplies and predictable weather conditions, all of which are more difficult to access and manage as the climate changes.

Farmers already experience higher temperatures, increasingly variable rainfall and more frequent droughts, storms, fires and floods that threaten crop and livestock production across the United States.[1] These climate-related challenges compound other severe challenges posed by poor economic conditions and disruptions from the COVID-19 pandemic. While these risks are felt by all farmers, they are particularly challenging for small farms, farmers of color and low-income farming communities.

"Concerns about climate change are now a permanent part of the operating environment for rural America; they are here to stay regardless of which political party happens to be in power at state or federal levels."

— Tom Halverson, president and chief executive officer of CoBank[5]

Climate change also threatens farmers' financial partners, including agricultural lenders. Nearly half of all agricultural loans are held by lenders with at least one-quarter of their portfolio concentrated in farm operating or real estate loans, and many of those lenders also have correlated risks because of concentrations of loans in particular geographies or related agricultural businesses.[2,3] This contributes to lending sector vulnerability to climate-related disruptions.

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.[4]

Fortunately, agriculture has the capacity to build resilience and protect long-term productivity and profitability.

Building resilience is a complex undertaking that crosses multiple scales, from individual farms to global markets, and requires economic, social, environmental and cultural considerations. This report focuses on a critical piece of puzzle — farm-level management strategies for soil health, water use and crop diversification that enhance climate resilience.

Risk and opportunity for agricultural lenders

As farmers' closest financial partners, agricultural lenders have a critical role to play in supporting climate-resilient agriculture, but U.S. lenders currently lag the broader financial sector in assessing climate risk and incorporating it into risk mitigation strategies.

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.[6] However, research and interviews with agricultural lending institutions indicate that they view the largest risks as commodity prices, production costs, farmland values and global market issues.[7] Most agricultural lenders have not specifically assessed climate risk. The longer the agricultural lending sector fails to prepare for climate risks, the greater the likely severity of economic consequences — both for lenders and their farmer clients.

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 over a third in the second half of this century.[8] In addition, while insurance coverage is high for the major field crops, only one-quarter of U.S. agriculture's total production value is covered by crop insurance.[9] This means that the vast majority of U.S. agricultural production value is left unprotected by crop insurance and vulnerable to weather shocks.

Given the severity of weather events already affecting farmers across the country, a major shift in the agricultural lending sector's approach to climate risk and resilience is overdue.

Well-known conservation practices, including no-till, cover crops and extended crop rotations, contribute to improved resilience.[10] EDF and many other organizations 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.[11] This value is particularly evident when viewing farm budgets over multiple years.[12] These practices can also generate benefits for water quality and quantity, biodiversity, greenhouse gas emissions reductions and carbon sequestration.[13]

Despite these benefits, short-term costs and risks during the transition period may deter many farmers from adopting new conservation practices, especially in economically challenging times. In addition, there are several ways in which agricultural loans currently create disincentives for farmer borrowers who want to adopt conservation practices. They include information gaps or lender unfamiliarity with the return profiles of the practices, the short-term focus on annual operating loan repayment to the detriment of long-term profitability and financial stability, and loan terms that do not align with the transition to conservation practices or accord value to them.

Fortunately, several existing agricultural lender initiatives can inform the development of lending programs or products for resilient agriculture, such as programs developed for young, beginning and small farmers, the Farm Service Agency's conservation loan program and organic transition loans. This report derives five key lessons from these initiatives, including the need to understand the financial benefits of and barriers to resilient agricultural practices, design loan structures and requirements that correspond with the financial characteristics of those practices, utilize loan support to launch initial products, collect data on financial and environmental performance to show results and adjust credit rating processes, and consider other forms of support farmers may need to ensure successful practice adoption. The recommendations below are informed by these insights.

Recommendations

This report offers agricultural lenders and lending institutions a path forward to engage in understanding climate risk and improving resilience. It contains three main recommendations:

1. Assess climate risk at the lending institution level. This will require buy-in from senior leadership, and it could utilize or modify existing climate risk assessment tools developed for the finance sector. Smaller lenders may be able to collaborate with each other or get external support to develop this capacity.

2. Understand the role of resilient agriculture in managing climate risk. Lenders should familiarize themselves with locally-relevant climate risks and resilience strategies, collaborate with other organizations in assessing the farm budget impacts of conservation practices, and identify data blind spots — including for small farmers and farmers of color.

3. Design lending programs or products that support farmers in building climate resilience. Products could include transition loans that align with return projections of resilient farming practices. Such products can also be utilized to collect data that can be incorporated into credit ratings. This will allow the value of resilient agriculture to be accurately reflected in credit structures and pricing. As new lending programs or products are developed, they should avoid doubling down on existing inequities in the agriculture system and seek to mitigate disparities in access to opportunities to build resilience for all farmers.

For lenders interested in pursuing these recommendations, the report also contains two resource guides — one on climate risk assessment for financial institutions and one on farm budget analyses of conservation adoption.

This report provides a path forward for agricultural lenders to mitigate climate risks and finance resilient agriculture. Our hope is that it is useful to all those who are invested in the future of U.S. farms.

Introduction: The need for resilient agriculture

The challenges facing the U.S. agriculture sector in 2020 are dire. They include extreme weather related to climate change, a poor farm economy and supply chain disruptions from the COVID-19 pandemic. The farm economy is currently in the middle of its worst downturn since 2001.[14] Net farm income dropped by nearly half between 2013 and 2016, from $123 billion to $63 billion.[15] In 2019, the combination of a trade war with China, the continuation of depressed crop prices, and incessant rain and subsequent wide-scale flooding that prevented planting in much of the Midwest compounded farmers' economic distress.[16] In 2020, the added shock of the COVID-19 pandemic massively disrupted agricultural supply chains, including closures of major meat processing plants, loss of demand from food service and restaurants, food waste, depressed ethanol demand, and illness outbreaks in processing plants and among farmworkers.[17,18,19]

The need for resilience in agriculture has never been this clear.

"Weather and climate present the greatest, consistent — yet uncertain — risks to the agricultural economy and rural communities. More frequent and more severe extreme weather events have presented a growing set of longer-term challenges that require a different way of assessing long-term risk management and the policies to support it."
— U.S. Commodity Futures Trading Commission Commissioner Rostin Behnam[22]

Building a more resilient agricultural system is a complex undertaking that requires many different considerations, including farming practices and crop choices, farm ownership structures, net returns for farm products, diversity of markets and value chains, farmer health and personal capacity, farm and supply chain labor, rural communities and more. While these considerations all deserve inquiry, the focus of this report is on three farm-level management strategies that improve climate resilience.

One of the foundational steps in boosting farms' climate resilience is the improvement of soil health by using conservation practices such as cover crops and conservation tillage. Two other core strategies known to build climate resilience in agriculture are water management and crop diversification.

Despite the well-known and researched benefits of these practices, low implementation rates reveal a disconnect between the benefits of these practices and the overall financial framework in which agriculture operates, including risk management and agricultural credit.[20,21] This disconnect has significant impacts on farm viability, rural communities, and the role of agriculture in addressing and weathering climate change. As farmers' closest financial partners, agricultural lenders have a critical role to play in building agricultural resilience.

Agriculture is on the front lines of climate change

Agriculture is a "front-line sector" in terms of both its dependence and impacts on natural resources, which means that the economic and environmental challenges facing farmers and the agricultural system are closely connected.[23] Agriculture will be affected by a wide range of shocks and stresses, which vary by type of production and growing region. Climate-related stresses include soil erosion and crop damage from extreme precipitation and drought,[24] heat stress impacting livestock[25] and farmworkers,[26,27] increased pest damage[28] and increased

disruptions to processing infrastructure from extreme weather.[29] These stresses have an increased impact on lower-wealth farming communities and farmers of color.[30]

The Fourth National Climate Assessment, a congressionally mandated report by the U.S. Global Change Research Program, describes how increased temperatures and more frequent droughts and extreme precipitation events threaten crop productivity across the United States.[31] These weather changes are expected to affect crop yields, growing season durations and geographical suitability of major crops. The impacts will be either detrimental or beneficial to yields depending on the crop, region and irrigation system.[32,33,34]

For example, irrigation can buffer crops against drought, but excess irrigation may hasten water shortages in some regions.[35,36] In the Midwest, corn, sorghum and soybean yields are projected to be affected differently from increased temperatures and precipitation, and will vary significantly across subregions.[37] Corn is particularly heat-sensitive, and the Midwest's specialization in that crop increases the region's vulnerability to higher temperatures.[38] Changing temperatures will also shift the optimal geographic growing range for some of these grains northward.[39] Fruit crops in the Northeast such as apples may bloom earlier due to milder winters, but may also be damaged by frost if the crops bloom too early.[40] In California, perennial crops such as grapes, avocados and almonds may also be substantially impacted by increasing temperatures and higher intensity droughts influenced by climate change.[41]

Building climate resilience in agriculture

Mitigating the financial risks of climate change to the U.S. agriculture system requires resilience, which is the ability of system function to recover from a disturbance. Experts describe three different capacities of resilient agricultural systems:[42]

- **Response capacity:** the ability of a farm to cope with climate-related challenges in order to avoid or reduce potential damages and to capture new opportunities.
- **Recovery capacity:** having the reserves needed to swiftly and efficiently return to full function after a disruption.
- **Transformation capacity:** the ability to make fundamental changes to farms and the broader agricultural system that enhance its response and recovery capacity in the face of changing conditions now and into the future.

Resilience can be considered across multiple scales, from individual fields to agricultural landscapes and beyond, and also has environmental, economic and social components.[43] Recognizing that complexity, the focus of this report is on some of the foundational building blocks of climate-resilient farm management: soil health, water management and crop diversification.

Resilient agriculture should be considered holistically as a management system — the whole is greater than the sum of its parts, or practices. The farming practices and management shifts that improve resilience are not new and continue to be used by many farmers. However, predominant agricultural production systems emphasize efficiency and specialization, which are goals that can conflict with resilience. Resilient farm management emphasizes risk reduction and farm financial viability through crop yield stability, reduced costs of production, diverse revenue streams and preserving the long-term value of the land.[76,77,78]

Farm management strategies to improve resilience

Build soil health

Farming practices and cropping changes including no-till and cover crops, extended crop rotations and perennial crops can help prevent erosion, improve the soil's physical and biological properties, supply nutrients, suppress weeds, improve soil water holding capacity and break pest cycles.[44,45] Implementing these practices can reduce input costs by allowing farmers to decrease fertilizer and herbicide use.[46] Healthy soils can function as sponges. They are better able to absorb rainfall and can also hold onto moisture in times of insufficient rain.[47,48,49] This can improve the resilience of crop yields to variable rainfall and lower the use of irrigation, and therefore contribute to stabilizing farm income.[50,51,52] The practices that build soil health also have the potential to generate multiple environmental benefits, including reduced erosion, water use and greenhouse gas emissions, and improved water quality, biodiversity and carbon sequestration.[53,54,55,56,57] The 2017 U.S. Department of Agriculture Census of Agriculture found that cover crops were implemented on 15.4 million acres in 2017, just under 4% of total U.S. cropland.[58,59] The census reported 104 million acres of no-till in 2017, which is approximately 25% of total U.S. cropland.[60] No-till adoption is more widespread than cover crops, though adoption varies widely across crops and regions.[61]

Manage water efficiently

Climate projections show that different agricultural regions will face different changes to rainfall patterns, requiring a variety of water management responses to reduce climate risk from drought or excess rain.[62] In some regions such as the arid West, the frequency and intensity of drought will increase and water availability will be the greatest concern. Continuing or expanding existing levels of irrigation will be limited by the availability of water.[63] In these areas, it will be necessary to embrace efficient irrigation practices and systems, and switch to crops that make the most of scarce water.[64] Other regions may experience the same or increased overall rainfall, but rains will increasingly come in sudden bursts, which can increase erosion and runoff and prevent crops from accessing the water they need at the right time.[65] Drainage water management can provide farmers the ability to hold back water when fields need it and release water when they do not. Drainage water management can improve crop yield resilience by smoothing out water availability in fields.[66,67] Drainage water management has also been found to reduce nitrogen losses from agriculture to surface water by as much as 75%.[68]

Diversify crop rotations

In regions dominated by just a few crops, increasing the diversity of crops and rotations can help reduce risks associated with weather variability due to climate change in several complementary ways.[69,70] Crop diversity also helps reduce economic and production risks due to the "portfolio effect," whereby different crops respond differently to stress.[71] Extended crop rotations (three or more crops over a five year period) have been found to lower farm input costs due to decreased pest pressure and reduced soil-borne diseases.[72,73] A diversity of crops also shields farms from the negative impacts of fluctuations in market prices and the costs of production.[74] Diversification has also been found to generate yield benefits for crops that are already in the rotation, such as corn. An analysis of long-term crop yield datasets in North America showed that more diverse rotations increased corn yields over time and across all growing conditions, including both favorable and unfavorable weather conditions.[75]

Agricultural lenders are exposed to climate risk

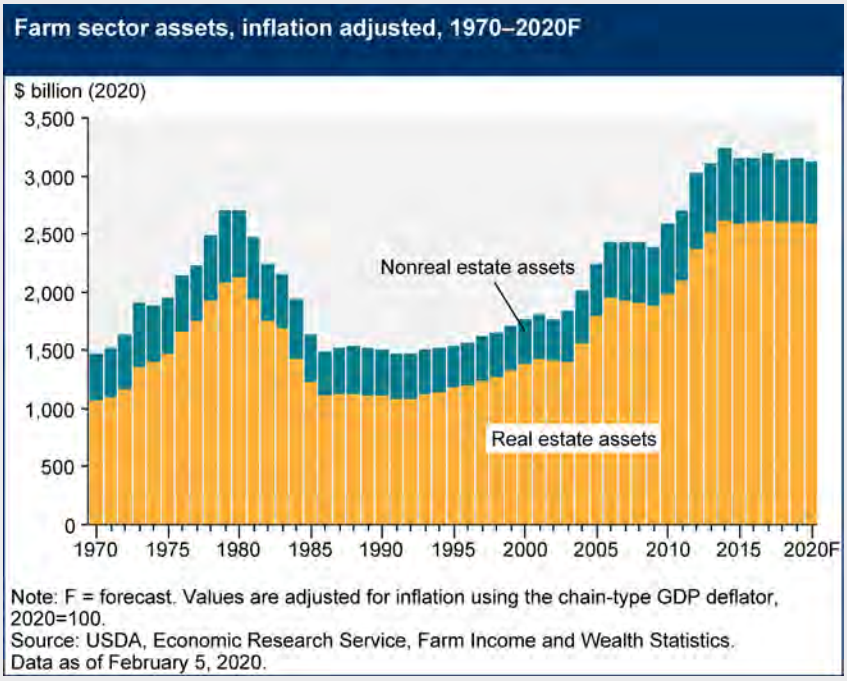
Building climate resilience is an urgent task that requires the involvement of the entire agricultural sector. Research suggests that climate risk is currently underpriced and that climate-exposed financial assets may be overvalued.[79] Because the agricultural sector faces substantial climate risk, its financial assets are also vulnerable. Lenders could both suffer losses from impaired loans and perhaps be less able to provide credit to borrowers in the future.[80] Despite these risks, there is little evidence of proactive climate risk assessment by U.S. agricultural lenders.

Inaction on climate risks within the agricultural lending sector stands in contrast to the broader finance sector, in which there is a growing push to assess and mitigate financial market risks from climate change. The following section provides an overview of the agricultural lending sector in the U.S., how lenders currently relate to their farmer clients and assess risk, the role of crop insurance as a shock absorber for agricultural lenders and ways that lenders can assess their climate risk.

An overview of agricultural lending in the U.S.

Farm debt is on the rise, reaching levels unseen since the 1980s. Figure 1 shows trends in U.S. farm real estate and non-real estate debt from 1970 to the present.

Figure 1: Trends in farm real estate and non-real estate debt



Agricultural lending in the U.S. is conducted by two main segments: commercial banks and the Farm Credit System. Farm Credit holds a greater percentage of farm real estate debt, while commercial banks hold a larger percentage of agricultural non-real estate debt, such as equipment and operating loans. Figures 2 and 3 show the distribution of farm real estate and non-real estate debt by type of lender.

Figure 2: Non-real estate debt by lender, 2018

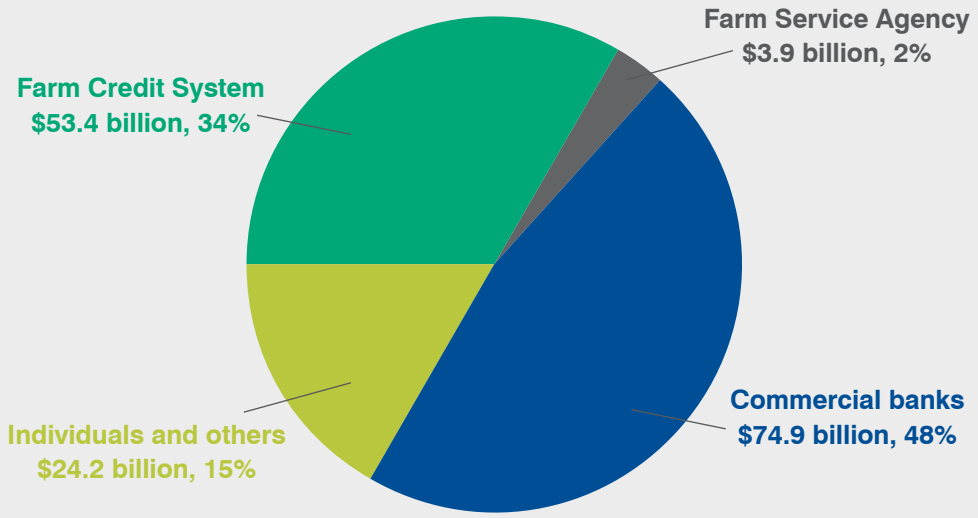
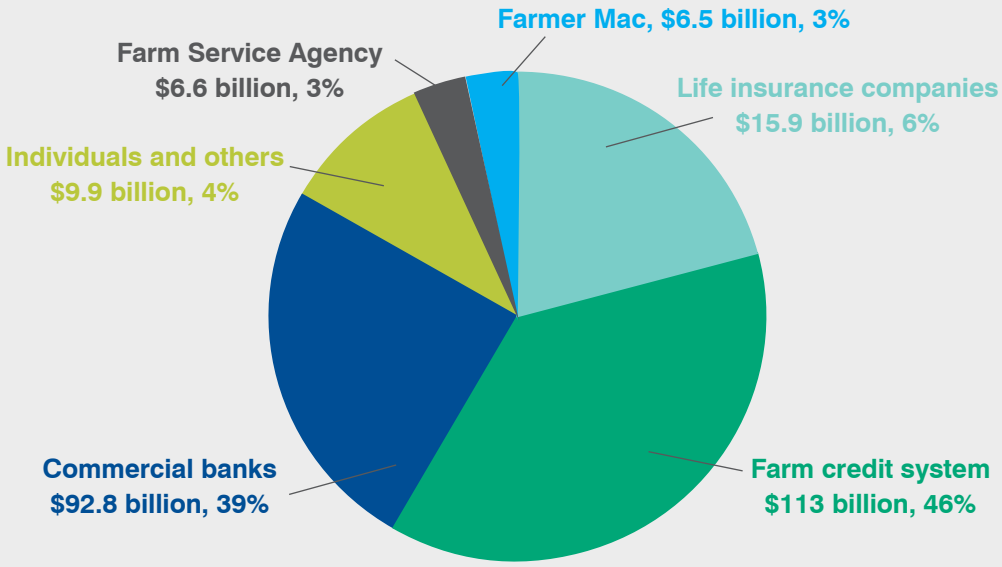
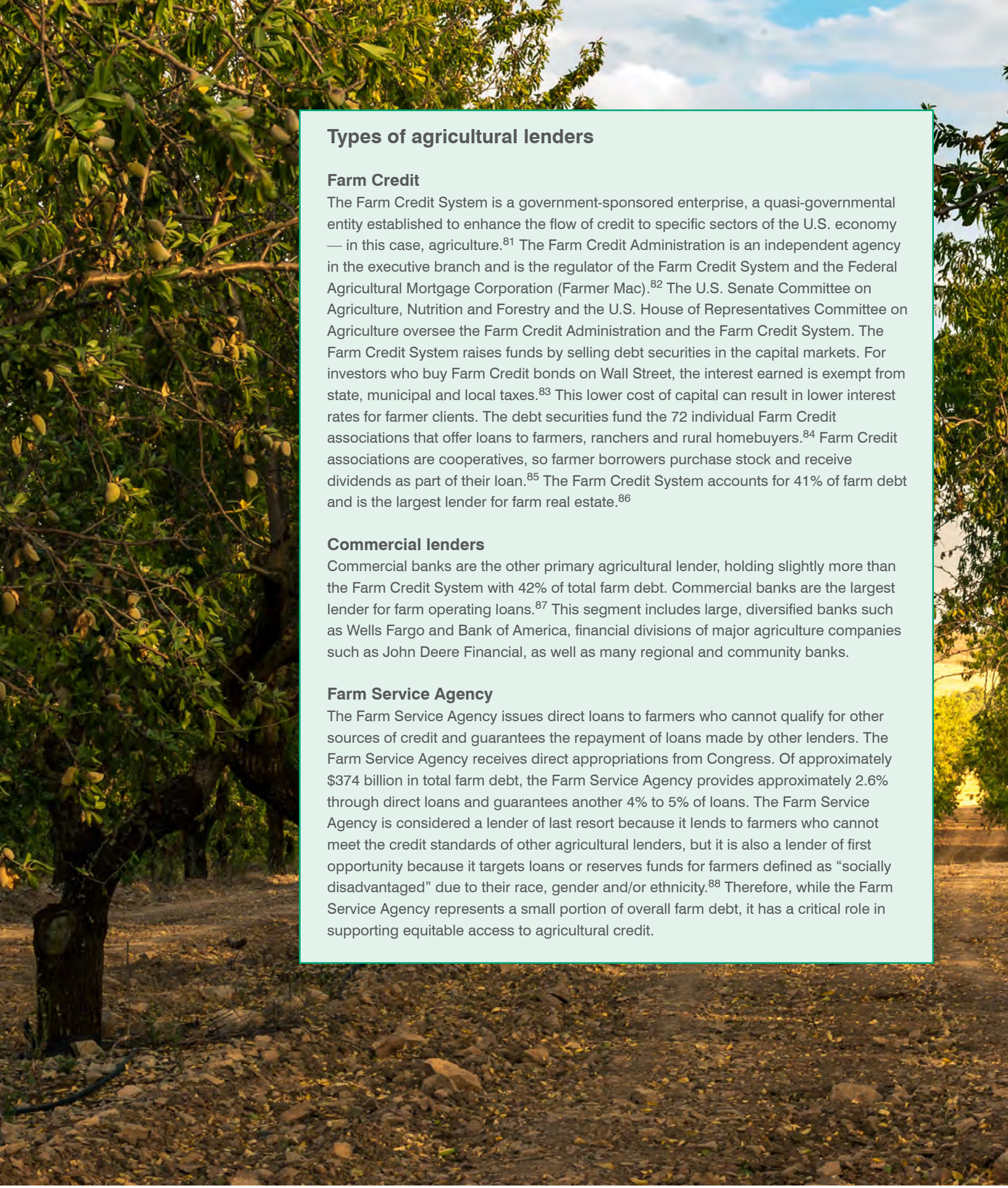


Figure 3: Real estate debt by lender, 2018



Source: U.S. Department of Agriculture, Economic Research Service. (2020, February 05). Charts and Maps of U.S. Farm Balance Sheet Data. Farm Debt: By Lender. Retrieved August 19, 2020, from https://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/charts-and-maps-of-us-farm-balance-sheet-data/



Types of agricultural lenders

Farm Credit

The Farm Credit System is a government-sponsored enterprise, a quasi-governmental entity established to enhance the flow of credit to specific sectors of the U.S. economy — in this case, agriculture.[81] The Farm Credit Administration is an independent agency in the executive branch and is the regulator of the Farm Credit System and the Federal Agricultural Mortgage Corporation (Farmer Mac).[82] The U.S. Senate Committee on Agriculture, Nutrition and Forestry and the U.S. House of Representatives Committee on Agriculture oversee the Farm Credit Administration and the Farm Credit System. The Farm Credit System raises funds by selling debt securities in the capital markets. For investors who buy Farm Credit bonds on Wall Street, the interest earned is exempt from state, municipal and local taxes.[83] This lower cost of capital can result in lower interest rates for farmer clients. The debt securities fund the 72 individual Farm Credit associations that offer loans to farmers, ranchers and rural homebuyers.[84] Farm Credit associations are cooperatives, so farmer borrowers purchase stock and receive dividends as part of their loan.[85] The Farm Credit System accounts for 41% of farm debt and is the largest lender for farm real estate.[86]

Commercial lenders

Commercial banks are the other primary agricultural lender, holding slightly more than the Farm Credit System with 42% of total farm debt. Commercial banks are the largest lender for farm operating loans.[87] This segment includes large, diversified banks such as Wells Fargo and Bank of America, financial divisions of major agriculture companies such as John Deere Financial, as well as many regional and community banks.

Farm Service Agency

The Farm Service Agency issues direct loans to farmers who cannot qualify for other sources of credit and guarantees the repayment of loans made by other lenders. The Farm Service Agency receives direct appropriations from Congress. Of approximately $374 billion in total farm debt, the Farm Service Agency provides approximately 2.6% through direct loans and guarantees another 4% to 5% of loans. The Farm Service Agency is considered a lender of last resort because it lends to farmers who cannot meet the credit standards of other agricultural lenders, 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.[88] Therefore, while the Farm Service Agency represents a small portion of overall farm debt, it has a critical role in supporting equitable access to agricultural credit.

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.

Lenders seek to understand the factors that impact loan repayment capacity, including cost of production, a variety of risk factors, financial metrics such as solvency and liquidity, and off-farm income sources. While all lenders seek to understand their clients' repayment capacity, some lenders also seek a more in-depth understanding of the many factors that influence the overall profitability of the farming operation.[89] They also are considered trusted advisers and encourage good financial practices, such as risk management and the use of recordkeeping and accounting systems that enable farmers to better understand their farms' profitability.[90]

Lenders take care not to make farming decisions for borrowers or exercise control over farm operations because that would trigger lender liability concerns.[91] While agricultural lenders cannot advise farmers to adopt specific management practices because of liability restrictions, they often share information among their clients on what different farmers are trying and what results they are seeing. Some lenders conduct financial benchmarking of their clients, allowing them to identify and share success factors among their client base.[92]