An aerial photograph of a vast agricultural landscape, showing a patchwork of green fields and dark, tilled rows. The fields are arranged in a grid-like pattern, with some areas appearing more densely planted than others. The overall scene is bright and vibrant, with a clear sky and strong sunlight creating distinct shadows and highlights on the crops.

Equity considerations in agricultural lending

Black, Indigenous and people of color (BIPOC) represent nearly one-quarter of the U.S. population, yet they operate less than 5% of the nation's farms and cultivate less than 1% of its farmland.⁸¹ BIPOC farmers have experienced discrimination and additional disadvantages in obtaining agricultural credit.⁸²

Information is limited on the amount and types of agricultural credit used by socially disadvantaged farmers and ranchers (SDFRs), which the USDA defines as members of certain racial and ethnic minority groups and women. However, a study of agricultural credit services provided to SDFRs conducted by the Government Accountability Office in 2019 found that SDFRs represented an average of 17% of primary producers in the survey, but they accounted for only 8% of total agricultural debt.⁸³

SDFRs face several challenges that restrict their ability to obtain private agricultural credit. According to the GAO report, SDFRs are more likely to operate smaller, lower-revenue farms, have weaker credit histories or lack clear title to their agricultural land, which can make it difficult for them to qualify for loans. SDFRs and advocacy groups also report unfair treatment in lending and discrimination.⁸⁴ One of the highest-profile examples is *Pigford v. Glickman*, a class action discrimination suit between USDA and Black farmers, which showed that Black farmers seeking loans and participation in USDA programs faced discrimination on the basis of race and USDA's failure to investigate or properly respond to complaints.⁸⁵

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,⁸⁶ the economic impacts of climate change on agriculture are likely to fall disproportionately on BIPOC farmers. At the same time, many BIPOC farmers have already embraced the resilient agriculture strategies described in this report and can attest to the benefits.⁸⁷ There are many opportunities to improve the resilience and equity of agriculture together through inclusion of the expertise of BIPOC-led organizations, and increased understanding and avoidance of disproportionately negative consequences for BIPOC farmers. Strengthening support for BIPOC farmers within the agriculture sector can establish paths toward long-term prosperity while helping to secure the future of resilient food systems.⁸⁸

Agricultural lenders face growing risks from climate-related shocks

Weather extremes and disruptions associated with climate change impact farmers' financial partners, including agricultural lenders. Following severe flooding in the spring of 2019, bankers lending in the Midwest reported to the Federal Reserve Bank of Chicago that approximately 70% of their borrowers were at least moderately affected by extreme weather events in the first half of the year. At the same time, the portion of the region's agricultural loan portfolio reported as having "major" or "severe" repayment problems hit the highest level in 20 years.¹⁰¹

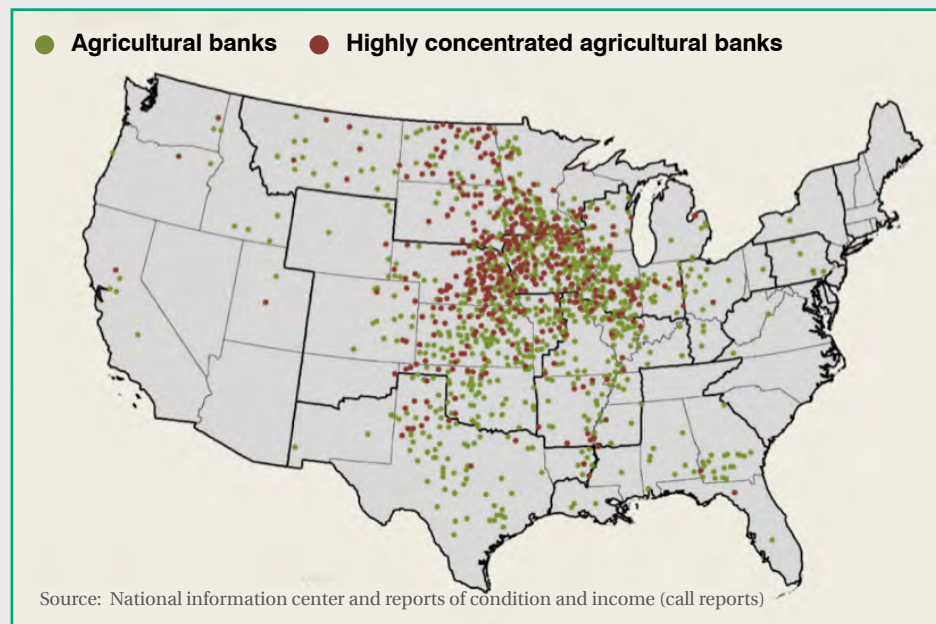
“Extreme weather conditions can substantially impact harvest volume and prices of agricultural products and, ultimately, impact the credit quality of some of our agribusiness borrowers and our Associations’ borrowers as their earnings are affected.”

— CoBank 2018 annual report¹⁰²

Agricultural banks are defined by the Federal Reserve as those where combined agricultural production and farmland loans account for at least a quarter of total loans in their portfolio. Banks that meet this criterion hold nearly half of all agricultural loans (see Figure 4). About one-third of those agricultural banks are considered “highly concentrated,” meaning total agricultural lending is more than 300% of their total risk-based capital, the minimum capital requirements for banks set by regulators to act as a cushion from insolvency.^{103,104}

Many agricultural banks are highly exposed to impacts that reduce farmers' ability to service their debts, including climate-exacerbated extreme weather events. This is due in part to their concentration in agricultural loans, their geographic concentration and correlated risks. Their portfolios often include multiple types of agricultural businesses or other businesses dependent on farmer customers, all of which are affected by agricultural production shocks and economic downturns.¹⁰⁵ Many agricultural banks are also small, another potential risk factor. As of 2019, more than 70% of non-performing agricultural loans in the Midwest were at banks with less than \$10 billion in total assets.¹⁰⁶

Figure 4: Half of all agricultural loans are held by banks with at least 25% of their portfolio concentrated in agricultural production or farmland¹⁰⁷



Large banks are not immune to climate stress, especially chronic risks such as prolonged drought.¹⁰⁸ In 2017, nine major international banks with combined assets of more than \$10 trillion voluntarily conducted a modelling exercise to assess how drought might affect creditworthiness among a sample of their borrowers.¹⁰⁹ The exercise showed that agriculture was among the most affected sectors, and most borrowers experienced some level of credit downgrade.¹¹⁰

Credit-stressed agricultural lenders can reduce access to affordable credit for farmers, making it more difficult for them to recover from climate-related shocks. Credit supply constrictions are particularly likely to impact farmers who are historically underserved by lending institutions, including small farmers and farmers of color. This dynamic can then contribute to greater consolidation in the agriculture sector, which may further reduce diversification and resilience to future shocks.¹¹¹

Common considerations of agricultural lenders in risk assessment

A common framework that lenders use in evaluating credit applications is called the “Five C’s of Credit” (see box). This framework shows that lenders value both tangible financial indicators of repayment ability (collateral), as well as less tangible relationship factors (character).

The Five C’s of Credit

- **Capacity** refers to the borrower’s ability to repay debt obligations.
- **Capital** relates to a borrower’s ability to meet obligations, continue business operations, and protect against adversity and unexpected losses.
- **Collateral** is the security pledged on the loan. Guarantees and crop insurance also add strength to the collateral position.
- **Character** refers to the borrower’s integrity and management ability, including considerable emphasis on the institution’s past relationship with the borrower.
- **Conditions** are items that help the lender control risk in loans. Conditions should be commensurate with the loan type, purpose and overall risk in the account.

Source: Farm Credit Administration. Classifying Assets Using the UCS. Retrieved July 2020 from: <https://www3.fca.gov/readingrm/exammanual/General%20Guidance/Classifying%20Assets%20Using%20the%20UCS.pdf>

Farm operating loans are typically renewed annually, and the renewal process requires that the farmer provide financial information and discuss the farm's performance and plans with their lender. Farmers are asked to provide their lender with financial records, including tax returns, profit and loss statements, balance sheets and a plan of future operations that shows financial impacts. The lender uses this information to project a cash flow, rate the risk of the loan, and seek to understand the financial strengths and weaknesses of the farm operation.¹¹²

Lenders determine loan terms using several factors captured in the Five C's, the most important of which is typically collateral and the capacity to repay.¹¹³ Lenders use basic financial measures, as well as working capital assessments, financial statements and loan repayment calculations, to evaluate a farm's probability of default. If a farm has significant equity, crop insurance or a loan guarantee, that will improve its score.¹¹⁴ The Farm Credit Administration regards repayment capacity as the most important quantitative credit factor, but it also notes that negative character assessments can be significant enough to outweigh strengths in the other C's.¹¹⁵ This subjective character component can be used to support farmers who have a constructive relationship with their lender, but it also is a source of risk for farmers of color and others who may diverge from conventional farming methods.¹¹⁶

Lending institutions identify, measure and report credit risk through several different methods. Risk ratings support numerous lending institution processes (e.g., hold limits, underwriting, loan pricing, allowance for losses methodology, capital planning and other risk management functions).¹¹⁷ For example, Rabo AgriFinance identifies and quantifies probability of default and loss given default ratings for each client, along with other ratings prescribed in the Basel Accord.¹¹⁸ Individual ratings then roll up to portfolio and business analyses.¹¹⁹ The Farm Credit System uses the Uniform Classification System based on thorough analysis of a borrower's Five C's, which then inform the Uniform Classification System ratings of acceptable, special mention, substandard, doubtful and loss.¹²⁰ Farm Credit also develops probability of default and loss given default ratings for farmers and portfolio analysis.¹²¹

Lenders can establish differential interest rates for loans based on a variety of factors that may include loan type, purpose, amount, quality, funding or operating costs, or similar factors or combinations of factors. In the adoption of differential interest rate programs, lenders also consider the special credit needs of classes of farmers with positive attributes that they want to protect, advance or manage (such as young, beginning and small farmers, which are described in more detail later in the report).¹²² While conversations with agricultural lenders indicate that they may qualitatively consider conservation practice adoption as a testament to the farmer's management prowess and character, they typically do not consider or collect financial information on the quantitative connection between conservation adoption, financial performance and risk in their loan underwriting practices.¹²³ Lenders have a blind spot when it comes to understanding the connections between conservation adoption and farm finances, and incorporating that information into lending decisions.

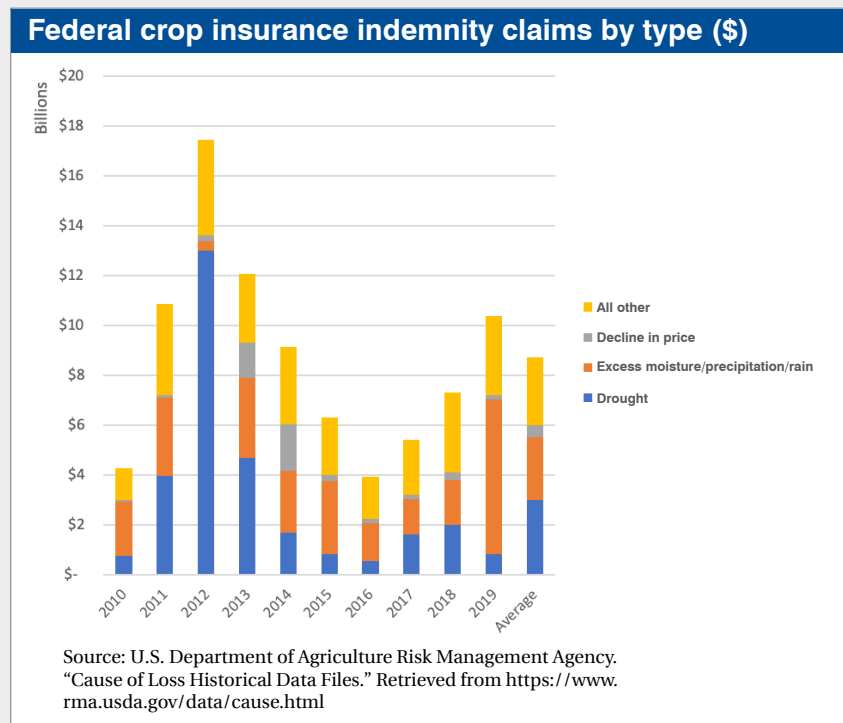
Lenders have a blind spot when it comes to understanding the connections between conservation adoption and farm finances, and incorporating that information into lending decisions.

Crop insurance is not sufficient to protect farmers or lenders from climate risk

Crop insurance helps to shield both farmers and their lenders from the financial impacts of weather-induced crop yield and quality losses, and is frequently described as agriculture's most important risk management tool.¹²⁴ Total crop insurance liability represents nearly 70% of all non-real estate agricultural debt in the U.S.^{125,126} Insurance can be critical from a lending perspective since it guarantees a minimum revenue or yield, which affects the farmer's ability to repay the loan. Agricultural lenders typically require their borrowers to hold crop insurance (or require significant collateral in its absence) because loans backed by insurance are lower risk.¹²⁷ Often, the amount of crop insurance that a farmer selects sets the amount that they can borrow as operating capital. Crop insurance also allows farm loans to maintain relatively low interest rates by absorbing much of the risk of yield loss and market swings from farmers, and therefore their lenders.¹²⁸

The federal government is heavily involved in the crop insurance industry through USDA's Risk Management Agency, which subsidizes between 50% of farmers' insurance premiums.¹²⁹ In 2017, federal crop insurance policies covered 311 million acres, protecting nearly 90% of the nation's insurable cropland.¹³⁰ Insurers backed more than \$106 billion worth of crops in 2017, and farmers paid \$3.7 billion in premiums for insurance protection.¹³¹ Crop insurance is the second most volatile insurance category after flood insurance, as measured by the range of loss ratios (incurred losses divided by earned premiums).¹³² Figure 5 shows federal crop insurance indemnity claims over the 2010-2019 period.

Figure 5: Droughts and excess precipitation drive the variability in crop insurance indemnities



The close relationship between crop insurance and agricultural lending has important implications for climate-resilient agriculture and conservation adoption. First, while lenders cannot require specific farming practices, crop insurers do — and when lenders require crop insurance to receive a loan, they are de facto requiring farmers to utilize the “Good Farming Practices” designated by USDA’s Risk Management Agency. These Good Farming Practices have created barriers to some key conservation practices, including cover crops. Many organizations have pushed to incorporate conservation practices in the Good Farming Practices definition, and while significant progress has been made, some producers still find their conservation efforts hindered by crop insurance requirements.¹³⁴

In addition, crop insurance is used mainly by farmers who grow a select group of major field crops — feed grains (corn, sorghum, barley and oats), cotton, wheat, rice, soybeans and peanuts. Since 1980, the Federal Crop Insurance Commission has paid over \$80 billion in premium subsidies to support federal crop insurance policies. The major field crops have received over 85% of federal crop insurance premium subsidies.¹³⁵ Given the importance of crop insurance in lending decisions and the value of crop insurance as a safety net for farmers, the emphasis on a small group of crops creates a disincentive to crop diversification.

On the other hand, the close linkage between lending and crop insurance also means that efforts to incorporate the risk reduction benefits of resilient agricultural practices into the way that crop insurance is rated will also flow through to lending, potentially creating a positive feedback loop between both financial products. Members of the AGree Economic and Environmental Risk Coalition have conducted significant research on the connections between agricultural conservation, crop yield risk reduction and crop insurance.¹³⁶ The coalition advocates for federal risk management programs that encourage farmers to implement practices that reduce producers’ long-term risk, in addition to improving soil health and water quality.¹³⁷

Crop insurance does not protect farmers or lenders completely from the financial impacts of weather shocks.

Crop insurance will continue to be an important risk management tool for farmers and lenders, and opportunities to integrate the risk reduction benefits of resilient agriculture into crop insurance methodologies is a key area for continued work. However, there are several reasons why crop insurance does not protect farmers or lenders completely from the financial impacts of weather shocks:

- Crop insurance is not designed to make farmers “whole” after a disaster. The maximum crop insurance coverage is 85% of farm losses.¹³⁸ In the face of more frequent extreme weather events, a farm’s financial position will degrade over time as crop insurance does not completely make up for losses.
- Many agricultural lenders finance not only farmers, but also local processors and agricultural businesses. Those entities are also negatively affected when crop yields suffer, and they are not buffered by crop insurance. Therefore, a regional agricultural lender could have correlated risks in its portfolio.¹³⁹
- There are also significant barriers to small farmer participation in crop insurance: 75% of large farms participate in federal crop insurance, compared with just 15% of all U.S. farms.¹⁴⁰ 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.¹⁴¹ This means that the vast majority of U.S. agricultural production is left unprotected by crop insurance and vulnerable to weather shocks.



An exclusive reliance on crop insurance to absorb the impacts of weather shocks without considering opportunities to build resilience in the underlying agricultural system is a strategy that will ultimately increase overall risk and losses in the agricultural economy.

Looking to the future, the continuation of crop insurance in its current form depends on the willingness of legislators and taxpayers to subsidize agricultural risk. A study by USDA's Economic Research Service found that crop yield volatility increases under most climate scenarios and for most crops, increasing the frequency and/or depth of losses, and thus increasing premiums and subsidies. Under different greenhouse gas emissions and farmer adaptation scenarios, the cost of today's federal crop insurance program in the second half of this century is projected to range from a 3.5% increase under moderate emissions with farmer adaptation, to a 37% increase under severe emissions and no adaptation.¹³¹

In sum, an exclusive reliance on crop insurance to absorb the impacts of weather shocks without considering opportunities to build resilience in the underlying agricultural system is a strategy that will ultimately increase overall risk and losses in the agricultural economy. Agricultural lenders must expand their view of risk mitigation beyond crop insurance to include farm management strategies that reduce risk — in other words, agricultural resilience.

Agricultural lending institutions must assess their climate risk

Major financial institutions around the globe are increasingly recognizing their role in assessing and mitigating climate risk to financial markets. In early 2020, Larry Fink, the chairman and CEO of the world's largest asset management firm BlackRock, wrote a letter in which he asserted that climate change is causing a fundamentally reshaping of finance. Fink emphasized the need to focus on long-term profitability and to make sustainability integral to portfolio construction and risk management.¹⁴⁴ Continued pressure from asset managers, including BlackRock, has mobilized banks to build climate risk strategies. A 2019 survey of 20 banks and seven other financial institutions found that 55% of mainstream financial institutions are currently taking a strategic approach to climate risk, and 95% aim to implement a strategic approach in the future.¹⁴⁵

Despite this trend, most U.S. agricultural lending institutions have not yet integrated climate risk into their risk management frameworks. The Federal Reserve outlines the four major categories of risk facing agricultural lenders as agricultural commodity prices, production costs, farmland values and global market issues, which includes weather events as a sub-category but does not include a specific focus on climate change.¹⁴⁶ In 2010, the Farm Credit Administration released a statement expressing its intent to adequately plan for the effects of climate change so that it can continue its mission of ensuring a safe, sound and dependable source of credit,¹⁴⁷ yet interviews with Farm Credit lenders and system experts indicated that lenders have not examined climate risk. Interviews indicated that Farm Credit views its largest risks as interest rate risks and general farm economy risks, especially land values.¹⁴⁸

A more comprehensive approach to assessing and mitigating climate risk is needed for agricultural lenders of all types and sizes. There are several different types of climate risks¹⁴⁹ that may affect agricultural lenders. They include physical risks to assets such as crops,¹⁵⁰ correlated risks when lenders finance multiple related businesses, regulatory risks and reputational risks.¹⁵¹

In 2019, the U.S. Commodity Futures Trading Commission formed a subcommittee focused on climate-related market risk. Founded by CFTC Commissioner Rostin Behnam, the subcommittee includes experts from financial markets, the banking and insurance sectors, the agriculture and energy markets, data and intelligence service providers, environmental and sustainability public interest sector (including EDF), and academics.¹⁵³ The work of this subcommittee is likely to significantly influence U.S. financial institutions' approach to climate risk.

Agricultural lenders in the U.S. can learn from progress in the banking sector more broadly. For example, global consulting firm McKinsey published five principles for banks to manage climate risk:¹⁵⁴

- 1. Establish strong climate-risk governance.** Nominating a senior leader to be responsible for climate risk can ensure that the process is taken seriously and that there is a clear path for oversight from the board. The Task Force on Climate-Related Financial Disclosures recommends assigning climate risk responsibilities to management or the board, regular updates to the board, and a formal structure for climate risk considerations to imbed into strategy, risk management policies and capital allocation.¹⁵⁵



2. Tailor business and credit strategy. Climate considerations should be deeply embedded in risk frameworks and capital-allocation processes. Boards should regularly identify potential threats to strategic plans and business models.¹⁵⁶


3. Align risk processes. To align climate-risk exposure with risk appetite and the business and credit strategy, risk managers should inject climate-risk considerations into all risk-management processes, including capital allocations, loan approvals, portfolio monitoring and reporting.¹⁵⁷

4. Utilize tools including scenario analyses and stress tests. Reliable data and methodologies must be utilized to adequately understand, assess and price environmental risks to inform financial decision making.¹⁵⁸ Currently, few banks use environmental stress testing, and those that do employ a range of different techniques, data sources and analytical processes, which leads to inconsistencies of reporting between and even within institutions.¹⁵⁹ However, new developments such as the stress tests conducted in 2020 by the European Banking Authority provide new standardized tools that banks can use (See Appendix A to access the stress test template).¹⁶⁰

5. Create a strong enabling environment through partnerships. Banks taking their first steps address climate risks should not expect to do it on their own. Partnerships with climate risk experts and organizations focused on developing climate risk assessment tools can help banks assess and mitigate risks efficiently and effectively.¹⁶¹

The International Finance Corporation and Sustainable Banking Network describe sustainable banking as spanning two important aspects of banks' business operations — risk management that integrates environmental and social risks into lending considerations, and loan origination that supports lending to businesses that are environmentally and socially responsible.¹⁴⁷ In the case of agricultural lending in the U.S., neither is occurring at a level that matches the scale or urgency of the threat of climate change. Given the severity of weather events already affecting agriculture across the country, a major shift in the agricultural lending sector's approach to climate risk and resilience is overdue. 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.

[For a resource list on climate risk assessment for financial institutions, see Appendix A.](#)



Other trends supporting agricultural lender engagement in conservation

Climate risk is not the only reason why lenders should take a more active role in understanding the benefits of resilient farming practices and supporting their farmer clients who wish to adopt them. There are several other trends or risks lenders should consider, including:

- **Supply chain sustainability initiatives.** Major companies including Walmart, Tyson Foods, Smithfield Foods, Unilever, Cargill and others set sustainability targets and have launched programs to engage farmers in their supply chains to adopt conservation practices.¹⁶³
- **Regulatory risks.** Related to water quality, these risks include federal Clean Water Act nutrient limits¹⁶⁴ and state nutrient reduction plans and regulations.^{165,166} Areas reliant on irrigation that are not proactively managing for variable water supplies are likely to face increased regulations, such as California's Sustainable Groundwater Management Act, which will likely require the retirement of 500,000 to 780,000 acres of irrigated agriculture in order to curb unsustainable groundwater extraction and resulting community and economic impacts.¹⁶⁷
- **Litigation risks.** Environmental litigation is also a rising risk, as exemplified by the Des Moines Water Works' lawsuit against three drainage districts in northern Iowa due to high levels of nitrates in the Raccoon River, a source of drinking water for central Iowa residents.¹⁶⁸
- **Reputational opportunities and risks.** Consumers and citizens are increasingly interested in where their food comes from, how it is made and its impacts, which offers both new market opportunities for some farmers,¹⁶⁹ as well as reputational risks and opposition for others.¹⁷⁰

The role of agricultural lenders in supporting resilient agriculture

Agricultural leaders interviewed for this 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 specific practices, there are still multiple ways that they can pursue strategic objectives that benefit the agriculture sector and farmer clients, and there are several existing examples of lender programs or products that support farmers in navigating similar financial barriers or transitions. Where such programs and products do not meet current credit standards, loan support from partners can help bridge the gap, de-risking initial programs and offering the opportunity to collect data that prove new or modified lending products for resilient agriculture can stand on their own.

Ultimately, the objective is to accurately reflect the value of resilient agriculture in credit pricing and structures.

The objective of developing new lending programs to finance resilient agriculture is not to create new agricultural subsidies through lenders, but rather to realign lending structures to better match the needs of farmers who adopt practices that improve resilience, and in doing so realign the overall risk of a lender' portfolio. Ultimately, the objective is to accurately reflect the value of resilient agriculture in credit pricing and structures.

The financial case for resilient agricultural practices

A frequently cited reason for the limited adoption for agricultural conservation practices is the perception of a poor or negative return on investment, or short-term financial obstacles to change.¹⁷¹ However, when evaluated as a long-term investment, resilient agricultural practices can generate significant financial benefits to farming operations. Organizations working to better understand the farm budget impacts of conservation adoption include EDF, American Farmland Trust, Precision Conservation Management, Soil Health Partnership, Sustainable Agriculture Research and Education (SARE), Soil Health Institute and land-grant universities such as the University of Illinois.

To date, this body of work shows that there are several ways in which resilient practices impact farm budgets, including:

- **Production costs.** Practices that build soil health can allow farmers to reduce input costs over time, as biological processes replace some synthetic nutrients, herbicides and pesticides. Financial analyses of cover crops by the Iowa Soybean Association, EDF and SARE found cover crops can serve as a nutrient source or stabilizer and suppress weeds, reducing fertilizer and herbicide costs.^{172,173,174} Analysis from the Precision Conservation Management program in Illinois shows that between 2015 and 2018, 66% of fields received applied nitrogen over the university-recommended “Maximum Return to Nitrogen” rate.¹⁷⁵ Precision Conservation Management determined that farmers can save \$5 per acre for every 10 pounds of excess nitrogen reduced.¹⁷⁶

No-till also reduces the number of trips across the field and can allow farmers to downsize their equipment, reducing machinery, fuel and labor costs.¹⁷⁷ Extended crop rotations have been found to lower farm input costs due to decreased pest pressure and reduced soil-borne diseases.^{178,179}

There are also cost increases associated with some conservation practices. Cover crop seed and application increased costs for farmers in studies from Iowa Soybean Association and EDF.^{180,181} SARE found that cover crop seed and application cost an average of \$37 per acre, though they also identified multiple strategies to compensate for those costs.¹⁸² In the case of water management improvements, there may be upfront capital costs of new technology or drainage water management systems.¹⁸³ Opportunity costs are another consideration for farmers, particularly when some of the management operations related to conservation conflict with the timing of other farm management operations.¹⁸⁴

- **Crop yields.** Analysis by SARE identified that for many farmers, implementing cover crops minimized drought-related losses. According to an analysis of yield data collected in a national cover crop survey, grain farmers experienced a 3% increase in their corn yield and a 5% increase in soybeans after five consecutive years of cover crop use. 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.¹⁸⁵ Grain farmers in EDF case studies also described benefits of yield resilience in poor weather years.¹⁸⁶ Cover crops also can allow earlier planting in a wet spring and improve field trafficability.¹⁸⁷

Almond farmers in California found yield benefits from mulching, nutrient management and compost application.^{188,189} Drainage water management can improve crop yield resilience by smoothing out water availability in fields.¹⁹⁰

Diversification can also have benefits for crops that are currently the focus of specialization, 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.¹⁹¹

- **Farm revenue.** While resilient farming practices do not currently receive a premium price like organic production, there are opportunities for farmers to increase or smooth revenue associated with these practices. Federal and state cost-share programs are the most significant source of potential revenue for farmers who are newly adopting conservation practices.¹⁹² Extended crop rotations shield farms from the negative revenue impacts of fluctuations in market prices and the costs of production.¹⁹³ Farmers who graze or harvest products from their cover crops have also been found to consistently make a positive return on investment.¹⁹⁴

In addition, there is a growing number of supply chain sustainability programs that offer farmers a financial incentive to adopt conservation practices. For example, Unilever and PepsiCo offer \$40 per acre for up to 40 acres to farmers new to using cover crops, or \$10 per acre for up to 160 acres or 10% of acres farmed (whichever is larger) to existing cover crop users.¹⁹⁵ There are also numerous efforts to develop markets for ecosystem services and carbon credits generated by farmers.^{196,197} As these opportunities expand, there will be more opportunities for farmers to generate revenue from resilient practices.

- **Farmland asset value.** Farmland buyers typically consider location, soil type and soil class. Appraisers seldom place a value on soil health, and there is no standard method to incorporate the value of healthy soils into farmland appraisal. However, it is intuitive that farmland that has been managed well, without erosion or nutrient mining, has greater production value than farmland with degraded soils. While there is anecdotal evidence that farmland with healthy, well managed soils can receive a premium price, there is little information currently available on this connection at scale.¹⁹⁸

“Conservation agriculture isn’t just stopping tilling or planting cover crops — it’s a complete systems change. That systems change requires a mindset change that embraces the benefits of diversity and building resiliency over time.”

— Justin Knopf,
Knopf Farms, Kansas





Farm Finance Report

Farm finance and conservation: How stewardship generates value for farmers, lenders, insurers and landowners, a 2018 report by Environmental Defense Fund and agriculture accounting firm K-Coe Isom AgKnowledge, details the financial impacts of conservation for three Midwestern grain farmers and provides a comparative sample of conservation adopters and non-adopters. The three farmers profiled adopted a variety of conservation and precision farming practices and were able to reduce their costs and improve their soils, which they observed to increase the resilience of their crop yields to adverse weather events. Their stories and budget information combine to show how they were able to improve both financial and environmental performance on their farms.

Farm budget analyses of conservation adoption reveal key themes that are essential to understand the unique financial profile of conservation practices that improve resilience:

- 1. Cost savings come from practice interactions.** Resilient agriculture is a management system — the whole is greater than the sum of its parts, or practices. There are significant cost savings that can be achieved, but it requires a focus on the interaction between practices in order to achieve those savings. For example, no-till often requires a different regime of herbicide use, but integration of cover crops can assist with weed suppression and provide nutrients back to the crop, which may allow for decreased fertilizer and chemical application.¹⁹⁹ This dynamic can add to the challenge of quantifying benefits, because costs often occur in one or two budget categories while the benefits occur over multiple categories.²⁰⁰
- 2. Benefits can take several years to materialize.** Practices that build soil health can take several years (for example, three to five years for cover crops) to generate a financial benefit. In a cost-benefit analysis of cover crops in California almond orchards, researchers found long-term financial benefits that could not be quantified in an annual analysis.²⁰¹ Adjusting farm management to improve resilience requires a process of trial and error, recording results and making further adjustments. There are both biochemical and farmer learning components to this transition. Each farm has its own unique mixture of soils, water, climate and topography that impact the integration of new crops and practices.

Farmers often incur transitional risk in the form of reduced yields and exposures to new types of weeds or pests until the new system can normalize.²⁰² American Farmland Trust case studies identified significant learning costs to implementing new conservation practices.²⁰³ Recognizing and planning financially for this transition period and taking a multi-year view of the investment are both critical to success.

“Without good numbers, you can’t have trends and you can’t understand where you’ve been, where you are, and where you’re going.”

— Jim Knuth,
senior vice president of
Farm Credit Services
of America²⁰⁶

3. Risk reduction is a key benefit. The relationship between healthy soils, water management and crop yield resilience is important, as is the opportunity to reduce financial risk overall through crop diversification and cost savings. However, it can be challenging to measure financial benefits that only appear in certain years or under poor weather conditions. While many farmers have stories of their investments in soil health paying off in bad weather years,²⁰⁴ it is difficult to proactively incorporate that experience into a return projection. In addition, while crop diversity helps reduce economic and production risks due to the “portfolio effect” and helps foster long-term financial stability,²⁰⁵ extended crop rotations may also cause variability in revenue in the short-term.

4. Strong farm management — including accurate recordkeeping — is essential. Farm recordkeeping allows farmers to track practice interactions and potential cost savings, and to effectively manage the many variables involved on each farm to achieve the best results. However, comprehensive recordkeeping often is not at the top of farmers’ priorities, especially for those under financial stress or who have less capacity around the farm.

One opportunity to improve recordkeeping and quantification of the financial impacts of practice adoption is agricultural technology and data collection. While farm data collection capabilities have expanded drastically over the past decade, there are still many gaps in farmer access to technology and the ability of farmers to manage and analyze data.²⁰⁷ There are also integration gaps with key types of software, such as farm management and financial accounting software.²⁰⁸ Despite these challenges, there are signs that integration of farm management and financial software is now occurring, with lenders playing a significant role in the transition. For example, Rabo AgriFinance, a subsidiary of Rabobank, announced a partnership with farm management software Conservis focused on co-developing technology to help farmers connect real-time field and management data with financial results and analysis.²⁰⁹ These software integrations could allow lenders to better understand the connections between conservation adoption and farm profitability, risk and resilience at a much more granular level.

At the same time, it is important to note that such software is much more commonly available to and used by large-scale farmers.²¹⁰ An exclusive reliance on technology-heavy solutions to understand opportunities to build resilience creates a significant blind spot in leaving out smaller and more diverse operations, many of which may already be utilizing more resilient practices. The path forward 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 farmers in terms of how their data will be used and protected.²¹¹ Opportunities to support farm recordkeeping for farms of all sizes would help overall farm management, as well as the assessment of resilient practices.²¹²

In summary, the core financial attributes of resilient farming systems are reduced costs and risk. These benefits are particularly evident when farm budgets are viewed over multiple years. While some costs increase, in many cases they can be offset by other cost savings and yield benefits. When farmers are able to attract additional revenue, the financial case is even stronger. However, despite the long-term benefits, the transition period may deter many farmers from adopting these practices — especially in economically challenging times.

[For a resource list on farm budget analyses of conservation adoption, see Appendix B.](#)

Disconnects between current loan offerings and resilient agriculture

There are several ways in which current loan offerings do not align with the financial attributes of resilient farming practices, and therefore create challenges for farmer clients that use or are considering adopting more resilient practices, including:

- **Information gaps.** First, there is less data available to lenders on the return proposition of resilient practices than conventional farming practices, and many lenders are unaware of the data that does exist. This information gap disadvantages both farmers and lenders in developing reasonable projections of the financial impacts of the transition to resilient practices. Continued efforts to create locally relevant analyses of the finances of farms that use resilient practices can help fill that gap, as can lender efforts to educate themselves on the information that is available (see Appendix B for a resource list).
- **Short-term focus.** The annual nature of many crop cycles and associated business practices, including annual operating loans, compel farmers and their financial partners to focus on short-term cash flow rather than longer-term profitability and value.²¹³ This has the potential to create significant blind spots. For example, soil degradation or mining for nutrients can produce high yields in the short term, but over the long term such practices undermine crop productivity and the value of the land asset.²¹⁴ Similarly, excess water consumption for irrigation can lead to future water scarcity and the risk of crop failure.²¹⁵ Lastly, extended crop rotations may also cause variability in revenue in the short term, but greater stability over the long-term.²¹⁶ With risk and loan assessment conducted on a single-year basis, short-term risk is given more weight than long-term stability.²¹⁷
- **Loan terms do not value resilience.** While farmers who use crop insurance are able to access significantly better loan terms, farmers who utilize a production-system risk reduction strategy receive little or no benefits. In addition, lenders do not provide short-term accommodations in loan terms for farmers who are transitioning to more resilient practices. Some lenders contend that if farmers increase their financial health and stability by using resilient practices, ultimately their lending terms will improve along with the farm's improved financial performance. However, this is a lagging indicator and does not support farmers in navigating the transition so that they can arrive at the better outcome. Farmers face an additional barrier to conservation adoption when they cannot partner with their lenders to plan for the transition period and take a multi-year view of conservation investments.

If success is only defined as the farmer's ability to repay his or her annual operating loan, farmers and lenders will miss opportunities to reduce risk and maximize long-term profitability.

Agricultural lenders in the U.S. do not currently collect financial data specific to resilient practices, incorporate the risk-reduction potential of resilient farming practices into their risk ratings, or design programs or products to support farmers in managing the transition to practices that improve resilience. Some in the lending sector may ask why such changes are needed when many farmers are currently able to finance conservation expenses using existing lending products. While this is true, it is also true that existing products were developed with conventional farming practices in mind, and are not designed to support farmers in overcoming the unique financial characteristics of the adoption of resilient farming practices. As such, this places the onus of navigating the existing loan products and structures on the farmer who desires to increase resilience. This disconnect creates a structural disincentive to change, and contributes to persistent low adoption levels. Ultimately, this results in sub-optimal outcomes both for farmers and for lenders seeking the best risk-adjusted return.