



# Four Market and Policy Opportunities to Increase Agricultural Resilience

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## About this report

In July 2018, Environmental Defense Fund (EDF), the Farm Journal Foundation (FJF) and the National Corn Growers Association (NCGA) convened, “Market and Policy Innovations for Resilient Agriculture,” a multi-stakeholder dialogue about opportunities to advance agricultural resilience.

Former U.S. Secretary of Agriculture Tom Vilsack provided the keynote address for the event, followed by a panel featuring:

- Chris Novak, former CEO of NCGA.
- Lynn Tjeerdsma, senior policy adviser to Senator John Thune.
- Josette Lewis, associate vice president of sustainable agriculture at EDF.
- Fred Yoder, fourth-generation farmer and chair of the North America Climate Smart Agriculture Alliance.
- Stephanie Mercier (moderator), senior fellow at FJF.

The conversation, while far ranging, anchored around the following questions:

- How can the private sector help farms become more resilient in the face of extreme weather?
- How can public policy at the federal and state levels improve agricultural resilience and encourage innovation?
- What role should the federal crop insurance program and other public-private partnerships play?
- Are there specific innovations or partnerships that could expedite resiliency?

Approximately 60 representatives from agricultural associations, conservation nonprofits, international organizations, congressional offices and media outlets attended the event and contributed to the discussion.

This white paper summarizes four recurring themes and priority actions that surfaced during the event.

## Introduction

Farmers across the U.S. face unprecedented pressures from a variety of factors, including policy and regulations, markets and trade, and variability in input costs. Change is nothing new to agriculture, but these factors combine to create severe turbulence for today’s farmers. That makes finding ways to bolster agricultural resilience even more important.

Extreme weather affects farmers’ individual operations and communities. It has consequences for farm productivity, rural economies, food supply chains and natural resources, all of which are important to long-term agricultural viability.

The National Oceanic and Atmospheric Administration (NOAA) recorded [16 weather and climate disasters](#) that caused one billion dollars or more in property damage in 2017, from freezes and hail, to fires and flooding.

In the first six months of 2018, NOAA reports that the U.S. experienced six billion-dollar disasters. More recent disasters are sure to exceed the one-billion dollar mark as well. North Carolina's Department of Agriculture and Consumer Services estimates that September's Hurricane Florence caused more than [\\$1.1 billion](#) of agricultural damage in the state.

With extreme weather becoming a new normal, we all have a stake in building a food and agriculture system that can absorb and recover from such stress. Action and responsibility does not rest on the shoulders of farmers alone. Farm advisers, agribusiness, consumers, retailers, governments and nonprofits all have a role to play. A resilient, climate-smart food and agriculture system requires action in the U.S., both at the local and national levels, and at the global level.

Pressures caused by extreme weather, volatile marketplaces and growing global population make the following four resilience-boosting steps an imperative for the public and private sectors:

- Align state and federal policies.
- Increase investment in agricultural research.
- Strengthen market certainty and opportunity.
- Refine crop insurance.

## **1. We need greater coordination and collaboration across state and federal policies**

There is a great need for improved coherence across state and federal policies, as well as a need to create better opportunities to share innovative technology, best practices and success stories across geographies in order to scale and replicate solutions.

Given the challenges ahead, we need to remove existing impediments to action. While conservation programs at the national and state levels play an important role in advancing agricultural viability and environmental improvement, too often red tape hinders the programs' effectiveness. We need to streamline bureaucratic processes that slow down collaboration and experimentation. Public-private partnerships and other innovative ways to facilitate connections and experimentation can expedite on-farm deployment of conservation tools and solutions.

Farmers face an ever-expanding list of standards for sustainability from their customers in the food-processing industry and others in the private sector. Meeting multiple sets of standards can be costly and confusing. NCGA economic analysis found that complying with private label standards can be expensive for producers who have little ability to change the cost of inputs or the price of crops. Few food companies have been willing to

pay a premium for such products, so farmers typically bear the burden of compliance without financial reward.

Effective public policy and investments to help farms address these costs are essential. It is critical to look at the economics – the potential for farmers to profit or receive other value from conservation practices – as well as the factors outside of farmers’ control, such as weather and market risk.

We need federal and state policy agendas that help farmers mitigate these risks. States have a real opportunity to innovate and share ideas, to find what works and what does not. Many states are experimenting with different voluntary and regulatory approaches. Stakeholders at the state and federal level should follow these efforts to identify which strategies are most effective, and then adapt and replicate them more broadly.

One specific area of opportunity for improved policy and innovation is data, in particular creating better data flow from existing U.S. Department of Agriculture sources to get more answers to pressing resilience questions. USDA has significant amounts of data siloed in different agencies. By pooling and mining that data, while maintaining current privacy protections, we could generate much greater insights into which practices reduce yield risk and deliver the greatest economic value to the farmer, as well as how regional variables affect those outcomes.

Finally, we need to evaluate and refine policies that inadvertently penalize early adopters. Federal and state policies should focus on achieving positive conservation outcomes and not restrict the practices used to attain them. This would better enable innovative farmers to be part of the solution.

### ***What will change our current situation?***

The U.S. needs better-coordinated public policies to overcome the lack of public understanding about the realities of agriculture. Most consumers have very distant connections to how food is produced, from what it takes to grow the crops to how they are transported, processed, packaged and delivered. A coordinated policy effort could help bridge this gap.

We also need coordinated policies that incentivize farm-level adoption of conservation practices. These incentives would create a value signal to farmers to prioritize environmental outcomes even if those outcomes do not necessarily influence consumers’ purchasing decisions.

### ***Why do regulations affect farms differently than other kinds of businesses?***

Traditional businesses can rely on a competitive marketplace to keep input costs low while they adapt to regulations. Farmers do not have those options. They have no control over input costs or the value of their crops because prices are set on a commodity market.

Sound policy can create certainty and economic incentives for farmers. We need to reform regulatory mechanisms to allow for quicker, more nimble decision-making on factors that affect farmers’ bottom lines results.

In sum, sound policy can level the playing field, reduce confusion from ad hoc demands on farmers, open the door for innovation and partnership, and enable communication and sharing of effective approaches. Public policy can help reduce risk, create opportunities to share costs and benefits across the whole market, and increase engagement and understanding from farm to fork.

## 2. We need investment in agricultural research

The U.S. lags dangerously behind the world in investing in agricultural research. This gap has serious implications for the resilience of our agricultural sector.

In 2016, the Chinese government announced plans to [invest \\$450 billion](#) over the next four years to help modernize agriculture and scale up practices that increase food security while minimizing impacts to the environment. This commitment to agricultural research was three times greater than USDA's total 2016 outlays of \$148 billion for all programs and activities – a spending level that has not budged in years. In fact, 2016's outlay was down significantly from \$156 billion three years earlier. Yet [research-driven innovation](#) is pivotal to creating a sustainable and resilient food and agricultural system.

### ***Where do we need more research?***

The U.S. needs better [economic data](#), tracking of environmental outcomes and innovation on soil sensors. This will allow us to track and analyze data for both economic and environmental outcomes.

Three areas in particular need further research to advance agricultural resilience.

### ***Better economic data***

To inform decision-making, farmers need economic data on yield benefits and production cost savings that they can expect from conservation practices such as planting cover crops, optimizing fertilizer use and reducing tillage. We need policy to support and direct USDA to expand research into measuring the economics and long-term benefits of those practices, including the role they can play in enhancing a farm's resilience to harsh weather events like droughts, heat waves and floods intensified by climate change.

### ***Tracking of environmental benefits***

Expanded research is needed into effective, low-cost ways to track and measure environmental outcomes from agricultural conservation efforts. Effective, accessible tools for tracking reductions in greenhouse gas emissions and nitrate leaching at the farm, and the corresponding benefits to watersheds and regional environments, would help farmers, food companies, consumers and governments. Bottom-up measurement across tens or hundreds of thousands of farms is prohibitively expensive. However, it is very difficult for regional top-down measurements of greenhouse gas fluxes or nutrient loads to separate contributions from agriculture and those from other major sources.



## ***Soil sensor technologies***

Innovators in Silicon Valley and beyond have produced an array of soil sensor technologies for farm equipment and satellite-based remote sensing apps. Expanded public research is needed on the role these technologies can play in helping farmers manage their soil, water and fertilizer in order to improve productivity and environmental outcomes.

Greater U.S. investment in enhancing the sustainability and resilience of our agricultural system and farmlands would not only deliver significant value to farmers, consumers and natural resources, but also create a model that other countries could emulate. If leading nations like the U.S. and China upped their investment and support of sustainable, highly productive farming, then agriculture's environmental footprint would lighten while farmers continue to do the critical work of feeding us all.

In effect, the U.S. has delegated a lot of the responsibility for advancing applied research to the private sector. While public dollars used to be the primary source of support for agricultural research, this is no longer the case. Today, the private sector spends as much on agricultural research as the government does, according to [USDA](#). Long-term growth in funding for agricultural research is also higher in the private sector. While we need this private investment, public and private agricultural research funding do not always have the same goals. They play different, but equally important roles.

Public funding is diverse in its agricultural research investments, as it spans all geographies and a wide variety of crops and livestock species. Government dollars also tend to focus on issues that have broader social benefits, such as water quality, natural resources conservation and community development. According to the USDA, public sector research also tends to consider the longer-term, and to address a broader set of research topics than the private sector.

Public funding has been critical to advancing our understanding of soil health, water quality and climate change impacts on farmland. It has also enhanced knowledge about the benefits of crop rotations and strategic filtering to capture and treat nutrients that leave farm fields before they reach local waters.

When the private sector conducts research, they reasonably expect to sell the technology they develop at a profit. Private sector research is responsible for important innovations in variable rate technology, mapping technologies and improved farm equipment – all critical to agriculture today. At the same time, relying on private sector funding alone can lead to some inequities in farming.

Private sector funding tends to focus on the crops and geographies where they can make the most money, leaving out many research questions for less dominant crops and regions. Private sector research into tools like precision agriculture is critical to helping crop and livestock farmers manage variability and build resilience. Farmers with access to these technologies can now farm by the square foot rather than the field or acre.

However, the profit motive of the private sector can lead to a focus on the development of high-end technologies that many farmers with smaller operations cannot afford.

There is a critical need for both public and private sector agricultural research. In general, public funding sparks basic research, and private funding carries those ideas to a bigger stage. Public-private partnerships can ensure that agriculture will benefit from a diversity of research topics with clear social benefits. To have the resilient, sustainable food and agriculture system that a growing population and changing climate demand, ongoing and expanded research investment from all parties will be critical.

### **3. We need better certainty and opportunities in the marketplace**

Policies and programs from the public and private sector can determine market access for the agriculture sector – a make or break factor for farmers and farm businesses. Trade and ecosystem marketplaces are also two key areas that affect agricultural resilience.

#### ***What is the relationship between trade and resilience?***

Uncertainty and institutional hurdles in international trade have serious, but underappreciated, implications for agricultural resilience. If U.S. trade policy drives away international buyers for our agricultural products, the result could be an acceleration of environmental problems. For example, if importing countries look elsewhere to buy corn and soy, those new markets could be producing commodities at the expense of deforestation and without policies in place to protect water supplies. Instead of moving forward on national and global environmental challenges, we likely will see increased production in regions with conditions far less suited to sustainable production.

International trade also highlights the link between agriculture and national security. The U.S. is not as dependent as many other nations around the world on trade for food security given the volume and diversity of productivity within our borders. The opportunity enjoyed by most Americans to pursue non-agricultural careers and lifestyles is available precisely because U.S. farmers are so productive.

While trade is a significant part of our agricultural economy, our ability to feed ourselves without trade makes the U.S. relatively unique and fortunate. When confusion and uncertainty in trade ensues, it puts farmers at the front line of conflict on behalf of the rest of consumers who rely on them for food.

#### ***What role do ecosystem markets play for agricultural resilience?***

Ecosystem marketplaces, where there is an economic value placed on an environmental benefit, provide an opportunity to advance agricultural resilience and conservation. The key to making ecosystem markets work is having the data to document and monetize the

environmental services that farmers produce and ensure buyers have confidence in those services.

A growing diversity of agricultural software programs offer farmers the ability to collect and manage data that can enable them to be more precise and report on their performance to others. Remote sensing, soil sensors and predictive modeling now integrate with these management platforms and factor into farmers' decision-making. Producers are better able to track in-field variability and fine tune seed, nutrient and water management to maximize efficiency.

Farm management technology also offers opportunities to aggregate data and provide the reporting needed for ecosystem markets to thrive. We have a long way to go, however, and policy could provide a boost. The Senate version of the farm bill improves the availability of data about conservation, but until the U.S. figures out how to quantify, measure and verify conservation outcomes, we cannot leverage those opportunities as much as we could.

There is still no clear path to opening ecosystem markets to farmers. The farm bill and other state and federal policy opportunities could advance this area by providing certainty or infrastructure to these fledgling markets and advancing experimentation within them. Policy can help develop and launch markets that incentivize investment in resilience, including improved water quality and soil health and reduced greenhouse gas emissions and water use.

#### **4. We need crop insurance to advance resilience**

Crop insurance is an essential safety net to reduce a farmer's risk of financial loss resulting from weather events like hail storms, droughts and floods. Crop insurance can also be the linchpin for advancing resiliency on farms.

Extensive research, including by the partners in the AGree coalition, on challenges and opportunities for crop insurance to support farm resilience through conservation identified some key themes:

- Crop insurance policies may constrain producers' decision-making about ways to improve resilience and lower risk from extreme weather.
- Crop insurance rules can stifle innovation and practices that improve resilience.
- Conservation practices like reduced tillage, cover crops, rotation, and efficient application of inputs improve soil health to improve yields over the long term.
- Small changes to the crop insurance program can lower financial risk.

The crop insurance system should prioritize productivity while also encouraging the use of conservation practices that reduce yield risk and improve environmental outcomes. Farmers know that healthy soils are more resilient and can improve the profitability and environmental performance of their operations. We need a crop insurance program that recognizes and rewards farmers who increase resilience.



Linking conservation programs with crop production and crop insurance is a win for everyone. With this linkage, farmers would see greater resiliency to weather catastrophes while also insuring their fields and crops against losses.

### ***What is our opportunity?***

There is a need for accessible data and analysis that quantifies the risk reduction benefits of conservation practices. This analysis will help farmers reduce risks and increase profitability. Public policy can enable better use of existing data under strong privacy protections:

- Harness existing data at USDA agencies – the Farm Service Agency, Risk Management Agency and Natural Resources Conservation Service – to help producers increase productivity and profitability.
- Provide a platform to connect the dots between conservation practices, crop yields, soil health and risk.
- Protect producer data by upholding strict privacy protocols already in place at USDA.

### ***How does crop insurance work today and where do we need to go?***

Today, the market pays farmers based on yield, but their balance sheets do not account for the important services farmers provide to preserve air and water quality, conserve water supplies and protect wildlife habitat. Pressures on farm budgets and on our natural resources demand that federal programs move beyond the current practice of rewarding intentions to rewarding quantitative outcomes. There are emerging collaborations to advance [data and analysis](#) that quantifies the risk reduction benefits of conservation practices. These types of programs will catalyze conservation while improving farmers' bottom line results.

## **Collaborating for future success**

By convening stakeholders from across our food and agricultural system, we identified four priorities for improving resilience in agriculture:

- Greater coordination and collaboration across state and federal policies.
- Investment in agricultural research.
- More certainty and opportunities in the marketplace.
- Advancing crop insurance.

A more resilient food system equips farmers with the tools and incentives to identify and adopt climate-smart solutions and build agricultural resilience. This is an imperative as the global population climbs toward 11 billion people by 2100 and extreme weather becomes a new normal. Despite these challenges, U.S. farmers will continue to provide a resilient and sustainable food supply for generations to come.