



Catalytic Capital and Agriculture

Opportunities to Invest in Healthy Soils,
Resilient Farms and a Stable Climate



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Climate and Forest Capital, LLC is a mission-driven investment and advisory firm focused on developing and managing market based solutions that deliver both impact outcomes and financial returns. With a specific focus on climate change, infrastructure, and land use, CFC seeks to leverage public, private, and philanthropic capital to accelerate long-term systemic change.

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Contents

About this report	3
Catalytic capital and agriculture: Insights and opportunities	4
Prevailing barriers to investment	6
The role of catalytic capital in overcoming barriers to investment	8
Three promising areas for catalytic capital investment	11
Insights for funders and investors to maximize impact	13
Summary of case studies	14
Case study 1: Soil and Water Outcomes Fund	16
Case study 2: The Perennial Fund	22
Case study 3: Regional Restore Programs	28
Case study 4: Agrarian Commons	35
Case study 5: FarmStart	41
Conclusion	48
References	49

About this report

This report was developed by Vincent Gauthier and Maggie Monast of Environmental Defense Fund, Eron Bloomgarden of Climate and Forest Capital, and independent consultant Daniel Pike, under the support of a Conservation Innovation Grant from the U.S. Department of Agriculture Natural Resources Conservation Service.

The purpose of the report is to highlight opportunities for catalytic capital to advance agricultural conservation, resilience and sustainability. In this report we define catalytic capital as capital *intentionally* deployed to identify, financially support and scale promising solutions for environmental and social impact that would otherwise be unlikely to raise funding on a purely commercial basis.

This report is for foundations, philanthropists or investors that wish to deploy their financial and non-financial resources to catalyze lasting and systemic change in U.S. agriculture. It is also for anyone designing projects, enterprises or initiatives that share those objectives.

The report builds on four years of EDF and CFC collaboration to develop private investment solutions for sustainable agriculture. This work included research and partnerships developed with leaders in the agriculture and finance sectors to understand and address financial barriers to farmer adoption of conservation practices. It also includes ongoing efforts by CFC to develop a Working Lands Investment Facility, which would source catalytic capital from multiple providers and aggregate it to support and scale high-impact investment opportunities in U.S. agriculture.

In this report we distill our learnings from this work, illustrated by five case studies, into insights for readers on:

- The key barriers holding back investment.
- How catalytic capital can be deployed to address these barriers and help scale high-impact solutions.
- Promising areas of investment.

We welcome feedback and engagement from readers on this topic. Please direct inquiries to Vincent Gauthier, vgauthier@edf.org.



Catalytic capital and agriculture: Insights and opportunities

Agriculture's global environmental footprint and critical contribution to food security make it central to meeting the challenge of managing climate risk by mitigating greenhouse gas emissions and supporting resilient crop productivity.

Meeting this challenge will require expeditious and unprecedented adoption of farming practices that build soil health, improve water quality, support biodiversity, reduce greenhouse gas emissions and generate other environmental benefits at scale while also supporting agricultural productivity and farmer livelihoods.

The impetus for investing in these solutions is even greater in the wake of major shocks to the agricultural system in recent years. Flooding in 2019 caused \$20 billion in losses across the Arkansas, Mississippi and Missouri watersheds.¹ In 2020, the COVID-19 pandemic disrupted supply chains and exposed significant vulnerabilities,² while many regions grappled with droughts,³ hurricanes⁴ and wildfires.⁵ Climate change will further challenge farmers as precipitation patterns and temperatures change.

The impact potential of investing in sustainable agriculture has attracted substantial interest from private investors in the last few decades. A 2014 survey found that private investors increased their holdings in sustainable agriculture by 600% between the periods of 2004-2008 and 2009-2013.⁶ Since 2013, investments in new agricultural strategies and innovations have continued to grow to meet changing consumer and agribusiness demands. Significant sums are being invested in alternative proteins and controlled-environment agriculture,⁷ and major food companies⁸ have made public commitments and internal investments in supply chain sustainability and climate-smart agriculture.

The range of investment opportunities in sustainable agriculture is vast. A 2019 report by the Delta and Croatan Institutes identified \$321.1 billion in assets deployed across 127 strategies in the U.S. incorporating sustainable food and agriculture thematically or through investment criteria.⁹

Nonetheless, investors have only just begun to unlock the funding required to transition the U.S. agriculture sector to a sustainable future. Significant barriers remain to achieving the level of investment and impact required for agriculture to meet the challenges of the 21st century.

Terms for agricultural systems that improve environmental outcomes

This report draws from several different initiatives that use a variety of terms to describe agricultural systems that improve environmental and social outcomes. While these terms differ in focus and scope, they share a common set of farming practices that build soil health and improve environmental outcomes, including:

- Diversified crop rotations (NRCS Conservation Practice Standard 328)
- Conservation tillage (CPS 329 & 345)
- Cover crops (CPS 340)
- Integration of livestock
- Compost and manure application
- Riparian buffers (CPS 391 & 604)

Terms used by initiatives in this report to describe some combination of this set of practices include:

- **Climate-smart agriculture.** The Food and Agriculture Program of the United Nations describes climate-smart agriculture as an approach with three main objectives: “sustainably increasing agricultural productivity and incomes; adapting and building resilience to climate change; and reducing and/or removing greenhouse gas emissions, where possible.”¹⁰
- **Conservation agriculture.** Sometimes referred to as agricultural best management practices, conservation agriculture is described by the FAO as “a farming system that promotes minimum soil disturbance (i.e. no tillage), maintenance of a permanent soil cover and diversification of plant species. It enhances biodiversity and natural biological processes above and below ground, which contribute to increased water and nutrient use efficiency and sustained crop production.”¹¹
- **Regenerative agriculture.** In their report, *Soil Wealth: Investing in Regenerative Agriculture Across Asset Classes*, the Delta and Croatan Institutes broadly defined regenerative agriculture as “holistic approaches to agricultural systems that work with natural systems to restore, improve and enhance the biological vitality, carrying capacity and ecosystem services of farming landscapes.” Regenerative farming operations also aim to support the resilience of the rural communities and broader value chains in which they are situated.¹²
- **Resilient agriculture.** EDF’s report, *Financing Resilient Agriculture: How Agricultural Lenders Can Reduce Climate Risk and Help Farmers Build Resilience*, refers to resilient agriculture as an approach that shifts focus from efficiency to stability in the face of evolving trends and sudden shocks. Resilient agriculture incorporates three different capacities:
 - ◆ *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.¹³

This report will use the term sustainable agriculture to represent the broad suite of the farming practices consistent with the terms above.



Prevailing barriers to investment

Investment in sustainable agriculture is constrained by several barriers. These barriers include the multi-year timeframe for soil health practices to deliver financial value, the prevalence of mainstream agriculture financial structures that favor conventional practices, a lack of market premiums for sustainably produced crops and a lack of pricing for environmental benefits. Understanding these barriers and how they constrain investment in sustainable agricultural models is essential to developing catalytic solutions that address these barriers. Each key barrier is described in greater detail below.

The multi-year gap between conservation investments and financial benefits

Conservation practices such as conservation tillage (CPS 329 & 345), cover crops (CPS 340) and extended crop rotations (CPS 328) all have different costs and benefits over time. Some practices entail up-front and/or ongoing costs for seed and new equipment. These practices are considered medium- to long-term investments that typically generate financial benefits to the farm operation over three to five years. Research by EDF and others shows that the up-front costs associated with these practices are typically offset within this three to five year time frame by savings in production costs, crop yield improvements or resilience, and in some cases new forms of farm revenue.^{14,15,16,17} However, the current poor farm economy may hinder many farmers from taking on any additional cost or risk, even when it would pay off in the long term.

Mainstream agriculture financial structures favor conventional practices

Mainstream agricultural financing and crop insurance are not designed to align with the financial attributes of the agricultural conservation practices described above.¹⁸ Agricultural lending and insurance typically operate on an annual cycle and do not incorporate the financial value and risk reduction benefits of conservation practices, creating structural disincentives to conservation adoption. To address this, lenders and insurers need to measure the financial and risk impacts of conservation practices over time and develop financial products aligned with those attributes.

Lack of market premiums for crops grown with soil health practices

Unlike crops grown under organic certification, crops grown using soil health practices do not receive market premiums. Products grown with certified organic practices receive a significant market premium — ranging between 7% and 100% for different crops.¹⁹ Some efforts are underway to develop standards and certifications²⁰ that could provide market premiums for crops grown with sustainable practices, but it is unclear whether that could be accomplished at scale or if it would remain a niche market.

Lack of pricing for environmental benefits

Environmental benefits generated by agricultural conservation practices including greenhouse gas emissions reductions, water quality improvements and biodiversity remain unpriced externalities. Although examples of compliance and voluntary carbon markets are growing, environmental markets in U.S. agriculture remain limited due to lack of enabling policy and high transaction costs. However, there is significant interest and attention to market solutions, as exemplified by recent bills introduced in Congress and support from both the U.S. Department of Agriculture and the Environmental Protection Agency.^{21,22,23}

Origins of this report

EDF and CFC's collaboration to spur investment in sustainable agriculture

This report represents insight from the culmination of a four-year collaboration between EDF and CFC to spur investment in sustainable agriculture. Supported by a U.S. Department of Agriculture Natural Resources Conservation Service Conservation Innovation Grant and Encourage Capital, CFC and EDF set out to develop a Working Lands Investment Fund intended to build both supply and demand for carbon offsets from agricultural soil enhancement projects by offering bridge financing for carbon offset transactions in the California compliance emissions trading system.

The team contributed to the development of carbon offset protocols, project pipelines and financial instruments to support the development of those markets in collaboration with a group of leading carbon credit registries, lawyers and carbon project developers including American Carbon Registry, Baker & McKenzie, BlueSource, Climate Action Reserve and ClimeCo.

While carbon offset markets can provide a premium for the adoption of agricultural practices that mitigate greenhouse gas emissions, the project team determined that carbon offset transactions (e.g. avoided conversion of grasslands and more efficient application of nitrogen fertilizer) could not support an investment fund model under prevailing conditions. In short, the prevailing carbon price is too low and the project development and monitoring costs are too high to support an independent effort to source and trade agricultural carbon credits.²⁴

For these reasons, the project team broadened its focus to explore other financial solutions for increasing soil health practices — an area ripe with opportunity. The project activated research, partnerships and project development for financial solutions to advance soil health practices. Partners explored opportunities in both the mainstream agriculture financial system and among sources of catalytic capital.

The project developed educational tools, resources, recommendations and solutions for both traditional agriculture finance providers and catalytic capital sources to incentivize soil health practices at scale.



The role of catalytic capital in overcoming barriers to investment

Catalytic capital can play an important role in increasing the pace of investment in sustainable agriculture by addressing prevailing barriers and enabling the proliferation of new financial models that work for farmers and investors.

This report defines catalytic capital as capital *intentionally* deployed to identify, financially support and scale promising solutions for environmental and social impact that would otherwise be unlikely to secure funding on a purely commercial basis.

Catalytic capital is often defined synonymously with blended finance, commonly known as the use of financial instruments to bridge a project's risk-return profile from commercially un-investable to commercially investable (see box on blended finance tools on page 10). In blended finance structures, catalytic capital acts as a lynchpin to mobilize investment from commercial sources.

This report proposes a broader definition of catalytic capital, which should be strategically deployed to overcome barriers through both blended finance and investments in enabling conditions such as policy, research and partnerships.

This approach can be implemented in several ways, including:

- 1. Stewarding the development and validation of new investment models.** Catalytic capital is well suited to support concepts at the research, development and validation stage, especially ones that may have a commercial application or deliver financial returns but are not yet positioned for commercial investment. The USDA-NRCS Conservation Innovation Grant program is a great example of deploying grants alongside other forms of funding to spur innovation in new models of sustainable agriculture.²⁵ The Conservation Finance Network — a CIG award recipient — has also demonstrated the power of facilitating innovation by bringing partners, investors, and project developers together into a community of practice.²⁶



- 2. Attracting market-rate investors.** Catalytic capital can be used to make novel solutions and investments palatable to market-rate investors, securing their initial engagement and opening the opportunity to unlock more commercial investment over time. Deploying catalytic capital to achieve market rate returns for private investors can involve the use of blended finance tools, some of which are described in the box below.
- 3. Measuring and demonstrating key outcomes.** One essential pathway for accelerating investments in sustainable agriculture is to present greater evidence of the financial viability and environmental impacts of conservation practices. Catalytic capital can support forms of measurement that are actionable by farmers and investors. In comparison to commercial capital, catalytic capital can better support deeper investments in research, data collection and measurement for first-of-its-kind projects.
- 4. Testing financial solutions for use by mainstream financial institutions.** Catalytic capital can be used to pilot investment models that are transferable for use by mainstream financial institutions, or in collaboration with those financial institutions. For example, catalytic capital could test an agricultural loan or insurance product that then could be adopted and scaled by existing agricultural lenders or insurers. By collecting data on the financial and environmental performance of the product, catalytic capital can reduce the risk of trying something new to traditional finance providers. Developing solutions that could be taken up by the mainstream financial system presents a powerful pathway for impact at scale — an opportunity to realign many of the barriers identified earlier in this introduction, including the short-term nature of operating loans and the undervaluation of environmental costs and risks.

Blended finance tools

Blended finance aims to facilitate the flow of commercial capital to enterprises and projects that have an explicit impact objective by filling the gap between a project's original risk-return profile and the requirements of market-rate investors.²⁷ Key blended finance tools include:

Concessionary capital. Concessionary capital is capital provided at below-market terms within an investment structure to lower the cost of capital for recipients and or reduce the risk profile of the capital structure for market-rate investors. Concessionary capital instruments include flexible forms of debt, junior equity and subordinated debt which place concessionary capital as the first-loss provider.²⁸

Credit enhancements. Credit enhancements are loan guarantees or loan-loss reserves that provide a guaranteed amount of repayment in the event of non-repayment or loss of value.²⁹

Pay-for-success financing. Pay-for-success financing pays for the realization of specific social or environmental outcomes and is often provided by public entities or philanthropic actors to finance environmental or social impact bonds.

Program-related investments and recoverable grants. Program-related investments are loans, equity investments or guarantees made by foundations in pursuit of their mission. Program-related investments must meet certain federal tax code requirements and be undertaken primarily to advance a charitable purpose. Recoverable grants may be repaid fully or in part if the recipient successfully raises the necessary funds. Their repayment may be forgiven under circumstances in which the project fails.^{30,31}

Mission-related investments. Mission-related investments are any investment that an investor intends to provide financial as well as social or environmental returns.³²

Technical assistance funds. Grants for technical assistance or fund management fees can provide enhanced viability, scale and impact of a transaction.³³

Design-stage grants. Design-stage grants provide capital to design and launch projects, increasing the likelihood of success, scale and commercial viability of an impact investment.³⁴



Three promising areas for catalytic capital investment

This report includes an 18-month systematic exploration of where catalytic capital could be deployed most effectively in U.S. agriculture to advance conservation, soil health, and climate mitigation and resilience. Based on this evaluation, there are three key areas of investment that could address prevailing barriers and achieve significant climate, water quality, economic and social outcomes.

Transition finance

Transition financing involves the use of loans in which repayment terms are pushed back to accommodate for multi-year return gaps associated with transitioning to new practices. Transition finance presents a direct solution to the challenges posed by the mid- to long-term returns associated with conservation practices and by the limitations of conventional financing structures. Transitioning from conventional to conservation practices requires a change of equipment, input levels and other management decisions. This transition often takes a few years (three to five) and can involve a temporary drop in yields and income as the farmer invests time to learn and the soils take time to adapt. Traditional lenders do not offer products to support farmers through this transition, aside from some recent organic transition products.^{35, 36} A recent EDF report on financing resilient agriculture in the traditional agricultural finance system points to catalytic capital as an important component for testing transition financing models with traditional banks.³⁷

Environmental markets

Markets for environmental services like carbon sequestration, greenhouse gas emissions reduction, water quality improvements and habitat restoration present an opportunity to compensate farmers for providing these services and offer incentives for them to adopt conservation practices. Innovation is accelerating rapidly in this area, spanning attempts to establish marketplaces to support the voluntary and compliance carbon markets, such as those being developed by the Ecosystem Services Market Consortium and Nori; and efforts to facilitate a range of voluntary transaction types, such as Regen Network.

Regional value chain development

Regional value chains and regional concentration of sustainable agriculture operations enable farmers to tap into better markets and prices for food with attributes that consumers are willing to pay for – whether it is labeled organic, local, regenerative or something else. Targeted efforts to build complete regional value chains can mobilize greater adoption of conservation practices by farmers and support communities economically. Catalytic investment in shared equipment, processing and marketing enables the development of these value chains.

The role of NRCS in catalyzing private capital

The USDA Natural Resources Conservation Service (NRCS) provides approximately \$5 billion annually in public dollars to support agricultural conservation.³⁸ The Service also acts as a source of catalytic capital by distributing \$12.5 million in grants through its Conservation Innovation Grant program to projects developing innovating conservation solutions for U.S. agriculture.³⁹ Two of the profiles in this report have received catalytic capital grants for the CIG programs. NRCS can continue to grow its impact as a source of catalytic capital by:

- 1. Gathering data to measure the financial impacts of conservation practices.** NRCS can partner with other USDA agencies and with external organizations to facilitate research on the financial case for conservation. NRCS could achieve this by growing partnerships with USDA's Risk Management Agency, Economic Research Service, and Agriculture Research Service. NRCS can also partner with organizations and universities that are already measuring the financial case for conservation practices. Lastly, NRCS can continue to grow and improve economic data gathering within its own programs, exemplified by the economic data requirements included in the CIG On-Farm Conservation Innovation Trials Soil Health Demonstration Trials.⁴⁰
- 2. Supporting innovative investment models with research and technical support.** This report highlights that catalytic capital must pair blended finance with investments in research, policy, and advocacy that support an enabling environment for new agricultural financing models. Providing these forms of support can help assess, improve and scale new approaches to financing conservation agriculture. NRCS is already supporting connections and information exchange among its Conservation Innovation Grant grantees who are focused on conservation finance. NRCS can continue to foster these efforts by providing research, data gathering and technical support to inform new conservation investment models.
- 3. Providing public funds that can attract private investment to new financing models.** NRCS can use blended finance tools to improve the terms of emerging financial models for sustainable agriculture. This allows NRCS to support greater impact per dollar spent by bringing private investment to the table. For example, the 2018 Farm Bill increased NRCS' ability to pursue alternative funding arrangements through its Regional Conservation Partnership Program.⁴¹ The Soil and Water Outcomes Fund, one of the case studies profiled in this report, was awarded funds to pay farmers directly for their environmental outcomes through the new RCPP.⁴²

These recommendations are echoed by the findings of a 2017 report by Encourage Capital titled *NRCS and Investment Capital: Investing in America Together*.⁴³



Insights for funders and investors to maximize impact

The research conducted over the course of the CIG and the five case studies included in this report offer useful insights for investors who aim to catalyze transformation in U.S. agriculture. We recommend that funders and investors focus on these three strategic elements:

1. Understand and target prevailing barriers in your investment strategy.

Funders and investors should clearly identify the greatest barriers to change (some of which are described in this report) and develop investment strategies and criteria that tackle these barriers head-on. Investment strategies targeted at addressing difficult barriers may often require more than blended finance tactics. Funders and investors should make complementary investments and efforts to create an enabling environment to reach scale by filling gaps in the evidence base or working to shape relevant policies. This can be done by implementing grants to stimulate model innovation and development, and supporting policy and advocacy.⁴⁴

2. Identify the path to scale from the outset.

Catalytic capitalists should use their “impact-first” mindset to ensure projects and programs have identified a clear path to scale from the outset. This analysis found that the most promising models set a path to reaching scale at early stages of their development. Catalytic capitalists can help identify and execute the path to scale by encouraging project developers to think big, address key barriers, and identify the relationship between their model and other changes occurring in the agricultural system. Catalytic capital can also help bring valuable scale-up partners to the table in early stages. Lastly, catalytic capital should deploy capital to achieve effective measurement, marketing and advisory support that can help the long-game objectives of reaching scaled solutions.

3. Collect financial and environmental information to hone and scale solutions.

Information gaps about the environmental and financial dynamics of conservation practices continue to hold back solutions from mainstream agricultural lending institutions, crop insurance providers, impact investors, and federal and state incentive programs. It is imperative that catalytic capitalists build data-gathering into the projects and programs they support. This may involve partnering with land grant universities, non-profit organizations or agricultural technology companies.

Summary of case studies

This report features five specific solutions to present as case studies that illustrate the possibilities that transition finance, environmental markets and regional value chain development provide for catalytic capital. The case studies are summarized below, including a brief description and best practices demonstrated by each case.

The Soil and Water Outcomes Fund

By Quantified Ventures and the Iowa Soybean Association

Catalytic category: Environmental markets

- The project is built on a revolving loan structure that funds conservation practices on farms and is refilled through revenue generated by the sale of environmental outcomes (water quality, greenhouse gas emissions mitigation) to beneficiaries such as municipalities, state and federal government entities, and supply chain companies.
- The project illustrates the role catalytic capital can play in mobilizing commercial partners. It also demonstrates the importance of engaging scale-up partners early on and grounding the model in measurable impact outcomes.

The Perennial Fund

By Mad Agriculture

Catalytic category: Transition finance

- The fund offers three-year operating loans to farmers transitioning to organic production, with market off-take support and repayment over eight to 10 years through a 10-50% revenue share.
- The fund illustrates the value of designing from first principles*, addressing fundamental challenges, and thinking creatively to allocate and mitigate risk. It illustrates the importance of using a pilot phase to validate key outcomes while preparing for scale. The Perennial Fund also engaged scale-up partners early on. It is also laying the technical and technological scaffolding to integrate carbon markets and scale up the model.

Regional Restore Programs

By Zero Foodprint

Catalytic categories: Environmental markets / Regional value chain development

- Zero Foodprint is looking to establish city- and county-wide initiatives for restaurants to add 1% surcharges to restaurant bills, to be aggregated into grantmaking funds to spur local carbon farming projects.
- The model illustrates the importance of designing from first principles with a focus on consumers. The model is informed by behavioral economics and applied to transforming regional systems.

*First principles refer to the underlying concepts or assumptions on which a theory is built.



Agrarian Commons

By Agrarian Trust

Catalytic category: Regional value chain development

- Agrarian Trust uses Program-related investment funding to acquire farmland from retiring farmers and places it under the control of a local non-profit entity. It is also financed through a set of agricultural easements. The Agrarian Commons (the non-profit entity) is designed to convey long-term affordable multi-farmer tenure in support of sustainable agricultural management. Some commons sites can act as anchors for regional value chains for organic and sustainable farming, supporting shared investments in equipment, processing and marketing. They also offer technical resources and serve as a training ground for the experienced and next-generation farmers.
- The Agrarian Commons illustrates the power of challenging deeply held assumptions about how land and other assets are valued and should be used.

FarmStart Model

By Farm Credit Council

Catalytic category: Transition finance

- The Farm Credit East FarmStart program supports young and beginning farmers to build equity and improve access to operating loans. Investors for FarmStart LLP purchase equity in farms, which helps young and beginning farmers access operating loans. The farmer buys back the equity after five years.
- The model could be translated to regenerative agricultural practices. Investors could invest in an LLP that purchases equity in farms that want to transition to regenerative practices. Farmers could then access regenerative transition loans against that equity.

Soil and Water Outcomes Fund

By Quantified Ventures and the Iowa Soybean Association

Summary

The opportunity for impact

- Pricing environmental services can unlock measurable environmental outcomes via greater resource stewardship on farms.
- Environmental service markets generate market efficiencies by shifting risks and costs to the entities best suited to bear them.
- Disparate stakeholders may have complementary goals that environmental service markets can unlock.

The investment model

- The model uses outcomes-based contracting to sell verified environmental outcomes that provide investor returns.
- The model uses a revolving loan structure that funds conservation practices on farms and is refilled through revenue generated by the sale of environmental outcomes.
- The environmental outcomes generated by the participating farmers are purchased by beneficiaries such as municipalities, state and federal government entities, and supply chain companies

Opportunities to unlock scale

- The project aims to scale by growing the cohort of outcomes customers to include state and federal entities responsible for water quality.
- The project aims to expand its footprint within Iowa and into new states.
- The project also aims to add verified outcomes for flood mitigation and biodiversity in the future.



The opportunity for impact

Developing markets for environmental services provides opportunities to place financial value on positive conservation outcomes farmers provide. These markets also generate efficiencies by allowing the market to properly distribute the risks, costs and benefits of these services.

Early examples of upstream payments for water quality in New York State's Hudson Valley demonstrated the cost-effectiveness of paying farmers to implement conservation practices instead of paying for expensive water treatment plant upgrades.⁴⁵ Employing a similar logic, environmental service markets are continuing to develop across the country, including the carbon offset market in California. The growth in measurement tools and methods for capturing environmental outcomes are propelling new opportunities to actuate carbon, water quality and habitat values in the market.

Catalytic capital can help provide financing to jump-start new environmental markets, which in turn can help improve water quality, carbon sequestration, habitat protection and financial resilience.

The investment model

The Soil and Water Outcomes Fund (SWOF), a joint project between Iowa Soybean Association and Quantified Ventures, meets demand for verified environmental outcomes from a range of stakeholder by financing improved environmental outcomes on Midwest cropland.

Figure 1 below demonstrates the SWOF market model. Investing entities finance loans put out by a SWOF-affiliated entity managed by Quantified Ventures. These loans are backed by revenue from sales contracts for environmental outcomes. The SWOF works with farmers to design an agricultural best management practice plan, and then uses its revolving loan funds to pay farmers to make the practice changes identified in the plan.

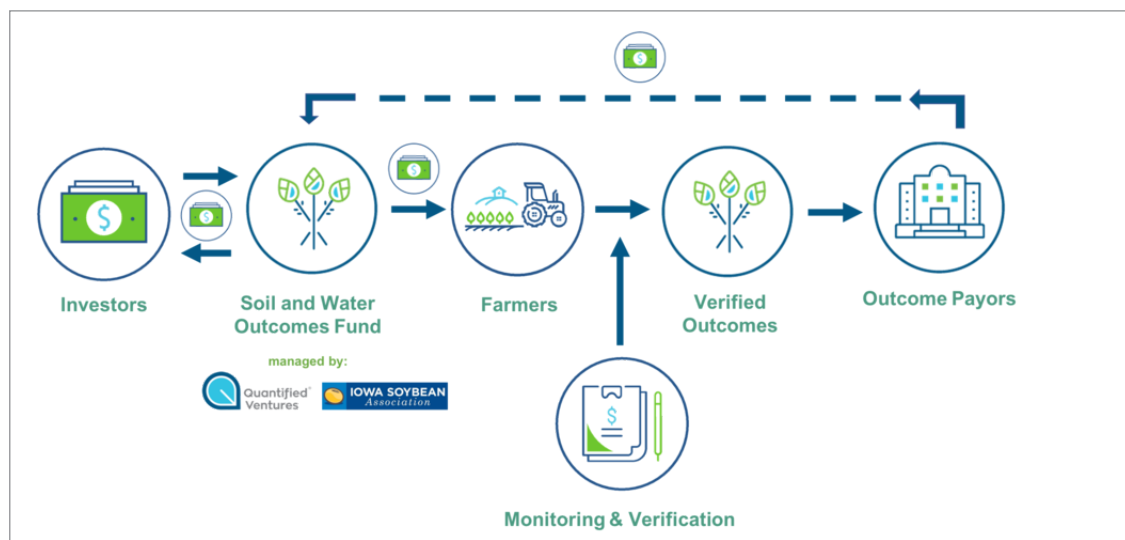


Figure 1: The Soil and Water Outcomes Fund model



Independent third parties verify the environmental outcomes using a combination of models, in-field soil and water quality sampling, and remote sensing analysis. The SWOF currently uses the COMET-Farm model to quantify carbon sequestration and the Nutrient Tracking Tool to quantify water quality outcomes. Improvements are measured against farms' baseline performance prior to adopting conservation practices to ensure additionality.

After verification, the environmental outcomes are sold to beneficiary customers via service contracts or procurement agreements. Customers include municipal governments, water and wastewater utilities, state departments of agriculture, USDA-NRCS and companies with supply chain sustainability or Scope 3 greenhouse gas mitigation goals. The fund works with the EPA and state regulators to ensure that water credits can be applied towards Clean Water Act permits or banked for future use.

Sales revenue is used to repay investors and scale the program.

Value proposition and terms to farmers

Participating farmers receive financial incentives based on the volume of environmental outcomes that are expected to result from the practices they implement. As much as possible, the fund aims to provide payments for the complete costs of practice implementation. The total payment amount depends on the practices farms implement. In the SWOF's first year of implementation in 2020, participating farmers received \$30-50 per acre, with an average payment of \$37 per acre. The 9,500 acres of cropland enrolled in the 2020 program achieved estimated reductions of 170,000 lbs of nitrogen and 15,000 lbs of phosphorous, and sequestered an estimated 7,500 tons of carbon. Two Iowa municipal wastewater utilities will purchase the verified nitrogen and phosphorous reductions and apply them to Clean Water Act permits or bank them for future use under the Iowa Nutrient Reduction Exchange. Cargill will purchase all the carbon outcomes and apply them against their Scope 3 greenhouse gas mitigation goals.

Investor types and return structure

The SWOF is suited for impact investors as well as philanthropic catalytic capital, program-related investments and high net worth individuals. Impact investors such as Quantified Ventures can generate measurable environmental impact while receiving returns through the sale of the verified outcomes. SWOF also received catalytic capital from the Walton Family Foundation and Cargill, which helps cover costs such as fund design and management.

As mentioned above, beneficiaries participating in the market include or may include municipal governments, water and wastewater utilities, state departments of agriculture, USDA-NRCS, flood mitigation authorities, companies with supply chain sustainability goals and conservation organizations.

Municipalities have an incentive to purchase water quality outcomes to reduce costs associated with wastewater treatment or source water protection. The benefits of these investments have been demonstrated across the country, showing that purchasing upstream improvements on farms can be cheaper than treating polluted water downstream. Similarly, for governmental entities such as state departments of agriculture or NRCS, which spend millions annually on programs or projects that safeguard or protect water quality using non-point source activities, purchasing verified outcomes from the SWOF presents a more cost-effective means of achieving that goal.



Cargill, a supply chain beneficiary, is supporting the fund by purchasing outcomes generated by the market in its supply chain. Cargill has set out to reduce its Scope 3 emissions by 30% by 2030. Purchasing the outcomes generated in its own supply chain allows Cargill to retire those benefits to achieve its sustainability goals.⁴⁶

Risks and risk mitigation

The SWOF faces two main forms of risk: 1) that conservation investment costs outpace revenues from verified environmental outcomes; and 2) that the public does not perceive the outcomes as additional.

As an outcomes-based financing model, the SWOF holds some risk that the outcomes and the revenues associated with them prove less than expected. To mitigate this risk, the SWOF pays participating farmers based on outcomes rather than practices, takes a conservative approach to forecasting outcomes, and engages with investors who fully understand the performance risk profile of the investment.

The challenges of demonstrating accurate, verified and additional outcomes is inherent to environmental markets. SWOF is no exception. To mitigate this risk SWOF uses a trusted third-party verifier to measure baseline conditions and assess improvements relative to them. In addition, the SWOF only pays for environmental outcomes produced by newly implemented practices, and by working with farmers who are not currently receiving payment to implement such practices from other incentive programs.

Unlocking scale

Pathways for scaling

Scaling the SWOF will require increased confidence in the model's ability to generate returns for farmers and investors, and to generate environmental outcomes for beneficiaries. In 2020, grants have provided the main source of investment into the fund. Starting in 2021, investor capital will replace grants as the primary funding source. Contracts with Cargill and two municipal wastewater utilities provide certain demand for environmental outcomes generated at the 9,500-acre scale. Building on this, the SWOF will look to scale by reaching market investors and a larger set of environmental beneficiaries.

Scaling the SWOF from its 9,500-acre pilot to hundreds of thousands of acres in the Midwest could be achieved through the following pathways:



1. Increasing beneficiaries' comfort with an outcomes-based approach to conservation.

The SWOF offers downstream environmental beneficiaries such as water utilities a new way to achieve their conservation goals. Scaling demand for environmental outcomes from water utilities will require subsidized purchases in early years to demonstrate the effectiveness and benefits of purchasing environmental outcomes, and increase buyers' comfort with the model. Expanding to a broader pool of payors including state and federal government entities will also be essential, particularly as these entities have fewer geographical restrictions on where water quality outcomes can be generated than municipalities, which typically look for water quality improvements within their own watersheds.

2. Increase market investors' confidence in returns. As an innovative model, the SWOF must prove in the pilot stage its ability to generate risk-adjusted returns for investors. Catalytic capital could be used to accelerate the scaling process by reducing risk for new investment.

The role for catalytic capital

Catalytic capital could be put to work in many ways to support the pathways above, including via:

- 1. Recoverable grants.** Grants repaid once a project is successful or raises the necessary funds could help smooth SWOF's transition from a grant-funded structure to a debt-based structure. They could also be used alongside other instruments to support specific ancillary technical or operational needs that emerge during scaling, e.g., to finance equipment purchases that would otherwise be prohibitively expensive for farmers and prevent them adopting new practices.
- 2. Loan guarantees.** Guarantees commensurate to underperformance in the sale of environmental outcomes would mitigate a third risk that would be present under a scaling scenario: that the SWOF is unable to effectively market and sell the outcomes that participating farmers generate.
- 3. Purchase subsidies.** To increase beneficiaries' confidence in the SWOF model, catalytic capital could subsidize purchases of environmental outcomes. Specifically, they could pledge to subsidize the purchase of environmental outcomes by a certain percentage for a limited time period, creating an incentive for beneficiaries to try out the SWOF while incentives are still available.
- 4. Acting as a buyer of last resort.** Catalytic capital could also support the purchase of environmental outcomes by forming a pool as the buyer of last resort. This would lower the risk the fund's investors and allow the model to continue uninterrupted during market shocks.

Case study 1: Takeaways for catalytic capitalists

Lessons learned

The Soil and Water Outcomes Fund provides key lessons to catalytic capital investors looking to grow new models to scale with measurable environmental impact.

First, the SWOF shows a strong potential for achieving scale because of its commitment to including stakeholders required to achieve a scaled version of the model from the outset. SWOF is building the foundation of its model in collaboration with key stakeholders including Cargill, which will allow them to refine the scaled version of the model based on feedback from essential participants.

Second, the SWOF has been designed to use market-rate capital at scale. Concessionary and catalytic capital will be important to the SWOF as it scales, but Quantified Ventures and the Iowa Soybean Association expect to access market-rate capital in order to operate at the scale needed to make a significant impact on carbon sequestration and water quality improvement outcomes.

Third, the SWOF model is built on a foundation of measurable environmental outcomes. The SWOF will be able to demonstrate the environmental impact it provides per dollar of investment, using a third-party verification process that provides confidence to investors and buyers and helps manage real and perceived risks around additionality.

Lastly, SWOF demonstrates how catalytic capital can be used to spur greater investment from other forms of capital in order to reach scale. In a model as innovative as the SWOF, the confidence of traditional investors must be supported by catalytic capital that helps prove the concept.

Opportunities for catalytic investment

At large scale the SWOF model would have significant impact. The two opportunities below illustrate how philanthropists and impact investors could intervene now to catalyze the scaling-up of the SWOF.

1. Provide concessionary capital for the provision of financial incentive payments to farmers and related monitoring and verification costs.

- *Outcome objective:* To scale up to between 250,000 – 500,000 acres of cropland enrolled over the next three years.
- *Catalytic capital need:* \$15-25 million total, in the form of annual or term debt with < 5% rate.

2. Fund an environmental outcome “buyer of last resort” facility to backstop market demand for ecosystem services (particularly water quality).

- *Outcome objective:* To secure market rate capital needed to operate at significant scale (250,000+ acres).
- *Catalytic capital need:* \$5-\$10 million worth of outcome purchase commitments to be drawn down as / if needed over next three years.

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The Perennial Fund

By Mad Agriculture

Summary

The opportunity for impact

- The U.S. has a large organic crop supply gap, with <1% of cropland certified organic.
- Transitioning to organic production supports environmental quality and improves farm profits.
- Farmers face a three-year transition to organic in which yields may fall without receiving organic premiums.

The investment model

- Mad Agriculture is providing three-year organic transition loans backed by market off-take support.
- The farmers must repay 150% of the loan amount over an eight to 10-year period.
- The loan repayment is performance-based through 10-50% revenue share.

Opportunities to unlock scale

- Mad Agriculture could scale-up with a follow-on fund at five-10 times its current size.
- Another scaling pathway would be for other place-based organizations to replicate the model with support from Mad Agriculture.



The opportunity for impact

Agriculture in the U.S. significantly contributes to greenhouse gas emissions, soil erosion and nutrient pollution in waterways. The high and central regions of the American Great Plains — some of the most productive agricultural lands in the world — face many of these challenges, as well as a growing likelihood of flooding.⁴⁷

Addressing the soil and water quality challenges facing the Great Plains requires the adoption of practices that reduce chemical inputs and increase soil organic matter. Organic farming practices — defined as farming without prohibited chemical inputs and managing pests and soil health through integrated methods — reduces chemical pollution in waterways, soil loss susceptibility and emissions of nitrous oxide — a potent greenhouse gas.⁴⁸

The U.S. has a substantial organic crop supply gap. Five percent of food sales in the U.S. are organic. Yet in 2016 (the most recent year for which data is available), less than 1% of U.S. cropland was certified organic,⁴⁹ and the U.S. imported \$1.6 billion of organic produce.⁵⁰

Certified organic crop production receives market premiums that present a substantial financial opportunity for farmers and their financial partners. Organic premiums range between 7% and 100% for a range of crops.⁵¹ And premiums for commodity crop grains tend to be at the high end of that range.

However, transitioning from conventional to organic practices requires a three-year transition period in which farmers can no longer use prohibited chemicals but are not yet eligible to receive organic premiums. This is known as the organic transition trough. During this transition period, farmers incur yield losses without receiving higher revenue. In time, yields often rebound and are associated with lower input costs.⁵² However, most farmers today are operating on thin margins and do not have the financial strength to weather the three-year transition.

This creates an opportunity for financial and commercial innovation – which Mad Agriculture (Mad Ag) has seized.

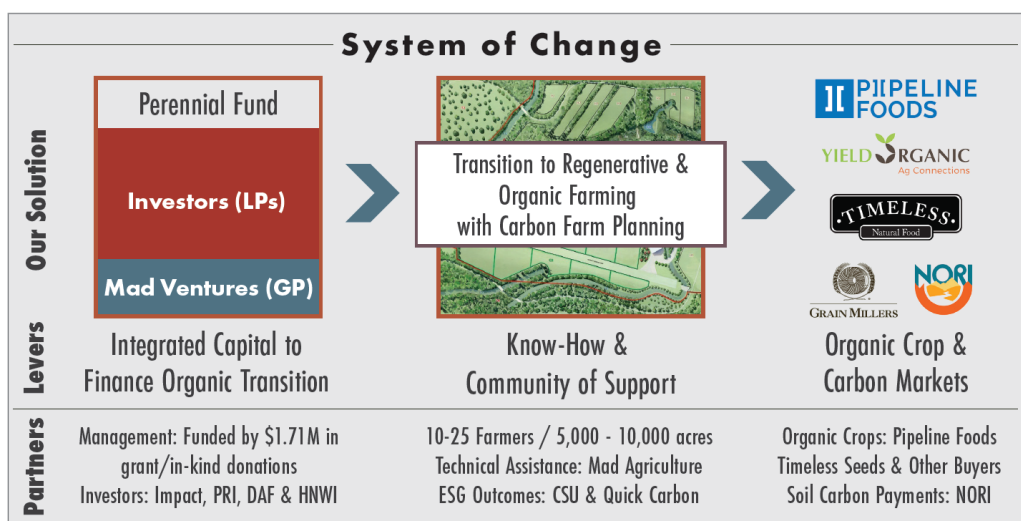


Figure 2: Mad Agriculture system of change



The investment model

Mad Ag is pioneering a financial model called the Perennial Fund to help farmers bridge the transition trough to organic and regenerative production. Figure 2 on page 23 summarizes the key elements.

Integrated (blended) capital from a range of sources enables Mad Ag to offer a 10-year organic transition loan to small- and mid-size (50-10,000 acre) commodity cash crop farms in the high and central plains.

In addition, Mad Ag provides farmers with technical assistance in planning and implementing a transition to organic farming, including carbon farming outcomes and monitoring by independent third parties.

This is reinforced by a community of support arranging off-take agreements with buyers for crops, seeds and carbon credits.

Value proposition and terms to farmers

The Perennial Fund's proposition is customized to the needs of farmers going through the organic transition as demonstrated by Figure 3 below: a 10-year structure based on a three-year transition, a five-year payback and two years of financial buffer (to hedge against bad weather and/or markets). The loan amount varies from \$50-\$1,000 per acre depending on the production costs and operating needs during the organic transition. The loan repayment follows an outcomes-based model in which farmers only begin repaying the loan once they begin to make profits. After the three-year transition period, farmers are required to pay a 10-50% gross revenue share until 1.5 times the initial investment is returned, within 10 years of receiving the original loan. If the whole amount cannot be repaid after 10 years, the loan can be restructured and/or extended.

Investor types and return structure

The Perennial Fund is capitalized by a blend of capital from family offices, foundations and high net worth individuals.

Mad Ag will manage the Perennial Fund. No management fee will be charged to investors. The management of the fund will instead be supported by an \$817,700 grant from USDA-NRCS and an \$889,000 in-kind match from Mad Ag, made possible by grant support from companies like Patagonia and other donors.

The Perennial Fund conservatively estimates that it will generate a 9% internal rate of return (IRR) over the life of the 10-year fund, with the potential of achieving an 11% IRR if market and weather conditions are favorable.

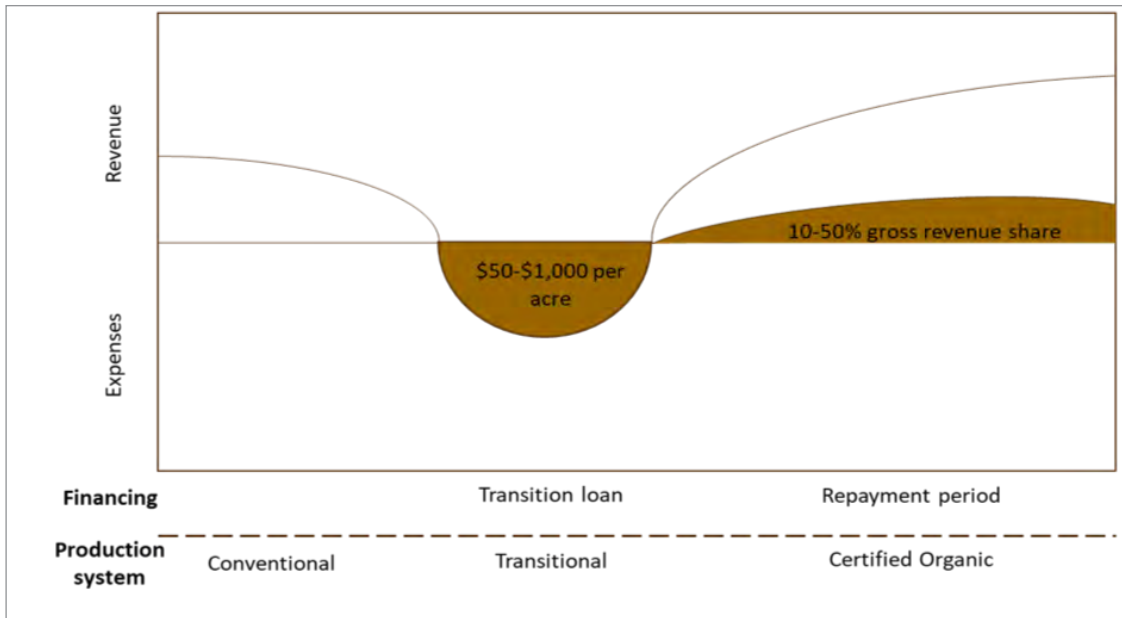


Figure 3: Financing the organic transition

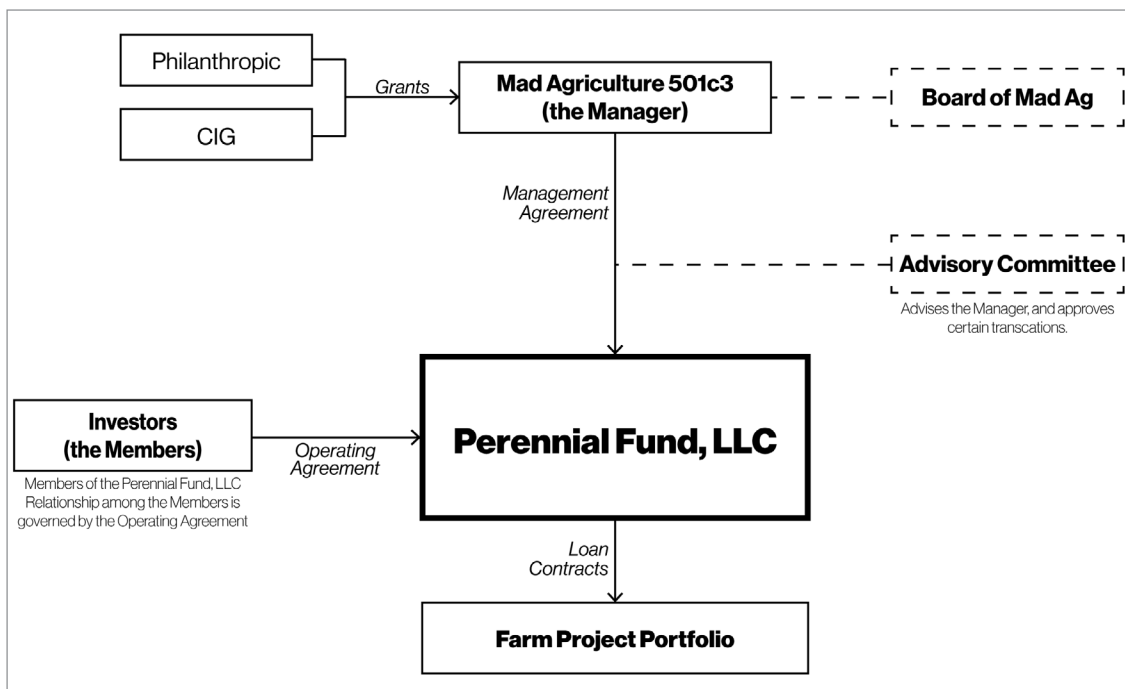


Figure 4: The Perennial Fund structure



Risks and risk mitigation

The Perennial Fund applies multiple layers of risk mitigation including robust due diligence, careful selection of farmers and secured collateral from farmers. Due diligence includes an initial survey, in-person meetings, mapping and soil testing, market analysis and financial analysis.

In farmer selection, the Fund prioritizes farmers who are already experienced in operating organic fields and aim to expand their organic production on additional fields. Most participating farms are transitioning 200-500 acres of their farm to organic production.

Finally, the Fund secures its loans at a 1:1 loan to value ratio against farm assets such as farm equipment, the crop and/or future earnings.

Unlocking scale

During the pilot stage of the Perennial Fund, Mad Ag will direct approximately \$5 million of funding and validate the economics and scalability of their model in the Midwest Corn Belt.

Once Mad Ag has validated its model, it identifies three pathways for taking the model to significant scale:

1. A follow-on fund managed by Mad Ag that is five to 10 times larger than its pilot fund.
2. Enabling replication by other place-based organizations using the tools and model Mad Ag has developed. This could take the form of a retail offering in a community bank.
3. A pledge fund approach where Mad Ag creates the pipeline and due diligence process but works with equity investors and reliable banking partners to continually fund new projects.

Astutely, Mad Ag has developed a set of strategic partnerships that provide a long-term foundation for significant scale, while remaining agnostic on an approach to carbon markets.

First, Mad Ag partner with organic grain buyers, who are searching for greater domestic supply and therefore keen to partner with Mad Ag to form new regional organic purchasing hotspots.

Second, they partner with farmer associations that are trusted by farmers. By beginning to build relationships with them now, Mad Ag is laying the foundation for a follow-on fund that would need to secure many more farmers as customers.

Third, they have engaged software developers to develop digital tools for site surveys, due diligence, outcomes monitoring and technical assistance, which can support robust validation of the model and be deployed at larger scale in the future.

And finally, Mad Ag has laid the foundation for the Fund and its farmers to participate in carbon markets, by investing in carbon farm planning and measurement capabilities, while maintaining a wait-and-see posture around which buyers and markets to engage.

Case study 2: Takeaways for catalytic capitalists

Lessons learned

The Perennial Fund illustrates the critical role that grant funding can play in catalyzing the development of pioneering financial models for sustainable agriculture. Grants from NRCS, Patagonia and others have enabled Mad Ag to design and launch a pioneering model for investing in the expansion of organic and regenerative farming in the U.S.

This example also suggests some lessons on the most effective way to design and launch pioneering models.

First, Mad Ag designed the Perennial Fund from first principles, reckoning with the unique timelines, risks and complexities associated with the transition to organic production, and structuring a solution with loan terms and non-financial support designed to meet those unique requirements.

Second, Mad Ag has appropriately measured its ambition during the pilot phase. Since they recognize that the Perennial Fund model must be tested and validated before it can be scaled, Mad Ag has capped the size of their pilot fund and taken smart steps to maximize its probability of success – specifically, their approach to farmer selection, due diligence and wrap-around supports, which is reinforced by the alignment of incentives between Mad Ag and its farmers.

And finally, Mad Ag has taken forward-looking steps to prepare to scale the model. They have identified key scale-up partners and involved them in the design and validation stages. They are also building the technical and technological foundation to integrate carbon markets and to serve many more farmers.

Opportunities for catalytic investment

The Perennial Fund model, as currently configured, would achieve significant environmental and economic impact if deployed at scale. It could also achieve significant social impact if customized and validated for farmers who are beginners or historically disadvantaged. The three opportunities below illustrate how philanthropists and impact investors could intervene now to catalyze the broader application of the Perennial Fund and advance these impact goals.

1. Sponsor replication of the Perennial Fund by other place-based organizations or major commercial lenders in geographies that Mad Ag will not cover over the next five years.

- *Outcome objective:* Validation of the Perennial Fund model in a wider range of contexts by 2024, laying the foundation for a broader, more rapid scale-up post-validation.
- *Catalytic capital need:* For each replication fund, \$150,000 grant for design and advisory support by Mad Ag and \$1 million grant for fund management by the place-based partner.

2. Accelerate the build-out of Mad Ag's partnerships with farmer associations and farmers, who act as both customers and referrers for Mad Ag's services.

- *Outcome objective:* More farmers receive regenerative farm planning services from Mad Ag by the end of 2022, increasing exposure to those farming methods and laying the groundwork for more rapid scale-up of the Perennial Fund model once it is proven.
- *Catalytic capital need:* Approximately \$1 million grant to subsidize the cost of training farmers or the consulting fees offered to farmers who help scale the Mad Agriculture model

3. Customize and validate the Perennial Fund/Mad Ag model for beginner, minority, and otherwise disadvantaged farmers.

- *Outcome objective:* Validation of the viability of organic regenerative transition loans for beginner, minority and otherwise disadvantaged farmers, via an approximate \$5 million pilot fund.
- *Catalytic capital need:* Approximately \$1 million grant for design and fund management by Mad Ag; approximately \$2.5 million of concessionary capital for the fund itself.

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Regional Restore Programs

By Zero Foodprint

Summary

The opportunity for impact

- Approximately 67% of U.S. and U.K. consumers expect food companies to invest in sustainable farming.
- Consumer participation in promoting sustainable farming is limited by high price premiums and market distortions.
- Behavioral economics-based design and the aggregation of small micro-grants from consumer purchases could unlock consumer demand and funding for carbon farming.

The investment model

- Zero Foodprint works with restaurants to add a 1% surcharge to customer bills which is aggregated into grant making funds to spur local carbon farming projects.
- The program is expanding to city- and county- wide initiatives.

Opportunities to unlock scale

- The program can continue to scale by achieving adoption across counties and metropolitan areas via restaurant/business sign-up initiatives supported by local governments.
- Catalytic capital can enable up-front investment in marketing and program capacity to launch the initiative, to be repaid via a small share of revenue from surcharges.
- The county-wide model can be replicated in other settings include university systems.



The opportunity for impact

There is growing interest among food companies and chefs to engage their customers in sustainability efforts. But, by and large, to support sustainability with their wallets, consumers must either be highly informed about the products they purchase, pay prohibitive premiums or both. For example, grass-fed sirloin beef steaks cost \$18.15, while grain-fed beef steaks cost \$10.42.^{53,54} As a result, market share of sustainable food products has only increased 3% from 2014 to 2017, making up 22% of total store sales even though 73% of consumers state that they want to change their consumption habits to reduce their environmental impact.⁵⁵

To unlock consumer demand for sustainably grown food, a new approach to pricing, marketing and decision framing is needed. Innovations in these areas that enable consumers to more easily and effectively buy into sustainable growing practices stand to unlock a new level of consumer demand and funding for regenerative farming.

The investment model

Zero Foodprint is a nonprofit actively innovating in this area by raising funds for carbon farming through a 1% fee on restaurant meals. Zero Foodprint's 1% meal fee is inspired by the community choice aggregation model that has gained impressive traction in energy markets and is helping move more than 100 cities, states and countries toward 100% renewable energy.⁵⁶ The community choice aggregation model employs decision framing techniques to encourage residents to collectively choose and procure power generated from alternative and clean sources. This model has proven effective at achieving seismic shifts in the energy sector through collective economic action.

Other private and public actors including Patagonia and the 1% for Open Space organization of Crested Butte have used this microgrant model at small scales to protect natural lands.^{57,58} Zero Foodprint is applying the model with a new level of ambition to support a transition to regenerative carbon farming across entire counties and jurisdictions.

All restaurants in a given city or county are asked, on an opt-out basis, to participate in Zero Foodprint's Regional Restore Program by adding a 1% carbon farming surcharge to their bills. Customers are then presented with a 1% carbon farming surcharge on their meals, to which they can opt-out.

Zero Foodprint has piloted the program and their experience so far suggests that more than 99% of customers are willing to pay this fee. Many restaurants across the world have voluntarily opted into the program and successfully generated more than \$100,000 in grants from pilot programs

The fees from the 1% surcharges are aggregated into regional funds, which in turn are used to fund regenerative farming projects with a focus on carbon sequestration. The funds are geographically bound and named, to sync with city- and county-wide initiatives. For example, a program in Sonoma County, California would establish and normalize a circular economy in which the majority of Sonoma County restaurants presented customers with a "Restore Sonoma" surcharge, generating millions per year for a "Restore Sonoma" fund.

The funds also create a platform that can leverage matching funds from USDA conservation programs and co-investment from a range of philanthropic, nonprofit and private actors. Just as with community choice aggregation in clean energy, many small contributions and choices are harnessed for more seismic shifts.



Zero Foodprint is piloting this model in the state of California with the “Restore California” fund, in collaboration with the state’s Department of Food and Agriculture, the California Air Resources Board, the California Environmental Protection Agency, and the California Association of Resource Conservation Districts. The conservation districts help link the funds from the Zero Foodprint program to farmers needing financing to make farm management transitions to soil health practices. Conservation district experts will also help implement the practices and verify carbon farming projects.

Value proposition and terms to farmers

The value proposition for farmers to participate in Zero Foodprint’s Regional Restore Program is an opportunity to receive grants and technical assistance that support high quality conservation and carbon farming projects. The exact mix of interventions that the grants support will vary by farm but must comport with USDA Conservation Practice Standards. The projects are designed and measured using USDA’s COMET-Farm modeling tool, with on-the-ground technical assistance from local providers such as Resource Conservation Districts.⁵⁹ Because of this, the Zero Foodprint grants can provide a basis for farmers to secure additional funding from USDA NRCS grants and other sources.

Farmers can apply for any amount of funding up to the full cost of the project. But they will be competing for funds and so may choose to request amounts that cover partial costs. Zero Foodprint selects projects based on one primary criteria: a project’s carbon dioxide equivalent sequestration potential per dollar spent. Additional bonuses are provided for growers from an underserved or underrepresented geography, product, practice or demographic, and for growers in the supply chain of participating restaurants.

More details can be found in the grant application for Restore California.⁶⁰

Projects undertaken so far by Zero Foodprint’s Restore California fund have supported composting, cover crops (CPS 340), hedgerows and managed grazing.

Investor type and return structure

Thus far Zero Foodprint has raised grants to cover its working capital needs as it validates and scales its model. Zero Foodprint was the recipient of a 2019 NRCS Conservation Innovation Grant to fund the establishment of the program in California and began accepting applications for carbon farming projects in January 2020. Zero Foodprint membership is presently comprised of 53 restaurants from around the world. On average, participating restaurants generated approximately \$1,000 per month for carbon farming grants before COVID-19 impacted the restaurant industry.

Looking forward, Zero Foodprint’s model could accommodate a range of investment structures and target returns, with initial investment in city- and county-wide initiatives earning a return from the revenue generated from the surcharges.



Risks and risk mitigation

Zero Foodprint faces two potential risks: low restaurant participation and farm projects that do not adequately deliver the conservation and regeneration outcomes laid out in their applications.

The program addresses the risk of low restaurant participation in three ways:

- *Use of key influencers.* The founders of Zero Foodprint, Karen Leibowitz and Anthony Myint, are well-known chefs and restaurateurs who have assembled a network of other recognized and influential chefs as early adopters to the program.
- *Engagement with public policy and public relations.* Zero Foodprint works closely with aligned stakeholders in public policy and civil society who support the program via the press and other forms of public engagement. These measures increase the benefits to restaurateurs participating in the programs.
- *Giving restaurateurs confidence, based on evidence, that participating will help their business.* Zero Foodprint provides testimonials, survey results and other forms of data to restaurants to give them confidence that the costs of participating are minimal, and that customers are willing to pay the fee – and feel good about it.

The Zero Foodprint program addresses the risk of poor farm outcomes via three mechanisms. First, the program uses a competitive bidding process to ensure the highest outcome per dollar investment. Second, the program uses USDA NRCS Conservation standards to ensure the practices used by farmers meet requirements for other forms of public funding. And third, the program uses diligence, assistance and oversight from local technical assistance providers that know the local soils and conditions.

Unlocking scale

Pathways for scaling

The Zero Foodprint model presents many exciting opportunities for scaling. Two of the most promising opportunities – county-wide initiatives and university dining programs – are outlined below.

1. County-wide initiatives

Zero Foodprint has scoped the opportunity to scale its model across entire counties, through public-facing initiatives that have the support of county governments. For example, Zero Foodprint could partner with a county to communicate to all restaurants and to the public that restaurants in the county will, by default, apply a 1% carbon farming surcharge to restaurant bills to fund carbon farming in that county. Restaurants could have the option to opt-out during their annual business license renewal. Dining customers could decline to pay the charge when they receive their bills. But whether restaurants choose to participate or not would be publicly available information, and participating restaurants would be given window display stickers to show customers they are participating.



Funds from the 1% surcharge would then flow back to Zero Foodprint, who would use the funds to administer grants for carbon farming to farms in that county. The grant would fund farm planning and technical assistance provided by Resource Conservation Districts, and cover the full project implementation costs, as bid by the grower. Zero Foodprint and private sector funding could leverage matching contributions from farmers and from NRCS conservation programs such as EQIP.

Sonoma County, California is an example of a county that would be a strong candidate for this program. It has a vibrant and diversified agricultural sector, with approximately 264,000 acres that could be transitioned to soil health practices. Its Resource Conservation Districts are leaders in carbon farming, with dozens of projects completed and many more in development. And the county is motivated to act. It declared a climate crisis in 2019 due to the increasing threat of wildfires, drought and flooding.⁶¹ And restaurant industry revenue in Sonoma County is projected to remain over \$600 million per year, post COVID-19. This could generate approximately \$6 million per year for the Zero Foodprint fund, assuming a 1% meal surcharge and a 1% opt-out rate.

This presents the possibility of a county-level model of \$2-5 million of upfront investment to launch the Zero Foodprint program, unlocking \$6 million per year in surcharge revenue, which could then be used to repay the upfront investment in under five years and unlock \$10-20 million per year of funding for carbon farming, in perpetuity.

2. University dining services

Scaling through university partnerships could take a very similar approach to the county-level example. Many universities have set carbon neutrality targets across Scope 1, 2 and 3 emissions. These schools have developed plans to address their Scope 1 and Scope 2 emissions. The Scope 3 emissions, including carbon emissions from the food products purchased by campus dining services, are harder to address.

To help universities address the Scope 3 emissions from their dining services, Zero Foodprint could enable universities to fund carbon reduction projects on farms in their supply chain or local counties via an opt-in 1% charge on student meal plans.

Sponsoring this model would be an appropriate role for catalytic capital. Initially, grants would fund a life cycle analysis of campus dining services to establish the system's baseline carbon emissions. Then, as in the example above, upfront investment could fund the design, development and launch of the program. The universities could then establish the 1% surcharge opt-in option for students, which would repay the upfront investments made and pay for additional carbon projects.

Over time, depending on student uptake, the opt-in option could be switched to being opt-out.

The universities would also gain value through generating and verifying carbon offset credits from the farm practices to which the Zero Foodprint fund would provide grants. These de facto carbon credits could be used toward campus carbon reduction efforts and provide a legitimate inroads to Scope 3 carbon reduction through supply chain carbon sequestration.

Finally, there could also be an opportunity to involve university researchers, students and extension services in design, data collection, monitoring and applied research related to the farm projects themselves – opening up new opportunities to generate value for the university or defray implementation and monitoring costs.

Case study 3: Takeaways for catalytic capitalists

Lessons learned

Zero Foodprint is innovating a table-to-farm circular economy model that can be scaled dramatically through public-private collaboration.

They started from first principles by asking two simple but powerful questions:

- 1) How could restaurants become part of the solution to the climate crisis?
- 2) How can we direct as much money as possible into carbon farming, as soon as possible?

To answer these questions, Zero Foodprint mined carbon accounting, behavioral economics and clean energy markets for inspiration on how to shift behavior and unlock collective funding decisions at scale for agriculture.

At the tactical level, their decision to synchronize their implementation model with USDA NRCS conservation practices, modeling tools and approved technical assistance providers has enabled them to streamline program design, leverage existing technical capacity and unlock opportunities for matching funds. As many farmers are already familiar with USDA standards and services, it is another good example of designing with key users and their decision-making behavior in mind.

A key lesson learned for scaling strategies from this project is the power of aiming to achieve transformation across regional governmental jurisdictions, which strike the ideal balance between scale and feasible implementation.

Opportunities for catalytic investment

Zero Foodprint has proven key elements of its model via voluntary participation by leading restaurants and their customers.

However, moving to this next level of scale entails more significant capital (\$2-5 million per county or university system) and non-trivial amount of risk. This is where catalytic capital can play a valuable role by providing a mix of grants and Program-related investments to cover the upfront investment needed to rollout and validate the model at this scale.

There may also be an opportunity to more quickly accelerate the rollout of the model across more counties and systems by providing concessionary capital or loan-loss guarantees alongside commercial investors to source the larger volumes (\$10-50 million) of upfront investment required.

The exact mechanics would be refined and customized for the target region or partner, but in general terms impact investors could explore three promising opportunities:

1. Sponsor the launch of the Zero Foodprint model in one large county.

- *Outcome objective:* Approximately \$30 million in funding within five years for carbon farming in that county.
- *Catalytic capital need:* Approximately \$2.5 million PRI in the form of a five-year loan at 5% interest.



2. Sponsor the launch of the Zero Foodprint model in one large university system.

- *Outcome objective:* Approximately \$20 million in funding within seven years for carbon farming within the university's supply chain or local region.
- *Catalytic capital need:* Approximately \$4 million PRI in the form of a seven-year loan at 5%

3. Sponsor the launch of the Zero Foodprint model across multiple counties and/or university systems.

- *Outcome objective:* Approximately \$50-100 million in funding within seven years for carbon farming within the university's supply chain or local region.
- *Catalytic capital need:* Approximately \$10 million concessionary capital or credit enhancement.

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Agrarian Commons

By Agrarian Trust

Summary

The opportunity for impact

- Financial markets typically treat U.S. farmland as a commodity that generates a certain amount of cashflow and thus can service a certain amount of debt.
- Many farmers either cannot access land or must service significant debts, which increases financial risk and short-term, extractive farming.
- De-commodified commons ownership structures address ownership, access and tenure challenges, which are especially severe for young, beginning and disadvantaged farmers.

The investment model

- The Agrarian Trust purchases land from retiring farmers and places it under the control of a locally embedded non-profit entity to form an Agrarian Commons.
- The Commons conveys affordable tenure to many mid-sized farmers — who are beginners or of disadvantaged groups — by funding low-cost and long-term leases.
- Agricultural easements on the property ensure natural resource protection and help leverage additional funding from various USDA programs.

Opportunities to unlock scale

- Catalytic capital can help unlock scale by funding Agrarian Commons in states across the U.S.
- The Agrarian Commons can scale by building thriving regional value chains for organic and regenerative farming, using certain well-positions Commons as main sites.



The opportunity for impact

The U.S. agricultural economy has commodified agricultural land. Agricultural land values reflect development, speculation and extractive uses, and are treated as an asset class from which farmers must extract financial value to cover the significant debt incurred to purchase and own the land.

Farm debt has risen from \$220 billion in 1992 (inflation adjusted) to \$425.3 billion in 2020, at a time when farm profits are at their lowest points in 20 years.⁶² At the same time, agricultural land values in the U.S. have continued to rise, from an average of \$1,460 per acre in 2000 to \$3,160 in 2019.

This financial pressure contributes to continued consolidation, industrialization and short-term management of farmland, and undermines land access for new, beginning and disadvantaged farmers. Socially disadvantaged farmers and ranchers continue to lose and be excluded from agricultural land while facing low access to credit.⁶³ And even the most financially stable farmers must service significant debts with slim margins, and thus have little incentive or ability to make investments in the long-term value of the land.

At the same time, 400 million acres of agricultural land is projected to change hands between 2010 and 2030.

In this context, Agrarian Commons offers an opportunity to transfer and restructure farm ownership and management in a way that provides more affordable land access and tenure to mid-sized farms, and removes the weight of a traditional mortgage from their shoulders in return for their commitment to long-term land stewardship.

Agrarian Commons achieves this by transitioning agricultural lands into the ownership of a locally embedded non-profit commons entity that has a mission to promote access for mid-sized farms as well as ensuring regenerative farming methods and ecological stewardship. This arrangement de-commodifies the land and releases farmers from high debt burdens, allowing them to focus on long-term stewardship of the land. It offers access opportunities to beginner, minority and otherwise disadvantaged farmers who have historically been denied access to land and operating capital. And it provides a basis for the creation of thriving regional value chains for regenerative farming.



The investment model

The Agrarian Commons model provides mid-size farmers access to land at low cost, while placing conservation requirements into its lease agreements to preserve the health of the land.

The Agrarian Trust establishes commons by purchasing farmland at significant discounts or receiving full land donations from sellers that are looking to retire and want their land to be maintained in sustainable agricultural practices.

The farmland is purchased without a mortgage, meaning investor capital would be the only debt attached to the land. The Trust self-imposes a 20% debt secured cap in order to de-risk the land to keep it within sustainable agriculture. The debt on the land can therefore be serviced through affordable lease rates.

After purchasing the land, the Agrarian Trust transfers the land to a locally governed Agrarian Commons 501(c)(2) or (c)(25). The commons are governed by a board that includes farm leaseholders, community technical service providers and stakeholders, and Trust appointees.

The commons uses lease restrictions and sells conservation easements to further lower the cost of holding the land. By purchasing and holding the land at low costs under a 501(c)(2), the commons can provide low-rate long-term leases to farmers. The Agrarian Trust provides lease contracts that are not held on a per-acre cost basis. Instead, the lease prices are determined by a farm's viability. These agreements could range between \$5,000 and \$12,000 per year.

The commons further supports farmers leasing the land through equipment purchases and technical support. The commons will also fund stewardship projects using lease revenue.

Forming each commons, including legal fees, costs approximately \$100,000. Once operational, a commons costs approximately \$30,000-\$50,000 per year. The optimal size for a commons is between six and 12 farmland properties.

Value proposition and terms to farmers

The Agrarian Commons model reduces the cost of land to beginning and mid-size farmers. It also supports land transitions to a new generation of farmers to maintain the long-term stewardship of the land.

The commons model can specifically align land cost with agriculture production value to provide opportunities to farmers that have historically been pushed out of the agricultural system by inequitable policies. The Commons system can help spur minority participation in agriculture and cultivate new local food systems.

Unlike traditional farmland leases that are based on a per-acre price, farmers leasing land from the Agrarian Commons pay lease costs that are based on their agricultural business viability and their capacity. The lease agreements range between \$5,000 and \$12,000 per year.

Participating farmers also receive investments in soil health practices, renewable energy, agricultural buildings and infrastructure, community engagement, technical support and network resources from the commons. These investments are especially meaningful for young and beginning farmers.



Investor types and return structure

The Agrarian Trust is raising capital from grants, donations (land and cash), program-related investments, crowd-sourced funding and conservation easement receipts. These investment types play different roles in completing the Agrarian Commons model.

Donations of land and farms below market value allow the commons to purchase and hold farmland at low costs — unlocking the ability to realign farmland value with regenerative agricultural production and away from market values determined by development, extraction, speculation and financial asset based financial returns. Philanthropic investors and program-related investments provide the capital necessary for the Trust and Commons to make land acquisitions and invest in buildings, management and support, and unlock other forms of revenue including conservation easements and USDA cost-share funds.

Risks and risk mitigation

In many ways the Agrarian Commons model is designed to address risks pervasive in conventional agriculture. For example, the high amounts of debt leverage placed on land and farms places significant risks on the landowners and farmers who must service it. And, over the long term, conventional agriculture will be increasingly exposed to risks presented by climate change and the erosion of soil and others forms of natural capital – risks that are compounded by limited and short-term investments in land, ecosystems and farm assets. The Agrarian Commons model directly addresses the need to invest more now in climate resilience and long-term agricultural business sustainability.

That said, those providing funding and investment to support the establishment of Agrarian Commons will be exposed to risks, primarily on the financial side. Mid-sized farms occupy a challenging position in the value chain and may struggle to meet their lease payments.

The Agrarian Trust plans to mitigate these risks through careful farmer selection and investments in training and marketing.

Unlocking scale

Pathways for scaling

The Agrarian Commons model could scale its impact via two distinct pathways:

1. Establishing commons in more states.

The Agrarian Trust aims to acquire 12 founding farms, making up 2,400 acres across 10 states, to launch the project. The Agrarian Trust is looking for program-related investment funds to support purchase of the farms under the Agrarian Commons structure.

During the first phase of the Agrarian Commons project, the Agrarian Trust has set an objective to raise \$10 million for the following:



- \$7.5 million for acquisitions, land transactions and organizational capacity at a discount prices for a total purchase land value of \$16.5 million.
- \$500,000 for infrastructure, renewable energy projects and conservation practices.
- \$2 million for revolving loan fund for farmers.

Scaling the pathway model further to each state across the country would generate substantial impact in sustaining mid-size farms and building local regenerative agriculture clusters. Scaling the commons structure across the U.S. would require establishing a repeatable and dependable model that can be funded by a consistent stream of grants, philanthropic capital and program-related investments. It also requires leveraging philanthropic grants and program-related investments to gather USDA-NRCS funds that support regenerative farming practices. Scaling the Agrarian Commons model would take a nature-centric approach of growth in which commons would be established and built to capacity before transitioning efforts to a new geography.

2. Building regional value chains for organic and regenerative agriculture through the Commons.

The second opportunity to scale the impact of the Agrarian Commons model is to use newly formed commons to establish regional value chains for organic and regenerative agriculture. The capital raised to establish a commons could provide a foundation for even greater social and environmental impact over time, via additional strategic investments to cultivate thriving regional value chains. The first farms purchased in an area — the centerpiece of the commons — could be leveraged as a resource to build regional capacity for training, economies of scale in purchasing, operations, processing and logistics, and cooperative marketing and sales initiatives.

Scaling impact by investing in regional value chains could take the following steps:

- **Purchasing strong anchor sites.** Investors would begin by investing in the Commons model to support the purchase of strong anchor sites that have the capacity to support farmer training and equipment sharing that could be used by smaller farms eventually added to the Commons.
- **Expansion of the commons.** The Agrarian Trust would grow regional capacity with more investment in other farms in the region purchased and managed under the Commons, building on the anchor sites. Beginning farmers trained at the anchor sites could receive access to low-lease land at the new sites. Equipment and other resources could be shared from the main site to reduce the operating costs of farmers at the new sites. Building off the anchor sites would reduce the cost of capital for the new sites.
- **Formation of a cooperative.** Farmers operating across the regional Commons sites could form a cooperative with the support of grant-stage funds to increase their purchasing and marketing capabilities. The co-op could also invest in local processing infrastructure to improve the efficiency of their supply chain. Building on the increased capacity of the Commons, the cooperative would involve a small investment with huge impact in building the farmers' businesses and their future ability to access financing from traditional farm financial institutions.

The role for catalytic capital

Achieving these scaling models efficiently requires catalytic capital to support the purchase of the land, the conservation easements and other forms of public grants.

A funding pool with a 50% Program-related investment-to-grant ratio could provide the capital necessary for the Agrarian Trust to purchase properties at approximately 45% of market value and endow the land to the Agrarian Commons 501 (c)(2)s. Twenty percent of the land purchase cost could be held as debt to the Program-related investment and would be repaid over time through lease payment revenue. The purchase of the land through the grant and the Program-related investment would unlock the funds from selling a conservation easement through the USDA Agricultural Conservation Easement Program, as well as other USDA conservation program funds such as Environmental Quality Incentives Program.

The grant and PRI could also unlock bank and private financing for operating loans or equipment loans that would not have been available to farmers without access to land and the resources of the Commons.

Case study 4: Takeaways for catalytic capitalists

Lessons learned

The Agrarian Commons model provides unique insights about the power of challenging embedded financial barriers to long-term stewardship and farm viability.

First, similar to other models presented in this paper, the strength of the Agrarian Commons model stems from its foundation in first principles, including:

- 1) Long-term farmland stewardship cannot coexist with significant short-term debt obligations and short-term land ownership and agricultural business lifecycle.
- 2) Young, beginning and historically disadvantaged farmers cannot be successful without entering the system with low debt levels

Second, the Agrarian Commons model demonstrates that addressing a pervasive underlying problem (land valued as an extractive asset) can directly achieve social and environmental impact simultaneously. Realizing how parts of the agricultural system are valued inherently provides social and environmental impact.

Third, the Agrarian Commons exemplifies that investing in new and innovative models can unlock opportunities for farmers traditionally excluded from mainstream financial products. This provides unique impact to a group of farmers that need the most support.

And lastly, the Agrarian Commons model sheds a light on the important consideration catalytic capital investors must make between rapid scaling of models with targeted impact on outcomes and slow scaling models with deep multi-benefit impact. The Agrarian Commons provides the opportunity for deep change in the status quo that takes slow and dedicated capital to achieve over time.

Opportunities for catalytic investment

Agrarian Commons are place-based initiatives that take time and significant resources to cultivate. The two opportunities below illustrate how philanthropists and impact investors could intervene now to establish more Agrarian Commons across the U.S., and realize the full regional potential of each Commons that is established.

1. Sponsor the Agrarian Trust's current capital campaign for forming Agrarian Commons.

- *Outcome objective:* Acquire land worth approximately \$16.5 million to establish Agrarian Commons in four of the 10 states that provide land access to approximately 20 mid-sized regenerative farms.
- *Catalytic capital need:* \$10 million total, in the form of:
 - o \$7.5 million in grants, to acquire land worth approximately \$16.5 million and for organizational capacity.
 - o \$500,000 in concessionary debt/equity for infrastructure, renewable energy projects and conservation practices.
 - o \$2 million in PRIs for a revolving loan fund for farmers.

2. Cultivate thriving regional value chains for regenerative farming in strategic locations, using Agrarian Commons as a foundational platform.

- *Outcome:* Successful clusters of mid-sized organic/regenerative farms for grains, vegetables, livestock, dairy, and value-added production and community engagement serving fast-growing urban and local markets.
- *Catalytic capital need:* \$5 million total, in the form of:
 - o \$1.5 million in grants for strategic planning, technical assistance and cooperative formation.
 - o \$4.5 million in concessionary capital and credit enhancement for investments in keystone processing and logistics infrastructure.

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FarmStart

By Farm Credit Council

Written in collaboration with Gary Matteson, Farm Credit Council

Summary

The opportunity for impact

- Traditional annual operating loans do not match the multi-year time horizons of conservation practice investments.
- Increasing equity on a farmer's balance sheet improves his/her ability to receive a multi-year loan for conservation practices.
- Farm Credit's FarmStart program has leveraged private capital to increase equity for over 300 young, beginning and small farmers in the last 15 years.
- The FarmStart equity program could be used to help farmers secure multi-year loans for conservation practices.

The investment model

- FarmStart Regen LLP could raise funds from investors looking to support agricultural conservation practices.
- These funds would be used to provide equity to farmers under conservation requirements and the farmer's ability to acquire a multi-year loan for the conservation practice(s).
- The lender would provide a multi-year conservation loan backed by the farmer's conservation-specific equity.
- Farmers would repay the equity to FarmStart Regen LLP. The repaid equity would become available for revolving investments to additional farm operations.

Opportunities to unlock scale

- The FarmStart model has a 15-year record of success as a beginning farmer program, serving over 300 farmers.
- There is potential for this model to be used in support of transition to organic or regenerative practices.
- Farm Credit is an existing source of credit for 500,000 farmers per year — providing an opportunity to reach a large scale of farmers.



The opportunity for impact

Adopting conservation practices entails a multi-year delay between implementation costs (such as purchase of new equipment) and the anticipated increased earnings from operating cost savings and improved yield and resilience. However, typical annual operating loans for crop input expenses in the spring must show a positive annual cash flow through expected crop sales from the fall harvest. Current low profitability for commodity crops like corn and soybeans makes the cost of implementing regenerative practices such as planting a cover crop (CPS 340) difficult to fund through an annual operating loan.

Spreading the cost of implementing regenerative practices over several years could allow farmers to repay the investment through increased profitability from operating cost savings and enhanced future crop earnings generated by the slow accumulation of agronomic benefits from the regenerative agriculture practices.

Regenerative practice adoption must be supported as a farm budget decision to assure the financial sustainability of the farm operation. Farmers create annual crop budgets, then usually test those plans with a trusted farm lender through the process of seeking credit.

Approximately 500,000 farmers access credit through one of the 68 Farm Credit financial cooperatives across the country that are owned and controlled by farmers — analogous to a series of credit unions for farmers. Each of the 68 independently operated Farm Credit Associations is owned and governed by its farmer-borrowers as a cooperative. Groups of about 20 associations own their wholesale bank as a cooperative and the four wholesale banks own the Farm Credit Funding Corporation as a cooperative. The Farm Credit Funding Corporation sells debt instruments to investors as the funding source for the four Farm Credit wholesale banks that aggregate the debt capital needs of the 68 local Farm Credit Associations' lending to farmers. Farm Credit Associations have a high degree of customer loyalty because of their cooperative structure, which allows loan officers the latitude to use a “consultative credit” approach with the farmer-borrower-owner-member of the cooperative.

Farm Credit structure and lending practices are well suited to de-risk borrowing costs for farmers seeking to adopt regenerative agriculture practices through efficient equity investment that supports longer loan repayment terms. Equity investment allows farmers to access farm loans without modifying existing lending standards and practices, while maintaining the trust inherent in farmer-lender relationships. This combination makes the FarmStart Equity Investment Model an effective, scalable and financially promising program.



The investment model

The FarmStart equity investment model for regenerative practices builds on an existing program designed to assist beginning farmers. The FarmStart concept was created 15 years ago to address the most common problem facing beginning farmers: a lack of equity. The local Farm Credit Association in the Northeast, Farm Credit East, established FarmStart LLP as an independent equity holder and investor to work in conjunction with Farm Credit East loan officers to remove barriers to beginning farmers.

The equity investment model for beginning farmers works in the following way. FarmStart LLP places up to \$75,000 in cash on a beginning farmer's balance sheet. This allows Farm Credit East to follow normal underwriting procedures to make a loan it could not have made otherwise without the strength of the \$75,000 of equity in the farm's available working capital. The \$75,000 comes from the beginning farmer selling a five-year bond to FarmStart LLP that is non-recourse, subordinated debt — meaning that there is no way to recover the money if the beginning farmer decides not to pay it back (no collateral as recourse), and is subordinate to other debt (meaning last in the line of debtors in the event of a default).

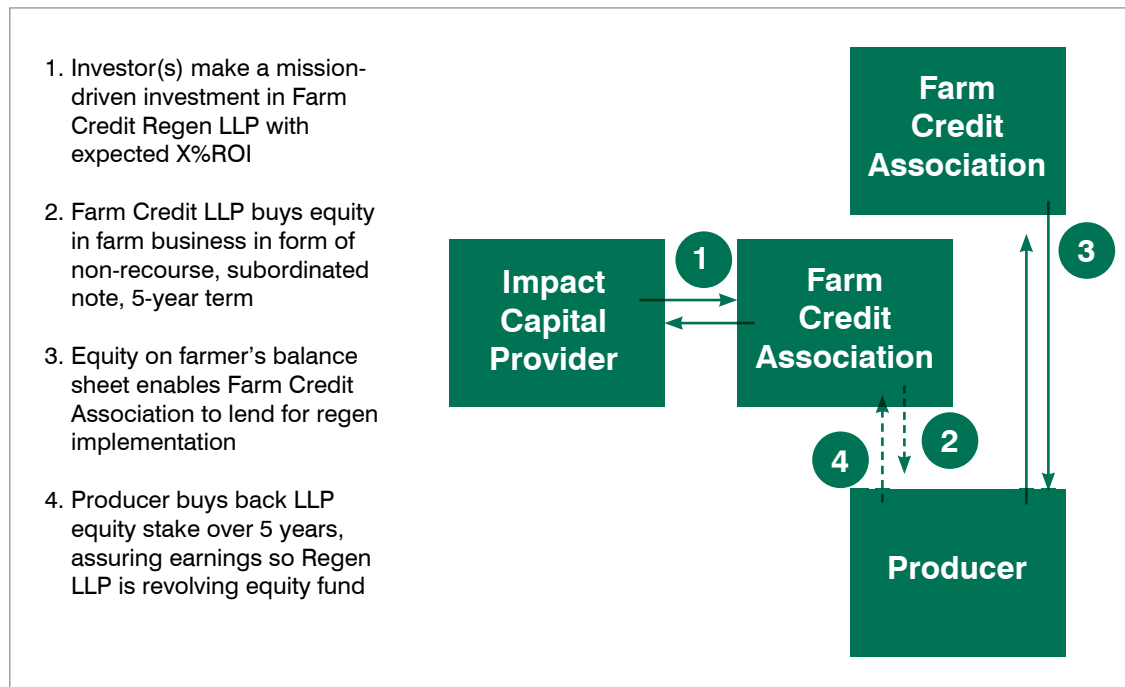


Figure 5: FarmStart Equity Investment Model for Regenerative Agriculture

FarmStart LLP acts as a mission-driven impact investor by making equity ownership investments in beginning farmers' businesses as start-up capital. The mission driving this effort is to promote the success of beginning farmers. The beginning farmer gets free financial software, financial skills education and mentoring. The multiple forms of start-up support increase the likelihood of farmers' success and accountability to a seasoned business advisor.

The bond is typically rolled over into a traditional loan if it is not repaid in five years. The traditional loan is then based on the beginning farmer's history of earnings and repayment capacity. In the program's 15-year history, more than 300 beginning farmers have received these equity investments with very few defaults. The interest rate on the FarmStart LLP bond is typically 2% over prime, which represents a source of earnings that can be used to offset some of the costs of the program.

This model, which has been successfully deployed to support beginning farmers, could be adapted to support farmers transitioning to regenerative practices. The diagram below depicts the FarmStart Equity Investment Model adapted to encourage an existing farmer to implement regenerative practices. In the example below, investors, which could be a local Farm Credit Association, a regional sustainability nonprofit or a downstream processor that seeks to incentivize sustainable production, could all invest in Farm Credit Regen LLP as impact capital providers. Investors would define the conditions for deploying equity to farmers through a contract with Farm Credit Regen LLP, establishing program parameters to accomplish conservation or regenerative goals.

An illustrative example of the Farm Start program adapted for conservation

Consider a farmer adopting regenerative agriculture practices has estimated their costs at \$250,000. Using the FarmStart model, \$200,000 can be borrowed from a Farm Credit lender on the basis of a \$50,000 equity investment by Farm Credit Regen LLP (\$200,000 loan + \$50,000 equity = \$250,000 cost of implementation). Interest expense for the \$200,000 loan over a five-year term (loan repayment at 5% rate for 5 years' interest expense is \$26,455) plus \$50,000 equity (equity repayment at 7% rate for 5 years' interest expense is \$9,404) would then total \$35,859 in accumulated interest expense over the 5 year term of the loan. Repayment of the principal (the \$200,000 loan and the \$50,000 investment that was used to implement regenerative practices) would come from increased cash flow from adoption of the regenerative agriculture practices. In practice, the appropriate mix of equity and debt would be specific to the individual farm's financial condition and other factors.

The equity investment and the loan happen together. By putting Regen LLP equity on the farmer's balance sheet, the Farm Credit lender may lend against that equity to cover the longer term of the loan for implementing regenerative practices. And like the FarmStart beginning farmer program, there must be access to technical assistance and coaching for farmers transitioning to new agronomic practices. Agronomic technical assistance may be paid for by impact investors and concurrent financial skills training may be provided by Farm Credit.

It is important to note that Farm Credit can and does make extended term loans to farmers for the adoption of regenerative practices based on the strength of the individual farmer's balance sheet and repayment capacity. However, it is anticipated that the risk mitigation to the farmer available through the FarmStart Equity Investment Model could provide clear incentive and encourage wider adoption of regenerative practices.

Because the farmer buys back (repays) the equity investment with interest (typically 2% over prime), the Farm Credit Regen LLP becomes a revolving equity fund with a 5-year term. That allows impact investor money to accomplish a beneficial mission with a small return on investment. This would enable raising equity funds in the form of Mission Related Investments from 501(c)(3) organizations seeking to maintain their non-profit tax status.

The innovative and efficient aspect of this model is its ability to leverage the impact investor's equity investment into access to a regenerative practice loan. By collaborating with a mainstream provider of agricultural credit, the impact investor gets a bigger bang for their equity investment buck. Impact investors can also rely on Farm Credit's existing lending infrastructure and expertise, rather than having to set up a process to make grants or loans to farmers.



Value proposition and terms for farmers

The primary advantage to farmer participating in the FarmStart model would be that the risk of adopting regenerative agriculture practices is reduced by the impact investor's capital.

The equity investment would give the farmer time to improve soil health and generate cost savings over several years before the anticipated increases in yield and resilience create increased crop earnings for repayment. As an example, it may be difficult to cash flow a simple regenerative practice such as planting a cover crop (CPS 340) through an annual operating loan, especially in years of low profitability or for operations with lower working capital positions. For example, planting a cover crop (CPS 340) may cost \$15 per acre on a corn crop while that acre only generates \$5 in net profit, making it a poor investment when considered purely on a one-year basis. The equity investment buys the farmer time so that the repayment can occur over several years of increasing crop earnings as a likely result of regenerative practices.

Risk and risk mitigation

The primary risk mitigation is the Regen LLP buying a non-recourse, subordinated debt bond from the producer who wishes to implement regenerative agriculture practices. This provides the farmer with non-recourse risk capital, which may then be borrowed against through the normal loan-making process. The normal loan-making process is an additional layer of risk mitigation for the farmer, since repayment capacity is a necessary condition of extending credit and getting the equity investment assistance.

Partnering with Farm Credit assures that any investment of impact capital is only with a farmer who can demonstrate sufficient repayment capacity. Normal loan underwriting practices require Farm Credit to generate written documentation of repayment capacity. This practice provides an opportunity for Farm Credit to guard against lending money that could harm the borrower by providing too much credit.



Unlocking scale

Pathways to scaling

Farm Credit has approximately \$350 billion in assets, with a 40% market share of U.S. farm business debt, lending to about half a million farmers and farmer owned cooperatives nationwide. That scale is unmatched by any other individual agriculture lender.

However, it must be noted that each of the 68 local Farm Credit Associations makes independent management decisions about adopting programs or practices to serve the needs of farmers in the defined geographic regions that they serve. That means the program described here for supporting regenerative agriculture is conceptual because it has not yet been adopted by any Farm Credit lender, although several are currently considering it. The FarmStart program has been running well for the past 15 years, so there is a history of success for the model in serving the needs of beginning farmers in Farm Credit East's territory.

The ability to use typical underwriting standards is another positive factor in unlocking scale and widespread use of the FarmStart model. As a regulated lender, Farm Credit is bound by technical directives regarding the equity required to make loans. If equity is provided through a model similar to the FarmStart program, then Farm Credit lenders do not have to change their underwriting standards that are based on repayment from crop earnings, because it has the backing of the equity provided by impact investors.

In addition to using this model for encouraging adoption of regenerative practices, it could easily include transition to organic or other desired practices — whatever specific goals and parameters the impact investors agree to by contracting with the Farm Credit Regen LLP. The impact investors may also gain by accumulating a base of evidence that shows the regenerative agriculture cost-benefit equation in terms of financial performance of the farms that adopt a certain set of practices

For example, a food company may be an impact capital provider and contract with Farm Credit Regen LLP to offer equity investments specifically to farmers in the food company's supply chain so as to encourage adoption of regenerative practices. Other impact capital investors may establish by contract that their capital is to be used in a particular geographic area, or for adoption of specific production practices related to water quality, or general approaches such as transition to organic production.

This description of the FarmStart Equity Investment Model does not mean that any particular Farm Credit Association will adopt such a program in the future. Some Farm Credit Associations have created other solutions to help farmers adopt more environmentally friendly practices, such as Compeer Farm Credit's Organic Transition Bridge Loan program. With Compeer's organic bridge loan, clients pay only interest on their loan for the first two to three years, with a declining balance operating loan while they are working toward organic certification. The loan converts to a standard five-year intermediate term loan with fully amortized principal and interest payments after a client has achieved organic certification.

Case study 5: Takeaways for catalytic capitalists

Lessons learned

De-risking the adoption of regenerative agriculture practices by farmers through equity investments may be a valuable incentive for farmers to increase adoption of regenerative agriculture, and for Farm Credit lenders to creatively finance it. Providing equity investments to farmers to support loans grounded in repayment capacity that is evaluated through conventional agriculture lending underwriting standards assures extension of constructive credit while demonstrating acceptance of regenerative practices to the broader community of farmers and lenders. This allows farmers the benefit of analysis by their lender, a neutral arbiter of future profitability and repayment capacity. Using existing trust-based relationships that farmers have with lenders and individual loan officers allows for consultative decision making that considers the long-term financial effect on the overall farm operation. It also opens the door for greater engagement by mainstream agricultural lenders to support regenerative agriculture.

Opportunities for catalytic capital investments

Catalytic capital has the opportunity to reach farmers at scale by partnering with Farm Credit to establish the FarmStart program in the following way:

1. Support the development of a FarmStart-like program for conservation practices in collaboration with Farm Credit.

- *Outcome objective:* There is potential for further adoption of a model similar to the FarmStart program by Farm Credit Associations to spur investment in conservation practices.
- *Catalytic capital need:* If the program were to materialize, funders and investors could invest in the program's first conservation equity funding pool.

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Conclusion

Farmers are under growing pressure to deliver environmental and climate benefits to meet the needs of consumers, communities, food companies and policymakers. They also face the challenge of adapting to increasing changes in weather caused by climate change. But farmers are severely constrained in their ability to change practices due to limited financial resources. Actors with greater financial flexibility and capacity must remove the burden from farmers and take on the task of addressing financial barriers to change and developing innovative solutions. Funders and investors should utilize catalytic capital to spur new financial models for agriculture and simultaneously address barriers to sustainable investments through policy and research.

This report is a starting point for funders and investors on their journey to invest in sustainable agriculture solutions. Funders and investors can utilize the three areas of investment opportunity, the catalytic capital insights and the five model examples presented in this report to build an investment strategy in U.S. agriculture that will address the financial barriers to sustainability and spur innovation and scale in the models tackling these barriers head-on.



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