



# The Economics of Regeneration:

A Landscape Assessment of Opportunities to  
Support A Viable Regenerative Agricultural System

SPRING 2020

Garrett Stoll  
Carbon Economy Fellow | Mad Agriculture

*with support from:*

Nicole Civita, LL.M, J.D.  
Sustainable Food Systems Specialization Lead |  
Masters of the Environment, University of Colorado Boulder

Tanner Starbard, MENV  
Director of Farm Planning | Mad Agriculture

# EXECUTIVE SUMMARY

## OVERVIEW

---

This report offers an overview of financial levers currently available to raise the regenerative capacity of farms across a spectrum of management regimes and ecological contexts. The document identifies and interrogates the mechanisms that give regenerative agriculture potential as a viable strategy for improving farm enterprises and related investment outcomes. The assessment covers 13 categories of incentives, investments, and funding opportunities that reward producers and financial partners for conservation outcomes. Each category is discussed in terms of its potential to enable sustainable agricultural practices, including leading examples and, if present, notable critiques. The categories are also ranked according to criteria across financial potential, environmental impact, and approachability. Through the overview and comparison of these financial mechanisms, producers and interested investors can quickly grasp the range of opportunities available and identify those that best suit the regenerative operation they aspire to create.

## KEY INSIGHTS

---

Farm economics is often passed over in discussions around regenerative agriculture, but this inattention is perilous. Financial viability is essential to the adoption of these practices at scale.

The overarching structures of conventional agricultural finance do not often explicitly reward ecologically beneficial outcomes. While there are disparate financial incentives attached to conservation practices, these methods are viewed as niche or secondary to other aspects of the enterprise. Momentum for more integrated sustainable agricultural investment is growing, but significant reforms will be necessary to tip the balance in favor of a regenerative system.

Many of the current strategies for motivating sustainable and regenerative agriculture are applied to enterprises ad hoc. Producers face challenges in creating an ensemble of financial mechanisms that offer mutual economic and environmental benefits. There is a real case to be made for an agricultural support service that specializes in regenerative enterprise planning to optimize outcomes across both domains.

Specific opportunities that are both actionable and impactful at this point in time include: federal grants and cost share programs, farmland investing programs with strong operator partnerships, and best management practices that offer long-term cost savings through resource management.

# TABLE of CONTENTS

- Introduction ..... 3
- Categories of Incentives ..... 6
  - Capital-Aligned Strategies*
    - Investment: Real Assets ..... 7
    - Investment: Private Debt and Credit ..... 12
    - Investment: Private Equity ..... 16
    - Investment: Public Debt ..... 18
    - Investment: Public Equity ..... 21
    - Grants and Philanthropic Funding ..... 23
  - Revenue-Aligned Strategies*
    - Ecosystem Service Markets ..... 28
    - Added Operations ..... 36
    - Offtake Methods ..... 39
  - Hybrid Strategies*
    - Risk Management ..... 41
    - Tax Instruments ..... 47
    - Management Optimization ..... 51
    - Alternative Accounting ..... 56
- Category Ranking ..... 58
  - Criteria & Summary ..... 58
  - Ranking Matrix ..... 61
  - Themes ..... 62
- Outlook and Conclusion ..... 64
- Glossary of Terms ..... 65
- Appendix 1 ..... 66
- Appendix 2 ..... 67

# INTRODUCTION

Regenerative agriculture is maturing as a prospective strategy for improving the environmental state of working lands at a meaningful scale. International resolutions, like the Food and Agriculture Organization of the United Nations' World Soil Charter<sup>1</sup> or the global 4 per 1000 Initiative<sup>2</sup>, support the adoption of ecological land management practices. State legislation targeting soil conservation and agricultural reform has passed in four states and is pending or drafted in at least fifteen more<sup>3</sup>. Large companies like Danone, General Mills, and Kelloggs have adopted initiatives to promote regenerative management for agricultural operations within their supply chains. With recognition of the serious potential for regenerative agriculture as a climate-beneficial strategy, there is now a rapidly-accelerating conversation about how to operationalize this alternative management regime and intelligently transition millions of acres under conventional management. A vital component of conceptually-sound, context-sensitive regenerative agriculture is farm economics.

The levers of finance available to most conventional operations are credit, tax-subsidized benefits (e.g. direct subsidies and price supports), risk management mechanisms (including subsidized crop insurance), cost controlling strategies (e.g. optimizing usage of expensive inputs), and revenue structuring (e.g. selecting crops, livestock, and supplemental activities for cash flow potential). Exemptions from certain regulations and taxes applied to other industries, while not direct financial levers, also factor into profitability. Exceptions to environmental regulations, for example, can lower the cost of doing business<sup>4</sup>. These mechanisms help make it possible to farm in this country at all, but they can also generate incentives for maladapted activities that cause environmental and social harms. Consider, for example, how crop insurance can motivate producers to undertake risky activities, like planting varieties that aren't suited to local conditions but are covered by indemnities<sup>5</sup>. Or consider how subtherapeutic antibiotic use, a common risk management mechanism in livestock production, offers short-term profit enhancement while risking dire long term harms. Indeed, one investor advocacy group representing \$20T in assets argues that non-therapeutic antibiotic use will contribute to \$100T in global losses by 2050 as antibiotic resistance reaches a tipping point<sup>6</sup>.

Currently, regenerative-specific versions of these financial levers are nascent — if they exist at all. Producers who embrace the tenets of regenerative agriculture can face an uphill battle in

---

<sup>1</sup> Revised World Soil Charter (2015). Food and Agriculture Organization of the United Nations. From: <http://www.fao.org/documents/card/en/c/e60df30b-0269-4247-a15f-db564161fee0/>

<sup>2</sup> 4 per 1000 (2018). From: <https://www.4p1000.org/>

<sup>3</sup> Healthy Soils Legislation and Policy (2020). Tufts Northeast Healthy Soils Initiative. From: [https://sites.tufts.edu/gdae/files/2019/10/Keleti\\_HealthySoilsLegislationPolicy\\_2019.pdf](https://sites.tufts.edu/gdae/files/2019/10/Keleti_HealthySoilsLegislationPolicy_2019.pdf)

<sup>4</sup> Adleman and Barton (2002), Environmental Regulation for Agriculture: Towards a Framework to Promote Sustainable Intensive Agriculture. Stanford Environmental Law Journal.

<sup>5</sup> The Strange Economics of Crop Insurance (2018). Niskanen Center. From: <https://www.niskanencenter.org/the-strange-economics-of-crop-insurance/>

<sup>6</sup> Managing environmental risks in meat and dairy supply chains: Engaging with companies to improve supply chain sustainability (2019). Farm Animal Investment Risk and Return Network. From: <https://www.fairr.org/research/reports/page/3/>

the search for capital aligned with the principle of patience in returning fertility to the soil, or in finding end markets that value food produced with an eye toward the longevity of the resource base. Fortunately, coordinated efforts to motivate these practices are in full swing. This report is intended to serve as an overview of the landscape of incentives, investments, and funding opportunities that reward agricultural producers — as well as their financial partners — in the pursuit of improved conservation outcomes at the farm level.

The broad opportunity categories outlined below all revolve around compensating land managers with additional capital, revenue, or cost savings for their conservation activities<sup>7</sup>. Most categories also have actionable methods for a diverse range of partners to co-invest, sponsor, or otherwise participate in the economic and environmental impacts of regenerative agriculture. There are already some excellent analyses about regenerative agriculture as an impact investment strategy. *Soil Wealth* — a 2019 report by the Croatan Institute, the Delta Institute, and the Organic Agriculture Revitalization Strategy group — and *Impact Investing in Sustainable Agriculture Across Asset Classes* — a 2017 report by the Croatan Institute, RSF Social Finance, and other partners — both offer comprehensive looks at the current opportunities for investors to motivate and participate in sustainable agriculture. For more examples see the publications listed in Appendix 1: Additional Resources.

The categories considered here, however, look beyond the scope of direct investment by institutions and individuals to include strategies that could be directly enrolled in by a farmer, or could be entered into by a farmer with the right partners. Space is also given to potentially impactful strategies that are currently speculative. In considering the applicability of these opportunities, it is important to recognize the incredible diversity of agricultural operations —

---

<sup>7</sup> The term “conservation activities” is used to describe a range of practices that are generally correlated with environmental improvements (also called “conservation outcomes”). The direct effects of a given conservation activity might differ based on local contexts, but overall, they impart environmental benefits that in turn build the regenerative capacity of a farm. The term “regenerative” requires more careful application. The exact definition of regenerative has been debated extensively, but it implies (some might say requires) that the balance between extraction and replenishment of resources is tipped toward the latter. A working model of this principle suggests that a full accounting of a regenerative farm’s inputs and outputs would reveal that the farm returns more to natural systems — in terms of nutrients, carbon, biomass, energy, or other measures — than it removes. So, precise usage of the terms requires a semantic distinction between a farm that employs numerous conservation activities and a regenerative farm. As a random ensemble of conservation activities does not inherently lead to regeneration, there is utility in being aware of this distinction. In other words, the regenerative capacity of a farm is greater than the sum of the conservation practices applied there.

However, performing analytically rigorous evaluations (e.g. life cycle assessments or trial-based scientific studies) for every operation aspiring to regeneration is far from cost-effective. In practice, evaluating the regenerative state of a farm comes down to more readily observable indicators, like soil cover, soil structure, natural soil fertility, species diversity, and many others. Almost separate from quantification and observation, switching to the regenerative perspective also requires a paradigm shift. Regenerative agriculture is not necessarily about managing for outcomes or applying best practices. It is more about relationships — between land and steward, between health and food, between community and citizen, between nature and humankind. See [Levels of Regenerative Agriculture](#) by Ethan Solevie and Gregory Landua for a more nuanced take.

diversity manifested in differing sizes, growing environments, ownership structures, crop rotations, end markets, and so on. Even relatively narrow classifications, like the USDA's farm typologies or census divisions, don't capture the nuance inherent to an individual enterprise.

To streamline some of this complexity, this assessment is targeted at a hypothetical subset of operations with common features that help narrow the scope. This approach is intended to capture general trends while still offering insight that producers or partners could adapt to unique contexts. The hypothetical farm type used for comparison consists of midsized crop and/or livestock operations. In general, incentives consider a conventional management regime as a baseline, although some opportunities have more utility for regulated production types like certified organic. While these financial mechanisms can also generally apply to small farms, there is some consideration given to economies of scale and potential capital thresholds that might restrict payback. Consideration is additionally given to whether an incentive requires ownership of managed land, or whether lessees can also participate. And while some opportunities can be applied to forestry, aquaculture, or other kinds of operations, specific incentives for these production regimes are out of the scope of this report.

If regenerative management and ecologically-motivated financial strategies can make an operation more profitable, then the likelihood of transitioning conventional farms increases drastically. In other words, meaningful scale will be achieved when regenerative is the best way of doing business, stewardship motives aside. As it stands, some producers have found piecemeal ways of making regenerative management competitive — better than competitive, in select cases — but the challenge is in identifying and creating sufficient economic mechanisms that can apply to a greater variety of farming contexts and involve more actors from the realm of conventional finance. The diverse strategies below represent the best efforts of policy advocates, investors, entrepreneurs, conscious consumers, and farmers to create an economic system that rewards regeneration.

## CATEGORIES of INCENTIVES

There are 13 primary categories into which the incentives, investments, and funding opportunities for regenerative agriculture are organized. These categories are:

1.	Investment: Real Assets	19
2.	Investment: Private Debt and Credit	17
3.	Investment: Private Equity	15
4.	Investment: Public Debt	17
5.	Investment: Public Equity	13
6.	Grants and Philanthropic Funding	
	Public	20
	Private	16
7.	Ecosystem Service Markets	
	Carbon	15
	Water Quality	15
	Water Quantity	15
8.	Added Operations	15
9.	Offtake Methods	17
10.	Risk Management	
	Insurance	15
	Resilience	16
11.	Tax Instruments	17
12.	Management Optimization	19
13.	Alternative Accounting	14

Some of these categories have notable subcategories — ecosystem service markets for example includes carbon markets that trade GHG equivalents, water quality markets, and water quantity markets. Organizing these opportunities across a high level of similarity will hopefully prove useful for farmers looking to understand the landscape of funding mechanisms that might fit their existing operation, and the ideal operation they envision. This organization is also essential for comparing the current maturity, scope, and diversity of strategies within and across the categories.

Each section includes a description of the given category and select examples of relevant mechanisms<sup>8</sup>. Examples range from existing financial products, companies or organizations working with the category, policy mechanisms supporting the category, and methods to deploy ecologically-motivated capital or earn environmentally-contingent revenue. Note that the provided examples are not exhaustive. They are a sample of strategies and mechanisms that are applicable to a range of farm typologies, financial functions, and environmental focuses.

## CAPITAL-ALIGNED STRATEGIES

The first grouping of categories includes strategies that reward producers with access to capital — or better capital terms — for their conservation activities. The mechanisms span debt and equity, and even include direct injections of philanthropic capital from grants. Farm operations of all sizes have considerable capital requirements, even more so when they are attempting to finance a transition to regenerative management. These strategies bring institutional assets to bear in acquiring land for new farmers hoping to start a regenerative enterprise, expanding already-sustainable operations, financing conservation infrastructure projects, building robust regenerative supply chains, petitioning for regenerative corporate policies through shareholder advocacy, and more. In almost every case, fair returns for investors remain a key priority. However, like impact investment in any sector, these strategies seek balance between reasonable returns and beneficial outcomes, in this case for managed land and rural communities.

### 1. INVESTMENT: REAL ASSETS

#### BACKGROUND

---

For agriculture, real asset investment primarily consists of farmland real estate acquisitions and management. Fishery and forestry investment can also be included in this category, but the primary focus here is on land managers who would adopt these strategies for crop and grazing land. Farmland investing is a recognized tool for diversifying a portfolio and managing risk. The relatively consistent appreciation of farmland offers steady returns to investors looking at a long time horizon. Investing in farmland, either directly or as shares in a Real Estate Investment Trust (REIT) or similar vehicle, can also offer opportunities to share in revenue from production undertaken by managers of institutionally-owned farmland<sup>9</sup>. Over the past five decades, farmland investment has consistently yielded over 10%, outperforming some real estate and stock indexes<sup>10</sup>. While agricultural land value has plateaued since about 2014, this investment

---

<sup>8</sup> Note that the ordering of examples is not intended to convey a ranking or assessment of impact

<sup>9</sup> Investing in Farmland: A Real Estate Investor's Guide (2020). Million Acres. From: <https://www.fool.com/millionacres/real-estate-investing/investing-farmland-real-estate-investors-guide/>

<sup>10</sup> The Biggest Investment Opportunity You've Probably Never Heard Of (2018). Forbes. From: <https://www.forbes.com/sites/navathwal/2018/12/02/the-biggest-investment-opportunity-youve-probably-never-heard-of/#78fd8b93299f>



class offers a relatively high degree of stability<sup>11</sup>. Some investors also see appeal in connecting their portfolios with an economic sector that supports food production — an integral part of our economic and cultural landscape.

Farmland investing requires major pools of capital to acquire, and in some cases improve, the purchased land. Improvements can include transitioning to certified organic production, investing in cropland or pasture restoration, adopting conservation practices, and installing new infrastructure to optimize production. Given the large capital requirements and targeted geographies in which firms operate, not all farms or farmers are able to participate in this funding strategy. However, this strategy does offer investors an opportunity to engage with sustainable agriculture in a meaningful way that effectively mitigates investor risk.

## CRITIQUES

---

Farmland investment has been criticized as a “land grab” by Wall Street that is counter to the motives of stewarding agricultural land and actively harmful to the vitality of rural communities<sup>12</sup>. If investment firms do not include farmers as valued stakeholders, or if they treat all farming contexts as broadly the same, there is the risk that this investment strategy can ignore substantive social and resource management concerns. Meaningful partnerships between investors and farm operators, as well as transparent management terms, are important for mitigating this risk. There are rental term models for land owner/lessee partnerships that can motivate mutually beneficial relationships that also prioritize farm ecosystem health<sup>13</sup>. First, rental rates can be tied to indicators of soil health or environmental performance overall. Second, rental payments can be delayed or reduced if the farm operator agrees to transition the land to organic production on behalf of the land owner. And finally, owners and tenants can negotiate long-term leases or lease-to-own terms that motivate continuous stewardship and cooperation.

Another critique of farmland investing is, with the exception of lease-to-own models, this strategy lacks an ownership pathway for farmers. Land ownership can be a major source of farmers’ own wealth and a historical source of long-term — even intergenerational — stewardship. To address this, some farmland firms also offer competitive mortgage or expansion financing for operators that meet their environmental criteria.

## ACCELERATING REGENERATIVE AGRICULTURE THROUGH REAL ASSET INVESTING

---

There is a growing group of farmland investors who integrate sustainable outcomes and conservation best practices into their management criteria. The considerable potential that

---

<sup>11</sup> Farmland Value (2020). USDA Economic Research Service. From:

<https://www.ers.usda.gov/topics/farm-economy/land-use-land-value-tenure/farmland-value/>

<sup>12</sup> Down on the Farm — Wall Street: America’s New Farmer (2014). The Oakland Institute. From:

[https://www.oaklandinstitute.org/sites/oaklandinstitute.org/files/OI\\_Report\\_Down\\_on\\_the\\_Farm.pdf](https://www.oaklandinstitute.org/sites/oaklandinstitute.org/files/OI_Report_Down_on_the_Farm.pdf)

<sup>13</sup> Sustainable Farmland Investment Strategies: An Introduction to Current Conditions (2016). Yale Center for Business and the Environment  
From: [https://cbey.yale.edu/sites/default/files/2019-09/Sustainable%20Farmland%20Investment%20Strategies\\_Nov%202016.pdf](https://cbey.yale.edu/sites/default/files/2019-09/Sustainable%20Farmland%20Investment%20Strategies_Nov%202016.pdf)

farmland investment has for accelerating the adoption of regenerative agriculture is through the control that investor groups have over the land in their management portfolios. Some farmland investment groups directly manage owned land through hired operators, while others set rental terms for tenant farmers. In either case, investors have the ability to mandate environmental practices or performance for owned land. Depending on the firm, environmental outcomes can be the primary focus of management criteria, a component of larger performance targets, or not considered at all. Examples of investment groups with a primary focus on regenerative or ecological farm management are included in the table below.

#### FARMLAND REAL ESTATE INVESTMENT TRUSTS AND FARMLAND INVESTMENT GROUPS

<p>IROQUOI VALLEY ORGANIC FARMLAND REIT<sup>14</sup></p>	<ul style="list-style-type: none"> <li>➤</li> <li>➤ Land purchase or mortgage funding for organic farmland and partnerships with organic growers</li> <li>➤ Geographically focused on Northern Great Plains and NE (plus some peripheral)</li> <li>➤ 60 farms in 14 states, impacting over 12,000 acres</li> <li>➤ \$50-99M under management<sup>15</sup></li> </ul>
<p>FARMLAND LP<sup>16</sup></p>	<ul style="list-style-type: none"> <li>➤ Acquires undervalued farmland, adds value to farmland (through organic certification, infrastructure development, and increasing crop diversity), actively manages farms for profit</li> <li>➤ 12,500 acres of farmland in Northern California and Oregon</li> <li>➤ \$50-\$99M under management<sup>17</sup></li> </ul>
<p>SLM PARTNERS<sup>18</sup></p>	<ul style="list-style-type: none"> <li>➤ Acquires and manages land for institutional investors; focus on regenerative and ecological farming, as well as forestry</li> <li>➤ Separate farm portfolios and funds in: Australia, Ireland, US</li> <li>➤ US Fund: organic farmland, focus on grains, &gt;30,000 acres               <ul style="list-style-type: none"> <li>○ Acquire land, transition to organic with local farmers, offer long-term leases</li> <li>○ No apparent geographic focus</li> </ul> </li> <li>➤ \$50-\$99M under management<sup>19</sup></li> </ul>
<p>PEOPLES COMPANY<sup>20</sup></p>	<ul style="list-style-type: none"> <li>➤ Land management: Peoples Company oversees farmers who operate land on behalf of absentee landowners, high net worth individuals, and other clients who hold farmland as an asset</li> </ul>

<sup>14</sup> Iroquois Valley Farmland REIT (2018). From: <https://iroquoisvalley.com/about/>

<sup>15</sup> Impact Assets: Iroquois Valley Farms, LLC (2020). From: [https://www.impactassets.org/ia50\\_new/fund.php?id=a01440000wV5m9AAC](https://www.impactassets.org/ia50_new/fund.php?id=a01440000wV5m9AAC)

<sup>16</sup> Farmland LP (2020). From: <https://www.farmlandlp.com/our-work/#.XnDxH6hKhqM>

<sup>17</sup> Impact Assets: Farmland LP (2020). From: [http://impactassets.org/ia50\\_new/fund.php?id=a01E000000TzTW4IAN](http://impactassets.org/ia50_new/fund.php?id=a01E000000TzTW4IAN)

<sup>18</sup> SLM Partners (2019). From: <https://slmpartners.com/>

<sup>19</sup> Impact Assets: SLM Partners (2016). From: [http://impactassets.org/ia50\\_new/?filters=](http://impactassets.org/ia50_new/?filters=)

<sup>20</sup> Peoples Company (2020). From: <https://peoplescompany.com/>

	<ul style="list-style-type: none"> <li>○ Top level objectives include conservation, fertility, drainage, and yields</li> <li>➤ Land investment: Peoples Company identifies “investment grade” land for sale, facilitates farmland acquisition for investors, and partners land owners with farmer tenants</li> <li>➤ Also offer land appraisals and brokerage services</li> <li>➤ Large commercial operator licensed in 20 states</li> </ul>
<p style="text-align: center;">AGRICULTURE CAPITAL<sup>21</sup></p>	<ul style="list-style-type: none"> <li>➤ Manages two funds that “invest in permanent cropland and synergistic midstream assets to create a vertically integrated enterprise that grows, packs and markets high-value produce”</li> <li>➤ Emphasis on permanent crops: blueberries, oranges, hazelnuts, and table grapes</li> <li>➤ Approximately 21,000 acres in California and Oregon</li> <li>➤ Second fund closed in 2017; oversubscribed at \$548M (original cap was \$400 M)<sup>22</sup></li> </ul>
<p style="text-align: center;">CERES PARTNERS LLC: Ceres Farms<sup>23</sup></p>	<ul style="list-style-type: none"> <li>➤ Acquires and manages productive farmland; accrues revenue through cash rent and crop share agreements with tenant farmers</li> <li>➤ Conservation outcomes are a piece of the investment strategy, but are balanced with maximum returns for investors</li> <li>➤ Approximately 130,00 acres concentrated in the Midwest</li> <li>➤ Approximately \$815M assets under management</li> <li>➤ Annualized net returns of 11% since 2007<sup>24</sup></li> </ul>
<p style="text-align: center;">DIRT CAPITAL PARTNERS<sup>25</sup></p>	<ul style="list-style-type: none"> <li>➤ Financing for qualified farmers looking to acquire land, expand operations, or refinance <ul style="list-style-type: none"> <li>○ Restricted to farmers using organic or transitional practices (no certification required)</li> <li>○ Begins with a long-term lease, then purchase options at year 5, year 6, or on lease expiration</li> </ul> </li> <li>➤ 20 farmland investment projects to date</li> <li>➤ Restricted to farms in New England, New York, New Jersey or Pennsylvania</li> </ul>
<p style="text-align: center;">GRASSLANDS LLC<sup>26</sup></p>	<ul style="list-style-type: none"> <li>➤ Land management arm of the Savory Institute</li> <li>➤ “Our mission is to create low risk stores of capital and solid investor returns (in the form of both annual dividends and an appreciating land</li> </ul>

<sup>21</sup> Agriculture Capital (2020). From: <https://agriculturecapital.com/acm-investment-strategy/>

<sup>22</sup> Agriculture Capital’s ACM II Closes Oversubscribed at \$548M (2017). Global Ag Investing. From: <https://www.globalaginvesting.com/agriculture-capitals-acm-ii-closes-oversubscribed-548m/>

<sup>23</sup> Ceres Partners: Farmland (2020). From: <https://www.cerespartners.com/farmland>

<sup>24</sup> Ceres Partners (2016). Global Ag Investing. From: <https://www.globalaginvesting.com/ceres-partners/>

<sup>25</sup> Dirt Capital Partners (n.d.). From: <https://www.dirtpartners.com/>

<sup>26</sup> Grasslands, LLC (2020). From: <https://www.grasslands-llc.com/>

	<p>base), all in the process of restoring biodiversity and soil organic matter to degraded grasslands, and creating economic opportunities in rural communities.”</p> <ul style="list-style-type: none"> <li>➤ Manage a limited portfolio of ranches invested in by high net worth individuals and family offices</li> </ul>
SUSTAINABLE FARM PARTNERS <sup>27</sup>	<ul style="list-style-type: none"> <li>➤ Purchases conventional land and converts to organic grain operations <ul style="list-style-type: none"> <li>○ Focus on small grains for human consumption; leverage brand relationships for price assurance</li> </ul> </li> <li>➤ Restricted to farmland in the Midwest, primarily Iowa</li> <li>➤ Availability for accredited and unaccredited investors</li> </ul>
TIAA GLOBAL ASSET MANAGEMENT <sup>28</sup>	<ul style="list-style-type: none"> <li>➤ Large global asset manager with a funding arm focused on real assets, including farmland</li> <li>➤ Several multibillion dollar funds targeted at acquiring farmland globally</li> <li>➤ Conservation outcomes are a stated priority for management; performance indicators on sustainability, human rights, resource rights, ethical standards, and transparency are reported<sup>29</sup></li> </ul>
BLACKDIRT CAPITAL <sup>30</sup>	<ul style="list-style-type: none"> <li>➤ Launched a \$40M farmland fund in 2016<sup>31</sup> <ul style="list-style-type: none"> <li>○ Acquiring undervalued farmland for grass fed beef and dairy</li> <li>○ Focus in SE US, including Virginia and Georgia</li> </ul> </li> <li>➤ Current focus appears to be management of owned land; sustained revenue through livestock acquisition, finishing, and sales</li> </ul>
THE BEARTOOTH GROUP <sup>32</sup>	<ul style="list-style-type: none"> <li>➤ Leverages investor capital to acquire and/or restore degraded ranch land, then sells for profit <ul style="list-style-type: none"> <li>○ Utilizes land managers to oversee conservation projects</li> <li>○ Uses conservation easement profits for early revenue to investors</li> </ul> </li> <li>➤ Projects based in Montana, California, Idaho, Wyoming, and Colorado<sup>33</sup></li> <li>➤ \$50-\$99M assets under management</li> </ul>

<sup>27</sup> Organic Farm Partnerships Through Sustainable Farm Managers (2020). Sustainable Farm Partners. From: <https://sustainablefarmpartners.com/>

<sup>28</sup> Real assets (2020). Nuveen, a TIAA Company. From: <https://www.nuveen.com/en-us/institutional/strategies/real-assets>

<sup>29</sup> How we invest in farmland (2018). Nuveen, a TIAA Company. From: [https://www.tiaa.org/public/pdf/how\\_we\\_invest\\_in\\_farmland.pdf](https://www.tiaa.org/public/pdf/how_we_invest_in_farmland.pdf)

<sup>30</sup> Blackdirt Capital (2019). From: <https://blackdirtcapital.com/>

<sup>31</sup> Gratitude Railroad and Blackdirt Capital Launch \$40m impact livestock JV (2016). Agri Investor. From: <https://www.agriinvestor.com/gratitude-railroad-and-blackdirt-capital-launch-40m/>

<sup>32</sup> Beartooth Capital (n.d.) Impact Assets. From: [https://www.impactassets.org/ia50\\_new/fund.php?id=a01E000000LMMynIAH](https://www.impactassets.org/ia50_new/fund.php?id=a01E000000LMMynIAH)

<sup>33</sup> Beartooth Capital restores, sells large ranches (2013). Billings Gazette. From: [https://billingsgazette.com/lifestyles/recreation/beartooth-capital-restores-sells-large-ranches/article\\_6213c4db-afef-55af-bdc7-0fc356b99119.html](https://billingsgazette.com/lifestyles/recreation/beartooth-capital-restores-sells-large-ranches/article_6213c4db-afef-55af-bdc7-0fc356b99119.html)

## 2. INVESTMENT: PRIVATE DEBT AND CREDIT

### BACKGROUND

---

Private debt issued by investment or loan funds can offer fixed income for investors and vital capital for producers. Agricultural lending is crucial for the continued operations of many farms — gross farm debt in the US was estimated at a record \$416B in 2019<sup>34</sup>. Conventional institutional lenders include members of the Farm Credit System, commercial banks, the Federal Agricultural Mortgage Corporation, USDA lending programs, and other entities approved by the Comptroller General of the United States<sup>35</sup>.

Outside of conventional agricultural lending, there are emerging strategies that tie loan terms and eligibility to ecological criteria. The strategies and investment performance expectations in this category are diverse. Some funds offer 0% loans with flexible terms for producers, while others operate similarly to conventional banks with the stipulation that loans are issued to projects addressing specific goals in agriculture or local food systems.

Community loan funds and Community Development Financial Institutions (CDFIs) that target agriculture and food make up a significant portion of creditors in this category. These firms take direct investment from individuals and make loans across mission-aligned impact areas. If food and agriculture are included in the institution's impact areas, producers can be eligible for loans that support conservation practice adoption, new projects that contribute environmental benefits, or operating expenses of sustainable farms<sup>36</sup>. Some of these community institutions have loan loss reserves or federal deposit insurance to mitigate investor risk in the case of loan defaults.

In addition to investor-backed loan funds, there are federally subsidized programs that issue loans for adopting conservation practices or implementing environmental improvement projects. Often set up as revolving loan funds, these programs use repayments and interest from previous loans to build a base of credit that is self-sustaining. Subsidies can include federal or state grants for capitalization and principal forgiveness<sup>37</sup>.

### CRITIQUES

---

Loans of this type can be harder for producers to access than conventional financing. Funds can be geographically restricted — they may only issue loans only to entities operating in a given region, state, or county — and they may be restricted to farms that already meet

---

<sup>34</sup> Farm Bankruptcies Rise again (2019). Farm Bureau. From: <https://www.fb.org/market-intel/farm-bankruptcies-rise-again>

<sup>35</sup> Farm Credit: Information on Credit and Outreach to Socially Disadvantaged Farmers and Ranchers is Limited (2019). US Government Accountability Office. From: <https://www.gao.gov/assets/710/700218.pdf>

<sup>36</sup> Financing Farming in the US: Nine Case Studies of Community Development Financial Institutions Lending in the Farm Sector (2013). Michigan State University Center for Local Food Systems. From: <https://www.canr.msu.edu/foodsystems/uploads/files/ffus-cdfi-case-studies.pdf>

<sup>37</sup> Clean Water State Revolving Fund (2020). US Environmental Protection Agency. From: <https://www.epa.gov/cwsrf>

relatively high thresholds of environmental performance. These restrictions reflect the disparity between environmentally-linked loans and the overall scale of farm debt. The Soil Wealth report identified 17 strategies directly targeting regenerative agriculture through private debt, representing approximately \$2.6B in assets<sup>38</sup>. This figure is unfortunately dwarfed by the \$416B of currently outstanding farm debt.

## ACCELERATING REGENERATIVE AGRICULTURE THROUGH PRIVATE DEBT AND CREDIT

Private lending for regenerative agriculture could offer interested individuals an alternative to cash/cash equivalent investing. Products like certificates of deposit and money-market accounts offered by banks are somewhat mimicked by community investment and CDFIs. Community investment notes and community loan funds can offer relatively low risk yields for long-term, low minimum investments. Risks are further mitigated when funds maintain a loan loss reserve or, like CDFIs, federal deposit insurance. These investment vehicles can give individuals a direct and relatively easy way to engage with sustainable agriculture and community food systems.

### PRIVATE DEBT FUNDS AND CREDITORS

<p><b>SLOW MONEY FUNDS<sup>39</sup></b></p>	<ul style="list-style-type: none"> <li>➤ Formal and informal financing for local, organic, and sustainable food production             <ul style="list-style-type: none"> <li>○ Tax-deductible charitable donations are used to supply low interest or 0% loans directly to farmers</li> <li>○ Circular loan reinvestment enables growth of the Slow Money asset base</li> </ul> </li> <li>➤ Loans are granted by local Slow Money groups — primarily in the US</li> <li>➤ Approximately \$57M has been deployed since 2010<sup>40</sup></li> </ul>
<p><b>THE FOOD, FARMS &amp; FORESTS FUND<sup>41</sup></b></p>	<ul style="list-style-type: none"> <li>➤ Run by Vermont Community Loan Fund, a community supported financial institution             <ul style="list-style-type: none"> <li>○ Local investors can earn fixed or graduated returns from several investment vehicles that target local development, including sustainable agriculture and the local food system through this fund</li> </ul> </li> <li>➤ Farms, food producers, wholesalers, and stewardship organizations engaged in sustainable resource management are eligible for loans             <ul style="list-style-type: none"> <li>○ Terms cap at 20 years, interest rates start at 5% (fixed)</li> </ul> </li> </ul>

<sup>38</sup> Soil Wealth: Investing in Regenerative Agriculture Across Asset Classes (2019). The Croatan Institute, The Delta Institute, and Organic Agriculture Revitalization Strategy. From: <http://www.croataninstitute.org/images/publications/soil-wealth-2019.pdf>

<sup>39</sup> Slow Money (2020). From: <https://slowmoney.org/about>

<sup>40</sup> Access to Capital: Slow Money (n.d.) National Farmers Union. From: <https://nfu.org/2017/04/18/access-to-capital-slow-money/>

<sup>41</sup> Food, Farms & Forest Fund (2020). Vermont Community Loan Fund. From: <https://www.investinvermont.org/borrowers/business/food-farms-and-forests-fund-borrowers.html>

<p>NATURAL CAPITAL INVESTMENT FUND<sup>42</sup></p>	<ul style="list-style-type: none"> <li>➤ US Treasury certified Community Development Financial Institution <ul style="list-style-type: none"> <li>○ Open to individual and institutional investment</li> </ul> </li> <li>➤ Focuses on business and nonprofit lending in the Appalachia and the SE US</li> <li>➤ Approximately 22% of cumulative lending (2001-2018) allocated to “Local Foods and Value-Added Agriculture” (16%) and “Production Agriculture” (6%)<sup>43</sup></li> </ul>
<p>CRAFT3<sup>44</sup></p>	<ul style="list-style-type: none"> <li>➤ Regional community supported loan fund in the Pacific Northwest</li> <li>➤ Several goals for loan impact, including: “Shift to agricultural practices that support resilience and promote soil and water conservation”</li> <li>➤ Approximately \$146M under management; has deployed \$580M in financing to more than 7,700 individuals and businesses (\$80M to food and ag businesses)<sup>45</sup></li> <li>➤ Maintains a loss rate of 2.38%, but has a 100% repayment rate to investors through a loan loss reserve</li> </ul>
<p>FOOD SYSTEM TRANSFORMATION FUND<sup>46</sup></p>	<ul style="list-style-type: none"> <li>➤ Managed by RSF Social Finance</li> <li>➤ Designed for Program Related Investments of foundation endowments <ul style="list-style-type: none"> <li>○ \$100,000 minimum investment</li> </ul> </li> <li>➤ Flexible loans to enterprises working on issues in local food systems</li> </ul>
<p>CDFI LOAN FUNDS</p>	<ul style="list-style-type: none"> <li>➤ Loan products offered through certified Community Development Financial Institutions; lending can be tied to conservation outcomes or limited to borrowers who practice qualifying types of sustainable agriculture</li> <li>➤ Examples: <ul style="list-style-type: none"> <li>○ California FarmLink<sup>47</sup>: financing underserved individuals in farming</li> <li>○ Forge Community Loan Fund<sup>48</sup>: community fund started by organic farmers in Arkansas; offer multiple rural development loan products</li> </ul> </li> </ul>

<sup>42</sup> Growing Businesses. Healthy Communities. (2020). Natural Capital Investment Fund. From: <https://www.ncifund.org/what-we-do>

<sup>43</sup> Partnering for Impact 2018 (2018). Natural Capital Investment Fund. From: [https://www.ncifund.org/images/Files/Impact\\_Reports/NCIFund\\_2018\\_Impact\\_Report.pdf](https://www.ncifund.org/images/Files/Impact_Reports/NCIFund_2018_Impact_Report.pdf)

<sup>44</sup> Working for Food and Agriculture Businesses (2019). Craft3. From: <https://www.craft3.org/Borrow/foodag>

<sup>45</sup> Investing in People and Places (2019). Craft3. From: <https://www.craft3.org/Invest/overview>

<sup>46</sup> Hassle-free impact investing for foundations (2020). RSF Social Finance. From: <https://rsfsocialfinance.org/invest/food-system-fund/>

<sup>47</sup> California FarmLink (2020). From: <https://www.californiafarmlink.org/about-us/>

<sup>48</sup> Forge Community Loan Fund (n.d.) From: <https://www.forgefund.org/about/>

<p>MISSION/IMPACT BANKS</p>	<ul style="list-style-type: none"> <li>➤ Banks that include non financial (environmental or social) impact in lending decisions; relatively rare <ul style="list-style-type: none"> <li>○ Various models, can overlap with CDFIs</li> <li>○ Lending to agricultural producers would be dependent on the bank's mission areas</li> </ul> </li> <li>➤ Loan terms negotiated individually</li> <li>➤ Examples: <ul style="list-style-type: none"> <li>○ Beneficial State Bank</li> <li>○ Amalgamated Bank</li> </ul> </li> </ul>
<p>FARM SERVICE AGENCY CONSERVATION GUARANTEED LOANS<sup>49</sup></p>	<ul style="list-style-type: none"> <li>➤ Guaranteed loans are available from FSA-approved lenders; the loans must be dedicated to projects that address conservation issues approved by the NRCS</li> <li>➤ The FSA acts as a third-party loan guarantor, not a direct lender</li> <li>➤ Eligible for use on structurally significant projects (e.g. establishing permanent pastures, transitioning to organic, installing biogas digesters, etc.)</li> <li>➤ Terms and rates are negotiated on an individual basis; loans limited to \$1.75M and cannot exceed 30 year term</li> </ul>
<p>CLEAN WATER STATE REVOLVING FUND<sup>50</sup></p>	<ul style="list-style-type: none"> <li>➤ Federally subsidized low-cost loan program for water improvement projects; administered by each state</li> <li>➤ Funding includes: loans, debt refinancing, credit enhancements, loan guarantees, and additional subsidization to improve project affordability <ul style="list-style-type: none"> <li>○ Loans can have zero or negative interest rates (by policy, interest must be below market rate)</li> </ul> </li> <li>➤ Eligibilities are broad, but include conservation and management activities for nonpoint pollution sources (e.g. agricultural operations)</li> <li>➤ \$138B deployed through 2019; 41,234 loans issued</li> </ul>

<sup>49</sup> Conservation Loan Program (2019). Farm Service Agency. From: <https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdfiles/State-Offices/North-Carolina/docs/conservation-loan-program-factsheet-19.pdf>

<sup>50</sup> Clean Water State Revolving Fund (2020). US Environmental Protection Agency. From: <https://www.epa.gov/cwsrf>



### 3. INVESTMENT: PRIVATE EQUITY

#### BACKGROUND

---

Private equity investments give funders ownership stakes in private companies with prospects for enhanced scale and profitability. In agriculture, private equity, including venture capital, is generally reserved for growing companies with proven revenue in the natural foods, agriculture technology, and agricultural support sectors. Portfolios of the example private equity funds and venture capitalists in the table below include dozens of businesses upstream and downstream from agriculture. Upstream, there are companies developing geospatial software for precision ag, enhanced inputs, and improved farm equipment. Downstream, there are food manufacturers, food service suppliers, beverage companies, and packaged food brands — plus novel businesses involved in processing, distribution, and retail. While relatively rare, there are cases of midsize farms raising private equity to support expansion. Vital Farms, a pasture-raised egg producer, received investment through several rounds of funding from venture capital firms, for example<sup>51</sup>.

#### CRITIQUES

---

Private equity funding is difficult to access. In venture capital, interested businesses typically have to make a compelling case that their model is sound and their prospects for growth are promising. More than 90% of those proposals for venture capital funding are rejected<sup>52</sup>. Private equity is also difficult to engage with. Private equity funds often have large investment minimums and eligibility criteria that essentially restrict participation to high-net-worth individuals. They can also push portfolio companies to strive for rapid growth that may not be sustainable in the long-term. That is not to say that private equity does not have potential to help accelerate the adoption of regenerative agriculture. The report *Impact Investing in Sustainable Food and Agriculture Across Asset Classes* suggests that private equity and venture capital “provide the most opportunities for seeking positive impact on sustainable consumption and AgTech...”<sup>53</sup> There is significant potential for qualified investors to fund crucial enterprises that surround regenerative agriculture.

#### ACCELERATING REGENERATIVE AGRICULTURE THROUGH PRIVATE EQUITY

---

Growing consumer brands that purchase from sustainable farming operations is a key role for private equity investors. Scaling “sustainable consumption” will increase the purchasing power of natural food brands and increase the scope of sustainable supply chains — the broad goal being an increase in demand for commodities produced regeneratively. Fortunately, the

---

<sup>51</sup> Vital Farms (2020). Crunchbase. From: <https://www.crunchbase.com/organization/vital-farms#section-funding-rounds>

<sup>52</sup> Venture Capital (n.d.) Inc. From: <https://www.inc.com/encyclopedia/venture-capital.html>

<sup>53</sup> *Impact Investing in Sustainable Food and Agriculture Across Asset Classes* (2017). Croatan Institute. From: <http://www.croataninstitute.org/documents/Investing%20in%20Sustainable%20Food%20and%20Agriculture.pdf>

market for natural and specialty foods is growing at a faster pace than the overall food and beverage sector<sup>54</sup>, a trend that supports investor success. For farmers, the work is in finding and building relationships with brands who prioritize supply from ecologically-sound operations. See the Offtake Methods section for more detail.

## PRIVATE EQUITY INVESTORS AND VENTURE CAPITAL FUNDS

<p>INVESTECO<sup>55</sup></p>	<ul style="list-style-type: none"> <li>➤ Focus on high growth companies in sustainable food and agriculture <ul style="list-style-type: none"> <li>○ Invest in companies with revenue between \$1 and \$30 M</li> </ul> </li> <li>➤ Portfolio covers a wide range, from pasture-raised eggs, non dairy ice cream manufacturers, regional food distributors, ag geospatial software developers, and more</li> </ul>
<p>ARBORVIEW CAPITAL<sup>56</sup></p>	<ul style="list-style-type: none"> <li>➤ Provide Series A investment to “established, high growth companies” with more than \$5M in revenue <ul style="list-style-type: none"> <li>○ Willing to invest \$3-\$10 M</li> </ul> </li> <li>➤ Current portfolio includes two large farm production companies</li> <li>➤ \$25-\$45M assets under management<sup>57</sup></li> </ul>
<p>RENEWAL FUNDS<sup>58</sup></p>	<ul style="list-style-type: none"> <li>➤ Invests in early stage companies with more than \$1M in revenue; offer a “patient capital” window of 10 years</li> <li>➤ Screen investment by mission and sustainability impact; not solely focused on sustainable food and ag</li> <li>➤ Current portfolio includes numerous consumer brands, novel food retail companies, and ag tech — no apparent direct farm investment</li> <li>➤ \$98M deployed as of 2016<sup>59</sup></li> </ul>
<p>CERES PARTNERS LLC: Private Equity<sup>60</sup></p>	<ul style="list-style-type: none"> <li>➤ Invests in early/growth stage food and agriculture companies with “significant, measurable sustainable impacts”</li> <li>➤ Invests \$2-\$10M in equity</li> <li>➤ Current portfolio of six companies includes a wastewater manger, an indoor hydroponic grower, an aquaculture enterprise, and three beverage companies</li> </ul>

<sup>54</sup> Growth of Natural Food and Beverage Outpaces Overall Food and Beverage Market (2019). Food Industry Executive. From: <https://foodindustryexecutive.com/2019/09/growth-of-natural-food-and-beverage-outpaces-overall-food-and-beverage-market/>

<sup>55</sup> InvestEco (2020). From: <https://investeco.com/>

<sup>56</sup> Investing in SUsustainable Growth (n.d.) Arborview Capital. From: <http://www.arborviewcapital.com/>

<sup>57</sup> Arborview Capital (2020). Impact Assets. From: [https://www.impactassets.org/ia50\\_new/fund.php?id=a014400000jQnT9AAK](https://www.impactassets.org/ia50_new/fund.php?id=a014400000jQnT9AAK)

<sup>58</sup> Renewal Funds (n.d.). From: <http://www.renewalfunds.com/?cn-reloaded=1>

<sup>59</sup> 2016 Impact Report (2016). Renewal Funds. From: <http://www.renewalfunds.com/wp-content/uploads/2017/04/Renewal-Funds-2016-Impact-Report.pdf>

<sup>60</sup> Ceres Partners: Private Equity (2020). From: <https://www.cerespartners.com/private-equity/overview>

## 4. INVESTMENT: PUBLIC DEBT

### BACKGROUND

---

This category of investment effectively represents bonds, specifically sustainable or green bonds whose proceeds can be applied to agricultural conservation projects or other environmentally-beneficial land management strategies. Investors purchase bonds, or issued debt, to fund long-term projects undertaken by government agencies (including municipal governments), corporations, international development organizations, and other entities with large capital needs. Investors can typically purchase bonds on primary or secondary markets. Issuers are obligated to repay the bond's principal at a specified date of maturity as well as interest paid annually. Bonds are regarded as relatively a relatively low yield, low risk investment mechanism. Investor appeal relates to fixed income from interest payments (or coupons), repayment of principal on maturity, and relative liquidity. Bonds are generally issued by large entities looking to raise significant capital, but there are emerging ways for communities and individual producers to engage with this funding mechanism.

Green bonds follow voluntary guidelines or official standards that define qualified issuer, approved uses of proceeds, and credit quality considerations. A key differentiation between green and conventional bonds is the general requirement for bond proceeds to be used on projects that have measurable sustainability benefits. The green bond market has developed rapidly as investors demonstrate considerable appetite for investment strategies that fund on-the-ground environmental projects. In 2019 there was approximately \$2T invested in outstanding green bonds. New issuance of green bonds between 2018 and 2019 was approximately \$250 B, an increase of 20% over the previous year<sup>61</sup>. Sustainable agriculture and forestry are often named as a core project areas for green bond funding, along with renewable energy development, sustainable infrastructure, and green building<sup>62</sup>.

### CRITIQUES

---

Even though agriculture is included in conversations about green bonds, there are relatively few actionable strategies for funding sustainable agriculture through this mechanism. In an investigation of green bonds labeled and listed by Bloomberg, researchers found that between 2010 and 2016, there were no green bonds issued by municipalities or corporations with proceeds dedicated to agriculture. In that same time frame, only \$93M in conventional bonds were issued for agriculture — compared to \$1.86T in listed conventional bonds overall<sup>63</sup>. S&P

---

<sup>61</sup> Future Returns: Green Bonds on the Rise (2019). Barron's. From:

<https://www.barrons.com/articles/future-returns-green-bonds-on-the-rise-01570541371>

<sup>62</sup> How to Issue a Green Muni Bond (n.d.) Green City Bonds Coalition. From:

<https://www.climatebonds.net/files/files/Green%20City%20Playbook.pdf>

<sup>63</sup> Baker et al. (2019). Financing the Response to Climate Change: The Pricing and Ownership of U.S. Green Bonds. From:

<https://www.brookings.edu/wp-content/uploads/2018/07/Wurgler-J.-et-al..pdf>

Global reports that only 3.3% of the total green bond market since 2007 has been dedicated to land management strategies. The majority of that 3.3% has been earmarked for forestry projects in Brazil<sup>64</sup>. Though investment in green bonds has proved catalytic for strategies like renewable energy, it has yet to deploy much capital to agricultural land managers implementing sustainable practices.

## ACCELERATING REGENERATIVE AGRICULTURE THROUGH PUBLIC DEBT

---

A specific standard for agricultural green bonds is being developed by the Climate Bond Initiative. In order to qualify, issuers of the agricultural climate bonds would need to demonstrate climate mitigation and resilience. The working draft of this standard specifies that agricultural bonds proceeds would be eligible for<sup>65</sup>:

- Acquiring farmland
- New machinery
- Installation of storage facilities, barns, sheds etc
- Planting and management costs
- Training costs: e.g. training farmers in climate friendly practices
- Research & development: e.g. testing climate friendly practices or inputs
- Cost of advisory services: e.g. advice on transitioning a farm to climate friendly practices
- Performance monitoring: e.g. cost of monitoring GHG emissions and net carbon balance

The release of this standard will likely be crucial for increasing the mainstream appeal of agriculture-specific green bonds. The wide range of approved uses under the standard means that bond issuers will have flexibility in financing new conservation projects or refinancing operations that already exemplify regenerative agriculture.

Additional concepts to explore as agriculture-specific green bonds develop include:

- Issuing a bond on behalf of a private debt fund to refinance the debt of a portfolio of sustainable ag producers to ensure their continued viability (or increase their competitive advantage)
- Issuing municipal bonds to fund watershed improvements through nutrient pollution prevention at the farm level
- Issuing bonds on behalf of producer cooperatives to finance dedicated organic processing and distribution infrastructure
- Issuing corporate bonds for conscious companies that plan to invest in the sustainability of their agricultural supply chains

---

<sup>64</sup> Could Agriculture And Forestry Be The New Frontier For Green Bonds? (2019). S&P Global. From: [https://www.spratings.com/documents/20184/4756601/ePDF+US+Municipal+Green+Bonds\\_FINAL.pdf/e2f2fe5b-9a73-4ef2-9af5-d75631f1fbb0https://www.spglobal.com/ratings/en/research/articles/191204-could-agriculture-and-forestry-be-the-new-frontier-for-green-bonds-11263672](https://www.spratings.com/documents/20184/4756601/ePDF+US+Municipal+Green+Bonds_FINAL.pdf/e2f2fe5b-9a73-4ef2-9af5-d75631f1fbb0https://www.spglobal.com/ratings/en/research/articles/191204-could-agriculture-and-forestry-be-the-new-frontier-for-green-bonds-11263672)

<sup>65</sup> Agriculture Criteria (2020). Climate Bonds Initiative. From: <https://www.climatebonds.net/agriculture>

## PUBLIC DEBT MODELS

CLIMATE BONDS <sup>66</sup>	<ul style="list-style-type: none"><li>➤ The Climate Bonds Initiative has put agricultural criteria out for public comment; the criteria will launch in April, 2020</li><li>➤ Projects that meet the agricultural criteria (and the Climate Bonds Standard overall) will be issued a Climate Bond Certification</li><li>➤ Eligible use of proceeds include: purchasing farmland, purchasing equipment, installing facilities, planning and management activities, training in “climate friendly practices”, R&amp;D for “climate friendly practices, advisory services, and monitoring activities</li><li>➤ Certified bonds can be listed on the highly-subscribed green bond market</li><li>➤ Criteria for agriculture include mitigation measures (no conversion of carbon stock land; verified GHG reductions; use of low-emission best practices) and resilience measures (assessment and awareness of risks and tradeoffs)</li></ul>
RESILIENCE BONDS	<ul style="list-style-type: none"><li>➤ Resilience bonds fund risk reduction projects and monetize verified risk reductions, typically by capturing the difference in insurance premiums between the business-as-usual and the post-project scenarios<sup>67</sup></li><li>➤ The European Bank for Reconstruction and Development issued the first climate resilience bond in late 2019; the bond raised \$700M at issuance<sup>68</sup><ul style="list-style-type: none"><li>○ One of the specified uses of the bond is funding the Bank’s projects in “climate-resilient agriculture”</li></ul></li><li>➤ Resilience bonds for agriculture could also consider projects that:<ul style="list-style-type: none"><li>○ Protect watersheds through erosion control, pollution control, and soil moisture management</li><li>○ Increase regional or local food security, especially through farming practices that improve crop resilience during droughts</li><li>○ Prevent deforestation or land conversion that would release carbon stocks or harm biodiversity</li></ul></li></ul>

<sup>66</sup> Agriculture Criteria (2020). Climate Bonds Initiative. From: <https://www.climatebonds.net/agriculture>

<sup>67</sup> Vaijhala and Rhodes (2018). Field Actions Science Reports. From: <https://journals.openedition.org/factsreports/4910>

<sup>68</sup> World’s first dedicated climate resilience bond, for US\$ 700m, is issued by EBRD (2019). European Bank for Reconstruction and Development. From: <https://www.ebrd.com/news/2019/worlds-first-dedicated-climate-resilience-bond-for-us-700m-is-issued-by-ebrd-.html>

## 5. INVESTMENT: PUBLIC EQUITY

### BACKGROUND

---

Public equity refers to shares or stakes in publicly-traded companies. While public equity is a well-understood strategy for investment managers, it is generally difficult for capital to flow directly from public equity markets to farmers adopting regenerative management schemes. Fund managers and investors can selectively invest in food brands, agricultural technologies, and other peripheral companies that support regenerative and sustainable agriculture. Impact investing in these kinds of companies through funds that include environmental, social, and governance (ESG) factors is becoming increasingly common<sup>69</sup>. Even though funds directly benefiting agricultural producers are limited, shareholder networks and investor advocates represent interests consistent with regenerative farming.

### ACCELERATING REGENERATIVE AGRICULTURE THROUGH PUBLIC EQUITY

---

Leveraging investor networks to advocate for sustainable farming principles and practices could have substantial impacts on the adoption of regenerative agriculture. Investor networks with trillions of dollars under management have already signed resolutions to commit to responsible investing activities<sup>70</sup>. The considerable advocacy power of large investor networks could help spread consumer awareness about resource issues, motivate the expansion of sustainable food brands, and stimulate supply chain changes downstream of privately-owned farms. Divesting from large public companies that participate in practices which investors do not want to see rewarded — concentrated feeding or non-therapeutic antibiotic use in livestock production, for example — is also a viable strategy for shareholder advocates. While public equity might not be directly applicable to midsize regenerative farms, it is a key part of the larger financial universe that supports a transformed food system.

### MISSION-ALIGNED PUBLIC EQUITY INVESTOR NETWORKS

---

#### INVESTOR NETWORK: FARM ANIMAL INVESTMENT RISK & RETURN<sup>71</sup>

- Investor organization advocating for broad agricultural reforms, especially in livestock management
  - Members have \$20.3T assets under management
- Specialize in ESG research and risk assessment in protein production; work includes valuing the risk of antibiotic resistance in protein supply chains

---

<sup>69</sup> Impact Investing in Sustainable Food and Agriculture Across Asset Classes (2017). Croatan Institute. From: <http://www.croataninstitute.org/documents/Investing%20in%20Sustainable%20Food%20and%20Agriculture.pdf>

<sup>70</sup> Soil Wealth: Investing in Regenerative Agriculture Across Asset Classes (2019). The Croatan Institute, The Delta Institute, and Organic Agriculture Revitalization Strategy. From: <http://www.croataninstitute.org/images/publications/soil-wealth-2019.pdf>

<sup>71</sup> Farm Animal Investment Risk & Return (2020). From: <https://www.fairr.org/>

<p>INVESTOR NETWORK: INTERFAITH CENTER ON CORPORATE RESPONSIBILITY<sup>72</sup></p>	<ul style="list-style-type: none"> <li>➤ Membership-based network of institutional investors that advocate on sustainability issues <ul style="list-style-type: none"> <li>○ Several impact areas in food, including sustainable production, human rights, animal welfare, and food waste</li> </ul> </li> <li>➤ Advocate through equity position and voting rights in large public companies</li> </ul>
<p>INVESTOR NETWORK: REGENERATIVE AGRICULTURE INVESTOR NETWORK<sup>73</sup></p>	<ul style="list-style-type: none"> <li>➤ Consists of a network of research groups, investors, and agricultural experts focused on scaling regenerative agriculture</li> <li>➤ Work is supported by an NRCS Conservation Innovation Grant</li> <li>➤ Seeking partners who “have an interest in, or are actively deploying capital through various instruments (grants, loans, investments) to support the growth of the regenerative agriculture sector.”</li> </ul>

<sup>72</sup> Interfaith Center on Corporate Responsibility (2020). From: <https://www.iccr.org/>

<sup>73</sup> Regenerative Agriculture Investor Network (2020). Lift Economy. From: <https://www.lifteconomy.com/rain>

## 6. GRANTS AND PHILANTHROPIC FUNDING

### BACKGROUND

---

Grants for conservation are a well-established method for incentivizing on-farm environmental improvements. There are huge federal programs dedicated to funding and technically supporting conservation practices — the Natural Resource Conservation Service (NRCS), for example, had a budget of \$5.2B in 2019<sup>74</sup>. Federal and state programs for farm conservation are generally administered by the NRCS and the Farm Service Agency (FSA). These programs offer cost share agreements for farm improvements or direct payments for participating in ecological practices. Many programs also offer direct technical support for adopting best management practices. State departments of agriculture may also offer grants targeted at key resource concerns or other priority issues.

Grants from private organizations, such as philanthropic foundations, are also selectively available for environmentally-conscious producers. Private grant-making organizations allocate funding to their mission priorities, which can include diverse work areas across food and agriculture — food security, producer diversity, resource management, community economic development, and more. Though smaller in volume than public grants for conservation agriculture, private grants can be a valuable source of funding for producers whose operations complement a philanthropic organization’s mission. Private grants are typically allocated through a competitive application process.

### ACCELERATING REGENERATIVE AGRICULTURE THROUGH GRANTS AND PHILANTHROPIC FUNDING

---

Because of their relatively wide accessibility and established support network, grants can be a good place for producers to begin when looking for a base of funding to create a regenerative operation. Grant funding and technical support are available for developing conservation plans that address resource concerns at the enterprise level. This kind of conservation planning takes an integrated approach, meaning that producers are not limited to one-off projects or ad hoc planning and funding. In addition, grants can be supplemented by other financing at a producer’s discretion. A major benefit of this funding category is the lack of repayment obligation. While producers may be required to share some of the project costs, they don’t risk default or seizure of collateral.

---

<sup>74</sup> FY2020 Budget Summary (2020). United States Department of Agriculture. From: <https://www.obpa.usda.gov/budsum/fy2020budsum.pdf>



## GRANTS AND CONSERVATION-MOTIVATED FUNDING WITHOUT REPAYMENT OBLIGATION

### NATURAL RESOURCE CONSERVATION SERVICE ASSISTANCE<sup>75</sup>

- Funded under the 2018 Farm Bill, the NRCS offers financial and technical assistance for farmers
  - Note that some historical programs (e.g. Wetlands Reserve Program, Wildlife Habitat Incentives Program) were not reauthorized in the 2018 Farm Bill and are not accepting new applications
- Programs:
  - Environmental Quality Incentives Program (EQIP)
    - NRCS will cost share with farmers to implement and operate approved conservation practices
    - Producers work with local NRCS agents to identify resource concerns and select conservation practices
    - EQIP contracts, new under the 2018 Farm Bill, offer multiple incentives for farmers in priority areas addressing key resource concerns: payment for implementing the practice, payment for maintenance, and compensation for foregone income as a result of practice changes
  - Conservation Stewardship Program (CSP)
    - NRCS will pay producers to motivate the continued use and improvement of existing conservation plans
    - CSP enrollees commit to 5 year contracts and are eligible for two types of payments:
      - “Annual payments for installing new conservation activities and maintaining existing practices”
      - “Supplemental payments for adopting a resource-conserving crop rotation”
    - Producers must meet with an NRCS representative to review the prevailing resource issues and existing conservation practices applicable to their region
  - Agriculture Management Assistance (AMA) Program
    - A collaborative program between the NRCS, the Agricultural Marketing Service, and the Risk Management Agency
      - The NRCS is responsible for financial and technical assistance relating to conservation
      - The AMS is responsible for marketing assistance, including an organic certification cost share program

<sup>75</sup> Farm Bill Programs (2020) USDA Natural Resource Conservation Service. From: <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/>

- The RMA is responsible for risk mitigation through subsidized insurance
  - The program will share up to 75% of the cost of installing conservation practices (up to \$50,000 annually)
  - Farmers in 16 states with historically low levels of crop insurance enrollment are eligible
- Agriculture Conservation Easement Program (ACEP)
  - The NRCS provides financial assistance for purchasing land easements that preserve conservation and agricultural value of farmland
  - The NRCS will contribute 50% of the fair market value of the easement — 75% if the attached land is determined to have special environmental significance
- Healthy Forests Reserve Program (HFRP)
  - The NRCS will share costs with owners of private forested land for the duration of a 10 year restoration agreement and 30 year (or permanent) conservation easement

FARM SERVICE  
AGENCY  
CONSERVATION  
PROGRAMS<sup>76</sup>

- The FSA administers numerous voluntary conservation programs that offer financial compensation for improving environmental outcomes
- Select programs:
  - Conservation Reserve Program (CRP) and Conservation Reserve Enhancement Program (CREP)
    - The FSA offers annual rental payments in exchange for farmers removing land from production
    - Reserved land is fallowed or rested for an extended period of time, offering substantial conservation benefits
  - Farmable Wetlands Program
    - The FSA offers annual rental payments to farmers that protect wetlands by removing acres from production and establishing plant cover
  - Grasslands Reserve Program
    - The FSA offers annual rental payments to farmers who voluntarily limit the future uses of owned grassland

<sup>76</sup> Conservation Programs (n.d.) USDA Farm Service Agency. From: <https://www.fsa.usda.gov/programs-and-services/conservation-programs/>

<p style="text-align: center;"><b>STATE FUNDING</b></p>	<ul style="list-style-type: none"> <li>➤ Select states may offer compensation separate from USDA programs</li> <li>➤ Examples: <ul style="list-style-type: none"> <li>○ California Healthy Soils Program<sup>77</sup> <ul style="list-style-type: none"> <li>■ Offers financial assistance to incentivize the adoption of soil management practices such as: cover cropping, no-till, reduced-till, mulching, compost application, and conservation plantings</li> <li>■ Funded in part by proceeds from the cap-and-trade carbon market</li> </ul> </li> <li>○ Colorado Matching Grants Program<sup>78</sup> <ul style="list-style-type: none"> <li>■ Administered by the Colorado State Conservation Board</li> <li>■ Applicable to Conservation Districts in good standing</li> <li>■ Provides 50% cost share for “on-the-ground conservation projects and educational conservation activities”</li> </ul> </li> <li>○ South Dakota Coordinated Natural Resources Conservation Grants<sup>79</sup> <ul style="list-style-type: none"> <li>■ Awards funding to voluntary conservation projects</li> <li>■ Past projects have included: windbreak planting, waterway vegetation, pasture improvement, conservation tillage, and biological weed control</li> </ul> </li> </ul> </li> </ul>
<p style="text-align: center;"><b>SUSTAINABLE AGRICULTURE RESEARCH &amp; EDUCATION GRANTS</b> <small>80</small></p>	<ul style="list-style-type: none"> <li>➤ SARE offers grants to producers and peripheral agricultural entities in its four operating regions (covers all 50 states)</li> <li>➤ Eligible projects include: on-farm renewable energy, integrated pest management, conservation tillage, season-extending infrastructure (e.g. high tunnels), cover crops, crop rotations, and others</li> <li>➤ Funded by the USDA National Institute for Food and Agriculture</li> </ul>
<p style="text-align: center;"><b>PRIVATE GRANTS</b></p>	<ul style="list-style-type: none"> <li>➤ Select foundations and philanthropic organizations offer grants specifically dedicated to the promotion and adoption of sustainable agriculture</li> <li>➤ Examples: <ul style="list-style-type: none"> <li>○ The Regenerative Agriculture Foundation offers grants for research and implementation of regenerative management<sup>81</sup></li> </ul> </li> </ul>

<sup>77</sup> Healthy Soils Program (2020). California Division of Food and Agriculture. From: <https://www.cdfa.ca.gov/oeff/healthsoils/>

<sup>78</sup> Matching Grants Program (2019). Colorado Department of Agriculture. From: <https://www.colorado.gov/pacific/agconservation/matching-grants-program>

<sup>79</sup> Coordinated Natural Resources Conservation Grants (n.d.) South Dakota Department of Agriculture. From: <https://sdda.sd.gov/conservation-forestry/grants-loans/conservation-grant/>

<sup>80</sup> Sustainable Agriculture Grants (2012) Sustainable Agriculture Research & Education. From: <https://www.sare.org/Grants>

<sup>81</sup> Regenerative Agriculture Foundation (n.d.) From: <http://regenerativeagriculturefoundation.org/wordpress/>

- The Bullitt Foundation has given grants to multiple programs and collectives working to improve ecosystem services through agriculture and land management<sup>82</sup>
- One of the Cedar Tree Foundation's current funding priorities is a Regenerative Grazing Initiative that directly supports Native farmers and ranchers in applying regenerative pasture management<sup>83</sup>
- Other resources:
  - Sustainable Agriculture & Food System Funders<sup>84</sup> — maintains a network of members who fund and advocate for sustainable agriculture

---

<sup>82</sup> Grant History (2020). The Bullitt Foundation. From: <https://www.bullitt.org/grants/grant-history/>

<sup>83</sup> Regenerative Grazing Initiative (2020). The Cedar Tree Foundation. From: <http://cedartreefound.org/sustainable-grazing-initiative>

<sup>84</sup> Sustainable Agriculture & Food System Funders (2015). From: <http://www.safsf.org/who/members/>

## REVENUE-ALIGNED STRATEGIES

The second grouping of categories includes strategies that reward producers with revenue for adopting conservation practices, demonstrating conservation outcomes, or syncing operations with consumer priorities for regenerative agriculture and food systems. In some cases, opportunities add previously-untapped revenue streams to an operation. In others, opportunities drive additional value back to the operation by better-aligning activities with premiums for regenerative goods and services. Revenue-aligned strategies often have the potential to stack or blend with other incentives. Whether by leveraging conservation finance to obtain ecologically-motivated capital that enables a new business activity, or by increasing the share of profits retained by lowering costs through regenerative management, the impact of these opportunities can be multiplied with conscious enterprise planning.

## 7. ECOSYSTEM SERVICE MARKETS

### BACKGROUND

---

Ecosystem service markets allow different parties to buy and sell credits that represent environmental improvements or avoided environmental harms. There is considerable variety in the structure of ecosystem markets, but they fall into two general categories: compliance markets and voluntary markets<sup>85</sup>. Compliance markets, such as the California Cap-and-Trade Program, are used by governments to regulate the total allowances of negative environmental externalities, like GHG emissions. In a compliance setting, buyers are regulated entities that need credits in order to offset their environmental footprint. Sellers are entities — regulated or not — who implement projects that avoid or reverse the specific environmental harm. Projects generate credits that are intended to be equivalent to the volume of harm prevented or reversed — credits awarded to a farm for reducing downstream nutrient pollution could be valued in terms of pounds of nitrogen or phosphorus avoided, for example.

Voluntary markets are largely similar to compliance markets, other than the fact that buyers have no obligation to purchase credits. In the absence of a regulated cap or total allowance of negative environmental impact, these markets serve as a way for motivated buyers to incentivize beneficial projects. Voluntary credit buyers can be motivated by the desire to demonstrate leadership on environmental issues, to build in a pricing mechanism for climate risk, or to satisfy other unique personal environmental convictions<sup>86</sup>.

---

<sup>85</sup> Making Sense of the Voluntary Carbon Market: A Comparison of Carbon Offset Standards (2008). Stockholm Environment Institute and Triicornia. From: [https://www.globalcarbonproject.org/global/pdf/WWF\\_2008\\_A%20comparison%20of%20C%20offset%20Standards.pdf](https://www.globalcarbonproject.org/global/pdf/WWF_2008_A%20comparison%20of%20C%20offset%20Standards.pdf)

<sup>86</sup> Unlocking Potential: State of the Voluntary Carbon Markets (2017). Forest Trends. From: [https://www.forest-trends.org/wp-content/uploads/2017/07/doc\\_5677.pdf](https://www.forest-trends.org/wp-content/uploads/2017/07/doc_5677.pdf)

The subcategories of ecosystem service markets outlined in the table below are: carbon markets (including protocols for valuing other GHGs), water quality markets, water quantity markets, and novel crediting schemes that assign value to other ecosystem services.

## CRITIQUES

---

There are numerous critiques regarding the utility and efficacy of ecosystem service markets. In particular, carbon markets have been the object of extensive analysis and critique beyond the scope of this document<sup>87</sup>. Two specific issues that have implications for the adoption of regenerative agriculture are the cost obligations for farmers in listing credits and the quality of credits generated by different project types.

Unless different terms are negotiated otherwise ahead of time, credit generators are typically required to shoulder the cost of verifying and listing credits. These costs can be substantial. One voluntary carbon market platform estimates that agricultural projects can cost between \$3,000 and \$5,000 to verify<sup>88</sup>. Unfortunately, this implies that projects must achieve a level of scale in order to overcome cost thresholds to achieve profitability. There is considerable interest in developing new methods for measuring and comparing ecological states, partly motivated by reducing these costs and improving the efficacy of investment in ecosystems. For example, there are a range of new methods being researched for measuring soil carbon sequestration by sensing and spectroscopy — the detection of chemical and biological soil components through infrared or other wavelength measurement<sup>89</sup>. However, issues with accuracy and uncertainty mean that it may be some time before these tools become cost-effective and mainstream<sup>90</sup>.

The issue of credit quality revolves around uncertainty about the volume and permanence of environmental harm that is avoided or reversed. Buyers need assurance that they are paying for credits that represent verified environmental improvements. There are also concerns that credits can be double counted if sellers attempt to list credits from a single project on multiple markets. Fortunately, as ecosystem marketplaces mature, credit quality tends to increase<sup>91</sup>. Mechanisms like standards and protocols help to establish legitimate trading practices that offer assurance of environmental benefits. For example, the volume of carbon credits that are covered by official standards has increased substantially since the early days of carbon markets. Now, 99% of listed carbon credits are certified by standards that ensure real, measurable, and

---

<sup>87</sup> For a more comprehensive overview, see a critical review of carbon markets by Sovacool, Benjamin K (2011) Four problems with global carbon markets: a critical review. *Energy and Environment*. Although carbon markets are a subset of ecosystem service markets as a whole, the problems are broadly similar.

<sup>88</sup> For Growers (2020). Nori. From: <https://nori.com/for-growers>

<sup>89</sup> Smith et al. (2019). How to measure, report and verify soil carbon change to realize the potential of soil carbon sequestration for atmospheric greenhouse gas removal. *Global Change Biology*. Retrieved from: <https://doi.org/10.1111/gcb.14815>

<sup>90</sup> Nayak et al. (2019). Current and emerging methodologies for estimating carbon sequestration in agricultural soils: A review. *Science of the Total Environment*. From: <https://doi.org/10.1016/j.scitotenv.2019.02.125>

<sup>91</sup> Private Capital for Working Lands Conservation: A Market Development Framework (n.d.) Conservation Finance Network. From: [http://www.conservationfinancenetwork.org/sites/default/files/Private\\_Capital\\_for\\_Working\\_Lands\\_Conservation.pdf](http://www.conservationfinancenetwork.org/sites/default/files/Private_Capital_for_Working_Lands_Conservation.pdf)

additional GHG reductions<sup>92</sup>. There are also marketplaces being developed to address these problems by only allowing projects that actively undo — rather than purport to avoid — environmental damages. Nori, a carbon market of this sort, only lists credits that correspond to carbon sequestration verified by laboratory soil tests and rigorous modeling performed in accordance with a third-party protocol. Nori suggests that the focus on verified carbon removal prevents low quality, non-additional, or impermanent credits from being generated and sold<sup>93</sup>.

## ACCELERATING REGENERATIVE AGRICULTURE THROUGH ECOSYSTEM SERVICE MARKETS

---

Ecosystem service markets have lately received considerable attention as a way to incentivize environmentally-beneficial farming practices, especially those that sequester atmospheric carbon in an effort to combat climate change. The potential to deliver revenue to land managers depends not only on the robustness of the market platform, but also on demand. As yet unrealized developments — such as an ecommerce-like platform for easy consumer purchases or broader political support for expanded compliance markets — could boost demand and increase the value of this mechanism over others in the realm of conservation finance.

One of the factors that differentiates ecosystem service markets from other funding mechanisms is the potential to directly generate revenue through conservation activities. If there is payback potential above the upfront costs of a credit-generating project, producers can see long-term annual revenue from a one-time change in practices<sup>94</sup>. While these systems reward progressive, incremental changes, there is catalytic potential for earning revenue that is proportional to the scale of changes made. Since credits are awarded to land managers based on progress over a baseline, more radical regenerative transitions can generate more revenue. If an operation with an overwhelmingly negative environmental baseline were to demonstrably shift toward positive ecosystem outcomes, the volume of credits earned would equal the substantial reversal of environmental harms.

By offering payments for the outcomes of conservation activities, credits can be used as a valuable method for stacking environmental incentives and diversifying revenue sources. Ecosystem service credits are awarded for verified ecological improvements after projects have come to fruition. The methods of funding projects can include many of the mechanisms discussed here — grants, cost-share agreements, environmentally-motivated community loans, et cetera. Leveraging pre-project conservation funding in combination with ecosystem service markets can lower a producer's capital requirements and attach revenue to the project

---

<sup>92</sup> Unlocking Potential: State of the Voluntary Carbon Markets (2017). Forest Trends. From: [https://www.forest-trends.org/wp-content/uploads/2017/07/doc\\_5677.pdf](https://www.forest-trends.org/wp-content/uploads/2017/07/doc_5677.pdf)

<sup>93</sup> A blockchain-based marketplace for removing carbon dioxide from the atmosphere (2019). Nori. From: <https://nori.com/white-paper>

<sup>94</sup> Note that annual returns depend on annual credit generation, which is not universal to all ecosystem service market contracts. Projects that have continual or progressive conservation benefits over their lifetime can generate credits every year. An example of such a contract would be a soil carbon sequestration management change that sequesters carbon continuously up to a maximum threshold. Nori typically rewards these soil carbon projects with credits for 10 years. Other projects, such as one-time emission avoidance projects, only generate credits in the first year.

outcomes. In this way, ecosystem service markets can be viewed as a primary motivator of new conservation activities, or as an added layer of incentive.

## ECOSYSTEM SERVICE MARKETS, CREDIT REGISTRIES, AND PROTOCOLS

<p>NORI<sup>95</sup></p>	<ul style="list-style-type: none"> <li>➤ Emerging voluntary market for carbon credits             <ul style="list-style-type: none"> <li>○ Sellers earn Nori Carbon Removal Tonne tokens for each metric ton of CO<sub>2</sub>e sequestered</li> <li>○ Buyers can purchase available tokens to offset personal or institutional carbon footprints</li> </ul> </li> <li>➤ Agricultural producers and land managers are eligible for payments corresponding to credits generated by sequestering carbon; credit price will be determined by the market</li> <li>➤ Sequestration is verified by a third party, at the farmer’s cost</li> </ul>
<p>INDIGO CARBON<sup>96</sup></p>	<ul style="list-style-type: none"> <li>➤ Emerging voluntary market for carbon credits             <ul style="list-style-type: none"> <li>○ Sellers will be farmers that are implementing regenerative practices and enrolled in Indigo-Ag’s service platform</li> <li>○ Buyers will be individuals or institutions looking to: “maximize the impact of their sustainability investments... hedge climate risks, and... contribute to climate change solutions”</li> </ul> </li> <li>➤ Minimum credit price of \$15 per metric ton, with a market-set price coming</li> <li>➤ Initiative includes research on sequestration verification and measurement; proposed methods for verifying removal are “digital agronomy capabilities and satellite imagery analysis”</li> </ul>
<p>REGEN NETWORK<sup>97</sup></p>	<ul style="list-style-type: none"> <li>➤ Platform for monitoring ecosystem indicators and hosting contracts for inter party payments based on verified ecological improvements</li> <li>➤ Process:             <ul style="list-style-type: none"> <li>○ Contracts for ecosystem improvements are negotiated;</li> <li>○ Regen Network employs remote sensing to observe changes over time;</li> <li>○ Payments disburse when the agreed-upon changes have been verified</li> </ul> </li> <li>➤ Have a proposed product for farmers that explicitly targets regenerative practices<sup>98</sup></li> </ul>

<sup>95</sup> Nori: For Growers (2020). Nori Carbon. From: <https://nori.com/for-growers>

<sup>96</sup> Indigo Launches the Terraton Initiative to Remove One Trillion Tons of Carbon Dioxide from the Atmosphere (2019). Indigo Ag. From: <https://terraton.indigoag.com/news/indigo-launches-terraton-initiative>

<sup>97</sup> Regen Network (n.d.) From: <https://www.regen.network/>

<sup>98</sup> It’s time that farmers and ranchers get paid for their ecological impact (n.d.) Regen Network. From: [https://www.regen.network/farmers\\_signup.html](https://www.regen.network/farmers_signup.html)



<p>SOIL AND WATER OUTCOMES FUND<sup>99</sup></p>	<ul style="list-style-type: none"> <li>➤ Revolving fund that uses impact investor capital to pay farmers for implementing best management practices</li> <li>➤ Independent verification of outcomes is required before payments are disbursed</li> <li>➤ Payments to farmers scale with the environmental impact of the adopted best management practices</li> <li>➤ Administered by a 501c(3) managed by the Iowa Soybean Association (The Agriculture Technology and Environmental Stewardship Foundation) in partnership with Qualified Ventures</li> <li>➤ Currently operating in Iowa</li> </ul>
<p>ECOSYSTEM SERVICE MARKET CONSORTIUM<sup>100</sup></p>	<ul style="list-style-type: none"> <li>➤ Proposed integrated national market for carbon and water quality credits</li> <li>➤ Current work revolves around R&amp;D for credit quantification, ecological monitoring, and market infrastructure</li> <li>➤ Implementing pilot projects in several agricultural regions to “test and refine ESMC’s integrated ecosystem services credit protocol and new technologies”</li> <li>➤ Current partners include: Archer Daniels Midland, Cargill, Danone, McDonalds, The Nature Conservancy, and others</li> <li>➤ Aiming for a 2022 launch</li> </ul>
<p>WORKING LANDS INVESTMENT FUND<sup>101</sup></p>	<ul style="list-style-type: none"> <li>➤ NOW CLOSED</li> <li>➤ Fund created by the Environmental Defense Fund and Encourage Capital with support from and NRCS Conservation Innovation Grant</li> <li>➤ Acted as a buyer of last resort and price guarantor for agricultural carbon credits generated for the California Cap-and-Trade compliance market</li> </ul>
<p>CALIFORNIA CAP-AND-TRADE COMPLIANCE MARKET<sup>102</sup></p>	<ul style="list-style-type: none"> <li>➤ Projects that avoid GHG emissions are eligible to generate credits that can be used for compliance with California’s industrial emissions cap; buyers are regulated entities with emissions subject to the cap <ul style="list-style-type: none"> <li>○ Projects must adhere to an existing protocol for generating credits or submit a new protocol that is independently verifiable and subject to regulatory approval</li> </ul> </li> </ul>

<sup>99</sup> Soil & Water Outcomes Fund: Cost-effective, market-based solutions for soil and water stewardship (2020). The Outcomes Fund. Retrieved from: <https://www.theoutcomesfund.com/>

<sup>100</sup> Ecosystem Services Market Consortium: Growing Resilience in Agriculture (n.d.) Retrieved from: Ecosystem Services Market Consortium <https://ecosystemservicesmarket.org/>

<sup>101</sup> Private Capital for Working Lands Conservation (n.d.) The Conservation Finance Network. From: [http://www.conservationfinancenetwork.org/sites/default/files/Private\\_Capital\\_for\\_Working\\_Lands\\_Conservation.pdf](http://www.conservationfinancenetwork.org/sites/default/files/Private_Capital_for_Working_Lands_Conservation.pdf)

<sup>102</sup> Compliance Offset Program (2020). California Air Resources Board. From: <https://ww3.arb.ca.gov/cc/capandtrade/offsets/offsets.htm>

	<ul style="list-style-type: none"> <li>○ Projects must be listed with an approved registry to sell compliance credits</li> <li>➤ Approved registries: <ul style="list-style-type: none"> <li>○ American Carbon Registry</li> <li>○ Climate Action Reserve</li> <li>○ Verra</li> </ul> </li> <li>➤ Approved agricultural projects currently only cover methane reductions from manure management (e.g. anaerobic digesters) and methane reductions from rice production<sup>103</sup></li> </ul>
<p style="text-align: center;">WATER QUALITY MARKETS<sup>104</sup></p>	<ul style="list-style-type: none"> <li>➤ Nonpoint sources (e.g. farms) can reduce their discharge of nutrient pollutants and sell credits equivalent to the reduced volume to point sources (e.g. industrial operations) who are subject to pollution controls</li> <li>➤ The EPA has policies in place to support trading for nutrients (nitrogen and phosphorus), sediment load, and water temperature</li> <li>➤ Markets and trading programs are supported by federal policy, but managed by state or local entities</li> <li>➤ Examples: <ul style="list-style-type: none"> <li>○ Ohio River Basin Trading Project<sup>105</sup> <ul style="list-style-type: none"> <li>■ Current the world’s largest water quality trading project with state level participation from Ohio, Kentucky, and Indiana</li> <li>■ Farms implement best management practices to reduce downstream nutrient loads (nitrogen and phosphorus); credits are generated by a pound-for-pound prevention of discharge</li> <li>■ Credits have been successfully generated and purchased by private entities during the program’s pilot phase (pilot phase will continue through 2020)</li> </ul> </li> <li>○ Colorado watershed-level pilots<sup>106</sup> <ul style="list-style-type: none"> <li>■ Chatfield Reservoir</li> <li>■ Cherry Creek Basin</li> <li>■ Bear Creek</li> <li>■ Dillon Reservoir</li> </ul> </li> </ul> </li> </ul>

<sup>103</sup> What Do Farmers Need to Know About Climate Change? California Air Resources Board Cap-and-Trade Program (2017). National Farmers Union. From: <https://nfu.org/2017/11/13/what-do-farmers-need-to-know-about-climate-change-california-air-resources-board-cap-and-trade-program/>

<sup>104</sup> National Pollutant Discharge Elimination System (2016). US Environmental Protection Agency. From: <https://www.epa.gov/npdes>

<sup>105</sup> Project Overview (2018). Electric Power Research Institute. From: <https://wqt.epri.com/overview.html>

<sup>106</sup> Trading Programs at State Level (2020). The Environmental Trading Network. From: <http://www.envtn.org/water-quality-trading/state-programs>

## WATER TRANSFER MECHANISMS<sup>109</sup>

- Lower Colorado River
  - Wissahickon Creek, Pennsylvania sediment credit program<sup>107</sup>
  - Medford, Oregon temperature control credit program<sup>108</sup>
- Market or incentive-based mechanisms for flexible allocation of water that satisfies agricultural, municipal, and environmental demands
  - Generally applicable in arid states where prior appropriation systems allow for the sale or transfer of water rights
  - Often referred to as alternative transfer methods (ATMs), these are considered an alternative to “buy and dry” — the permanent purchase and reallocation of water rights from agricultural holders
- Many of these mechanisms seek to satisfy the long-term needs of farmers, including by incentivizing conservation measures like:
  - Planting less water-intensive crops
  - Investing in irrigation infrastructure
  - Managing soil moisture and water retention
- Cases:
  - Advanced metering infrastructure and groundwater market Fox Canyon, California<sup>110, 111</sup>: a market in its pilot phase being used to manage groundwater with a strict withdrawal limit and incentives for growers to trade unused water; growers who need additional water can bid for units on the market; the program aims to maintain ecologically-sound levels of groundwater while giving growers incentives to sell unused water — countering the “use it or lose it” premise that underlies agricultural water rights in the western United States
  - Rotational fallowing agreements in Windsor, Colorado<sup>112</sup>: the municipality has considered working with ditch companies to compensate farmers for fallowing fields in order to bolster municipal water supply; fallowed farms would receive compensation and conservation benefits for the year in which they do not produce

<sup>107</sup> The Wissahickon Creek Municipal Sediment Credit System (2010). Pennsylvania Environmental Council. From: [http://www.stormwaterpa.org/assets/media/news/PEC%20Wiss%20Muni%20Sed%20Credit%20System%20Final%20Report\\_2\\_24.pdf](http://www.stormwaterpa.org/assets/media/news/PEC%20Wiss%20Muni%20Sed%20Credit%20System%20Final%20Report_2_24.pdf)

<sup>108</sup> Medford Water Quality Trading Program (n.d.) The Freshwater Trust. From: <https://www.thefreshwatertrust.org/case-study/medford-water-quality-trading-program/>

<sup>109</sup> Water Transfers in the West (2012). Western States Water Council. From: [https://www.westernstateswater.org/wp-content/uploads/2012/12/Water\\_Transfers\\_in\\_the\\_West\\_2012.pdf](https://www.westernstateswater.org/wp-content/uploads/2012/12/Water_Transfers_in_the_West_2012.pdf)

<sup>110</sup> FAQs - AMI/Water Market (2018). Fox Canyon Groundwater Management Agency. From: <https://fcgma.org/faqs>

<sup>111</sup> GROUNDWATER MARKETS: A case study of the Fox Canyon Groundwater Market (2019). Maven's Notebook. From: <https://mavensnotebook.com/2019/11/20/groundwater-markets-a-case-study-of-the-fox-canyon-groundwater-market/>

<sup>112</sup> Alternative Water Transfers in Colorado (2016). Environmental Defense Fund. From: <https://www.edf.org/sites/default/files/alternative-water-transfers-colorado.pdf>

	<ul style="list-style-type: none"> <li>○ “Buy and supply” transfers in Fountain, Colorado: the municipality has considered purchasing irrigated farmland in order to transition the attached water rights into an “on call” source of municipal water; only water needed to meet shortfalls would be sourced from the irrigation supply</li> </ul>
<p style="text-align: center;">NITROGEN MANAGEMENT PROTOCOLS FOR VOLUNTARY CARBON MARKETS<sup>113</sup></p>	<ul style="list-style-type: none"> <li>➤ Emissions avoidance resulting from improved nitrogen fertilizer management can generate credits for voluntary carbon markets</li> <li>➤ Existing protocols from official registries: <ul style="list-style-type: none"> <li>○ Verra — VM0022 Quantifying N<sub>2</sub>O Emissions Reductions in Agricultural Crops through Nitrogen Fertilizer Rate Reduction<sup>114</sup></li> <li>○ American Carbon Registry — Methodology for Quantifying Nitrous Oxide (N<sub>2</sub>O) Emissions Reductions from Reduced Use of Nitrogen Fertilizer on Agricultural Crops<sup>115</sup></li> <li>○ Climate Action Reserve — Nitrogen Management Protocol<sup>116</sup></li> </ul> </li> <li>➤ The Delta Institute and The Climate Trust ran a dedicated nitrogen credit buying program for eligible farms in the North Central US<sup>117</sup></li> </ul>

<sup>113</sup> Using Carbon Markets to Create Positive Environmental Change (2016). The Climate Trust. From:

<https://climatetrust.org/crediting-farmers-for-nutrient-stewardship-using-carbon-markets-to-create-positive-environmental-change/>

<sup>114</sup> VM0022 Quantifying N<sub>2</sub>O Emissions Reductions in Agricultural Crops through Nitrogen Fertilizer Rate Reduction (2013). Verra. From:

<https://verra.org/methodology/vm0022-quantifying-n2o-emissions-reductions-in-agricultural-crops-through-nitrogen-fertilizer-rate-reduction-v1-1/>

<sup>115</sup> Methodology for Quantifying Nitrous Oxide (N<sub>2</sub>O) Emissions Reductions from Reduced Use of Nitrogen Fertilizer on Agricultural Crops (2012). American Carbon Registry. From:

<https://americancarbonregistry.org/carbon-accounting/old/carbon-accounting/methodology-for-n2o-emission-reductions-through-fertilizer-rate-reduction>

<sup>116</sup> Nitrogen Management Protocol (2018). Climate Action Reserve. From:

<http://www.climateactionreserve.org/how/protocols/nitrogen-management/>

<sup>117</sup> Nitrogen Credit Program (2014). The Delta Institute. From:

<https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/michigan/projects/Documents/Nitrogen%20Credit%20Brochure%202014.pdf>

## 8. ADDED OPERATIONS

### BACKGROUND

---

Many farmers choose to stack complementary business operations on top of crop and livestock production. Pursuing additional ventures can help diversify a farm enterprise, particularly if scale and capital restrictions have led to concerns about the viability of farming alone. There are plenty of caveats to consider when undertaking new business models — diversifying can require learning new skills, taking on additional debt to purchase necessary equipment, hiring new employees, cutting down on time dedicated to crop or livestock production, and complying with additional regulations. If the conditions are right, however, added operations can earn significant revenue, improve control over the price of finished goods, offset enterprise costs, and generate assets that lead to sustained wealth in the long term. Having a consumer-facing component of the farm business can also improve marketing and public relations.

### ACCELERATING REGENERATIVE AGRICULTURE WITH ADDED OPERATIONS

---

Embracing diversity is a core principle of regenerative agriculture, although it is communicated more often in terms of flora and fauna than business strategies. Diverse planting systems that include a range of beneficial animals have clear ecological benefits<sup>118</sup>. A diversified enterprise can also increase profitability and spread risk, leading to a less fragile operation<sup>119</sup>. As in natural systems, the benefits to stacking activities are most apparent when there are clear synergies. Identifying ways to use waste streams as profit-generating inputs, adapting equipment to perform additional functions, putting facilities to use during the slow season, and other creative business planning activities can maximize economic and environmental returns from new ventures.

### EXPANDED BUSINESS MODELS COMPLEMENTARY WITH REGENERATIVE AGRICULTURE

---

#### EDUCATION

- On-farm classes, tours, or workshops
- Must assess the costs and benefits related to:
  - Added labor
  - Regulatory compliance
  - Liability
  - Marketing

---

<sup>118</sup> Field to Fork: Resilience Through Diversification (2015). University of New Hampshire and New England Food Solutions. From: [https://sustainableunh.unh.edu/sites/sustainableunh.unh.edu/files/media/field\\_to\\_fork\\_farm\\_0.pdf](https://sustainableunh.unh.edu/sites/sustainableunh.unh.edu/files/media/field_to_fork_farm_0.pdf)

<sup>119</sup> Diversification of Your Operation, Why (2016). PennState Extension. From: <https://extension.psu.edu/diversification-of-your-operation-why>

AGROTOURISM	<ul style="list-style-type: none"> <li>➤ Farm stays, events, or hospitality</li> <li>➤ Must assess the costs and benefits related to: <ul style="list-style-type: none"> <li>○ Added labor</li> <li>○ Regulatory compliance</li> <li>○ Liability</li> <li>○ Marketing</li> </ul> </li> </ul>
FOOD SERVICE	<ul style="list-style-type: none"> <li>➤ Farm dinners, catering, or mobile food service</li> <li>➤ Must assess the costs and benefits related to: <ul style="list-style-type: none"> <li>○ Added equipment</li> <li>○ Added labor</li> <li>○ Regulatory compliance</li> <li>○ Liability</li> <li>○ Marketing</li> </ul> </li> </ul>
VERTICAL INTEGRATION	<ul style="list-style-type: none"> <li>➤ Expanding scope of operations to include additional activities that would otherwise be performed upstream of the farm gate, including: <ul style="list-style-type: none"> <li>○ Sorting/grading</li> <li>○ Processing</li> <li>○ Value-added manufacturing</li> <li>○ Packaging</li> <li>○ Retail or direct sales</li> <li>○ Shipping</li> <li>○ Logistics</li> </ul> </li> <li>➤ Consider costs and benefits related to: <ul style="list-style-type: none"> <li>○ Added equipment</li> <li>○ Added labor</li> <li>○ Regulatory compliance</li> <li>○ Liability</li> <li>○ Marketing</li> </ul> </li> </ul>
ENERGY GENERATION	<ul style="list-style-type: none"> <li>➤ Installing owned energy infrastructure or leasing space for long-term installation of privately-owned energy infrastructure <ul style="list-style-type: none"> <li>○ If generation equipment is owned, consider: <ul style="list-style-type: none"> <li>■ Payback time for equipment</li> <li>■ Changed costs for operations, especially those that are energy intensive</li> <li>■ Ability to sell excess generated power to utilities</li> <li>■ Enterprise resilience</li> </ul> </li> <li>○ If land is leased for private equipment, consider: <ul style="list-style-type: none"> <li>■ Lease rates (revenue from rent vs. revenue from production for a given piece of land)</li> </ul> </li> </ul> </li> </ul>

- Lifespan of equipment and length of lease terms
- Ability to utilize generated power for operations (and cost to do so vs. purchasing from utility)
- Depending on geography and regulation, could include:
  - Biofuel processors (e.g. anaerobic digesters, biodiesel, ethanol, or switchgrass)
  - Solar arrays
  - Solar grazing (integrating livestock into land set aside for solar arrays)<sup>120</sup>
  - Wind turbines
  - Geothermal heat or electric
  - Tidal/current electric
- Subsidies and incentives:
  - Rural Energy for America<sup>121</sup> — loans, loan guarantees, and grants
  - Database of State Incentives for Renewables and Efficiency<sup>122</sup> — state by state curated list of policies and financial incentives related to renewable energy or energy conservation

---

<sup>120</sup> Solar Grazing (2019). American Solar Grazing Association. Retrieved from: <https://solargrazing.org/>

<sup>121</sup> Rural Energy for America Program (2020). USDA Rural Development. From: <https://www.rd.usda.gov/programs-services/rural-energy-america-program-renewable-energy-systems-energy-efficiency>

<sup>122</sup> Database of State Incentives for Renewables and Efficiency (2020). NC Clean Energy Technology Center. From: <https://www.dsireusa.org/>

## 9. OFFTAKE MECHANISMS

Offtake mechanisms, somewhat related to added operations, are methods for producers to improve the prices of goods sold. Employing these methods can require substantial changes to operations, as in the case of a conventional farm considering a transition to certified organic. Depending on the operation, however, there may be relatively minor tweaks that can help producers qualify for a higher price or find a more amenable market. Commodity market prices have been relatively low and flat over the past five years, while the cost of farm inputs has increased significantly<sup>123</sup>. These combined effects mean that some producers may see benefits from changing their offtake strategies that outweigh the costs of making the switch. The primary ways to utilize new offtake mechanisms are to pursue certifications that offer market premiums or to identify buyers who are willing to pay for unique crops or production aspects. In either case, differentiation is the key to added value.

### OFFTAKE MECHANISMS

#### CERTIFICATION PREMIUMS

- Identity-preserved production, distribution, and marketing systems can offer price premiums and increased margins for producers; markets for these commodities are expanding and offer significant revenue potential — premiums for certified organic commodities are on average at least 20%<sup>124</sup>
- Examples:
  - Certified Organic
  - American Grassfed<sup>125</sup>
  - Animal Welfare Approved<sup>126</sup>
  - Certified Biodynamic<sup>127</sup>
  - Regenerative Organic Certified
  - Non GMO Project Verified
- Consider costs and benefits related to:
  - Cost of certification
  - Certification compliance burdens
  - Added equipment
  - Added labor
  - Marketing

<sup>123</sup> Ag Census: Input Costs Rise, Farm Income Declines Amid Low Commodity Prices (2019). Successful Farming. From:

<https://www.agriculture.com/news/business/ag-census-input-costs-rise-farm-income-declines-amid-low-commodity-prices>

<sup>124</sup> Growing Organic Demand Provides High-Value Opportunities for Many Types of Producers (2017). USDA Economic Research Service. From:

<https://www.ers.usda.gov/amber-waves/2017/januaryfebruary/growing-organic-demand-provides-high-value-opportunities-for-many-types-of-producers/>

<sup>125</sup> American Grassfed (2019). From: <https://www.americangrassfed.org/about-us/>

<sup>126</sup> Certified Animal Welfare Approved by AGW (n.d.) A Greener World. From: <https://agreenerworld.org/certifications/animal-welfare-approved/>

<sup>127</sup> Biodynamic Certification Marks (2020). Demeter Association, Inc. From: <https://www.demeter-usa.org/about-demeter/biodynamic-certification-marks.asp>



ALTERNATIVE  
/NICHE MARKETS

- Related to vertical integration, direct marketing to non-commodity buyers can allow producers to command higher prices and/or receive more of the final retail price paid for goods
- Growth of alternative sales channels has been rapid, as has the rise in demand<sup>128</sup>
- Models<sup>129</sup>:
  - Direct online retail
  - Community-Supported Agriculture (CSA)
  - Farmers markets
  - Farmstand retail
  - Restaurant sales
  - You-pick arrangements

<sup>128</sup> Why Local Food Matters: The rising importance of locally-grown food in the U.S. food system. USDA Agricultural Marketing Service. From: <https://www.ams.usda.gov/sites/default/files/media/Why%20Local%20Food%20MattersThe%20Rising%20Importance%20of%20Locally%20Grown%20Food%20in%20the%20U.S.%20Food%20System.pdf>

<sup>129</sup> Direct Marketing Channels & Strategy for Organic Products (2019). eOrganic. From: <https://eorganic.org/node/1493>

## HYBRID STRATEGIES

The third grouping of categories contains strategies that are not neatly separated along capital or revenue divisions. In general, these strategies help producers exert more conservation-aligned agronomic influence over operations — to control costs, reduce inputs, and increase outputs — or leverage support structures that mitigate risk and operationalize methods for recognizing and utilizing ecosystem service benefits. Some offer a mix of cost reduction and revenue generation opportunities, while others give producers a chance to reconceptualize the purpose of their operations in terms other than bushels per acre or dollars per hundredweight. Many of these strategies highlight the inherent differences between regenerative and conventional agriculture. They suggest some of the ways in which diversity, cooperation with natural systems, ecological resilience, and a stewardship mentality can be turned into an economic framework that more directly rewards regeneration.

## 10. RISK MANAGEMENT

### BACKGROUND

---

Risk management falls into two subcategories: insurance and resilient capacity building. Fortunately, these two practices are complementary. Resilient capacity building can be thought of as exerting as much control as possible over the risks of production through smart management. Insurance can reduce the risk of catastrophic loss when things happen that are outside of a producer's control.

Insurance is a commonly-used risk management tool for producers of all types. The USDA's Risk Management Agency (RMA) and Federal Crop Insurance Corporation (FCIC) administer nationally subsidized insurance programs for farmers that cover individual crops, whole enterprise revenue, commodity margins, and other losses. There are relatively few insurance products whose terms are directly tied to conservation outcomes, but there is potential to explore such models within the relatively strict confines of the Federal Crop Insurance Program. Cover crop insurance is a notable example of an insurance policy that does reward the use of a well-founded conservation measure. Once subject to restrictive regulations, the most recent Farm Bill has improved insurance protection for operations that include cover crops as an economic and ecological management tool<sup>130</sup>. See the table below for other examples of insurance strategies that would further support sustainable agriculture.

Policy claims can be reduced — or even denied — if RMA experts determine that producers were not employing “Good Farming Practices” to manage the covered commodities or

---

<sup>130</sup> If crop insurance rewarded conservation practices, would more farmers go no-till? (2019). The Counter. From: <https://thecounter.org/crop-insurance-conservation-no-till-regenerative-agriculture-climate-change-crisis-soil-health/>

enterprise features<sup>131</sup>. Given the stringent nature of Good Farming Practice determination, documentation is key for producers to get the full value out of their insurance coverage. Data tracking, through good bookkeeping or through digital enterprise management software, can dramatically improve the utility of insurance when it comes time to make a claim.

Resilient capacity is the ability for a farm to weather events that would negatively impact yields, revenues, or long-term prospects for viability. It is possible to improve on-farm resilience by implementing conservation practices that improve soil health and directly address ecological risks. Drought, excess precipitation, pest and disease pressure, and extreme weather are all reasonable risks that can disrupt one season or fatally injure a farm. While it is not possible to guard against every potential harm, regenerative and sustainable agricultural systems are inherently designed to increase resilient capacity<sup>132</sup>. Even selectively adopting a conservation practice like cover cropping can offer producers a management tool that reduces the risk of loss in extreme years and improves financial stability in normal years<sup>133</sup>. See the Management Optimization section for more detail on specific practices and associated benefits. Overall, building resilient capacity helps producers control risk at the enterprise level by creating less fragile farming systems.

## ACCELERATING REGENERATIVE AGRICULTURE THROUGH RISK MANAGEMENT

---

In insurance, there are a number of reforms that could support greater incentives for conservation. Reforms that involve regulations in the Federal Crop Insurance Program will require significant political advocacy and coordinated campaigns. Though difficult, these legislative reforms can have sweeping impacts. A good example is the recently-introduced Cover Crop Flexibility Act. If passed, the act would remove some restrictions on cover crop termination, increase indemnities connected to cover crops, and, pending a USDA study, give producers using cover crops a discount on their premiums<sup>134</sup>. Continued effort on the part of producers to track the benefits of risk reduction measures like cover cropping gives lawmakers and other stakeholders greater leverage in the pursuit of reforms.

Another potential model for rewarding sustainable agriculture lies at the intersection of insurance and resilient capacity building. The cost of maintaining the Federal Crop Insurance Program is likely to rise as the climate changes. Increasing weather variability and the increasing frequency of adverse weather is projected to increase the risk to yields insured under the program. In a scenario with limited climate adaptation, the cost increase across

---

<sup>131</sup> Good Farming Practice Determination Standards Handbook (2019). USDA Federal Crop Insurance Corporation. From: <https://www.rma.usda.gov/-/media/RMAweb/Handbooks/Program-Administration--14000/Good-Farming-Practice/2020-14060-Good-Farming-Practice-Determination-Standards.ashx>

<sup>132</sup> Regenerative Agriculture: The Path to Healing Agroecosystems and Feeding the World in the 21st Century (2019). Nuffield International Farming Scholars. From: <https://nuffieldinternational.org/live/Report/US/2018/brian-dougherty>

<sup>133</sup> Cover Crop Economics: Opportunities to Improve Your Bottom Line in Row Crops (2019). Sustainable Agriculture Research and Education. From: <http://www.sare.org/cover-crop-economics>

<sup>134</sup> Thune, Stabenow Introduce Cover Crop Flexibility Act (2020). American Seed Trade Association. From: <https://www.betterseed.org/thune-stabenow-introduce-cover-crop-flexibility-act/>

models averages 22%<sup>135</sup>. If more resilient operations file fewer and smaller insurance claims, the FCIC and RMA would benefit from incentivizing the adoption of sustainable methods. In the same vein as the Federal Emergency Management Agency’s finding that pre-disaster investment results in a six-fold savings over post-disaster intervention<sup>136</sup>, funding to accelerate the adoption of resilient agricultural practices could offset future increases in program expenses. Preparatory investment now could improve the ecological resilience of individual farms and the financial resilience of the national insurance system.

## RISK MANAGEMENT METHODS

### CROP OR ENTERPRISE INSURANCE

- The Federal Crop Insurance Program’s mission is to “to indemnify producers against losses in yield, crop revenue, margin, whole farm revenue, and other types of losses” through a range of insurance products<sup>137</sup>
- The USDA Risk Management Agency (RMA) and Federal Crop Insurance Corporation (FCIC) administer nationally subsidized insurance programs for farmers
- Growers not adhering to the FCIC’s list of “Good Farming Practices” risk a loss of or reduction in coverage; RMA-certified experts make Good Farming Practice determinations that impact claims’ eligibility<sup>138</sup>
- Existing insurance products consistent with conservation outcomes:
  - Whole-farm revenue protection, especially for organic farms; these tailored policies capture the potentially unique attributes of organic operations — diverse products, price premiums, specialty marketing, and prescriptive growing methods — and offer protection for projected revenue up to \$8.5 M<sup>139</sup>
  - Cover crop insurance; RMA recently extended insurance coverage to cover crops that are “agronomically sound for the area for erosion control or other purposes related to conservation or soil improvement...”<sup>140</sup>; note that termination

<sup>135</sup> Climate Change Projected To Increase Cost of the Federal Crop Insurance Program due to Greater Insured Value and Yield Variability (2019). USDA Economic Research Service. From: <https://www.ers.usda.gov/amber-waves/2019/november/climate-change-projected-to-increase-cost-of-the-federal-crop-insurance-program-due-to-greater-insured-value-and-yield-variability/>

<sup>136</sup> Natural Hazard Mitigation Saves: 2017 Interim Report (2018). Federal Emergency Management Agency. From: <https://www.fema.gov/natural-hazard-mitigation-saves-2017-interim-report>

<sup>137</sup> Crop Insurance: Title XI (2019). USDA Economic Research Service. From: <https://www.ers.usda.gov/agriculture-improvement-act-of-2018-highlights-and-implications/crop-insurance/>

<sup>138</sup> Good Farming Practice Determination Standards Handbook (2019). USDA Federal Crop Insurance Corporation. From: <https://www.rma.usda.gov/-/media/RMAweb/Handbooks/Program-Administration--14000/Good-Farming-Practice/2020-14060-Good-Farming-Practice-Determination-Standards.ashx>

<sup>139</sup> Organic Farming Practices (2019). USDA Risk Management Agency. From: <https://www.rma.usda.gov/Fact-Sheets/National-Fact-Sheets/Organic-Farming-Practices>

<sup>140</sup> 2020 Cover Crops Insurance and NRCS Cover Crop Termination Guidelines (2019). USDA Risk Management Agency. From: <https://www.rma.usda.gov/News-Room/Frequently-Asked-Questions/2020-Cover-Crops-Insurance-and-NRCS-Cover-Crop-Termination-Guidelines>

must follow NRCS guidance in order to qualify as a Good Farming Practice<sup>141</sup>

- Alternative models that would further support conservation outcomes:
  - Expand Good Farming Practices to include regenerative methods; instead of considering these methods niche conservation practices, the RMA could recognize their risk reduction potential and award claims accordingly
    - Advocate: Representative Chellie Pingree (1st District, Maine) introduced the Agriculture Resilience Act includes reforms to the language of Good Farming Practice in the Federal Crop Insurance Act that would include regenerative practices<sup>142</sup>
  - Crop insurance premiums tied to conservation practices — offer a discount on premiums for operations with approved NRCS conservation plans
    - Advocates: Conservation and Crop Insurance Taskforce<sup>143</sup> and the Regenerative Agriculture Initiative at the Yale Center for Business and the Environment<sup>144</sup>
  - Regenerative-specific enterprise insurance product — create a tailored product that captures the diversity and complexity that regenerative operations rely on; the Federal Crop Insurance Act has a provision, Section 508(h)<sup>145</sup>, for the introduction and subsidization of new insurance products developed by private sector groups; a tailored regenerative enterprise policy could be introduced through this provision

<sup>141</sup> NRCS Cover Crop Termination Guidelines (2019). Natural Resource Conservation Service. From:

[https://www.nrcs.usda.gov/wps/PA\\_NRCSCConsumption/download?cid=nrcseprd1466429&ext=pdf](https://www.nrcs.usda.gov/wps/PA_NRCSCConsumption/download?cid=nrcseprd1466429&ext=pdf)

<sup>142</sup> H.R.5861 - Agriculture Resilience Act (2020). Congress.gov. Retrieved from:

<https://www.congress.gov/bills/116/congress/house-bill/5861/text?r=1&s=2#toc-HA035E599DC5B46219159F66135378BF4>

<sup>143</sup> Strengthening Links Between Crop Insurance and Conservation (2015). AGree. Retrieved from:

<https://www.farmfoundation.org/wp-content/uploads/2018/02/1917-Deb-Atwood-Oct.-2015-Forum.pdf>

<sup>144</sup> The Case for Crop Insurance Reform (2020). Regenerative Agriculture Initiative at the Yale Center for Business and the Environment.

Retrieved from: <https://www.conservationfinancenetwork.org/2020/04/08/the-case-for-crop-insurance-reform>

<sup>145</sup> Private Sector Developed Plans (n.d.) USDA Risk Management Agency. From:

<https://www.rma.usda.gov/en/Federal-Crop-Insurance-Corporation/Private-Sector-Developed-Plans>

## RESILIENT CAPACITY BUILDING

- Exercising maximum control over conditions on the farm in order to mitigate the impacts of disasters and unforeseen circumstances, specifically through strengthening the farm ecosystem<sup>146</sup>
- Can be considered a counterpart to crop insurance — pre-disaster management vs. post-disaster loss recouping
- Select practices<sup>147</sup>:
  - Planned diversity in cropping systems
  - Conservation tillage
  - Cover crops
  - Waste cycling — compost and manure utilization
  - Diversified marketing
- Benefits<sup>148, 149</sup>:
  - Improved drought tolerance
  - Soil temperature buffering
  - Water infiltration and soil moisture retention
  - Stabilized yields
  - Resilient crops requiring fewer management interventions

## COMMUNITY RISK POOLING

- Regions with significant volumes of farmland can share spatially-correlated risks, especially in the case of weather events that cause adverse effects for all producers in the region<sup>150</sup>
- Community-level financial incentives for land management changes can motivate the adoption of conservation practices that reduce certain risks
- Case: New York City & the Watershed Agricultural Council<sup>151</sup>
  - NYC evaluated the likely costs of building additional water filtration and purification infrastructure and determined that it would be more cost-effective to pay farmers upstream to implement conservation projects that reduce downstream pollution

<sup>146</sup> Understanding Climate Resilience (2015). Sustainable Agriculture Research & Education. From: <https://www.sare.org/Learning-Center/Bulletins/Cultivating-Climate-Resilience-on-Farms-and-Ranches/Climate-Risk-Management-and-Resilience-on-Farms-and-Ranches/Understanding-Climate-Resilience>

<sup>147</sup> Managing Natural Resources for Climate Resilience (2015). Sustainable Agriculture Research & Education. From: <https://www.sare.org/Learning-Center/Bulletins/Cultivating-Climate-Resilience-on-Farms-and-Ranches/Climate-Risk-Management-and-Resilience-on-Farms-and-Ranches/Managing-for-Climate-Resilience/Managing-Natural-Resources>

<sup>148</sup> Large-Scale Soil Health Restoration (2017). Asian Development Bank. From: <https://www.adb.org/sites/default/files/publication/386056/sewp-16.pdf>

<sup>149</sup> Palm et al (2014). Conservation agriculture and ecosystem services: An overview *Agriculture, Ecosystems, and Environment*. From: <https://www.sciencedirect.com/science/article/abs/pii/S0167880913003502>

<sup>150</sup> Managing Agricultural Production Risk (2005). The World Bank. From: [http://siteresources.worldbank.org/INTARD/Resources/Managing\\_Ag\\_Risk\\_FINAL.pdf](http://siteresources.worldbank.org/INTARD/Resources/Managing_Ag_Risk_FINAL.pdf)

<sup>151</sup> Watershed Agricultural Council (2019). From: <https://www.nycwatershed.org/about-us/overview/>

- Voluntary participation by farms ensures 1.1 billion gallons of drinking water per day that would otherwise require added municipal treatment capacity
- Case: Community-Supported Agriculture (CSA) networks
  - Having direct consumer participation in a CSA agreement allows farmers to have cash flow in advance of harvest, which offers considerable protection from financial risk
  - Though consumer financial contributions are relatively small, the aggregate effect gives farmers a pool of operating capital that may let them avoid conventional loans, including the attached interest and potential loss of collateral
- Potentially applicable risk areas:
  - Regional drought and water supply risks
  - Watershed-level flood risks
  - Regional food insecurity risks

# 11. TAX INSTRUMENTS

## BACKGROUND

Tax instruments include deductions and credits that agricultural producers are eligible for at the state and federal level. There are significant tax benefits offered to all classes of agricultural producers, but the most impactful for the purposes of incentivizing regenerative agriculture are benefits attached to conservation practices and outcomes. The IRS offers complete guidance on federal tax deductions and credits for farmers in the Farmer’s Tax Guide (IRS Publication 225). Environmentally-motivated tax benefits at the federal level generally consist of deductions for expenses on installing or maintaining conservation practices and deductions for donating conservation easements. At the state level, similar deductions may exist. Different states also offer tax credits that are directly attached to conservation activities. These credits can be used to offset expenses for implementing conservation best practices, or to compensate farmers for enrolling land in conservation easements.

## ACCELERATING REGENERATIVE AGRICULTURE THROUGH TAX INSTRUMENTS

The ability for producers to reduce their tax burden through deductions and credits is already a significant incentive for adopting conservation practices. However, in a given year it is possible for tax benefits accrued through conservation to be larger than a producer’s tax liability. Recognizing that farmers may prefer added revenue in cases like this, some states have established programs for selling or exchanging tax credits on an open market. The ability to implement conservation practices, potentially eliminate your full tax burden, and then earn additional revenue from credits generated by those practices adds another powerful layer of incentivization.

## TAX DEDUCTIONS AND CREDITS ATTACHED TO CONSERVATION MEASURES

<b>FEDERAL TAX DEDUCTIONS<sup>152</sup></b>	<ul style="list-style-type: none"><li>➤ Taxpayers earning income from farming activities are eligible for deductions related to conservation expenses, including:<ul style="list-style-type: none"><li>○ Food donation<sup>153</sup></li><li>○ Soil or water conservation</li><li>○ Prevention of erosion</li><li>○ Endangered species recovery</li></ul></li><li>➤ These conservation deductions cannot exceed 25% of gross income from farming; see IRS Publication 225 for full guidance</li></ul>
---------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<sup>152</sup> Publication 225 (2019), Farmer's Tax Guide (2019). Internal Revenue Service. From: <https://www.irs.gov/publications/p225#idm140352622006384>

<sup>153</sup> Using the Federal Enhanced Tax Deduction for Food Donation program, producers are able to earn enhanced tax deductions for commodities donated for human consumption. The deductions might help a producer offset losses that might occur when including a less-marketable crop into an ecologically-sound rotation. See the legal guide produced by the Harvard Food Law and Policy Clinic, the Food Recovery Project, and the University of Arkansas: Blazek, Balkus, Broad, Civita, Maley, Nuckolls, and Zhu (2016). Tax Deduction for Food Donation: A Legal Guide. Retrieved from: <http://www.chlpi.org/wp-content/uploads/2013/12/Food-Donation-Fed-Tax-Guide-for-Pub-2.pdf>



## CONSERVATION EASEMENT TAX INCENTIVES

- The federal tax code allows for donations of conservation easements to qualify as charitable gifts that can be deducted — up to 50% of adjusted gross income in the year of donation<sup>154</sup>
- Conservation easements can also qualify for state tax credits
  - Colorado: conservation easements can be claimed for tax credits (“a dollar-for-dollar reduction of state income tax liability”) that can be transferred or sold; credits are issued for 75% of the first \$100,000 donated and 50% of any remaining value (maximum \$5M per easement); credits can be transferred or sold at a discounted rate, allowing landowners to earn revenue and individuals or businesses to participate in financing conservation<sup>155</sup>
  - South Carolina: donations of conservation easements qualify for a tax credit of 25% of the easement’s fair market value; credits are capped at \$52,000 per year; credits can be carried forward into future years to reduce the farmer’s tax burden or sold on the open market<sup>156</sup>
  - Virginia: donated land or conservation easements can be claimed as credits for 40% of the fair market value; taxpayers may use up to \$20,000 of credit in 2020 and up to \$50,000 in subsequent years; credits may be carried forward up to 13 years or sold on the open market<sup>157</sup>
- The utility of conservation credits is increased if they are transferable/sellable; if credit values exceed a farmer’s tax bill then transferable credits represent potential revenue

<sup>154</sup> Agricultural Conservation Easements (2016). Farmland Information Center. From:

[https://walandtrusts.org/wordpress/wp-content/uploads/2016/12/Agricultural\\_Conservation\\_Easements\\_AFT.pdf](https://walandtrusts.org/wordpress/wp-content/uploads/2016/12/Agricultural_Conservation_Easements_AFT.pdf)

<sup>155</sup> Division of Conservation: About Tax Credit Certificates (2019). Colorado Department of Regulatory Agencies. From:

<https://www.colorado.gov/pacific/dora/division-conservation-about-tax-credit-certificates>

<sup>156</sup> Tax Incentives (2020) Spartanburg Area Conservancy. From: <https://www.spartanburgconservation.org/tax-incentives>

<sup>157</sup> Land Preservation Tax Credit (2020). Virginia Department of Conservation and Recreation. From:

<https://www.dcr.virginia.gov/land-conservation/lpc>

## SEQUESTRATION TAX CREDITS

- The FUTURE Act introduced in 2017 contained the 45Q tax credit; 45Q offers tax credits to power plants and industrial facilities that capture and sequester carbon which would otherwise be emitted to the atmosphere<sup>158</sup>
  - The credit value will progressively increase over ten years from \$10 to \$35 per metric ton of CO<sub>2</sub>e stored “geologically through enhanced oil recovery” and from \$20 to \$50 per ton stored via saline or other geologic methods
  - To be eligible, qualified facilities must capture at least 100,000 tons of CO<sub>2</sub>e; 500,000 tons for electric generating stations
  - Credits can be transferred between entities, including companies, cooperatives, and municipal utilities
  - The 45Q program will not include agricultural operators, but the credit has inspired counterparts that could
- Senator Michael Bennet of Colorado has drafted a similar credit that would apply to farmers and ranchers whose operations sequester carbon: 45T<sup>159</sup>
- 45T would consist of two separate credits:
  - “Quantification Credit: Establishes a 30 percent tax credit for the cost of quantifying baseline and annual carbon sequestration levels for agriculture, rangeland, forest, and wetlands.”
  - “Outcomes Credit: Creates a dollar per ton tax credit based on the amount of carbon sequestered. The amount of the credit is tied to the funding levels for carbon capture and storage in the 45Q tax credit for carbon sequestration and utilization from industrial sources.”

## OTHER TAX CREDITS

- Individual states may offer conservation-motivated tax credits to reduce farmers’ tax burdens
- Examples
  - Virginia<sup>160</sup>:
    - Agricultural Best Management Practices Credit for expenses toward approved soil conservation plans
    - Conservation Tillage Equipment Credit for expenses on qualifying equipment

<sup>158</sup> 45Q Tax Credit (2018). Carbon Capture Coalition. From: <https://carboncapturecoalition.org/45q-legislation/>

<sup>159</sup> Bennet Unveils Discussion Draft to Create New Tax Credit for Farmers and Ranchers to Capture Carbon in the Land Sector (2019). Michael Bennet, US Senator for Colorado. From: <https://www.bennet.senate.gov/public/index.cfm/2019/12/bennet-unveils-discussion-draft-to-create-new-tax-credit-for-farmers-and-ranchers-to-capture-carbon-in-the-land-sector>

<sup>160</sup> Agriculture and Farming Credits (2020). Virginia Department of Taxation. From: <https://www.tax.virginia.gov/agriculture-and-farming-credits>

- 
- Fertilizer and Pesticide Application Equipment Credit for qualifying equipment that helps meet an approved nutrient management plan
  - Riparian Waterway Buffer Credit for preserving forested land adjacent to waterways
  - Pennsylvania: Resource Enhancement & Protection Program credit for implementing best management practices for conservation; applicants receive 50-75% of project costs through state tax credits (up to \$250,000); credits can be carried forward for up to 15 years or sold after 1 year<sup>161</sup>
- 

---

<sup>161</sup> Resource Enhancement and Protection Program (2020) Pennsylvania Department of Agriculture. From: [https://www.agriculture.pa.gov/Plants\\_Land\\_Water/StateConservationCommission/REAP/Pages/default.aspx](https://www.agriculture.pa.gov/Plants_Land_Water/StateConservationCommission/REAP/Pages/default.aspx)

## 12. MANAGEMENT OPTIMIZATION

### BACKGROUND

---

Farms of all types benefit from revising management strategies and implementing best practices. Fortunately, many of these optimizing activities align with individual conservation objectives and a more comprehensive regenerative perspective. Farm management can be viewed on a spectrum of sustainability — in terms of financial longevity, environmental impact, and social vibrancy. On the far end of the spectrum, farms work in concert with nature — using diligent management to employ ecosystem services — and achieve profitability.

How management changes affect the financial situation of a farm varies on a case-by-case basis. However, the potential for this mechanism as an incentive hinges on increasing efficiency in certain domains and substituting cost-generating activities with ecologically-beneficial alternatives. Efficient resource use offers direct cost savings and can have significant environmental benefits. Take fertilizer use as an example — as much as 20% of fertilizer is wasted as field runoff<sup>162</sup>. Optimal management of fertilizer can reduce application costs and prevent harmful nutrient pollution. Management substitutions, similar but distinct from efficiency improvements, seek to replace an environmentally-damaging practice or set of practices. In doing so, it is possible to increase profitability, typically through lower variable costs, but potentially with improved revenues in addition<sup>163</sup>.

### CRITIQUES

---

The potential for management changes to incentivize the adopting or expansion of conservation practices depends on how much these changes will cost and what the likelihood of payback is. If optimization requires overhauling significant aspects of an operation at a major cost, then this approach can be restrictive. Overhauling is certainly possible, but producers must make prudent decisions about capital requirements, terms attached to new sources of capital, and the risks associated with a changed production regime. If a major revision to farm operations is infeasible, incremental changes can serve as an introduction to managing for conservation. Relatively minor tweaks — creating a fertilizer management plan, for example — can have meaningful impacts to an operation's environmental footprint and bottom line.

### ACCELERATING REGENERATIVE AGRICULTURE THROUGH MANAGEMENT OPTIMIZATION

---

Seeing the ecological and financial benefits from a change in management can require reframing what is being managed for. Is it maximum yield? Is it maximum profitability? Is it a balance between profitability and stewarding the resource base? Depending on the answer,

---

<sup>162</sup> Sources of Eutrophication (n.d.) World Resources Institute. From:

<https://www.wri.org/our-work/project/eutrophication-and-hypoxia/sources-eutrophication>

<sup>163</sup> LaCanne and Lundgrin (2018). Regenerative agriculture: merging farming and natural resource conservation profitably. PeerJ. From:

<https://peerj.com/articles/4428/>

different approaches make sense. If long-term profitability is the priority, then there is a compelling argument in favor of a cost-minimizing strategy that recognizes the financial potential of ecological services.

Optimizing management goes hand in hand with understanding the outcomes of decisions. Information tracking and decision support infrastructure can be a prudent first step in revising an operation. In order to understand the best option in a range of possible changes, it is important to have a baseline for comparison and a method for monitoring results. New production regimes can have significantly different cost/benefit profiles. Unless expenses, revenues, and ecological metrics are tracked at a relatively granular level, it can be difficult to understand those costs and benefits.

## MANAGEMENT OPTIMIZATION METHODS

<p style="text-align: center;">IRRIGATION MANAGEMENT<sup>164</sup></p>	<ul style="list-style-type: none"> <li>➤ Best management practices that optimize irrigation timing and rates offer conservation benefits and operational efficiencies           <ul style="list-style-type: none"> <li>○ Methods:               <ul style="list-style-type: none"> <li>■ Install precision or variable rate irrigation infrastructure (see Infrastructure Improvements)</li> <li>■ Track soil moisture levels and manage moisture actively</li> <li>■ Time irrigation applications to minimize evaporation</li> <li>■ Monitor and operate pumping equipment remotely</li> <li>■ Line or improve ditches and reservoirs to minimize infiltration losses</li> <li>■ Plan crop rotations that are less water intensive</li> </ul> </li> <li>○ Benefits:               <ul style="list-style-type: none"> <li>■ Reduce water costs</li> <li>■ Mitigate issues related to over watering (inundation, root damage, disease propagation, increased pest presence, etc.)</li> <li>■ Stabilize yields</li> </ul> </li> </ul> </li> </ul>
<p style="text-align: center;">SOIL FERTILITY MANAGEMENT</p>	<ul style="list-style-type: none"> <li>➤ Sustainable and regenerative agricultural systems lean on soil health as a key asset; this management approach has considerable financial implications — depending on the degree to which producers shift their current operations, soil health improvements can require new equipment, differing labor requirements, changed planting/cultivating methods, changed pest control methods, and more</li> </ul>

<sup>164</sup> Irrigation in U.S. Agriculture: On-Farm Technologies and Best Management Practices (2016). Congressional Research Service. From: <https://fas.org/sgp/crs/misc/R44158.pdf>

- Overall, production systems that maximize soil fertility help realize the long-term goal of reducing input and management costs, and in some cases improving yields, through a more self-sustaining system
- Methods<sup>165</sup>:
  - Creating and implementing field-level nutrient management plans
  - Best management practices for synthetic fertilizer management (optimizing timing and application rates, minimizing runoff, tracking field and subfield nutrient balances to avoid under or over fertilizing, etc.)<sup>166</sup>
  - Cover cropping
  - Conservation tillage
  - Compost and manure applications
  - Livestock integration
  - Diverse plantings, which may include intercropping
  - Synergistic crop rotations
- Potential outcomes<sup>167, 168, 169</sup>:
  - Enhanced profitability — potential for increased upside from yields and reduced costs related to inputs
  - Improved water infiltration and retention
  - Biological pest management and weed suppression
  - Enhanced biological fertility
  - Yield and crop resilience
- Depending on a farm’s starting point, operators should assess the costs and benefits related to:
  - Added equipment
  - Labor requirements
  - Fixed and variable cost profile
  - Input requirements

<sup>165</sup> Regenerative Agriculture: The Path to Healing Agroecosystems and Feeding the World in the 21st Century (2019). Nuffield International Farming Scholars. From: <https://nuffieldinternational.org/live/Report/US/2018/brian-dougherty>

<sup>166</sup> Nutrient Management Planning: An Overview (2003). PennState Extension. From: <https://extension.psu.edu/programs/nutrient-management/educational/nutrient-management-general/nutrient-management-planning-an-overview>

<sup>167</sup> LaCanne and Lundgrin (2018). Regenerative agriculture: merging farming and natural resource conservation profitably. PeerJ. From: <https://peerj.com/articles/4428/>

<sup>168</sup> Regenerative Agriculture: The Path to Healing Agroecosystems and Feeding the World in the 21st Century (2019). Nuffield International Farming Scholars. From: <https://nuffieldinternational.org/live/Report/US/2018/brian-dougherty>

<sup>169</sup> Farm Finance and Conservation (n.d.). Environmental Defense Fund. From: <https://www.edf.org/sites/default/files/documents/farm-finance-report.pdf>

	<ul style="list-style-type: none"> <li>➤ Case: cover crop adoption<sup>170, 171</sup> <ul style="list-style-type: none"> <li>○ SARE research found permanent yield increases in corn and soybean row crop systems with the introduction of cover crops (between 1.3% and 9.6% for corn and between 2.8% and 11.6% for soybeans)</li> <li>○ SARE research estimates a net adjusted return of \$17.90 per acre during a normal weather year (after 5 consecutive years of cover cropping); adjusted returns can be as high as \$110.45 per acre in years when cover crops offer substantial drought protection</li> <li>○ The Iowa Soybean Association estimates that cover crops applied to reduce erosion on sloped fields can net \$21-\$60 per acre</li> <li>○ Individual farmers report substantial savings related to reduced input costs; an Iowa farmer estimates a \$99 savings per acre in herbicide costs alone</li> <li>○ Note that a multiyear time window may be necessary to see substantial financial benefits from a newly adopted cover crop regime</li> </ul> </li> </ul>
<p style="text-align: center;"><b>INFRASTRUCTURE AND EQUIPMENT IMPROVEMENTS</b></p>	<ul style="list-style-type: none"> <li>➤ Added equipment and permanent or semi-permanent improvements to fields, buildings, facilities, or other features of the property</li> <li>➤ Some conservation practices and sustainable farming systems require infrastructure that would be rare for a conventional operation (e.g. tine weeding or direct seed drilling implements)</li> <li>➤ Data is key to tracking the costs and benefits related to any management change; data infrastructure (farm management software, technologically-integrated implements, soil and nutrient testing plans, etc.) can vastly increase the precision with which other cost/benefit decisions can be made</li> <li>➤ Infrastructure and equipment improvements require upfront capital, but can offer long-term savings; producers should evaluate: <ul style="list-style-type: none"> <li>○ The source of and cost of capital</li> <li>○ The likely payback period vs. the useful life of the improvement</li> <li>○ Likely rates of depreciation</li> <li>○ Opportunities to use equipment for custom work or enroll in equipment sharing agreements</li> </ul> </li> </ul>

<sup>170</sup> Cover Crop Economics: Opportunities to Improve Your Bottom Line in Row Crops (2019). Sustainable Agriculture Research and Education. From: <http://www.sare.org/cover-crop-economics>

<sup>171</sup> Regenerative Agriculture: The Path to Healing Agroecosystems and Feeding the World in the 21st Century (2019). Nuffield International Farming Scholars. From: <https://nuffieldinternational.org/live/Report/US/2018/brian-dougherty>

- How the improvement can be leveraged for conservation benefits, and if there are opportunities to subsidize the purchase if conservation is a primary objective
- Examples<sup>172</sup>:
  - Data collecting and tracking software and hardware
  - Equipment and implement purchases
  - Precision or variable rate irrigation infrastructure (i.e. center pivots, sprinklers, drip lines, etc.)
  - Composting facilities
  - Mobile fencing for rotational grazing
  - Pasture improvements
  - Pollinator plantings
  - Buffer establishment

---

<sup>172</sup> Farm Improvement Cost Share (n.d.) Pierce Conservation District. From: <https://piercecd.org/238/Farm-Improvement-Cost-Share>



# 13. ALTERNATIVE ACCOUNTING

## BACKGROUND

This mechanism revolves around assigning monetary value to environmental outcomes. While not focused on increasing a producer’s revenue or supply of capital, alternative accounting can help producers recognize cost savings that are imparted through conservation practices. Specific strategies include quantifying avoided costs — of inputs, for example — that result from ecological management and attaching financial value to assets whose viability depends on environmental health. These financial considerations can be used as one-off decision aids for producers, or factored into an operation’s enterprise budget. When budgeted for, sources of environmental costs or savings can be evaluated on equal footing with other priorities.

## ACCELERATING REGENERATIVE AGRICULTURE THROUGH ALTERNATIVE ACCOUNTING

The overall goal of this mechanism is to bring the fair market value of farm products and farm assets closer to the value that would be assigned if all costs were accounted for. Negative externalities — the social costs of soil loss, watershed nutrient pollution, GHG emissions, antibiotic resistance in livestock, and others — can be made visible through new methods of valuation. When these deleterious effects are visible and assigned a cost, decision-makers, companies, consumers, and other stakeholders surrounding agriculture have powerful evidence to support reforms<sup>173</sup>.

## ALTERNATIVE ACCOUNTING/VALUATION MODELS

<b>MONETIZING CO-BENEFITS</b>	<ul style="list-style-type: none"><li>➤ Account for and translate co-benefits of increased ecological health into budgetary decision aids</li><li>➤ Potential methods:<ul style="list-style-type: none"><li>○ Quantify savings on irrigation related to soil moisture retention and water infiltration resulting from soil fertility management</li><li>○ Quantify monetary benefits of drought tolerance (e.g. in terms of bushels above regional averages yielded during dry years)<sup>174</sup></li><li>○ Quantify crop resilience in terms of avoided expenses from insurance premiums</li><li>○ Attach costs to negative ecological performance — if conservation is a personal priority, a farmer could budget in costs relating to soil organic matter losses, nutrient inefficiencies, bank erosion, and other resource issues</li></ul></li></ul>
-------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<sup>173</sup> TEEB for Agriculture & Food Interim Report (2015). The Economics of Ecosystems and Biodiversity. From: [http://img.teebweb.org/wp-content/uploads/2013/08/TEEBAgFood\\_Interim\\_Report\\_2015\\_Final\\_web2.pdf](http://img.teebweb.org/wp-content/uploads/2013/08/TEEBAgFood_Interim_Report_2015_Final_web2.pdf)

<sup>174</sup> The Economics of Cover Crops (2018). Successful Farming. From: <https://www.agriculture.com/crops/cover-crops/the-economics-of-cover-crops>

## APPRAISAL METHODS

- Factoring environmental quality into asset valuation when preparing financial documents, filing taxes, or determining fair market prices
- Potential models:
  - Increasing the appraisal value of land with enhanced soil health; typically, appraisal of farmland takes soil type and past economic performance into account, but not necessarily a nuanced assessment of soil quality and fertility<sup>175</sup>
    - Iowa State University is conducting a pilot study to determine if training farmland appraisers on soil health indicators including the “importance of soil health and linkages between soil health, yields, cover crops and no-till” will impact assessment decisions in favor of higher land values for farms employing conservation practices<sup>176</sup>
  - Rental rate discounts for tenants that make verified improvements to soil health on managed parcels

## OVERALL LANDSCAPE

The diverse opportunities for conservation finance should encourage producers and motivated partners alike. Whether from federal institutions, mainstream financial firms, or small community organizations, the strategies for generating and sharing wealth connected to positive ecological outcomes continue to grow. All of the currently actionable methods have unique strengths and particular use cases, but it is challenging to assess the full landscape of regenerative economics for agriculture. Whether considering a single opportunity or a comprehensive portfolio of conservation finance strategies, producers should begin by weighing costs and benefits. The following ranking offers an appraisal of financial potential, impact potential, and accessibility across all 13 categories described above.

<sup>175</sup> Ground Rules: How Soil Type Affects Land Values (2016). AgAmerica Lending. From: <https://agamerica.com/how-soil-type-affects-land-values/>

<sup>176</sup> Monetizing Soil Health: An Innovative Strategy to Drive Greater Adoption of Cover Crops and No-Till (2018). Iowa State University College of Agriculture and Life Sciences. From: <https://www.cals.iastate.edu/inrc/projects/2018/monetizing-soil-health-innovative-strategy-drive-greater-adoption-cover-crops-and-no>

## CATEGORY RANKING

Each category and notable subcategory of incentives, investments, and funding opportunities was qualitatively ranked according to five criteria — outlined below — and assigned a score between one and five. Scores were assigned and refined through an iterative process. After several rounds of assessment based on a review of academic and professional literature, ranks were adjusted with input from a farm planner and natural resource manager, as well as a food system planner. See Appendix 2: Additional Ranking Criteria for other factors that were considered, but ultimately not selected, in the assessment.

Since each category of opportunity contains a range of strategies and mechanisms that differ from one another, the assigned rank is not necessarily reflective of every use case. The scores indicate general trends that consider this variety. Future work could be performed to develop quantitative metrics and scales for the below criteria. Armed with this more robust basis for comparison, it could be possible to rank the potential impact of each opportunity — rather than the aggregated categories. It would also be possible to weight the criteria according to a user's preference.

## CRITERIA

### MONETARY POTENTIAL - PRODUCER

---

Generally reflects the overall potential for revenue or capital to be accrued as a result of the given funding opportunity. A low ranking opportunity would net a few dollars per acre per year for the enrolled operation, which might not make revenue a primary motivator for pursuing that opportunity. Low ranking opportunities also include strategies that pay relatively well, but inhibit normal operations. A high ranking opportunity would allow a farmer to earn significantly higher revenue than normal. The ability to stack revenue on top existing operations also contributes to a high ranking opportunity.

### MONETARY POTENTIAL - PARTNER(S)

---

The overall potential for earnings disbursed to partners based on investment in a farm, portfolio of farms, or conservation activity. Incentives for ecological improvements on farmland all rely on capital held by outside partners, whether investment trusts, market participants, grantmakers, or creditors. Expectations for investment performance in this arena range from philanthropic to near-market rates — partners may be satisfied with zero financial returns resulting from a charitable donation, or they may need assurances that investments will yield similarly to conventional assets. Low ranking opportunities, like grants, don't expect or require repayment, though they might require cost sharing. High ranking opportunities, like real asset or private debt investment, generate earnings for partners and repay principal, if applicable, with interest. One complication in this criteria are categories of funding that strictly involve

management decisions at the farm level without outside investment (e.g. fertilizer management, certain water conservation measures). These categories might offer diffuse monetary benefits related to the public good, through water pollution mitigation for example, but they are generally ranked low to reflect fewer chances for mutual earnings.

## CONSERVATION OUTCOME POTENTIAL

---

Conservation impacts that result from new practices. These outcomes can be expressed as improvements to ecosystem services — carbon sequestration, GHG mitigation, water quality improvement, biodiversity enhancement, and others — or as holistic environmental improvements that farmers can observe field-by-field. Low ranking opportunities generally have the potential to make minor improvements in one domain. High ranking opportunities result in significant, observable improvements to the ecological health of the farm across multiple domains.

## FARMER AFFORDABILITY

---

Many opportunities have an associated cost, either in the form of expenditures necessary to make operational changes or in management fees assessed as a condition of enrollment. High ranking opportunities represent the potential for a farmer to achieve significant savings relative to previous methods. Low ranking opportunities represent increased expenses for farmers — large upfront costs related to adopting new techniques, significant ongoing costs, or some combination of both. Note that there are complexities that arise from opportunities that have upfront costs, but offer long-term savings.

## EASE OF ENTRY

---

Relative difficulty of enrolling a farm in a market opportunity or entering an investment partnership with outside parties. Low ranking opportunities have significant barriers to entry, such as competitive applications, baseline testing requirements, limited quotas for farms, or other administrative hurdles. High ranking opportunities could be adopted with relative ease, on a farmer's own volition.

## MATURITY

---

This criteria reflects the stability and readiness of a category of funding opportunities. High ranking opportunities have a proven track record, established supportive infrastructure, a history of transactions, and a strong probability of continual operation. Low ranking opportunities are those in speculative, pilot, or early release stages.

## CATEGORY SUMMARY

1. Investment: Real Assets	Direct investment in farmland as an asset or investment linked to profit generating activities on farmland
2. Investment: Private Debt and Credit	Investment that relies on the repayment of private loans (or other debt mechanisms) whose terms are tied to conservation goals
3. Investment: Private Equity	Private stakes, including venture capital, in regenerative ag-related companies
4. Investment: Public Debt	Debt instruments traded on public markets; generally green bonds with agricultural proceeds
5. Investment: Public Equity	Investment in publicly traded companies involved in sustainable food systems and regenerative agriculture, including shareholder advocacy
6. Grants and Philanthropic Funding	Grants, donations, cost-share agreements, or other subsidies offered for conservation activities that don't require repayment
7. Ecosystem Service Markets	Marketplaces where credits representing environmental improvements are bought and sold (e.g. cap and trade carbon markets)
8. Added Operations	Complementary activities that offer added revenue streams without compromising environmental outcomes
9. Offtake Methods	Changes in marketing activities or product attributes to command higher prices (which may be aligned with markets for natural and sustainable products)
10. Risk Management	Pre-disaster management (e.g. resilience building) and post-disaster indemnities (e.g. insurance)
11. Tax Instruments	Deductions or credits generated by pursuing conservation activities; can be state or federal
12. Management Optimization	Using ecologically-integrated management to reduce inputs, increase outputs, and enhance profitability overall
13. Alternative Accounting	Budgeting positive and negative ecological externalities into enterprise plans and asset appraisals

# RANKING MATRIX

Opportunity	Monetary Potential - Producer	Monetary Potential - Partner(s)	Conservation Outcome Potential	Farmer Affordability	Ease of Entry	Maturity	TOTAL
Grants - Public	4	1	4	3	3	5	20
Investment - Real Assets	4	4	4	2	2	3	19
Management - BMPs	3	1	4	4	3	4	19
Investment - Debt/Credit	2	3	2	3	3	4	17
Offtake Mechanisms	3	3	3	2	2	4	17
Tax instruments	3	2	2	3	3	4	17
Grants - Private	3	1	3	3	2	4	16
Risk Management - Resilience	2	1	3	3	4	3	16
Investment - Private Equity	3	3	3	3	1	2	15
Investment - Public Debt	3	3	3	3	1	2	15
Management - Added Opps	3	2	2	2	3	3	15
Markets - Carbon	3	2	3	2	3	2	15

Markets - Water Quality	2	2	3	3	2	3	15
Markets - Water Quantity	2	1	3	4	2	3	15
Risk Management - Insurance	3	1	3	3	3	2	15
Alternative Accounting	1	1	2	3	4	3	14
Investment - Public Equity	2	3	2	3	1	2	13

## THEMES

Considering the ranking across categories, some themes emerge. At the highest level, it is important to recognize that a category with a low total rank still offers improvements over the status quo. These financial incentives are all considered in terms of the potential benefits they offer. While results will absolutely vary on a case-by-case basis, these methods are always intended to make the financial prospects of regenerative agriculture more attractive. Additionally, this ranking should not be viewed in isolation. Enterprise priorities might reshape how an individual operator (or investor) views the appeal of these categories and subsequently makes adoption choices. For example, a grower that wants to keep costs low could ignore some options with significant revenue potential and instead focus on easily adoptable, affordable opportunities. A different grower with the appetite for transformative change might select a portfolio of opportunities with high financial and ecological impact potential. Other emergent themes include:

## MATURITY

Most of the highest ranked categories have mature infrastructure in common. In order to support demand from producers and investors, opportunities in these categories have well established methods for screening applicants, disbursing funds, and tracking both financial and environmental performance. The relative stability of these high ranking categories helps minimize the risks of participation and increase legitimacy.

## EASE OF ENTRY

---

Accessibility is a limiting factor across numerous low ranking categories. For some opportunities, it is not a question of employing a sound concept or having high potential for impact — the challenge is engaging a wide enough base of participants. This happens primarily because restrictive criteria for entry and finite pools of capital (which are sometimes dwarfed by demand) reduce an opportunity's capacity for farmer or investor partners. For example, private equity investment strategies are seldom open to an average investor and private equity funds invest in only a fraction of existing agricultural businesses. In this case, while an opportunity might be financially and environmentally impactful, the potential for scaling that impact is limited. These strategies have their place in the realm of regenerative agricultural finance, but they may not be the catalyst for broad adoption.

## HIGH-IMPACT OPPORTUNITIES

---

Individual opportunities within some of the categories have standout potential. Some funding mechanisms of note are:

- Federal grants have robust infrastructure, significant funding, and proven channels. The various federal programs in place to motivate ecological performance can serve as a strong foundation for additional conservation planning and finance.
- Ecosystem service markets have considerable potential for revenue balanced with environmental outcomes, but the barriers to entry and relative immaturity hamper access. As it stands, ecosystem service markets specific to agriculture are largely in a phase of experimentation and R&D. It is possible that markets will emerge as a leading method for financing sustainable agriculture in the relatively near term.
- With the emergence of agricultural criteria for climate bonds in the private debt market, there is significant potential for producers and their financial partners to develop strategies that capitalize on investor excitement around green bonds. Having farmland acquisition and ecologically-beneficial infrastructure improvements listed as approved use of bond proceeds could empower many of the other opportunity categories.
- Implementing management optimization and best practices with technical support can be low cost and relatively transformative. One added benefit to this category is the synergy between operational improvements that lower costs and sources of capital (like grants) that are dedicated to motivating these kinds of changes.
- Real asset investment receives high marks across financial and ecological criteria, but the potential for this strategy to transform agriculture at scale is limited by high capital requirements and selective participation. A real asset strategy with low investment minimums, a broad geographical focus, and inclusive farmer partnerships could increase the efficacy of this already promising category.



## **OUTLOOK and CONCLUSION**

Future work to make ecologically-sound agriculture the convention is necessary. The modern agricultural paradigm has as much to do with loans, insurance, and contracts as it does land, livestock, and crops. Without rethinking the economic underpinnings of agriculture, it will be difficult for regenerative practices to expand and compete on equal footing. This work attempts to lay out the existing incentives that mutually benefit agricultural producers and financial partners in their efforts to scale conservation — giving some attention as well to promising ideas on the horizon. Though not exhaustive, this report is an interrogation of the breadth of regenerative finance for agriculture. The aim is to inspire further investigation of these and other options on the part of farmers, impact investors, and any other party interested in the widespread proliferation of regenerative agriculture.

The regenerative agricultural movement as a whole would benefit considerably from economic reforms that span the agricultural sector. A range of topics only touched on in this piece deserve much more thorough treatment. There is the question of marketing efficiency — what tradeoffs do farmers face in expending time and energy to develop conservation plans, search for investment partners, seek out new markets, and so on? What supportive services could be developed to perform and streamline this work on an operator's behalf? There is the impetus to stack opportunities for optimizing returns. How should operators approach the seriously complicated task of selecting, implementing, and tracking the incentives identified above? Is there justification for a new kind of farm service provider to perform this regenerative enterprise planning? There is the difficulty of meeting farms where they are while also challenging producers to rethink old ways of operating. Should farm planners advocate for producers to adopt a regenerative regime wholesale, or should they encourage incrementally tacking on progressively more comprehensive conservation practices over time? The answers to these questions have real implications for advancing the conversation around a mature and mainstream regenerative agriculture, as well as for the development of comprehensive financial mechanisms to support a regenerative transition.

Hopefully, this report presents a compelling case that farmers and investors alike stand to benefit from ecologically-motivated finance. As things stand, it takes serious work for farmers to move outside the conventional economic structures. Cobbling together ad hoc financial instruments has worked well for some regenerative farmers, but the potential for real transformation depends on the alignment of market forces, political will, and public perception. If it can be demonstrated that this really is the best way of doing business — considering fair livelihoods for farmers, satisfying returns for investors, healthful food for consumers, and the restoration of beleaguered working lands — then there is real potential for a system of agriculture that can thrive for generations to come.

# GLOSSARY of TERMS

## Conservation activities:

Farm management practices that are generally correlated with environmental improvements. Examples range from tillage strategies to controlled road access. See the list of NRCS [approved conservation practices](#) for an idea of the quantity of applicable methods.

## Conservation finance:

Strategies employed to assist or compensate for the adoption of conservation measures. Often involves impact investors who seek financial returns aligned with environmental or social improvements.

## Environmental, Social, and Governance (ESG) metrics:

Data relating to a company or organization's impact and interactions with environmental, social, or corporate governance issues. Higher scores on ESG criteria reflect better performance on these issues by a given company. Impact investing in public equities is often screened by ESG metrics.

## Identity-preserved production, distribution, and marketing systems:

Prescriptive standards for agricultural products can require separation from conventional products and traceability down to a granular level. The National Organic Standard is a leading example of an identity-preserved system. Certified organic goods must have robust documentation supporting each supply chain actor's adherence to the standard.

## Impact investing:

Asset allocation or management that seeks returns with at least some associated environmental or social benefit. The balance of priorities between profit and impact can vary based on a given investor or investment.

## Patient capital:

Investment that prioritizes long-term gains over short-term. Aligned with the Slow Money philosophy of seeking returns on time scales more aligned with real-world events than financial cycles (e.g. quarters).

## Regenerative agriculture:

A model of agriculture that seeks to return more to the land than it extracts, while simultaneously supporting healthy food systems and equitable farmer livelihoods. See [Regenerative Agriculture: A Definition](#) from Terra Genesis International and [Levels of Regenerative Agriculture](#) by Ethan Solevie and Gregory Landua for an introduction to the complicated subject of defining regenerative agriculture.

## Regenerative finance:

Methods for investing and managing capital that aspire to create an economic system more aligned with a society and environment that thrives under human management. This kind of finance seeks outcomes that are not just sustainable, but restorative in the face of damages perpetrated to people and planet.

## APPENDIX 1: ADDITIONAL RESOURCES

Farm Finance and Conservation (n.d.) Environmental Defense Fund. From:

<https://www.edf.org/sites/default/files/documents/farm-finance-report.pdf>

Farmland Investors: An Exploration for New England and Beyond (2013). Land for Good. From:

<https://landforgood.org/wp-content/uploads/LFG-Farmland-Investors-An-Exploration-Guide.pdf>

Financing Farming in the US: Nine Cases of Community Development Financial Institution Lending in the Farm Production Sector (2013). Michigan State Center for Regional Food Systems. From:

<https://www.canr.msu.edu/foodsystems/uploads/files/ffus-cdfi-case-studies.pdf>

Impact Investing in Sustainable Food and Agriculture Across Asset Classes (2017). Croatan Institute. From:

<http://www.croataninstitute.org/documents/Investing%20in%20Sustainable%20Food%20and%20Agriculture.pdf>

Innovative State-Led Efforts to Finance Agricultural Conservation (2019). The Environmental Defense Fund. From:

<https://www.edf.org/sites/default/files/documents/innovative-state-led-efforts-finance-agricultural-conservation.pdf>

Investing in regenerative agriculture – A podcast series on how to put money to work in regenerative agriculture and food. From: <http://investinginregenerativeagriculture.com/>

Private Capital for Working Lands Conservation: A Market Development Framework (n.d.). The Conservation Finance Network. From:

[http://www.conservationfinancenetwork.org/sites/default/files/Private\\_Capital\\_for\\_Working\\_Lands\\_Conservation.pdf](http://www.conservationfinancenetwork.org/sites/default/files/Private_Capital_for_Working_Lands_Conservation.pdf)

Soil Wealth: Investing in Regenerative Agriculture Across Asset Classes (2019). The Croatan Institute, The Delta Institute, and Organic Agriculture Revitalization Strategy. From:

<http://www.croataninstitute.org/images/publications/soil-wealth-2019.pdf>

Sustainable Farmland Investment Strategies: An Introduction to Current Conditions (2016). Yale Center for Business and the Environment From:

[https://cbey.yale.edu/sites/default/files/2019-09/Sustainable%20Farmland%20Investment%20Strategies\\_Nov%202016.pdf](https://cbey.yale.edu/sites/default/files/2019-09/Sustainable%20Farmland%20Investment%20Strategies_Nov%202016.pdf)

The investment case for ecological farming (2016). SLM Partners. From:

<http://slmpartners.com/wp-content/uploads/2016/01/SLM-Partners-Investment-case-for-ecological-farming.pdf>

## APPENDIX 2: ADDITIONAL RANKING CRITERIA

The following criteria were considered as a part of the opportunity ranking methodology. While not used in the qualitative assignment of rank for the final matrix, these criteria can be valuable to consider prior to pursuing funding opportunities.

<p>RISK TO IMPLEMENT</p>	<p>Potential for adverse outcomes affecting farmers or investing partners, including:</p> <ul style="list-style-type: none"> <li>➤ Repayment obligations and potential for default</li> <li>➤ Potential for relevant market or investment to close/collapse</li> <li>➤ Potential for operational changes motivated by investment to cause unintended negative outcomes</li> </ul>
<p>LIKELY IMPACTS TO OPERATIONS</p>	<p>Changes to operations intended to enhance environmental outcomes could negatively or positively impact how farms run; dynamics include:</p> <ul style="list-style-type: none"> <li>➤ Learning curves for new techniques or technologies</li> <li>➤ Added or reduced requirements for labor</li> <li>➤ Added or reduced requirements for inputs</li> <li>➤ Changed relationships with suppliers or buyers</li> </ul>
<p>ADMINISTRATIVE COMPLEXITY</p>	<p>Burden of administration that would fall on a broker, investment partner, or data manager; would be associated with the existence of standards, protocols, vetting procedures, or application processes</p>
<p>ELIGIBILITY RESTRICTIONS</p>	<p>Presence of criteria to restrict enrollment in a given opportunity, including by: size, location, farm type, farm ownership, certification status, etc.</p>
<p>ENROLLMENT PERIOD</p>	<p>Length of the term of investment or market participation; enrollment may be capped at a maximum number of years or at a maximum threshold of conservation outcomes</p>
<p>FARM TYPOLOGY</p>	<p>Pre-enrollment characteristics of a given farm, such as size, location, soil type, management type, certification status, ownership status, etc.; related to eligibility criteria and the progression from baseline typology toward a “state” on the continuum of regeneration that a funder or partner may assess for the purpose of continued investment</p>