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# Regenerative Agriculture

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*Benefits, Barriers and  
Call to Action for Companies with Agricultural  
Value Chains and Ag Retailers*

**March 2021**

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# Executive Summary

Agriculture is an essential human enterprise delivering a multitude of familiar benefits including food and nutrition, clothing, shelter, livelihoods and preservation of open space. Despite humanity's long history of being aware of the vital importance of the land and the connection between the way we grow our food, the quality of our soil and the health of communities, conventional agriculture today is facing a wealth of issues surfacing from years of practices that degrade natural resources. Agriculture is the largest single user of fresh water, the leading source of water pollution and soil erosion, and an important contributor to greenhouse gas emissions and biodiversity decline. The nutritional value of many crops is in decline and US farm bankruptcies have increased for five consecutive years.

While regenerative agriculture draws from millennia of traditional and indigenous agricultural practices from around the world, it is gaining momentum as a potential solution to many of these challenges.

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Regenerative agriculture is commonly described as a practice of farming or ranching, based on ecological principles, that builds soil health and recaptures carbon emissions from the atmosphere while addressing the entire ecosystem in which a farm operates.

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Core regenerative agriculture principles include minimizing soil disturbance by reducing tillage and using fewer inputs with potential impact on soil organisms and to protect and strengthen biodiversity in the entire agroecosystem; keeping living roots in the soil and maintaining cover on soil year-round; maximizing biodiversity above and below ground through crop rotation and crop diversity; and carefully integrating livestock. These principles are ideally integrated into individual farms using a systems approach, carefully considering the ecosystem.

Although an increasing number of farmers are pioneering promising paths forward, adoption of the core principles of regenerative agriculture has largely been piecemeal, with very few elements widely adopted, and a very limited number of farms in just a few cropping systems adopting the approach in whole.

Our paper explores how the adoption of regenerative agriculture can be accelerated, and captures key current knowledge, experiences and initiatives with regards to regenerative agriculture. We specifically focus on the role of farmers buy-and-supply side support - companies with agricultural supply chains and ag retailers - and provide information, tools and resources to professionals working in those fields. While we will focus on farmers buy-and-supply side support, we would like to acknowledge the work that is done by all pioneers driving regenerative agriculture, off the field, and on the field, by farmers and ranchers worldwide.

***“(They) are the true super-heroes, independently making decisions that may sacrifice short-term profits to aim for a bigger effect in the long-term. (...) They don’t follow the crowd. Instead, they swim upstream to understand the implications of their decisions. In short, they are making decisions to improve their land today and tomorrow for future generations. They know their title of ‘Land Steward’ carries a responsibility bigger than themselves.”***

Thousand Hills Lifetime Grazed

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## Key findings

- **Regenerative agriculture requires a paradigm shift from a focus on yield and stand-alone practices, to a focus on profits and holistic farm management.**

Established theory and supporting data from farms employing regenerative agriculture approaches suggests strong potential to boost farmer profits. While yield may initially decline, profits are boosted by reduced input costs, and diversifying and adding value to farm products. Indirect cost savings are gained through drought resistance, improved soil health and natural nutrient cycling, increased species abundance and diversity, better air and water quality, carbon sequestration, and buffering of climate change and weather extremes.

- **Acknowledging and addressing key information gaps are needed to lower barriers to transition.**

While data from pioneering farms looks promising, many still consider the farmer business case for regenerative agriculture to be incomplete. Investment is needed from all agents in the agricultural value chain in research and development of tools and methods to measure and report economic and ecosystem outcomes. Additional information gaps include lack of clarity of a definition, consensus standards and the business case for ag retailers supplying pesticide and nutrient inputs to farmers.

- **Due to the context-specific and ever-evolving nature of regenerative agriculture, an outcome-based approach is desirable.**

A lack of consensus around a single definition of regenerative agriculture is entirely appropriate given the rapid evolution of approaches to execute the concept, as well as the desirability of site-specific adaptation. No farm is the same - climate, soil types, topography, proximity to sensitive ecological features, availability of inputs, markets, crop prices, labor supply and other factors inform regenerative ag systems for individual farms. Focusing on outcomes such as farmer income, soil health and resilience in the face of unpredictable weather, rather than a rigid framework, can provide flexibility to farmers to choose practices and manage adaptively to improve outcomes.

- **For companies in the agricultural value chain, offering holistic support to farmers will be key to ensure the greatest chance of long-term success.**

A holistic surround of technical, financial, social and cultural support can facilitate successful transition to regenerative agriculture, encourage new farmers to initiate transition and build critical mass across a broad range of cropping systems. Companies in the agricultural value chain can provide:

- Technical support including expert input on farm reduces risk;
- Financial support can help overcome start-up costs and recognize the value-added long term;
- Social support including building local infrastructure and learning hubs for farmers and their suppliers and advisors; and
- Cultural support can grow buyer and consumer awareness and demand.

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# Our Agricultural Challenges

*“See what the land is like and whether the people who live there are strong or weak, few or many. What kind of land do they live in? Is it good or bad? (. . .) How is the soil? Is it fertile or poor? Are there trees on it or not? Do your best to bring back some of the fruit of the land.”<sup>1</sup>*

*Moses, approximately 1400 BC*

Humanity has been aware of the vital importance of the land and the connection between the way we grow our food, the quality of our soil and the health of communities and economies for thousands of years. The Bible depicts Moses as understanding that fertile soil was essential to the well-being of his people circa 1400 BC as they entered Canaan. Long before the arrival of Europeans in the Americas, indigenous populations protected local ecosystems and preserved biodiversity through land management and farming practices.<sup>2</sup> These populations adapted food-growing practices to local environments that worked with natural processes.<sup>3</sup> Stoll noted that in the early 1800s, North American farmers recognized a link between agriculture and an enduring society.<sup>4</sup>

Despite our long history of having an eye for the impact of our activities on the land, practices in the last decades are causing widespread concern for our long-term wellbeing. After doubling global food production since the 1950s, conventional agriculture today faces a wealth of issues surfacing from years of practices that degrade natural resources.<sup>5</sup>

**Soil loss and loss of soil health.** Each year, the US loses ~996 million metric tons of soil through erosion.<sup>6</sup> Erosion can deteriorate soil structure, cut fertility and increase drought susceptibility.

Healthy soil generally requires about four percent organic matter, ag soils on average have ~8 times less than that.<sup>7</sup>

**Water availability.** Agriculture uses up to 90% of all US freshwater, 70% globally, primarily for irrigation.<sup>8</sup> By 2060 in nearly all regions of the US, there will likely be significantly reduced water availability for agriculture as a result of climate change and current use patterns.<sup>9</sup>

**Water pollution.** Agriculture is the main source of pollution in rivers and streams, the second main source in wetlands and the third main source in lakes.<sup>10</sup> Eroded soil runs off into waterways, carrying contaminants such as fertilizer, nutrients and pesticides.<sup>11</sup> Waste from confined animal operations and fertilizer can also leach through soil and into surface and groundwater. Too much nutrients in water bodies can lead to an overgrowth of algae; when the algae die and decompose, they draw oxygen from the water, creating “dead zones,” where no other plant or animal life can survive. Dead zones persist in water bodies across the US.<sup>12</sup>

**Biodiversity decline.** Multiple insect populations are declining, including managed and wild pollinators, with many threatened by extinction due to habitat fragmentation, climate change, and pesticides.<sup>13</sup>

**Climate change.** Agriculture accounts for 8-10% of US greenhouse gas emissions.<sup>14</sup> Crop cultivation is about half of that amount, while livestock production represents approximately 42%.<sup>15</sup>

**Threats to farmer livelihoods.** In 2019, the number of US farmers filing for bankruptcy rose by 20%, the highest level in a decade.<sup>16</sup> Input costs continue to rise while farmer profits decrease due to a decline in the real cost of food.<sup>17</sup>

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**Nutrition loss.** More than half the world suffers from malnutrition.<sup>18</sup> USDA data show a drop in protein, calcium, phosphorus, iron riboflavin and vitamin C in conventionally grown produce.<sup>19</sup> Vegetables ranged from 5-40% nutrient loss.<sup>20</sup>

**Scientists are increasingly demonstrating that agriculture sits at the nexus of today's most pressing challenges: climate change, food security and nutrition, water and soil quality, biodiversity and sustainable livelihoods.**



# The Rise and Role of Regenerative Agriculture

*“By farming and ranching in ways that draw carbon down from the atmosphere — where it drives climate change — into the soil beneath our feet, regenerative agriculture can sequester carbon and build healthy soils that save precious water resources, increase soil biodiversity, improve crop yields and bolster resilience to drought and extreme weather associated with climate change.”*

*Friends of the Earth<sup>21</sup>*

Regenerative agriculture is commonly described as a practice of farming or ranching, based on ecological principles, that builds soil health and recaptures carbon emissions from the atmosphere<sup>22</sup> and addresses the entire ecosystem in which a farm operates, understanding the agricultural system as a set of interconnected actors and activities.

Typically, regenerative farmers follow these core principles:

1. Minimize soil disturbance by reducing tillage and using fewer inputs with potential impact on soil organisms and to protect and strengthen biodiversity in the entire agroecosystem;
2. Keep living roots in the soil year-round
3. Keep cover on the soil year-round
4. Increase diversity through crop rotation and crop diversity including cover crops, which promotes beneficial organism abundance and diversity in the soil and above ground;
5. Carefully integrate grazing livestock on crop land;
6. Understand current production practices within the larger context.

These principles are ideally integrated into individual farms using a holistic systems approach, carefully considering the ecosystem and key elements such as geography, climate, weather,

farmer preferences, experience and behavior, and key infrastructure on and off-farm including availability equipment, services and markets.

## Two examples of regenerative agriculture definitions

*“Regenerative Agriculture is a system of farming principles and practices that increases biodiversity, enriches soils, improves watersheds, and enhances ecosystem services.*

*By capturing carbon in soil and aboveground biomass, Regenerative Agriculture aims to reverse current trends of atmospheric accumulation. At the same time, it offers increased yields, resilience to climate instability, and higher health and vitality for farming communities.”*

### **Terra Genesis International**

*“Regenerative organic agriculture improves the resources it uses, rather than destroying or depleting them. It is a holistic systems approach to agriculture that encourages continual on-farm innovation for environmental, social, economic and spiritual well-being.”*

### **Rodale Institute**

While regenerative agriculture is a new concept to many farmers as well as to companies in the agricultural value chain, ag retailers, investors and other key infrastructure roles, the focus on soil health and holistic system management have long been advocated by organic farmers. Unlike organic agriculture, regenerative agriculture is largely undefined, with no consensus on a single definition or standard. This is entirely appropriate given the current rapid evolution of approaches to execute

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the broad concept, as well as the desirability of site-specific adaptation. Applying rigid definitions at this point in the evolution could potentially “squash innovation.”<sup>23</sup>

Site-specific context informing the customization of the regenerative agriculture approach and influencing speed of transition include:

- climate
- geography and location
- soil type(s) and current state of soil health
- access to capital
- farmer and advisor experience
- farmer preferences, including ability to bear risk
- access to expertise including for on-site assessment and advice during transition
- farm operation type, size and initial degree of diversity including crops grown
- labor supply
- availability of inputs, e.g., seeds
- available equipment and other infrastructure for production, harvest, transport, and any processing and storage
- current and potential markets
- crop prices
- buyer specifications and preferences

***“Even within regions, you have different ways of farming. I think our plans and our ways have to be adaptable and have to be tailored to the local situation.”***

Clifford Love, Nutrien Ag Solutions

Due to the context-specific and ever-evolving nature of regenerative agriculture, an outcome-based approach is desirable. Focusing on outcomes such as soil health and carbon sequestration, rather than a rigid framework, will provide flexibility for farmers and ranchers to identify what practices will help them reach those outcomes, preferably with trials and manageable changes in gradual steps.

### **The rise of regenerative agriculture**

Regenerative agriculture draws from millennia of traditional practices from around the world as well as over a century of applied research and development within the fields of soil health, organic farming, agroecology, agroforestry, permaculture, biodynamic agriculture, natural farming, keyline design, restoration ecology and holistic management.<sup>24</sup> Some of its components, such as cover crops and composting, have been part of organic, biodynamic, and other sustainable farming systems for generations. Indigenous cultures made invaluable contributions to many practices currently used in regenerative agriculture.<sup>25</sup>

The term was first introduced to the world by Medard Gabel in 1979, further developed by Robert Rodale in 1983 and Charles Francis et. al. in 1985.<sup>26</sup> The term was used only sporadically, reemerging with a Rodale Institute white paper about regenerative organic agriculture in 2014. Gabe Brown published “Dirt to Soil: One Family's Journey Into Regenerative Agriculture” in 2018, and several other publications came out around the same time.

Between 2015 and 2020, an increasing range of farmers and organizations started advancing regenerative agriculture. Food company pioneers such as General Mills, Walmart and Thousand Hills Lifetime Grazed publicly committed to regenerate or help regenerate a total of nearly 55 million acres of farmland. Several medium to small-sized brands, service and advocacy organizations and investors have also entered the stage, each contributing to regenerative agriculture in their own way.



## Benefits of regenerative agriculture

Regenerative agriculture has the potential to restore soil health, improve air and water quality, increase species abundance and diversity, boost farmer profits, sequester carbon, buffer climate change and weather extremes, and contribute to more resilient farms and rural communities.

While there will be some demonstrable benefits in the first year, other benefits might take longer to come to fruition. According to Gabe Brown, a well-known pioneer in regenerative agriculture and the founder of [Soil Health Academy](#) and [Understanding Ag](#), positive financial gains could generally be seen in the first year because producers use proper soil testing to determine appropriate fertilization rates. Brown points out that improved aggregation and soil health benefits could also be seen in the first year, if the principles are followed, and that most farmers will see significant benefits in year three.

***“Regenerative farming isn’t a get-rich-quick scheme or a fix-and-flip; it takes years to get right, but has the potential to pay off in spades if you look at it as a long-term investment.”***<sup>27</sup>

Artem Milinchuk, Founder and CEO of FarmTogether

## Soil health

Cover crops, crop rotation and reduced tillage used by regenerative farmers help restore and build soil health.<sup>28</sup>

- Cover crops protect the soil between crop rotations by reducing runoff, feeding beneficial soil microbes and sequestering carbon.
- Cover crops also have potential to increase on-farm biodiversity, including wild bees and honeybees.<sup>29</sup>
- Crop rotation increase soil organic matter which improves water holding capacity, natural nutrient cycling and carbon sequestration, while reducing soil erosion and nitrogen loss.<sup>30</sup> Carbon sequestration is the process of removing CO<sub>2</sub> from the air and storing it in plants, soil and oceans. Each pound of carbon added to the soil has

the potential to remove more than three and a half times that amount of CO<sub>2</sub> from the atmosphere.

- Conservation, or reduced tillage, in combination with cover crop grazing has been shown to prevent soil organic matter decline.<sup>31</sup>

Integrated crop-livestock systems are another regenerative practice proven to restore soil health. In the early 1900’s, most farms included both livestock and crops, but throughout the 20<sup>th</sup> century farmers in the US split the two to increase efficiency and yield.<sup>32</sup> In recent years, this split has accelerated to address food safety concerns associated with E. coli and other pathogens, especially in fresh market crops. This separation reduces natural nutrient cycling and increased reliance on synthetic fertilizers.<sup>33</sup> Food safety concerns will continue to limit livestock integration options for many farms – an example of the context-specific application of the core principles.

In an integrated crop-livestock system, livestock are rotated on grazing land planted to pasture plants, crops or cover crops. When the animals move, they turn the soil with their hooves, increasing water infiltration rates. The livestock also fertilize the land with manure.<sup>34</sup> Rotating livestock frequently to other fields reduces overgrazing, which can lead to soil erosion and compaction – closing pores in the soil which are essential for root growth, moisture retention and oxygen availability to soil microbes.

Integrated crop livestock systems can increase soil organic matter and reduce the need for synthetic fertilizers.<sup>35</sup> In one study, integrating cattle and pasture with a grain crop increased the quantity and quality of soil organic matter significantly when compared with continuous cropping.<sup>36</sup>

***“Soil health determines the productive capacity of any agricultural practice... By improving soil health, we can produce more and more from less: less land, less water, less fertilizer, less pesticides, less environmental damage and less emission of greenhouse gases.”***

Rattan Lal, soil scientist and 2020 World Food Prize laureate

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## Water and air quality

Regenerative practices reduce contaminant losses to water and air.

- Retention of nutrients on cropland can be improved by rotational livestock grazing and eliminating or reducing tillage. These practices can reduce amounts of commercial fertilizer needed, further contributing to loss reductions.<sup>37</sup>
- Diversifying crops can also reduce nutrient losses and contribute nutrients. For example, corn and soybean crops have been found to lose nitrogen more than perennial grasses and herbaceous legumes.<sup>38</sup> Total nitrogen and organic carbon concentrations were both higher in systems that planted an alfalfa cover crop.<sup>39</sup> Agroforestry, adding forest crops to a farm, can intercept 60-98% of nitrogen, phosphorus and sediment from escaping crop fields.<sup>40</sup> A second study comparing watersheds found that after nine years, grass buffer strips significantly decreased runoff by 8.4%.<sup>41</sup> USDA reported that using cover crops in the Midwest between corn and soybean production could reduce nitrate runoff by 43%.<sup>42</sup>
- Reducing commercial fertilizer use and eliminating tillage passes across fields contributes to reduced pollutant emissions from fertilizer production and farm equipment operation. Reducing pesticide use can also reduce airborne drift of pesticide particles and volatiles.

## Increased biodiversity, fewer pests and pesticides

Increasing the number and types of crop, cover crop and pasture plants leads to an increase in the amount and diversity of resources available for other organisms, including beneficial insects and soil microbes.

LaCanne and Lundgren (2018) found pests to be ten times more abundant on conventional corn farms when compared to regenerative farms.<sup>43</sup> Research by the German Centre for Integrative Biodiversity Research showed that higher rates of

plant diversity can limit pest pressure and reduce the need for pesticide use.<sup>44</sup> Greater plant diversity resulted in an insect feeding rate on plants that was 44% lower than that found in areas containing a monoculture. Larsen and Noack (2020) showed that monocultures experienced higher levels of pesticide use and an increase in pests.<sup>45</sup>

A recent study in *Nature* concluded that most farmers could decrease pesticide use while maintaining or even improving their productivity.<sup>46</sup>

### *Discussion: Are pesticides used in regenerative agriculture?*

Currently, pesticides are used to some degree in nearly every agricultural operation. The term “pesticide” applies to insecticides used to control insects, fungicides and bactericides for diseases, herbicides for weeds, many products used to control livestock parasites, and also disinfectants such as chlorine bleach used to sanitize surfaces. Similarly, the term “pest” is often used to refer to insects, diseases, weeds and other organisms that can harm crops and reduce yields.

Pesticides vary in the degree of risk they generate. In the US, the Environmental Protection Agency (EPA) is the federal pesticides regulator, and determines which pesticides may be manufactured, sold and used. EPA limits the uses for each product it allows on the market to limit risks and meet farmer needs to manage pests. Pesticide product labels are legal documents that include warnings about hazards, risk of exposure and restrictions on uses, required protective equipment, use limits and other practices to reduce risk of exposures.

Since the EPA was formed in 1973, they have prohibited or restricted thousands of high-risk pesticide products, and unintended impacts have been reduced on human and the environment. Despite these successes, compromises continue to be made to allow continued high-risk uses.

Integrated Pest Management (IPM), a term first used in 1973, has evolved. IPM includes tactics designed to limit pesticide use to when and where needed based on current conditions on the farm versus applications scheduled on a regular,

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calendar basis without monitoring of or regard for current conditions such as the number of insect pests present. In certified organic agriculture and in many sustainable agriculture certification programs, a farm plan must be in place that includes IPM and other practices to prevent pest problems. Organic agriculture restricts pesticide use to further limit risks by only allowing pesticides that are on approved-for-organic lists. Nearly all pesticides used in organic agriculture are derived from natural rather than synthetic substances.

A number of regenerative farmers participate in certification programs to add value to their crops and products and thus adhere to applicable restrictions. The Regenerative Organic Standard and Land to Market Seal are specifically geared towards regenerative agriculture. The Rainforest Alliance, Eco Apple, Equitable Food Initiative, Protected Harvest, SCS Sustainably Grown and TruEarth are some examples of sustainable agriculture certifications regenerative farmers participate in that have specific lists of prohibited and/or approved pesticides, and standards requiring IPM practices. Several of these certifications use the IPM Institute's Pesticide Risk Tool to help guide pesticide use policies and restrictions.

Certified or not, regenerative farms use practices that can reduce the need for pesticides. Increasing diversity of crops and other vegetation and improving soil health can increase the diversity of organisms present on the farm. These include beneficial species that can help control pest species. Rotating crops is a key strategy to ensure resources for crop-specific pests are not present year after year, shutting down pest life cycles, including insects, diseases and weeds. Reducing tillage and improving soil health can also help control weeds and soil-dwelling pests. Reducing pesticide use in itself can help reduce need, by preserving beneficials that help control pests.

Along with reductions in fertilizer need and use, there is limited but growing evidence for less need and use for pesticides on farms using regenerative practices, contributing to lower input costs and farmer profitability. Many regenerative farmers'

goals include reducing pesticide use and risks, and some are not using any pesticides.

The need for pesticides in regenerative agriculture, just as in conventional and organic agriculture, is likely to vary by crop, region, weather, climate and year. The extent to which pesticide use is reduced in regenerative agriculture will likely continue to be important for reducing unintended impacts, and for improving farmer profitability through reduced inputs and qualification for value-added programs such as organic.

### Carbon sequestration

Removing carbon from the atmosphere is a key strategy to slow climate change and reduce the impact of climate change on agriculture and communities. Soil is the second largest carbon sink in the world, after oceans.<sup>47</sup> Regenerative practices can enhance carbon removal from the atmosphere to soil:

- Studies in the southeastern US have shown that cover crops can increase organic carbon sequestration by 83% in no-till systems, and perennial pasture and conservation tillage can lead to significantly higher organic carbon sequestration.<sup>48,49</sup> It is important to note, however, that the science on the benefits of no-till for soil carbon sequestration is not settled. While some studies found an increase in soil carbon in no-till systems, that research focused only on the top foot of soil. Probing deeper into the soil profile, research suggests that no-till farming may redistribute soil carbon from deeper to shallower zones rather than increase the overall stock of soil carbon.<sup>50</sup>
- Carefully managed grazing, if applied to 25% of crop and grasslands, has potential to mitigate the carbon footprint of North American agriculture.<sup>51</sup>
- According to Project Drawdown, regenerative agriculture practices can deliver 30% of global climate mitigation through emissions reductions and carbon sequestration.<sup>52</sup>
- Practical Farmers of Iowa compared corn-soy operations to systems using small grain

cover crops and legume crop rotation. They found that small grain-corn-soy rotations had up to 10% less emissions than corn-soy rotations due to fertilizer use reduction. When factoring carbon sequestration in, the GHG emissions were reduced by up to 21%.<sup>53</sup>

- World Resources Institute scientists believe that the largest benefit is climate resilience.<sup>54</sup>

### Climate and weather resilience

Farms that have adopted regenerative practices have fared better during extreme weather events. Gabe Brown's ranch sustained a major rainfall event in 2009 without any erosion, while neighboring fields had erosion and standing water. Other research has concluded that pastures with trees have infiltration rates 13 to 67 times greater than treeless plots of land.<sup>55</sup> In another example, an Australian regenerative farmer went through nine years of drought without spending any money on animal feed due to native grassland grazing practices, saving between \$500,000 to \$800,000.<sup>56</sup>

### Farm profitability

Increasing a farmer net income, and farm net worth, will be essential to successfully create widespread adoption of regenerative agriculture, and for some farmers it is the key motivation for making the transition.

***"Money fuels my engine. (...) Call it soil health, conservation, sustainable, regenerative or any other buzzword of the day — frankly, I don't care. My savings have been incredible, and I just call my farming what it is: survival and profitability."***<sup>57</sup>

Adam Chappell, Farmer

Regenerative farms generally experience greater profitability through reduced input costs and value-added crop prices including certified organic. Research published in 2018 reported that

regenerative grain fields had 29% lower production but 78% higher profits over traditional corn production systems.<sup>58</sup> This profit was positively correlated with the soil organic matter, not yield.

Experienced regenerative farmer Gabe Brown notes that his farm makes about \$100 per acre per year versus an average conventional farm that makes \$0.10 - \$3.00 per acre per year.<sup>59</sup> In another comparison, a regenerative corn farm produced less grain than a conventional one, but the regenerative system made twice as much profit.<sup>60</sup> Integrating livestock into cropping systems can reduce or eliminate the need for fertilizers, increasing farmer profit. A case study in North Dakota found that a farms net worth could be increased by \$8,000 by converting crop only farms to integrated crop-livestock operations.<sup>61</sup> In Texas, when comparing corn only systems to integrated crop-livestock systems, profitability was found to be nine times greater for integrated crop-livestock systems due to reductions in fertilizer and irrigation.<sup>62</sup>

In one study published in 2019 no nitrogen fertilizer needed to be applied using an integrated livestock system.<sup>63</sup>

Livestock feed cost reductions can also contribute to higher profitability. Grazing with a short finishing period on grain was associated with lower costs when compared to processed feed in a 2018 report.<sup>64</sup> Integrated crop livestock systems can also increase crop yields. In one case study, a cattle and corn system compared to a corn only system in Illinois produced 6% more corn.<sup>65</sup>

Diverse cropping systems can provide access to a diversity of markets and reduce revenue risk. As Gabe Brown said in the documentary *Kiss the Ground*, "I could care less what the price of corn or beans are, because it's such a small fraction of my operation."<sup>66</sup>

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# Barriers to Transition

Obstacles to both farmers and those working in the infrastructure supporting farmers include many common to any innovation, such as low awareness; limited evidence of viability across the broad scope of potential applications; few advocates, experts and templates for successful implementation; and few proven models for evaluating and rewarding progress. Organizations including Forum for the Future,<sup>67</sup> Regenerative Agriculture Initiative, an initiative of the Center for Business and the Environment at Yale,<sup>68</sup> and the IPM Institute have researched and documented specific barriers of regenerative agriculture including:

- Current US agricultural policy
- Lack of clarity of definition
- Limited financial support
- Limited technical assistance and tools
- Incomplete business cases
- Limited consumer awareness and demand

## Current US agricultural policy

Agricultural policies since the 1950s have generally favored “fencerow to fencerow” planting and encouraged farmers to “get big or get out.”<sup>69</sup> Farm and agribusiness consolidation trends reflect and reinforce policies favoring large scale farms and farming enterprises. Policies generally prioritize production efficiencies and pursuit of maximum yields over soil health and food crop nutritional value and are based on a higher yield=higher profits assumption which does not always apply.

According to regenerative farmer and author Gabe Brown, the real detriment to the adoption of regenerative agriculture are Federal Farm Program policies, which subsidize monoculture production of corn and soy, promoting conventional agriculture.

*“Our food system that reflects the policies and creates the most significant barriers [to accelerate the adoption of regenerative agriculture]. Starting with the producers, a lot of aspects such as insurance, market, incentives and subsidies are created from a policy perspective to support monoculture and GMO grains. The fact that this whole machine exists and has had momentum and success in the past few decades, makes it hard to turn this ship around.”*

Matt Maier, Owner of Thousand Hills Lifetime Grazed

## Lack of clarity of definition

The lack of clarity, consensus and uniformity around a definition of regenerative agriculture, despite being appropriate given its context-specific nature, make it challenging for interested farmers and farm advisors to identify where to start, what sequence to follow, and effective approaches for evaluating progress and guiding adaptations and adjustments. These limitations also challenge development and growth of credible and uniformly applicable certification and standards, which have potential to qualify farmers for federal support and provide market recognition and incentives including price premiums and ecosystem services payments.

*“One of the biggest challenges and opportunities for food companies is identifying how and where we can make the most positive impact in agricultural spaces. There are new standards, certifications, and descriptive terms being created all the time. Which avenues make the most sense for our company and our farmer-owners to embrace and pursue?”*

Assistant Manager, Sustainable Agriculture & ESG

***“Without robust understandings of what regenerative agriculture looks like in our food system, there’s a danger that some companies will pull out the bits they like, call it “regenerative”, but continue largely with business as usual.”***

Forum for the Future<sup>70</sup>

Regenerative agriculture standards and certifications have the potential to help provide direction and clarity. A standard for regenerative agriculture is being piloted by the Regenerative Organic Alliance, a group of farmers and companies chaired by the Rodale Institute. The standard requires organic certification as a baseline and necessitates farmers and ranchers to adopt processes that boost soil health, including the use of cover crops and crop rotation. Standards also address worker and community well-being, and animal welfare. Land to Market Seal, created by the Savory Institute, assesses the outcomes of regenerative agriculture in soil health, biodiversity and ecosystem function.

#### **Limited financial and technical support and tools**

Average US farmer income in 2019 was a negative \$21,000<sup>71</sup>. Commodity crop corn and soybean prices are at historical lows. Transitioning to regenerative agriculture can entail substantial financial risk as new techniques are mastered, and up-front investments in equipment, inputs and labor are made. Markets and market incentives for regenerative agriculture are very limited, as are financial risk instruments including subsidized federal crop insurance for diversified operations. The high cost of farmland is a barrier generally to new farmers, including those interested in regenerative production.

Certain aspects of regenerative agriculture can be especially challenging, including integrating livestock or introducing new cover crops and crop rotations. Lack of farmer training programs were identified in a landscape analysis of ongoing efforts to accelerate regenerative markets in the United

States completed by the Regenerative Agriculture Initiative. The same can be said for farm retailer and advisor training, including independent crop consultants and ag retail agronomists.

***“While farmers may have an interest in investing in the adoption of new practices, they rely on their trusted local agricultural retailer, agronomist or salesperson for information and advice on how adopting new management practices can improve their operation. Therefore, agricultural retailers and advisors farmers trust may have the ability to increase adoption rates of conservation practices by encouraging farmers and providing the information, resources and services they need.”***<sup>72</sup>  
Purdue Center for Food and Agricultural Business

Beyond training, hands-on technical assistance is also difficult to access for most farmers.

***“When farmers come home from a conference, they sometimes have a challenge figuring out how to apply what they have learned to their unique system. And that’s really where technical assistance has been successful.”***

Jay Watson, Sourcing Sustainability Engagement Manager, General Mills

Sustainable agriculture including organic has benefited tremendously from growth in programs and funding for research, education, financial and technical assistance and implementation. For example, the National Sustainable Agriculture Coalition and its predecessor organizations alone have developed multiple federally funded programs including the Sustainable Agriculture Research and Education Program, the Conservation Stewardship Program, Value-Added Producer Grants Program, National Organic Certification Cost Share, the Beginning Farmer and Rancher Development Program, the Wetlands Reserve Program and the Farmers’ Market Promotion Program.

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While many of these programs have potential to also benefit at least a portion of farmers transitioning to regenerative practices, e.g., those pursuing organic certification may participate in the cost-share program, there are no specialty federal programs targeting regenerative agriculture, and the Land Grant University infrastructure of research and Extension is largely not yet addressing regenerative agriculture.

It is important to note that sustainable agriculture research is currently greatly underfunded. While food companies have stepped up their efforts to fund organic farming research in recent years<sup>73</sup>, there are opportunities to fund regenerative agriculture research to help create better insights into the outcomes of regenerative agriculture.

#### **Incomplete business case**

As reported in the [2018 Iowa Farm and Rural Life Poll](#), 70% of farmers interviewed will try a new technology or practice once they've seen "a number" or "most" of their peers try it successfully.<sup>74</sup> At present for most farm operation types and cropping systems, evidence of and models for success in regenerative agriculture are lacking.

Business models for companies with agricultural value chains are similarly incomplete.

***"The business case obviously has not been made yet for product sourcing from regenerative agriculture. No company out there has demonstrated that there is a market for these kinds of products. The companies that first get into this will be mission-based because it is the right thing to do. They are willing to take more risks on this and get out there to try and drive demand. Following this, other companies will jump aboard once that business case has been demonstrated."***

Virginia Asoudegan, Vice President Mission and Innovation, Applegate

Models for success for ag retailers supplying farmers with inputs are not at all well developed, and the reduction in inputs including fertilizers and pesticides, are threats to current ag retail business models.

***"It is clear that farmers are willing to adopt conservation practices if it can be proven to them that there is some benefit from doing so. Other agents in the agricultural value chain need to be able to prove these practices are truly beneficial to farmers, the economy, the environment, and society as a whole. Retailers, NGOs, universities and government agencies are some of the agents that should seek to provide this proof to farmers and retailers, as well prove the value of these practices to society."***<sup>75</sup>

Purdue University Center for Food and Agricultural Business and The Nature Conservancy

#### **Limited consumer awareness and demand**

Consumer demand is essential to the adoption of regenerative agriculture because the acceptance of consumers is pertinent for it to be a sustainable business model.

***"Consumers, in the end, hold all the power. Because without the dollars of the consumer, none of this lasts and change does not really happen. If I could talk to each consumer individually, I would tell them, 'you have way more power than you realize'."***

Matt Maier, Thousand Hills Lifetime Grazed

According to the 2019 Food & Health Survey by International Food Information Council Foundation, fewer than one in four consumers have heard of regenerative agriculture. Promisingly, over half of the consumers mentioned that they are interested in learning more about it. The same study reported 23% of consumers say they actively seek out foods or follow a diet for health benefits, and 27% say environmental sustainability is a purchase driver.<sup>76</sup>

# Action Plan for Companies with Agricultural Value Chains and Ag Retailers

Companies with agricultural value chains are well-positioned to advance regenerative agriculture. In our research, food companies reported that regenerative agriculture has the potential to provide them with solutions to help address a myriad of challenges including supply chain transparency, worker, consumer and environmental health, as well as active conversations with advocates for these concerns. Companies reported investing in research, implementation pilots, farmer incentives, technical support and tools, and market creation and development.

Ag retailers, key roles in nearly all agricultural value chains, report just beginning to explore regenerative agriculture and implications for business models. Current models rely on delivering value to farmers primarily through fertilizer and crop protection inputs, application services, and measurement, monitoring and recommendations. Independent crop advisors are also key technical support roles, focusing on service revenue from measurement, monitoring and recommendations.

***“Ultimately, ag retailers seek to serve farmer customer needs and create value they are willing to pay for. Thus, a potential challenge ag retailers face in influencing farmer adoption of conservation practices may be the lack of a clear value proposition and/or business model, which would allow retailers to create and capture value in assisting farmers with the adoption of these practices.”***

*Purdue University<sup>77</sup>*

Ag retailers likely have potential to increase service revenue to partially offset any declines in product sales, including technical support for farmers new to regenerative agriculture.

In January 2021, a Missouri case study was published that demonstrates that profit versus environmental sustainability is not a choice farmers nor ag retailers should have to make. Missouri-based ag retailer MFA Incorporated and three state conservation agencies — Missouri Department of Conservation (MDC), Missouri Natural Resource Conservation Service (NRCS) and Missouri Department of Natural Resources — teamed up to help farmers manage for both profitability and environmental sustainability. The innovative public-private partnership is featured in a [new report](#) prepared for Environmental Defense Fund by Datu Research.

## ***Ag retailer perspectives***

*“Our focus is to create more ROI for the grower and bringing sustainability practices to the growers will obviously increase their profits.”*

**Tom Daniel, Nutrien Ag Solutions**

*“Our philosophy has been centered around how we can collaborate with our growers, share information with them and leverage technology to be able to consult with them on the best management practices that we are performing for them, whether it be nutrients, soil health or cover crops. The opportunity for advancing cover crop adoption, if we see the results, is overall profitability and soil health, and we can manage those acres more efficiently. We can have nutrient uptake revision, which would mean we need to put down less nutrients.”*

**Andy Swerlein, Luckey Farmers**



## Food company profiles

Between 2018 and 2020, industry giants such as Danone, General Mills, Walmart, Land O'Lakes publicly committed to multi-million-acre goals. Smaller and mid-sized brands have also entered the stage, including Nature's Path, Harmless Harvest and Serenity Kids, Thousand Hills Lifetime Grazed and Hormel-owned Applegate. The following profiles of a selection of these companies – General Mills, Thousands Hills Lifetime Grazed and Applegate – demonstrate how companies can advance regenerative agriculture in different ways.

### *General Mills*

In 2019, General Mills made a commitment to advance regenerative agriculture on one million acres of farmland by 2030. The company defines regenerative agriculture as a holistic, principles-based approach to farming and ranching that seeks to strengthen ecosystems and community resilience.

General Mills believes a holistic surround of social and cultural support, technical support and financial support will give farmers the greatest chance of long-term success.

***“We’re investing in the capability and capacity of producers to think regeneratively and at some point, they take over completely.”<sup>78</sup>***

Jay Watson, General Mills

General Mills is partnering with Understanding Ag to activate pilots across three priority ingredient regions – Michigan; the northern plains of North Dakota, Saskatchewan and Manitoba; and the southern plains of Kansas. The pilots provide farmers with practical tools including one-on-one coaching and technical assistance for three years, customized plans for implementation in their operations, soil health testing, networking communities, and biodiversity and economic assessments to demonstrate impact on outcomes over time.

General Mills has launched a user-friendly [self-assessment tool](#) for farmers to understand alignment between their agricultural practices and the principles of regenerative agriculture.

General Mills is also investing in regenerative agriculture research, including water quality and biodiversity impact assessments, and is actively recruiting industry peers including competitors to share information and collaborate.

### *Applegate's New Food Collective*

Hormel-owned Applegate has taken a unique approach by launching a new brand focused on regenerative agriculture. The New Food Collective will offer premium sausages with meat from small U.S. farms that use regenerative agriculture practices. All the products under Applegate's New Food Collective initiative will carry the Savory Institute's Land to Market seal. The company has two goals: make pasture-raised meat available to everyone and help regenerative farmers and ranchers grow and be more profitable.

***“This has been hard—harder than we thought it would be, honestly. But that just makes us work harder.”***

New Food Collective website

### *Thousand Hills Lifetime Grazed*

Thousand Hills Lifetime Grazed, offering 100% grass-fed beef, was founded in 2003 with a mission to nourish soil, plants, cattle and people by holistically grazing cattle for their lifetime. The company set a goal to convert one million acres to holistic regenerative ag grazing practices by 2025. Thousand Hills sources cattle from regenerative ranchers they call Regenerative Renegades.

Timberland is currently sourcing hides from Thousand Hills Lifetime Grazed as part of their regenerative agriculture efforts, which demonstrates how companies can explore different ways of ensuring profitability by diversifying income streams.

### **Food company leader perspectives**

*“Being where we are in the value chain, we can try and connect different parts of the value chain, we can try to connect the consumer to the producer and vice versa. I think that food companies can play a role in advancing regenerative agriculture and serve as a connector and convener and to really lean into places to lead and accelerate and enable the movement.”*

Jay Watson, **General Mills**

*“If we honestly look around at the collective health of our nation, we know something is wrong. Who doesn’t have a loved one affected by cancer or a myriad of other diseases? The slow drip of our chemically-laden land and food system is killing our land and our people. We feel an urgency to act. The benefits as well as the detriments can be traced back to our methods of managing our land.”*

Matt Maier, **Thousand Hills Lifetime Grazed**

*“The environmental sustainability, along with the health and well-being of our farmer-owners, their families, their workers and their communities, is incredibly important to our cooperative. From ethical, brand identity and business sustainability perspectives, it is critical that these communities and our farmer-owners can thrive. We see regenerative agriculture as a tool to help them do that.”*

Emily O’Halloran, **Ocean Spray**

*“This is a system where we can say not only is raising animals in a regenerative system, good for the animals, but it’s also good for the environment and that it can essentially reverse climate change, and is good in flavor. Regenerative agriculture: Good for people, planet and palate.”*

Virginia Asoudegan, **Applegate**

### **Approaches and tools for companies and brands with ag value chains and ag retailers**

According to a study conducted by L.E.K. Consulting, common food company approaches include shifting product sourcing to farms that explicitly employ regenerative agricultural practices and eventually signing long-term contracts, partner with farmers to help them develop the technical capabilities to practice regenerative agriculture or invest in the development of tools and research.<sup>79</sup> Of course, the ideal for accelerating transition is to support willing current suppliers rather than disrupting existing relationships.

Farmers can be supported during their transition by companies with agricultural supply chains and ag retailers in many ways:

- **Financial support and incentives**, which includes funding regenerative research and/or practices, providing cost-share, offering long-term contracts, offering price premiums, providing and helping to build new markets for ecosystem services payments, and advocating for supportive federal, state and local policies and programs.
- **Providing or investing in tools and technical support**, including creating peer networks and social hubs for farmers.
- **Building markets** including launching new brands with ingredients sourced from regenerative farms or ranches and driving consumer awareness and demand.
- **Driving advocacy, research, standards and industry collaborations**

### **Financial support**

Long-term contracts facilitate long-term planning and can help farmers reduce market risk. As an example, Danone developed the Danone Cost Plus Model which offers five-year contracts to specific dairy farmers, paying the cost of their production plus a margin.

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According to Tina Owens, Senior Director of Agriculture at Danone it is important to note that although this model is promising, it is still experimental and it remains to be seen if soil improvements will materialize in the five-year timeline specified in the contract.<sup>80</sup>

Price premiums at consumer point of purchase are a common financial incentive in organic food production. However, consumers are unfamiliar with regenerative agriculture and many feel overwhelmed by the number of environmentally focused certifications on the market,<sup>81</sup> making it unlikely that brands will be able to recoup price premiums paid to farmers. Price premiums can also limit the size of the market.

***“What we are trying to figure out is, how do we make that price premium as low as possible, by being as efficient as we possibly can. I do not think any of us are interested at this point in selling really high premium products to 1% of the population. We want the product to be accessible to everyone.”***

Virginia Asoudegan, Applegate

Aligning farmers’ economic interests with positive environmental outcomes is another way to financially support farmers. Ecosystem services models provide payments to farmers in addition to revenue received from crop production for the ecosystem services they generate, including increases in soil carbon, reductions in greenhouse gas emissions, improvements in water quality, and reductions in water quantity used. Payments can be made directly from farm product buyers, and from broader ecosystem services markets including government programs.

A number of new platforms have launched in anticipation of corporate demand for ‘soil carbon credits’ to offset companies carbon emissions.

Indigo Ag is one of the organizations who is focused on helping farmers receive payments for their soil carbon sequestration outcomes. Their vision is that every farm will have a carbon mass balance where carbon sequestration can be tracked real-time with a variety of increasingly sophisticated tools and data analytics.

In December 2020, Hudson Carbon was launched, an agriculture-focused carbon marketplace they envision as a "farmers market" for carbon credits, where mission-driven brands and individual consumers can connect with a particular farm and buy offsets to support its regenerative transition.

### **Investing in or providing tools and technical support**

An important role food companies can fulfill is to invest in tools and technical support. Several pioneers such as General Mills, Nestlé and Walmart are already actively financing technical support efforts such as farmer trainings.

Ag retailers are typically very aware of local context informing regenerative ag approaches, and with expert training on regenerative ag, have strong potential to fill technical and transition support roles currently filled by specialty consultants, such as Understanding Ag.

### **Building markets**

Due to their broad consumer base, reach and communications channels, food companies are well-positioned to drive demand and create awareness for regenerative agriculture. In our research, food companies acknowledged that they have an important role to play when it comes to increasing consumer awareness and driving consumer demand for regenerative agriculture.

During our research, food companies shared that the real challenge lies in educating the consumers on why they should choose regenerative products, without making them worried about the

consequences of conventional agriculture. Other consumers who want to have a positive impact on agricultural systems, climate, protection of water and biodiversity, are not sure how to do that. That is where food companies can lead and help them understand what is possible. Virginia Asoudegan, Applegate: “Our number one role is that we can drive demand and educate customers.”

Jay Watson, General Mills, mentioned that regenerative agriculture is a nine-syllable term and that it is hard to talk to people about the solution to a problem that consumers do not know exists. “There’s a big undertaking needed there. One of our focus points could be talking more broadly about the promise of what regenerative agriculture can do, if driven on enough acres, with the right kind of incentives, while supporting the farmers.”.

### Driving advocacy, research, standards and industry collaborations

Due their resources, impact and network, food companies can play an important role in driving advocacy and research with regards to regenerative agriculture. Food companies can also pilot new regenerative agriculture standards in their supply chain to help drive improvements and create traction. An example is Patagonia Provisions who is currently piloting the Regenerative Organic Standard in their supply chain.

Food companies can also participate in industry collaborations. One Planet Business for Biodiversity (OP2B) for instance is a business coalition to advance regenerative agriculture, rebuild biodiversity and eliminate deforestation. Kellogg, Nestle and McCain Foods are among the 19 companies that compose OP2B. Danone-led Farming for Generations is a global alliance that helps dairy farmers adopt regenerative agricultural practices.

Companies with agricultural value chains and ag retailers can both support intelligent, science-

based policy. The policy agenda for regenerative agriculture includes:

- Leadership positions and cross-agency coordination in USDA and EPA.
- Cost-sharing to lower the bill for farmers adopting regenerative practice in new or existing programs such as USDA National Resource Conservation Service [Environmental Quality Incentives Program](#) and [Conservation Stewardship Program](#).
- Improvements to the federal crop insurance program to expand access and create comparable benefits for additional crops and diverse operations, and remove barriers for practices such as cover crops.

### Action plan for companies with agricultural supply chains and ag retailers

Informed by our research and conversations with food companies and agricultural retailers, we have developed a ten-point action plan for organizations interested to advance regenerative agriculture.

#### Ten-point action plan

1. Create a deep understanding of regenerative agriculture and its principles and outcomes
2. Set overarching goals
3. Connect with expertise including peers, researchers, Cooperative Extension, private sector experts
4. Build your regenerative agriculture team
5. Evaluate your operation for challenges and opportunities; assess your strengths and identify your weaknesses
6. Finalize goals, objectives and timelines
7. Identify and support existing tools and resources
8. Pilot (start small!), expand
9. Support intelligent, science-based policy
10. Share experiences, tools and results and communicate your efforts and successes to employees, shareholders, customers, regulators, your industry, community, consumers and the public.

## PARM: A Learning Community for Ag Retailers on Regenerative Agriculture

The Partnership for Ag Resource Management (PARM) was initiated by the IPM Institute in 2010 with support from the Great Lakes Protection Fund.

The original concept was to enlist ag retailers in identifying “hot spots” for resource impacts from agriculture and developing solutions. This idea came from evidence from research of disproportionality,<sup>82</sup> i.e., relatively few acres are responsible for the majority of negative impacts including loss of soil, nutrient and other agrichemical inputs from cropland and into ground and surface water. Ag retail professionals are on nearly every acre of every farm operation at least once during the year, and are optimally aware of issues on those fields such as eroded streambanks, or drainage tile problems, that can lead to natural resource impairments.

Initial listening sessions, facilitated by American Farmland Trust, with ag retailers, independent crop advisors, farmers, conservation professionals supported that premise. However ag retailers expressed great reluctance to play a role that included identifying farmers or farmer fields as problematic, due to the potential for disruption of customer relationships.

Instead, the project evolved to one where ag retailers worked with the PARM team to identify, promote, track and report acres receiving ag retailer products and services that protect resources. These include variable rate fertilizer application, where soil in fields are intensively sampled, with multiple sampling sites per field, and software translates soil sampling results, within-field yield variability

analysis and other factors into a prescription for maximum nutrient use efficiency.

The result is a custom application of nutrients, placing them in varying amounts across the field such that they are most likely to be taken up and used by crop plants to support growth and yields, and less likely to be lost to ground or surface water.

Additional ag retail products and services include several components of regenerative approaches including cover crop seed and sowing services; soil fertility, analysis and recommendations; and specialized tillage to minimize soil disturbance.

These beneficial products and services are promoted through training webinars given by experts, handbooks and fact sheets, and cost share for farmers to try products and services new to them. PARM has tracked and reported impressive increases among more than 90 participating ag retailers, including growth of variable rate application services from 24% of acres serviced to 39% between 2011 and 2019.

The IPM Institute and PARM have also generated a regenerative ag fact sheet, and hosted recorded webinars by Gabe Brown and Dr. Jonathan Lundgren on regenerative ag, as well as multiple videos and recorded webinars addressing specific elements of regenerative ag.

PARM is open to participation by any ag retail location worldwide. [PARM webinars](#), [webinar recording](#) and other resources are freely available on the PARM website. Topic ideas and sponsors for webinars, other training events and resources are welcome. Contact the PARM team at [info@partnershipfarm.org](mailto:info@partnershipfarm.org) for more information.

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# Final Recommendations

Widespread adoption of regenerative agriculture will be important to effectively and systematically address some of today's most pressing challenges such as climate change, food security and nutrition, water and soil quality, biodiversity and sustainable livelihoods. Based on our research, we have identified the following activities for companies in the agricultural value chain, ag retailers, farmers or consumers to focus on to successfully accelerate the adoption of regenerative agriculture.



## ADVANCE REGENERATIVE AGRICULTURE IMPACT DATA AND MEASUREMENT

**Companies, ag retailers and researchers:** Contribute to the development of tools and methods to measure outcomes and ecosystem impacts to fill in the information gaps and to enable farmers to show the concrete results and be compensated for their farming methods and build a better business case for regenerative agriculture.

**Farmers:** Measure outcomes of your regenerative practices



## ACCELERATE THE REGENERATIVE AGRICULTURE LEARNING CURVE

**Companies, ag retailers and researchers:**

- Create a wide-spread and deep understanding of ecosystem health, the systems-based and context-specific nature of regenerative agriculture and the wide variety of outcomes
- Drive local research and farmer training services
- Motivate open source information and data sharing
- Address and fill in the information gaps

**Farmers:** Share outcomes and learnings with others



## OFFER HOLISTIC SUPPORT TO FARMERS: TECHNICAL, FINANCIAL, SOCIAL, CULTURAL

**Companies and ag retailers:**

- Make the technical transition available and affordable to farmers
- Contribute to the development of financial reward mechanisms for farmers
- Build local capability and social hubs for regenerative farmers
- Contribute to growing consumer awareness and demand for regenerative agriculture

**Farmers:** Grow the community and join groups or hubs of regenerative farmers for knowledge sharing and social and cultural support



## ENABLE AND MOTIVATE MORE NEW ADOPTERS OF REGENERATIVE AGRICULTURE

**Companies and ag retailers:** Start small, let the results speak for themselves and meet every new adopter where they are



## CREATE A MARKET AND DRIVE ADVOCACY

**Food companies:** Launch new brands, sourcing ingredients from regenerative farms and ranches. Start the conversation with policy-makers

**Ag retailers:** Start the conversation with policy-makers

**Consumers:** Buy products from regenerative brands and put pressure on policy-makers

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# Resources

**Sustainable Food Group**, part of the **IPM Institute of North America** and led by the authors of this report, assists food companies with strategic planning and execution of sustainable supply chain initiatives, including in regenerative agriculture. Founded in 1998, clients include organizations of all sizes and from multiple sectors, and include Sysco, Frontier Co-op, General Mills, Honeybear Brands, Red Tomato. Read [success stories](#).

**Partnership for Ag Resource Management** is a ten-year old initiative of the IPM Institute and contributed to this report. The goal of the initiative is to collaborate with ag retailers to improve management of our key soil, nutrient and crop-protection resources by keeping them on our cropland and out of our streams, rivers and lakes. Our objectives are to identify and promote market-based solutions that improve farm economics and our natural resources. View [recorded testimonials](#) from partners.

## Support organizations and certifications

**The Savory Institute** aims for regeneration of the world's grassland habitats through holistic management of land, livestock and people. Their goal is to establish 100 global hubs to influence the management of one billion hectares by 2025. To date, they have created 47 locally owned, led and managed hubs offering Holistic Management consulting and training, on-going support, accreditation, state-of-the-art content and tools and access to the land, networks and funding resources necessary to create a local impact.

**The Savory Institute's Land to Market Program** is the world's first verified regenerative sourcing solution for meat, dairy, wool and leather and Ecological-Outcome-Verification (EOV) is the outcome-based science protocol inside of Savory Institute's Land to Market regenerative program.

**Indigo Ag** provides farmers with technical support to transition to regenerative agriculture. The organization develops biological and digital technologies that improve grower profitability, environmental sustainability and consumer health.

**Understanding Ag** is a team of farmers and ranchers combining decades of experience to provide farmers, ranchers, landowners, businesses and communities with regenerative agriculture consulting services.

**Soil Health Academy** is a non-profit whose mission is to teach and assist farmers and ranchers in applying regenerative agriculture principles.

**MAD Agriculture** works with farmers across the Mountain West, Southwest, Great Plains and Midwest to plan and implement regenerative agriculture practices using community support, capital and markets. One program offered by MAD Agriculture is The Perennial Fund, a loan to help farmers transition acres to organic.

**Regenerative Organic Alliance** is a group of farmers, business leaders and experts who established the Regenerative Organic Certification in 2017. They aim to empower farmers and eaters to create a better future through regenerative organic farming.

**Regenerative Organic Certification**, a label led by the Regenerative Organic Alliance requires organic certification as a baseline, while adding additional criteria for soil health, animal welfare and social fairness.

**The Carbon Underground** was created in 2013 and has grown into an international outcomes-based organization focusing on mitigating the climate crises by drawing carbon out of the atmosphere. They believe that that all climate change solutions will include drawing down legacy carbon from the atmosphere, and that soil restoration and regenerative agriculture are key to doing this.

## **Soil Carbon Initiative**

The Soil Carbon Initiative (SCI), created by The Carbon Underground, is an outcomes-based, scientific, agricultural standard designed to help farmers and supply chains measure improvements in soil health and soil carbon.

**Corteva Agriscience** is supporting The Nature Conservancy in its efforts to accelerate sustainable farming methods.

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## Industry collaborations

**One Planet Business for Biodiversity (OP2B)** is a business coalition to advance regenerative agriculture, rebuild biodiversity and eliminate deforestation. Kellogg, Nestle and McCain Foods are among the 19 companies that compose OP2B.

**One Step Closer to an Organic Sustainable Community (OSC2)** is a collaboration that counts up-and-coming companies like Numi Organic Tea, Treasure8 and Lotus Foods among its members.

**Danone-led Farming for Generations** is a global alliance that helps dairy farmers adopt regenerative agricultural practices.

## Advocacy and awareness

**Kiss the Ground**, a California-based nonprofit, is working to regenerate land and reverse climate change through rebuilding healthy soil. Kiss the Ground creates educational curricula and media campaigns to raise awareness and support individuals to purchase food that support healthy soils and a balanced climate.

**Regenerative Agriculture Definition** is an initiative of Terra Genesis International and **The Carbon Underground**. The effort aims to encourage global conversations to develop and improve the definition of regenerative agriculture.

**National Sustainable Agriculture Coalition (NSAC)** is an alliance of grassroots organizations envisioning a world where family farmers make a decent wage, protect the environment and contribute to their communities. NSAC advocates for federal policy reform to advance the sustainability of agriculture, food systems, natural resources and rural communities and gives a voice to sustainable and organic farmers.

**No Regrets Initiative** believes that our relationship to land is a partnership. Their mission is to improve soil health and grow soil carbon in the agricultural soils of

North America by demonstrating and advocating for a Regenerative Assets Strategy that deploys human, ecological and financial capital toward soil health and its effect on climate change.

**Project Grounded's** mission is to connect climate-conscious consumers and farmers in mutually beneficial networks to scale up regenerative farming quickly and effectively.

## Research and education

**Rodale Institute** is a nonprofit dedicated to growing the regenerative organic movement through rigorous research, farmer trainings and consumer education.

**American Farmland Trust** was founded in 1980 to save America's farms and ranches. Today, one of their many accomplishments is using agricultural conservation easements to protect over 6.5 million acres of farmland and ranchland. AFT has three main priorities: protecting agricultural land, promoting environmentally sound farming practices and keeping farmers on the land.

**Cornell University College of Agriculture and Life Sciences** connects the life, agricultural, environmental and social sciences to provide world-class education, spark unexpected discoveries and inspire pioneering.

**Purdue Center for Food and Agribusiness** creates and delivers management education programs that combine research with real-world application specifically for the food and agribusiness industries. The Center recently collaborated with the Nature Conservancy to explore and report on ag retailer and farmers perspectives on conservation, including implications for regenerative agriculture.

## Investors

**Farmland LP** is an investment fund founded in 2009 to convert conventional commercial farmland into a more profitable regenerative landscape using a team with decades of experience.



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## Food Companies

The following select list of US companies are advancing regenerative agriculture. Links provide quick access to regenerative agriculture webpages for these companies.

### General Mills

*Dairy and wheat*

### Danone North America

*Dairy*

### Patagonia Provisions

*Fruit, corn, grains, coconuts*

### Thousand Hills Lifetime Grazed

*100% grass fed beef*

### Applegate's New Food Collective

*Pork*

### Nature's Path

*Oats*

### Ocean Spray

*Cranberries*

### Harmless Harvest

*Coconuts*

### Serenity Kids

*Baby food*

### Cholaca and Alter Eco

*Cocoa beans*



Photo credits: Thousand Hills Lifetime Grazed

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# End Notes

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