TRENDS IN REGENERATIVE AGRICULTURE IN THE US

— POTENTIAL FOR EXPANSION INTO HEALTHCARE, WATER, AND OTHER SECTORS —

Shunsuke Nozaki
Industry Innovation Dept., Technology & Innovation Studies Div.
Mitsui & Co. Global Strategic Studies Institute

SUMMARY

- Regenerative agriculture is a form of sustainable farming rooted in indigenous practices, with the potential to transform conventional agriculture. This report categorizes it into two approaches—community-centered and business-centered—and focuses on the latter, which has attracted attention in recent years.
- Business-centered regenerative agriculture is being advanced primarily by major food companies. These firms are partnering with startups that possess cutting-edge technologies, raising expectations for early real-world implementation.
- Future prospects include expansion into the healthcare and water sectors. Developments in these emerging areas will also warrant close attention.

1. GROWING INTEREST IN REGENERATIVE AGRICULTURE

Regenerative agriculture is not a new concept. However, it has recently attracted attention due to the proactive efforts of global food companies. Although challenges remain, such as the lack of a clear definition, it is beginning to influence the energy sector as well, raising expectations for new business opportunities.

1-1. WHAT IS REGENERATIVE AGRICULTURE?

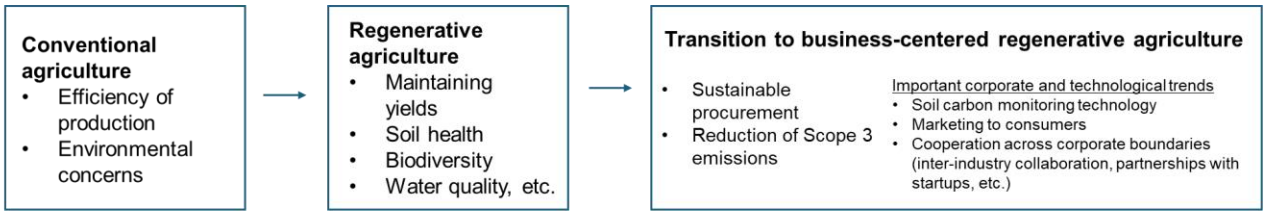
Regenerative agriculture refers to farming practices traditionally practiced by indigenous communities. The term “regenerative agriculture” has existed since the 1980s. While a clear definition has yet to be established, the core principles are broadly shared: (1) soil health, (2) water resource management, and (3) improvement of farmers’ livelihoods. Although similar to organic farming in terms of methods, regenerative agriculture encompasses broader social aspects, such as community revitalization. Depending on where the emphasis lies, it can be broadly categorized into two approaches: community-centered and business-centered (Figure 1).

Community-centered regenerative agriculture is characterized by the effective use of vacant urban lots to practice efficient organic farming through methods such as greenhouse cultivation, even within limited space. This approach aims to address social issues such as improving the health of residents in underserved areas known as food deserts, where access to fresh produce is limited. In recent years, there have been growing moves to scale up these traditionally community-centered efforts into viable business models.

This report examines the business-centered model of regenerative agriculture, which has drawn significant attention amid the broader trend toward commercialization.

Figure 1: Overview of regenerative agriculture

	Conventional agriculture*	Regenerative agriculture	
		Community-centered	Business-centered
Farming method	• Monoculture • Use of chemical fertilizers	• Crop rotation, cover crops, no-till, agroforestry, etc. • Minimal use of chemical fertilizers	
Purpose	Production efficiency	• Revitalization of local communities • Health of local residents • Addressing social issues such as food deserts, where access to fresh produce is limited	• Sustainable sourcing of food ingredients • Reduction of Scope 3 emissions



* Conventional agriculture is the form of agriculture that is widely and commonly practiced today

Source: Compiled by MGSSI

1-2. BUSINESS-CENTERED REGENERATIVE AGRICULTURE LED BY MAJOR CORPORATIONS

The business-centered model of regenerative agriculture is being driven by many global food companies. Their primary goal is to ensure a stable, long-term supply of raw ingredients used in their products. For these companies, Scope 3[1] emissions account for over 90%[2] of their total GHG emissions[3].

In addition, by adopting regenerative agriculture, these companies aim to ensure that their farmland is more resilient to climate change and make their businesses more sustainable. Figure 2 shows the goals set by major companies and, where available, their progress toward achieving them. It also lists their partner organizations. A wide range of players across the agri-food value chain—including major grain companies handling staple crops, global food manufacturers, agricultural material companies, and retailers—are aiming to transition specific parts of their supply chains to regenerative agriculture.

It should be noted, however, that some companies have not disclosed their progress toward their stated goals. While regenerative agriculture generally shares concepts such as “soil health” and “water resource management,” there is still no clear definition of the term. As a result, it remains difficult to make fair comparisons or evaluations across different corporate initiatives.

1 Emissions generated by other companies in relation to their own business activities (Source: Ministry of the Environment)

2 For example, Scope 3 emissions account for 94% of GHG emissions at PepsiCo (2023), 95% at Danone (2023), and 96% at Nestlé (2023)
PepsiCo, Climate change | PepsiCo ESG | Environmental impact Danone, Danone exhaustive 2023 extra-financial data Nestle, creating-shared-value-sustainability-report-2023-en.pdf

3 GHG stands for greenhouse gases, a collective term for gases that contribute to global warming

Figure 2: Regenerative agriculture by major corporations

Category	Company	Key details related to regenerative agriculture	Partners
Grains	ADM[1] (US)	• Aims to enroll **5 million acres** of land in regenerative agriculture programs by 2025. • Has already implemented regenerative agriculture on **over 2.8 million acres** (2023).	• **Farmers Business Network (US)** • **EarthOptics (US)** • Bayer (DE) & Embrapa (BR) • Ceres Rural (UK) & Map of Ag (UK)
	Cargill[2] (US)	• Aims to convert **10 million acres** of North American farmland to regenerative agriculture by 2030. • Has already implemented regenerative agriculture on **1.1 million acres** (2024).	• Regrow Ag (US) • Nestle Purina (US) • John Deere (US) • The Nature Conservancy (US)
	Louis Dreyfus[3] (NL)	• Aims to transition **100,000 hectares** of coffee farmland to regenerative agriculture by 2027. Has already implemented regenerative agriculture on **1,360 hectares** (2023). • Aims to plant 1.2 million shade trees on coffee farms practicing agroforestry by 2027. Has planted approximately 200,000 trees (2023).	• Sustainable Agriculture Initiative (SAI) Platform (BE) • Better Cotton (SZ)
Food	(PepsiCo[4] (US)	• Aims to transition **7 million acres** of farmland, equivalent to all the company's raw ingredient sources, to regenerative agriculture by 2030. Has already implemented regenerative agriculture on over **1.8 million acres** (2023).	• **Walmart[5] (US)** • ADM (US) • Yara (NO) • AgroScout (IL) • N-Drip (IL)
	Danone[6] (FR)	• Aims to source **30%** of its directly procured **raw ingredients** from farms that have begun transitioning to regenerative agriculture by 2025. Achieved **38% of this target** (2023). • Aims to **reduce methane emissions** from milk production by **30%** compared to 2020 levels by 2030. Achieved **43% of this target** (2023).	• Symbrosia (US) • Terviva (US)
	Nestle[7] (SZ)	• The company aims to source **20%** of its key raw ingredients from farms practicing regenerative agriculture **by 2025 and 50% by 2030**. Procures **15%** of key raw ingredients from such farms (2023). • Aims to source **100% of key raw ingredients** through responsible methods that take into account environmental and human rights impacts by 2030. Procures **36%** of main raw materials through responsible methods (2023).	• Klim (DE) • Grassroots Carbon (US) • Sustainable Agriculture Initiative (SAI) Platform (BE) • ADM (US) • Cargill (US)
	Unilever[8] (UK)	• Aims to transition over **1 million hectares** of land to regenerative agriculture by 2030. Currently implements regenerative agriculture on **350,000 hectares** (2024). • Aims to switch **95% of key crops** to those that are verified to be sustainably sourced by 2030. Procured **79%** of major agricultural products from sustainable sources as of 2021.	• Regrow Ag (US) • PepsiCo (US) • ADM (US)
Agricultural materials	Bayer[9] (DE)	• Aims to **reduce the environmental impact** per unit area of its crop protection products by **30%** by 2030 (from the average baseline for 2014 to 2018).	• Great Plains Ag (US) • Sound Agriculture (US) • EarthOptics (US) • ADM (US) • Neste (FI)
	CF Industries[10] (US)	• Aims to expand partnerships to bring **60 million acres** of farmland under sustainable practices by 2030.	• CHS Inc. (US) • POET LLC (US)
	Syngenta[11] (SZ)	• Aims to transition **50 million hectares** of farmland to regenerative agriculture by 2030. • Aims to **produce 85% of its seeds** through regenerative agriculture by 2030.	• Desert Control (NO) • Biotalys (BE) • FarmRaise (US) • Nestle (SZ) • The Nature Conservancy (US)
Retail	Walmart[12] (US)	• Aims to source at least **20 types of agricultural products** through sustainable methods by 2025. • **Announced collaborations with General Mills and PepsiCo.**	• General Mills (US) • PepsiCo (US)
	Target[13] (US)	• Aims to source 100% of key raw materials used in its products (agricultural and forestry products, cotton, etc.) through recycled, regenerated, or sustainable methods by 2030. • Aims to improve at least **1 million acres** of land through initiatives that promote soil health by 2025.	• The Nature Conservancy (US) • Cargill (US) • McDonald's (US)

Source: 1)ADM, 2024 Regenerative Agriculture Report, 2)Cargill, Impact Report 2024, 3)Louis Dreyfus, Integrated Report 2023, 4)PepsiCo, 5)PepsiCo, 6) Danone, Company Dashboard 2023, 7) Nestle, 8)Unilever, How Unilever is implementing regenerative agriculture practices across 1 million hectares, 9)Bayer 10)CF Industries, 2023 ESG Report, 11)Syngenta 12)Walmart, Product Supply Chain Sustainability, News, General Mills 13)Target

1-3. EXPANSION OF REGENERATIVE AGRICULTURE BEYOND FOOD PRODUCTION

In the US, the application of regenerative agriculture methods is also being considered for corn cultivation used in biofuel production. Starting in January 2025, the 45Z Tax Credit[4] allows bioethanol producers to receive tax incentives based on reductions in the CI[5] of corn.

Corn cultivation accounts for roughly half of the total GHG emissions in the bioethanol production process. By reducing chemical fertilizer use and promoting carbon sequestration in the soil, regenerative agriculture could contribute to decarbonizing bioethanol production. It may also offer economic benefits to farmers. At the same time, there is a need for services that help reduce the burden on farmers in managing records to verify the implementation of regenerative practices and in measuring soil carbon.

2. CORPORATE AND TECHNOLOGICAL TRENDS

For global food companies leading the push for business-centered regenerative agriculture, key challenges include reducing Scope 3 emissions and securing financial incentives for farmers to engage in regenerative practices. To address these challenges, technologies for measuring the amount of carbon sequestered in soil, as well as platforms to register and manage farmers' implementation of regenerative agriculture, will play an important role. Another challenge lies in marketing crops grown through regenerative agriculture and the food products made from them to consumers. In response, efforts are underway across the entire food value chain. Overcoming these challenges could pave the way for further expansion.

2-1. EFFORTS IN MEASURING SOIL CARBON

In regenerative agriculture, organic matter such as crop roots is decomposed by microbial activity and stored in the soil as stable organic compounds. Therefore, technologies that can efficiently measure soil carbon are required. Soil sampling is conventionally carried out manually, with analysis conducted by methods such as dry combustion[6] at research institutions. In recent years, wide-area analysis using satellite imagery, as well as estimation techniques powered by AI, have begun to be introduced to improve efficiency. However, accurate measurement of soil carbon requires assessing carbon levels at depths of 30 cm to 1 m below the surface. Since satellite data alone cannot capture data in the depth direction, new technologies are being developed, including automated soil sampling by robots.

---

4 Guidance was issued on January 10, 2025. U.S. Department of the Treasury Releases Guidance on Clean Fuels Production Credit | U.S. Department of the Treasury The guidance had initially been expected around November 2024.

5 Carbon intensity

6 Soil samples containing carbon are combusted at temperatures around 1,000°C, and the resulting carbon dioxide is analyzed using gas chromatography. Source: FAO,2019, Measuring and modeling soil carbon stocks and stock changes in livestock production systems

2-2. EFFORTS IN CONSUMER MARKETING

In the US, consumer awareness of sustainability is on the rise. According to a study by New York University[7], the share of products with sustainability-related certifications increased from 13.7% in 2015 to 18.5% in 2023. Even so, products associated with regenerative agriculture still make up only a small portion of this category, and the challenge is to raise recognition. Against this backdrop, certification schemes for regenerative agriculture are expected to increase consumer recognition (Figure 3). One notable example is Regenerative Organic Certified, which was newly added in 2024 to the Climate Pledge Friendly program, a collection of sustainable products curated by Amazon (US). Such developments are expected to further elevate the importance of certification[8].

Figure 3: Major certification programs related to regenerative agriculture

Certification	Organization	Overview
Regenerative Organic Certified[1)]	Regenerative Organic Alliance	• Based on USDA organic certification*, with soil health, animal welfare, and social justice also taken into account
FoodChain ID Regenerative Farming Standard[2)]	FoodChain ID	• A globally applicable certification system focused on soil health
Regeneratively Verified™ and Regenerative Grown™[3)]	Soil Regen	• Emphasizes ecosystem restoration, soil health, carbon sequestration, and biodiversity improvement • Applies to a wide range of food products; requires annual recertification
Land to Market[4)]	Savory Institute	• Primarily covers livestock, wool, and fur • Utilized for over 1,000 products
6-3-4 Verification Standard[5)]	Regenified	• 6-3-4 Verification Standard for soil health, etc. • First USDA-approved standard related to regenerative agriculture
Ethos Regenerative Outcome Verification™[6)]	Ethos	• Characterized by region-specific monitoring methods rather than a one-size-fits-all standard
Climate Beneficial™ Fiber[7)]	Fibershed	• Targets fibers such as wool and cotton • Guarantees that agricultural practices promote soil health and biodiversity
Certified Regenerative[8)]	A Greener World	• Standards for soil health, animal welfare, and environmental sustainability • Focuses on improving land and ecosystems
Real Organic Project Standards[9)]	Real Organic Project	• A farmer-led certification system created as an alternative to USDA organic standards • Focuses on soil health and animal welfare
RegenScore[10)]	RegenScore	• Farmers input data for whole-farm evaluation • Creates a RegenScore and five separate scores for soil health, water, air, biodiversity, and labor
Soil & Climate Initiative Verification[11)]	Soil & Climate Initiative	• Developed a three-year transition plan for regenerative agriculture, promoting regenerative agriculture such as soil health and biodiversity
Demeter Biodynamic Certification[12)]	Demeter USA	• Certification for biodynamic farming, a form of organic agriculture

*USDA Organic Certification: A certification based on standards set by the U.S. Department of Agriculture, indicating that crops are grown without the use of pesticides, herbicides, or synthetic fertilizers, and are not genetically modified.

Source: 1) Regenerative Organic Certified: Farm like the world depends on it , 2) Regenerative Agriculture Standard - FoodChain ID, 3) Regenerative Verified | Soil Regen, 4) Land to Market Verified | Regenerative Agriculture, 5) Regenerative Agriculture Certification | Regenified, 6) Ethos | Regenerative Outcome Verification™, 7) Climate Beneficial™ Fiber - Fibershed, 8) Certified Regenerative - A Greener World, 9) Home Page - Real Organic Project, 10) RegenScore, 11) Soil & Climate Initiative, 12) Is Certification For You? Demeter USA

[7] New Youk University, Sustainable Market Share Index

[8] However, the growing number of regenerative agriculture certifications has also led to concerns that they may be causing confusion among consumers.

2-3. EFFORTS ACROSS THE FOOD VALUE CHAIN

Expanding regenerative agriculture requires coordinated efforts across the entire value chain, from farmers to consumers. Of particular interest are partnerships between agricultural startups and large corporations, with expectations growing for validation of technologies on the extensive farmland held by major companies. Partnerships between large corporations themselves are also advancing, as shown in the "Partners" column of Figure 2.

In August 2024, ADM (US), a major grain company, announced the establishment of a joint venture called Gradable with agricultural startup Farmers Business Network (US).[9] Gradable's platform is designed to verify farming practices at the field level and provide farmers with financial incentives through the use of carbon credits. ADM (US) has partnered with EarthOptics (US), an agricultural startup that is developing technology to efficiently measure soil carbon.

Partnerships between food companies and retailers are also progressing. In 2023, PepsiCo (US) and Walmart (US) announced a seven-year, USD 120 million partnership to promote regenerative agriculture on more than 2 million acres of farmland across North America.[10]

In this way, collaborations between large corporations and startups, as well as between food manufacturers and retailers, are growing, and efforts are expanding across the entire value chain.

3. FUTURE PROSPECTS

This section explores the future potential of regenerative agriculture in the healthcare and water sectors. While both markets are still emerging, they represent areas where regenerative agriculture can make a contribution.

3-1. VALUE CREATION IN THE HEALTHCARE SECTOR

In the US, where obesity rates are high,[11] regenerative agriculture is increasingly linked to the concept of "Food is Medicine (or Food as Medicine)." This movement redefines food not merely as a source of calories, but as a key factor in maintaining health and preventing disease. The idea is that incorporating fresh vegetables into our daily diet can naturally lead to healthier living.[12] The perspective of improving community health aligns with the community-centered model of regenerative agriculture. At the same time, if scientific consensus continues to build, global food companies are likely to accelerate efforts to incorporate this concept into their business strategies. Evidence is gradually accumulating that crops grown using regenerative methods have higher nutritional value than those produced through conventional agriculture.[13] Initiatives like the Nutrient Density Alliance[14] are also advancing research beyond corporate boundaries, linking regenerative agriculture with consumer health. Members of the alliance include food companies such as Campbell's and Kellogg's, as well as NPOs like MAD Agriculture[15], which supports farmers in transitioning to regenerative practices. As such research progresses, consumer awareness of the health benefits of regenerative crops and foods is expected to grow, based on scientific data.

---

9 ADM and Farmers Business Network launch joint-venture Gradable ADM-and-Farmers-Business-Network-Launch-Gradable-Joint-Venture-to-Accelerate-Adoption-of-Regenerative-and-Sustainable-Ag-Practices | ADM

10 PepsiCo, PepsiCo and Walmart Aim to Support Regenerative Agriculture Across More than 2 Million Acres of Farmland

11 Approximately 40% of adults in the US are obese; Overweight & Obesity Statistics - NIDDK

12 Front. Nutr., 12 December 2024 Sec. Nutrition and Sustainable Diets Volume 11 – 2024, Frontiers | Integrating food is medicine and regenerative agriculture for planetary health

13 Soil health and nutrient density: preliminary comparison of regenerative and conventional farming [PeerJ]

14 Nutrient Density Alliance, Nutrient Density Alliance

15 MAD Agriculture, Mad Agriculture • Regenerative Farming

3-2. VALUE CREATION IN THE WATER SECTOR

Cover cropping[16], one of the techniques used in regenerative agriculture, offers the potential to improve water quality at a relatively low cost. Agriculture accounts for approximately 70% of global freshwater use,[17] and chemical fertilizers applied to soil often run off into rivers, contributing to water pollution. In contrast, legumes, a type of cover crop, can supply nitrogen to the soil naturally, helping reduce the need for chemical fertilizers and thereby improving water quality. In this area, initiatives are being led by NPOs such as the World Resources Institute[18] (US) and startups like NeptuneChain[19] (US), which issues water quality credits using blockchain technology.

16 Plants grown primarily to cover the soil. They help maintain soil health, prevent erosion, and replenish nutrients. Common types include legumes, grasses, and brassicas.
17 UNESCO 2022, Groundwater, making the invisible visible
18 World Resources Institute, After 15 Years, EPA Updates Water Quality Trading Policy. It Could Do More. | World Resources Institute
19 NeptuneChain, NeptuneChain

Any use, reproduction, copying or redistribution of this report, in whole or in part, is prohibited without the prior consent of Mitsui & Co. Global Strategic Studies Institute (MGSSI). This report was created based on information and data obtained from sources believed to be reliable; however, MGSSI does not guarantee the accuracy, reliability, or completeness of such information or data. Opinions contained in this report represent those of the author and cannot in any way be considered as representing the unified opinion of MGSSI and the Mitsui & Co. group. MGSSI and the Mitsui & Co. group will not be liable for any damages or losses, whether direct or indirect, that may result from the use of this report. The information in this report is subject to change without prior notice.