

# **Agriculture Carbon Sequestration Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, Segmented By Raw Material (Natural-Based Solution, Technology-Based Solution), By Application (Crop Farming, Livestock Farming, Forestry, Others), By Region and Competition, 2020-2030F**

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## **Abstracts**

Global Agriculture Carbon Sequestration Market was valued at USD 145.26 Million in 2024 and is expected to reach USD 236.74 Million by 2030 with a CAGR of 8.68% during the forecast period. The global agriculture carbon sequestration market is gaining significant attention as governments, corporations, and environmental organizations increasingly focus on sustainable practices and reducing greenhouse gas emissions. Carbon sequestration in agriculture refers to the process of capturing and storing atmospheric carbon dioxide (CO<sub>2</sub>) through agricultural activities, primarily within soils, biomass, and vegetation. This market plays a crucial role in mitigating climate change and achieving global emissions reduction targets.

The key drivers of the global agriculture carbon sequestration market include growing awareness of climate change and its impact on agriculture, government incentives, and rising demand for sustainable farming practices. Agriculture is a major source of greenhouse gas emissions, and the adoption of carbon sequestration techniques such as no-till farming, cover cropping, agroforestry, and biochar has proven to be effective in reducing emissions. Governments worldwide are introducing policies and offering financial incentives for farmers to adopt carbon sequestration technologies, such as carbon credits, carbon offset programs, and subsidies. These efforts are encouraging the integration of carbon sequestration strategies within the agricultural supply chain.

Despite its potential, the market faces several challenges. One of the key obstacles is the high upfront costs associated with implementing carbon sequestration technologies, particularly for small-scale farmers. Additionally, the complexity of measuring and verifying the amount of carbon sequestered remains a significant challenge, as consistent standards for carbon accounting and verification are still under development. Another challenge lies in the scalability of some sequestration methods, which may not be suitable for all regions or agricultural settings.

## Key Market Drivers

### Growth in Agricultural Industry

The growth of the agricultural industry is emerging as a significant driver of the global agriculture carbon sequestration market. As agricultural practices evolve with a heightened focus on sustainability, carbon sequestration techniques are becoming central to mitigating the environmental impact of farming. This market, which encompasses methods that capture and store carbon dioxide in soil, biomass, and other agricultural systems, is experiencing rapid expansion due to several key factors.

India is a key global player in the agriculture sector, serving as the primary source of livelihood for approximately 55% of its population. It boasts the world's largest cattle herd (including buffaloes), the largest area dedicated to wheat, rice, and cotton cultivation, and is the leading producer of milk, pulses, and spices. Additionally, India ranks second globally in the production of fruits, vegetables, tea, farmed fish, cotton, sugarcane, wheat, rice, and sugar. The country also holds the second-largest agricultural land area worldwide, generating employment for nearly half of its population. As such, farmers play a vital role in this sector, ensuring the nation's sustenance and agricultural productivity.

First, the agricultural sector is increasingly recognizing its role in climate change mitigation. With rising pressure to reduce carbon emissions, farmers and agribusinesses are adopting carbon sequestration practices such as no-till farming, cover cropping, agroforestry, and rotational grazing. These practices enhance soil health while simultaneously sequestering carbon, aligning with broader global sustainability goals. This shift is fueled by both environmental concerns and the growing regulatory frameworks that encourage carbon offset programs and emissions reduction targets.

Additionally, the rise of carbon markets has provided a financial incentive for farmers to

invest in carbon sequestration. Through carbon credits, which are generated by sequestering carbon, farmers are able to monetize their environmental efforts. This economic benefit enhances the appeal of carbon sequestration practices, offering farmers a new revenue stream while simultaneously contributing to climate change mitigation.

### Surge in Technological Advancements

The surge in technological advancements is significantly driving the global agriculture carbon sequestration market, with innovations offering improved efficiency, scalability, and cost-effectiveness in capturing and storing carbon within agricultural systems. As the global demand for sustainable agricultural practices intensifies, technologies such as precision agriculture, artificial intelligence (AI), and remote sensing are transforming how carbon sequestration is implemented in farming operations.

As the global shift toward carbon farming gains momentum, ensuring precise measurement and verification of carbon sequestration becomes paramount. TraceX DMRV emerges as a pivotal solution, offering an intuitive digital platform tailored to this need. By simplifying data collection through mobile and web applications, TraceX enhances farmers' efficiency, even integrating with remote sensing technologies such as satellite imagery. This streamlines complex data management while providing expert guidance on carbon farming techniques. For the broader market, TraceX builds trust and transparency by optimizing the verification process for carbon credit buyers. In equipping farmers and ensuring the credibility of carbon credits, TraceX is instrumental in fostering a thriving carbon farming market in India.

Precision agriculture, in particular, has allowed for more targeted interventions, where carbon capture strategies are optimized for specific crop types, soil conditions, and climatic factors. The use of AI-driven algorithms enables real-time data analysis, leading to more accurate predictions about soil health, carbon content, and the effectiveness of various sequestration techniques. These advancements make it easier for farmers to adopt carbon sequestration practices while enhancing yields and minimizing resource use.

Significant advancements in the agricultural sector include the development of innovative feed additives designed to reduce methane emissions from livestock. These additives are often derived from plant varieties with a higher ratio of carbon-capturing leaves relative to other plant components. Additionally, new technologies for capturing and managing agricultural emissions have been introduced, such as methane digesters,

which capture methane from livestock manure and convert it into energy, and nitrous oxide scrubbers, which effectively remove nitrous oxide from agricultural runoff. Collectively, these innovations present substantial opportunities to reduce the carbon footprint within the agriculture sector.

Another key technological driver is the development of soil health monitoring tools. With sensors and IoT (Internet of Things) devices embedded in farms, these tools provide continuous monitoring of soil conditions, allowing for proactive adjustments that optimize carbon storage potential. Furthermore, the integration of blockchain technology is enhancing transparency in carbon credit markets, ensuring that carbon sequestration efforts are properly quantified, verified, and monetized.

## Key Market Challenges

### High Initial Investment Costs

One of the key challenges facing the global agriculture carbon sequestration market is the high initial investment costs associated with implementing carbon capture technologies and practices. For many farmers, especially those in small-scale operations or resource-limited regions, the upfront financial burden of adopting carbon sequestration strategies can be a significant deterrent. These costs often include the purchase of new equipment, the integration of advanced technologies, and the transition to more sustainable farming practices such as no-till farming, agroforestry, and cover cropping.

The expenses associated with adopting these practices can be particularly high for farmers who lack access to financing options or government incentives. Additionally, while the long-term environmental and financial benefits of carbon sequestration, such as carbon credit generation, may offset these initial costs, the delayed returns can further discourage adoption. This delay in realizing financial rewards can be especially challenging for farmers who operate within narrow profit margins and are unable to absorb the upfront costs of transition.

Furthermore, farmers may face additional costs in terms of training and capacity building to properly implement and maintain carbon sequestration techniques. The need for specialized knowledge and expertise in managing these practices adds another layer of financial strain, making it difficult for some agricultural stakeholders to engage fully in the market.

## Key Market Trends

### Adoption of Regenerative Agricultural Practices

The adoption of regenerative agricultural practices is emerging as a pivotal trend in the global agriculture carbon sequestration market. As the need for sustainable agricultural systems intensifies, regenerative farming techniques are gaining prominence for their ability to sequester carbon, enhance soil health, and improve overall farm productivity. This trend is reshaping the way agricultural operations approach environmental stewardship, offering both ecological and economic benefits.

Regenerative agriculture focuses on practices that go beyond conventional farming by prioritizing soil regeneration, biodiversity, and long-term sustainability. Key practices within this approach include no-till farming, cover cropping, agroforestry, rotational grazing, and the integration of diverse crops. These methods significantly increase soil organic matter and promote the absorption of atmospheric carbon dioxide, thereby capturing and storing carbon in the soil.

No-till farming, for example, minimizes soil disturbance, allowing carbon to remain trapped within the soil rather than being released into the atmosphere. South America has witnessed the fastest adoption rates of no-tillage farming, with some countries implementing it on approximately 70% of their total cultivated land. In contrast to countries like the USA, where fields under no-tillage farming are occasionally tilled, more than two-thirds of the land under no-tillage systems in South America remains permanently undisturbed once the practice is adopted. The global expansion of no-tillage systems, now covering over 110 million hectares, underscores the system's exceptional adaptability to diverse climates, soils, and crop conditions.

No-tillage farming is now practiced across a wide geographical range, from the Arctic Circle to the tropics and as far south as 50° latitude, spanning elevations from sea level to 3,000 meters, and thriving in both extremely rainy areas (with 2,500 mm of annual precipitation) and arid regions (receiving only 250 mm annually). This method presents a valuable opportunity to enhance productivity and ecosystem services, delivering a broad spectrum of economic, environmental, and social benefits to both producers and society as a whole. Similarly, cover cropping and rotational grazing help prevent soil erosion, improve water retention, and create more resilient ecosystems. Agroforestry, the practice of integrating trees with crops or livestock, further enhances carbon sequestration by increasing biomass above and below ground.

## Segmental Insights

### Raw Material Insights

Based on Raw Material, Natural-Based Solution have emerged as the fastest growing segment in the Global Agriculture Carbon Sequestration Market in 2024. This is due to their effectiveness, cost-efficiency, and environmental sustainability. These solutions leverage natural processes to capture and store carbon, making them increasingly popular among farmers, businesses, and governments seeking to reduce greenhouse gas emissions while enhancing environmental resilience.

One key driver of this trend is the growing recognition that nature-based solutions, such as agroforestry, cover cropping, and improved soil management, offer a scalable and low-cost approach to carbon sequestration. Unlike technology-driven solutions, which often involve high upfront costs and complex infrastructure, Nature-based solutions (NbS) can be implemented with existing resources and knowledge, making them more accessible to farmers, especially smallholders.

Additionally, NbS provide multiple co-benefits, such as improved soil fertility, enhanced biodiversity, and better water retention, which contribute to the long-term sustainability of agricultural systems. These added advantages make NbS an attractive option for farmers looking to improve productivity while simultaneously addressing climate change. The dual benefits of economic and environmental sustainability have further accelerated the adoption of NbS in the agriculture sector.

### Application Insights

Based on Application, Crop Farming have emerged as the fastest growing segment in the Global Agriculture Carbon Sequestration Market during the forecast period. One of the primary reasons for the rapid growth of crop farming in the carbon sequestration market is the ability to implement large-scale, effective carbon sequestration practices. Key techniques such as no-till farming, cover cropping, crop rotation, and agroecological approaches can be seamlessly integrated into existing crop production systems. These methods not only sequester carbon but also enhance soil health, improve water retention, and reduce soil erosion—factors that directly benefit agricultural productivity.

Additionally, the rise of carbon credit markets has provided a significant financial incentive for farmers to adopt carbon sequestration practices. By engaging in practices



that capture and store carbon in the soil, crop farmers can generate carbon credits, which can then be sold to companies and organizations aiming to offset their emissions. This monetization of carbon sequestration has made it an attractive option for crop farmers seeking new revenue streams while simultaneously contributing to climate change mitigation.

## Regional Insights

Based on Region, North America have emerged as the dominating region in the Global Agriculture Carbon Sequestration Market in 2024. Technological advancements in North America have played a pivotal role, with the region adopting cutting-edge solutions such as precision agriculture, remote sensing, and data analytics. These technologies enable more efficient and targeted carbon capture, allowing farmers to enhance soil health and optimize carbon storage while simultaneously improving productivity.

Regulatory frameworks in North America, particularly in the United States and Canada, have also contributed to the region's leadership. Policies supporting carbon credits, emission reduction goals, and incentives for sustainable farming practices have encouraged widespread adoption of carbon sequestration techniques. These policies are further supported by private-sector investment, with companies and agricultural producers capitalizing on the financial benefits associated with carbon credits and the growing demand for sustainable products.

## Key Market Players

Indigo Ag, Inc.

Soil Capital SPRL

Yara International ASA

Carbon8 Systems Ltd.

The Cool Farm

Corteva Agriscience

BASF SE

Syngenta Crop Protection AG

Carbo Culture

Charm Industrial, Inc.

## Report Scope

In this report, the Global Agriculture Carbon Sequestration Market has been segmented into the following categories, in addition to the industry trends which have also been detailed below:

Agriculture Carbon Sequestration Market, By Raw Material:

Natural-Based Solution

Technology-Based Solution

Agriculture Carbon Sequestration Market, By Application:

Crop Farming

Livestock Farming

Forestry

Others

Agriculture Carbon Sequestration Market, By Region:

North America

United States

Canada

Mexico



Europe

France

United Kingdom

Italy

Germany

Spain

Asia Pacific

China

India

Japan

Australia

South Korea

South America

Brazil

Argentina

Colombia

Middle East & Africa

South Africa

Saudi Arabia

UAE

## Competitive Landscape

**Company Profiles:** Detailed analysis of the major companies present in the Global Agriculture Carbon Sequestration Market.

## Available Customizations:

Global Agriculture Carbon Sequestration Market report with the given market data, TechSci Research offers customizations according to a company's specific needs. The following customization options are available for the report:

## Company Information

Detailed analysis and profiling of additional market players (up to five).

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