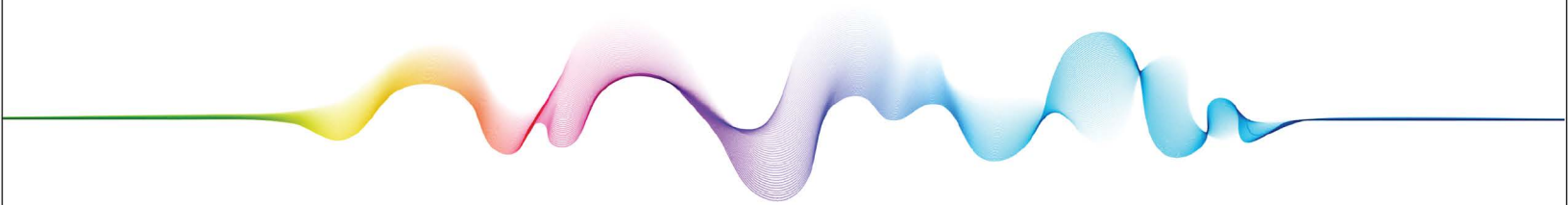


I N S I G H T R E P O R T

AN OVERVIEW OF SUSTAINABLE AGRICULTURE



C L I M A T E S C I E N C E



TAG Insights Report: An Overview of Sustainable Agriculture

Prepared by

Dr. Edward Amoroso
Chief Executive Officer, TAG Infosphere
Research Professor, NYU
eamoroso@tag-cyber.com

Version 1.0
March 28, 2024

Introduction

This TAG Insights Report on *Sustainable Agriculture* is intended to help companies, managers, practitioners, researchers, investors, and commercial vendors better understand current trends, issues, and market opportunities in this area. A list of representative commercial vendors working in various areas of water management is included. The five specific areas covered in this report include:

1. Precision Farming Technology
2. Organic Farming Solutions
3. Soil Health and Nutrient Management
4. Vertical Farming and Aquaponics
5. Crop Monitoring and AgTech

This report is intended for general and unrestricted use, but interested readers are encouraged to connect with the TAG research and advisory team for more information on the private [TAG Research as a Service \(RaaS\)](#) community that covers, discusses, and shares information on these topics in more depth and includes a wider range of startups, vendors, and companies.

TAG Climate Taxonomy

Our advisory work at TAG is guided by our TAG Climate Taxonomy which includes twenty different market categories, with one hundred associated subcategories – all developed consistent with our research into emerging and existing commercial offerings. Subscribers to

TAG Research as a Service (RaaS) have access to the more detailed specifics of the taxonomy and the full set of companies working in each area.

The taxonomy is intended to be interpreted as a market guide for commercial (and in some cases, open source) platform, tools, products, and services. The day-to-day tasks of any practitioners focused on sustainability will include many considerations such as dealing with regulators, addressing compliance issues, and keeping up with legislation that will not typically be represented in our taxonomy. We focus here on products and services.

TAG Climate Taxonomy V2.0 – 1Q2024

1 Renewable Energy 1.1 Solar and Wind Power Generation 1.2 Fission and Fusion 1.3 Hydropower Innovations 1.4 Geothermal Energy Technologies 1.5 Bioenergy and Biomass Systems	6 Water Management 6.1 Water Purification and Filtration 6.2 Smart Irrigation and Agriculture 6.3 Industrial Water Recycling 6.4 Stormwater Management 6.4 Desalination Technologies	11 Climate Data Analytics 11.1 Climate Modeling and Prediction 11.2 Weather Forecasting Technologies 11.3 Environmental Monitoring Services 11.4 Climate Risk Assessment Service 11.5 Carbon Footprint Assessment Tools	16 Eco-Friendly Consumer Products 16.1 Sustainable Fashion and Textiles 16.2 Eco-Friendly Personal Care Products 16.3 Biodegradable Packaging 16.4 Energy-Efficient Appliances 16.5 Sustainable Electronics
2 Energy Efficiency 2.1 Building Energy Management 2.2 Smart Grid and Energy Storage 2.3 LED Lights/Energy-Efficient Appliances 2.4 Industrial Process Optimization 2.5 HVAC and Cooling Solutions	7 Sustainable Agriculture 7.1 Precision Farming Technology 7.2 Organic Farming Solutions 7.3 Soil Health and Nutrient Management 7.4 Vertical Farming and Aquaponics 7.5 Crop Monitoring and AgTech	12 Sustainable Food and Beverage 12.1 Plant-Based and Lab Grown Meat 12.2 Sustainable Seafood Production 12.3 Food Waste Reduction Technologies 12.4 Eco-Friendly Food Packaging 12.5 Sustainable Ingredients and Oils	17 Clean Air and Pollution Control 17.1 Air Quality Monitoring Services 17.2 Air Purification Technologies 17.3 Pollution Source Tracking 17.4 Emission Control Systems 17.5 Indoor Air Quality Solutions
3 Sustainable Transportation 3.1 EV Charging Infrastructure 3.2 Sustainable Urban Mobility Solutions 3.3 Fleet Electrification Services 3.4 Alternative Fuel Technologies 3.5 EV Battery Recycling and Repurposing	8 Circular Economy 8.1 Recycling and Waste Management 8.2 Product Lifecycle Assessment 8.3 Sustainable Packaging Solutions 8.4 Reusable and Repairable Products 8.5 Upcycling and Repurposing Services	13 Eco-Tourism and Recreation 13.1 Eco-Friendly Accommodations 13.2 Sustainable Travel Booking Platforms 13.3 Adventure Tourism/Conservation Focus 13.4 Wildlife Monitoring/Conservation Tours 13.5 Eco-Friendly Outdoor Gear	18 Climate Education and Services 18.1 Climate Change Education workshops 18.2 Sustainability Training 18.3 Climate Industry Advisory 18.4 Climate Intelligence Software 18.5 Climate Insurance
4 Carbon Capture and Utilization (CCU) 4.1 Direct Air Capture incl. Point Source 4.2 Carbon Removal and Sequestration 4.3 Carbon Mineralization 4.4 Enhanced Oil Recovery (EOR) 4.5 Soil-Based Sequestration	9 Carbon Market and Trading Platforms 9.1 Emission Reduction Verification Services 9.2 Carbon Offset Project Development 9.3 Carbon Credit Exchange Program 9.4 Blockchain-Based Carbon Trading 9.5 Carbon Taxation Solutions	14 Green Energy Storage 14.1 Advanced Battery Technologies 14.2 Advanced Fuel Cells 14.3 Energy Storage for Electric Vehicles 14.4 Grid-Scale Energy Storage Solutions 14.5 Hydrogen Energy Storage	19 Sustainable Supply Chain 19.1 Sustainable Sourcing/Procurement 19.2 Supply Chain Transparency 19.3 Ethical Labor Practices 19.4 Circular Supply Chain Solutions 19.5 Eco-Friendly Transport in Supply Chain
5 Green Building and Infrastructure 5.1 Sustainable Architecture and Design 5.2 Green Building Materials and Concrete 5.3 Zero-Emission Construction Equipment 5.4 Green Roofing and Insulation 5.5 Sustainable Urban Planning	10 Sustainable Finance and Investment 10.1 Green Bonds and Sustainable invest. 10.2 ESG Analysis 10.3 Impact Investment Platforms 10.4 Carbon Disclosure and Reporting Tools 10.5 Sustainable Investment Advisory	15 Biodiversity and Conservation 15.1 Wildlife Habitat Restoration 15.2 Conservation Tech for Monitoring 15.3 Anti-Poaching Solutions 15.4 Sustainable Forestry Practices 15.5 Marine Conservation Initiatives	20 Green Technology Integration 20.1 IoT for Sustainability 20.2 Autonomous Electric Vehicles 20.3 Blockchain/Transparent Supply Chain 20.4 3D Printing for Sustainable Manufact. 20.5 Space Tech for Climate Monitoring

Figure 1. TAG Climate Taxonomy

Overview of Sustainable Agriculture

The following emerging global commercial opportunities for sustainable agriculture are covered in this report, including the listing of several viable commercial entities providing solutions on the market today:

- Precision farming technology involves using technologies such as GPS, sensors, and data analytics to optimize field-level management regarding crop farming. Precision farming enhances sustainable agriculture by minimizing waste and inputs like water, fertilizer, and pesticides, leading to lower emissions and better resource use.
- Organic farming solutions avoid or largely exclude the use of synthetic fertilizers, pesticides, and genetically modified organisms. By maintaining ecological balance and conserving biodiversity, organic practices can reduce pollution and greenhouse gas emissions, contributing to climate mitigation.

- Soil health serves as the foundation of sustainable agriculture, and proper nutrient management helps to maintain it. Practices such as crop rotation, cover cropping, and the application of compost improve soil structure and reduce the need for chemical inputs, leading to reduced emissions and better soil carbon sequestration.
- Vertical farming involves growing crops in stacked layers, often integrating systems like aquaponics, which combines plant cultivation with fish farming. These systems can drastically reduce land use, water consumption, and transport emissions, providing climate-friendly food production alternatives in urban settings.
- Agricultural technology (AgTech) for crop monitoring employs drones, satellites, and AI to assess crop health and soil moisture levels. These tools enable farmers to react promptly to changes, improving yields and reducing waste and emissions through more targeted farming practices.

Focus Area: Precision Farming Technology

Precision farming technology fundamentally transforms the way crops are cultivated. By incorporating advanced technologies such as GPS, remote sensing, and the Internet of Things (IoT), precision farming enables farmers to make informed decisions that optimize yield while minimizing both operating costs and environmental impact.

The core of precision farming is data. GPS technology allows for the precise mapping of farm fields. Farmers can pinpoint variations in field conditions, such as moisture levels, nutrient needs, and pest pressures, down to the square inch. This high-resolution insight supports targeted interventions, ensuring that water, fertilizers, and pesticides are applied only where needed and in the exact quantities required. The result is a significant reduction in the overuse of inputs, which not only cuts down on costs but also on the runoff of chemicals into nearby ecosystems.

Remote sensing technology, utilizing satellites or drones, offers detailed observations of crop health across vast areas. These tools can identify stressed plants, often before issues are visible to the naked eye. With this information, farmers can implement corrective measures swiftly, thus avoiding over-application of inputs and enhancing the efficiency of resource use.

IoT devices, such as in-field sensors, continuously monitor conditions like soil moisture and temperature. This real-time data is crucial for precision irrigation systems, which conserve water by adjusting watering schedules and volumes to the actual needs of the plants. Water is a precious resource, and its conservation is vital for sustainable agriculture, especially in water-limited regions.

Furthermore, precision agriculture technologies support the practice of variable rate technology (VRT), where inputs are dynamically applied at varying rates across a field to match the soil and crop requirements. This optimizes the productivity of different field zones, leading to a more efficient and sustainable crop production cycle.

By enhancing the precision of farming operations, these technologies not only bolster the sustainability of the agricultural sector by cutting greenhouse gas emissions but also fortify it against climate variability. Farmers can adapt more readily to changing conditions, reducing the risk of crop failure due to environmental stresses.

With only a reported 27% of US farmers currently utilizing precision farming technologies, there is a substantial opportunity to expand usage. However, there are also inherent challenges that must be overcome in order to fully realize this opportunity. These challenges include high up-front costs, concerns over data sharing and ownership, lack of uniform standards and interoperability between complementary tools.

Focus Area: Organic Farming Solutions

Organic farming is a holistic production management system that promotes and enhances agroecosystem health, including biodiversity, biological cycles, and soil biological activity by minimizing the off-site exchange of materials and energy. It is underpinned by several core principles that eschew the use of synthetic fertilizers, pesticides, and genetically modified organisms, aiming to sustain the health of soils, ecosystems, and people.

One of the primary ways organic farming supports sustainable agriculture is through its emphasis on biodiversity. By maintaining a diverse array of plant and animal species on the farm, organic systems support a range of ecosystem services, including pollination, pest and disease control, and nutrient cycling. This diversity helps build resilience against pests and diseases, reducing the need for chemical interventions.

Organic farming also prioritizes soil health, employing practices such as crop rotations, intercropping, symbiotic associations, cover crops, and the use of compost. These practices not only enhance soil structure and fertility but also boost its ability to sequester carbon, thus mitigating climate change. Healthy soil retains water more effectively, reducing the need for irrigation and making the farm more resilient to drought.

By avoiding synthetic fertilizers and pesticides, organic farming minimizes soil and water pollution. This is crucial for sustaining water quality and the health of aquatic ecosystems. Furthermore, organic practices often require less energy than conventional farming, mainly due to the non-use of synthetic fertilizers and pesticides, which are energy-intensive to produce.

This reduction in energy use translates to lower greenhouse gas emissions, and can, indeed, result in net carbon sequestration in the soils of organic farms. In organic farming, nutrient management is conducted through the cycling of resources, promoting closed-loop systems. The use of green manure, compost, and animal manure recycles nutrients within the farm, reducing reliance on external inputs and lowering the ecological footprint.

Moreover, organic farming often goes hand in hand with other sustainable practices, such as agroforestry and conservation tillage, which further support the environment. Agroforestry, for

example, combines agriculture with tree cultivation, enhancing carbon sequestration and providing habitats for wildlife.

In terms of socioeconomic benefits, organic farming can support local economies and food systems by providing opportunities for small-scale farmers and fostering local markets. Consumers increasingly seek out organic products for their environmental and health benefits, which can command higher prices and provide more significant economic returns for farmers.

Focus Area: Soil Health and Nutrient Management

Soil health and nutrient management are fundamental to the success of sustainable agriculture. Healthy soil is vital for producing food, filtering water, and breaking down organic materials, which in turn supports plant growth, regulates water flow, and sequesters carbon, thereby mitigating climate change. Managing soil health and nutrients effectively can sustain and improve these functions, ensuring long-term agricultural productivity and ecosystem stability.

Soil health is influenced by its biological, chemical, and physical properties. Sustainable practices that promote good soil health include crop rotations, cover cropping, reduced tillage, and the application of organic matter through compost and green manures. These practices help maintain soil structure and porosity, which enhances water retention and resilience against erosion. By encouraging a diverse microbial ecosystem, these practices also aid in the natural cycling of nutrients, reducing the need for chemical fertilizers that can have deleterious environmental impacts.

Nutrient management is about applying the right source of nutrients at the right rate, time, and place to improve crop yield and minimize environmental impact. Precision nutrient management, using soil tests and tailored fertilization schedules, can significantly reduce the leaching of excess nutrients into waterways, which can lead to eutrophication and the degradation of aquatic ecosystems. Efficient nutrient management also reduces greenhouse gas emissions, particularly nitrous oxide, a potent greenhouse gas released from over-fertilized soils.

Soil carbon sequestration is another key aspect. Organic farming practices, conservation agriculture, and agroforestry increase the organic matter returned to the soil, thus capturing atmospheric carbon dioxide. This not only combats climate change but also improves soil quality by increasing organic carbon content, which is critical for soil fertility and agricultural productivity.

Furthermore, healthy soils can break down contaminants and buffer against pollutants, reducing the need for chemical remediations and protecting groundwater quality. This also supports the biodiversity of soil organisms, which play essential roles in decomposing organic matter and cycling nutrients, key processes that support plant health and growth.

Focus Area: Vertical Farming and Aquaponics

Vertical farming and aquaponics are innovative approaches to agriculture that address some of the key challenges of sustainability in food production, particularly in urban environments where space is at a premium and demand is high.

Vertical farming involves cultivating plants in stacked layers, often using soil-less methods such as hydroponics, where crops grow with their roots suspended in nutrient-rich water, or aeroponics, where the roots are misted with nutrients. This method significantly reduces land use; a vertical farm can produce the same crop yield as traditional farming methods in a fraction of the area. While they do require a significant amount of power to operate, bringing farms closer to urban centers reduces the need for transportation. This, in turn, cuts down on fossil fuel burning and associated greenhouse gas emissions, while also providing fresher food for human consumption.

Furthermore, vertical farming typically uses controlled environment agriculture (CEA) technology, which optimizes growing conditions to maximize yield and can eliminate the need for pesticides since the environment is regulated to prevent pest infestations. Water use is also minimized; vertical farms use up to 70% less water than traditional farms because water is recirculated. This is particularly valuable in water-limited areas and contributes to more sustainable water management.

Aquaponics combines aquaculture (raising fish or other aquatic animals) with hydroponics in a symbiotic environment. In these systems, fish waste provides an organic nutrient source for the plants, and the plants help to filter and purify the water, which is then recirculated back to the aquaculture system. Aquaponics systems are highly efficient and can produce both fish and plants with a minimal environmental footprint. They do not require synthetic fertilizers, as the fish provide the necessary nutrients for the plants, and they produce minimal waste, with the entire system driven by sunlight.

Both vertical farming and aquaponics offer scalable solutions to food production within urban areas, which can reduce the need for land conversion and deforestation associated with traditional farming. They can also provide fresh, local produce all year round, reducing the carbon footprint associated with seasonal food transportation.

Focus Area: Crop Monitoring and AgTech

The integration of Crop Monitoring and Agricultural Technology (AgTech) is transforming the landscape of sustainable agriculture by providing farmers with advanced tools to manage their crops more efficiently and with a lower environmental footprint. The capabilities offered by AgTech, including data analysis, satellite imagery, drones, and sensors, allow for an unprecedented level of precision in agricultural practices.

Crop monitoring through AgTech enables the detection of plant stress, pest infestations, and nutrient deficiencies at early stages. Early detection allows for targeted interventions, reducing

the need for broad-spectrum pesticide use and lowering the potential for runoff into local waterways. This targeted approach not only conserves resources but also supports the maintenance of local biodiversity.

Satellite imagery and drone technology facilitate precise mapping and monitoring of crop health across vast areas with minimal physical intrusion. These technologies can assess vegetation health through indices such as Leaf Area Index (LAI), which measures the rate and extent of photosynthetic growth of plants, and the Normalized Difference Vegetation Index (NDVI), which measures plant greenness and can indicate plant stress before it is visible to the eye. With such tools, farmers can apply water, fertilizers, and pesticides in variable rates across a field (Variable Rate Technology, VRT), tailored to the specific needs of each plant or zone, enhancing yield while minimizing waste.

In-soil sensors contribute to soil health by providing real-time data on moisture levels, pH, temperature, and nutrient content. This information is critical for precision irrigation and fertilization, ensuring that crops receive exactly what they need for optimal growth. Precision irrigation conserves water, a critical resource in agriculture, especially in arid regions or during droughts.

Moreover, the use of robotics and automation in AgTech facilitates the planting, weeding, and harvesting processes, reducing the need for manual labor and enhancing efficiency. These technologies can also contribute to reduced soil compaction and structure damage, as lighter, autonomous machinery can be used instead of heavy equipment.

Beyond field operations, AgTech includes the use of Big Data and predictive analytics for forecasting and managing agricultural risks such as weather events, pest outbreaks, and market demands. This capacity for prediction enables better planning and resource allocation, enhancing sustainability by safeguarding against overproduction and waste.

Companies and Contributions

The companies listed below emerged as part of our research at TAG Climate. Our goal in listing these fine firms is to provide a starting point for buyers, advocates, stakeholders, and researchers trying to make sense of the commercial landscape for sustainable agriculture as a means for driving toward a more sustainable energy future.

Precision Farming Technology Vendors

1. [Aerobotics](#): Aerobotics offers solutions for agricultural insights to growers and insurers, utilizing advanced analytics and data.
2. [Apeel Sciences](#): Apeel Sciences develops a plant-based solution that extends the shelf life of produce, aiming to reduce food waste and promote sustainability.
3. [Augmenta](#): Augmenta provides precision agriculture solutions like field analysis and fleet monitoring to improve crop yield and reduce costs.

4. [DeepBerry](#): DeepBerry provides greenhouse automation solutions using AI, big data, and cloud computing to streamline agricultural production.
5. [Earth Rover](#): Earth Rover develops autonomous farming robots utilizing AI for precision agriculture and sustainable food production.
6. [Fuselage Innovations](#): This Indian startup makes agricultural drones for crop spraying and granular spreading, improving safety and efficiency in farming practices.
7. [GeoPard Agriculture](#): GeoPard Agriculture offers a platform for precision farming analytics, processing geospatial data for better agricultural decision-making.
8. [Hummingbird Technologies](#): Using AI and predictive analytics, Hummingbird Technologies delivers precise insights for sustainable crop management.
9. [Indigo](#): Indigo merges digital technologies with microbiology, providing sustainable solutions for growers and an online marketplace for agricultural transactions.
10. [Orchardly](#): Orchardly provides weather forecasts and alerts to farmers, enabling informed decisions for optimal crop growth and water conservation.
11. [Sencrop](#): Sencrop offers micro-climate technology with real-time weather data to help farmers manage crop risks and improve agricultural efficiency.
12. [TAGim](#): TAGim develops smart livestock monitoring systems, enhancing animal welfare and operational efficiency in farming.
13. [UpTerra](#): UpTerra develops smart irrigation systems using biomimicry to enhance water delivery for sustainable farming practices.
14. [Wefarm](#): Wefarm is a farmer-to-farmer digital network that provides open-source agriculture resources and connects farmers with retailers, serving over 2.4 million farmers globally.
15. [Ynsect](#): Specializing in insect breeding for animal feed and fertilizers, Ynsect aims to offer sustainable protein alternatives and reduce the environmental impact of farming.

Organic Farming Solutions Vendors

1. [Agricapture](#): Agricapture works on certifying Climate-Friendly farming practices and helps producers generate revenue through sustainable practices.
2. [Agripolis](#): This French startup focuses on urban organic farming, utilizing rooftops and other urban spaces for sustainable produce cultivation.
3. [AMFOR](#): AMFOR offers an adaptive release organic fertilizer that increases crop yield sustainably.
4. [Ceres Imaging](#): Ceres Imaging employs aerial imagery and machine learning to provide detailed crop health information, assisting in optimized yield and water usage.
5. [Farmer's Business Network](#): Utilizing data analytics and machine learning, FBN helps farmers make informed decisions to optimize crop management.
6. [Farmer's Edge](#): Farmer's Edge uses precision agriculture techniques to provide real-time crop data to help farmers improve their operations sustainably.
7. [Freight Farms](#): Freight Farms from Boston specializes in container-based hydroponic systems, enabling fresh produce growth in any environment.
8. [Full Harvest](#): Full Harvest's platform connects farmers with food companies to sell surplus produce, reducing food waste.

9. [InnerPlant](#): This startup uses nanotechnology to help plants communicate with farmers about their health, improving operations and reducing chemical usage.
10. [Protenga](#): Singaporean-based Protenga operates modular insect farms that recycle nutrients from organic waste into protein for animal feed and organic farming.
11. [Soil Scout](#): Soil Scout offers a solution with wireless underground sensors for real-time soil condition monitoring to enhance crop growth.
12. [Solinftec](#): Solinftec's AI-powered platform aids farmers in streamlining operations for increased efficiency and crop yield.
13. [TerViva](#): TerViva grows pongamia trees, which are used for sustainable animal feed and biofuels, with technology to optimize growth and yields.

Soil Health and Nutrient Management Vendors

1. [Agreena](#): Offers a platform for issuing and trading carbon certificates for European farmers, integrating with technologies for soil carbon certification.
2. [Aurea Imaging](#): This Utrecht-based startup offers crop intelligence tools to monitor and treat individual trees and crops, leading to precision farming and sustainability.
3. [CapChar](#): A UK-based company using pyrolysis kiln technology to produce biochar from low-grade wood chips, enhancing soil fertility and reducing greenhouse gas emissions.
4. [CropBiome](#): An Irish company creating seed dressings from natural microbes to produce healthier crops and improve soil health.
5. [eAgronom](#): An Estonian farm management software solution provider also developing a farming-based carbon credits platform to promote sustainable practices.
6. [Fixed Earth Innovations](#): Canadian startup offering microbial soil remediation solutions tailored to degrade pollutants and boost soil fertility.
7. [Global Biodesign](#): A Brussels-based startup enhancing the efficiency of biocontrol applications in agriculture and forestry.
8. [GRT](#): Canadian company specializing in soil remediation for construction sites, using technology that washes and sorts soil for reuse.
9. [IrrigationNets](#): A Berlin-based startup whose technology converts salinized groundwater into fresh water, offering a sustainable alternative to desalination plants.
10. [MAKABI](#): Croatian startup with a 3-in-1 encapsulation technology for plant protection and nutrition, aiming to reduce environmental pollution and enhance food biopotential.
11. [Nordetect](#): A Danish innovator of intelligent nutrient testing systems, aiding in efficient and environmentally-friendly food production.
12. [Photonome](#): This US-based startup develops microbial solutions that fix nitrogen, sequester soil carbon, and improve soil health.
13. [Qubeto](#): German company revolutionizing substance screening with automated data acquisition, experimental design, and AI-driven analysis.
14. [SAIA](#): Dutch startup that believes robots and AI are crucial for autonomous indoor farming, facilitating efficient climate-controlled farming.
15. [SARE](#): Supports various projects and initiatives to promote soil health in sustainable agriculture, including those that improve soil organic matter and enable carbon sequestration.

Vertical Farming and Aquaponics Vendors

1. [Apeel Sciences](#): Working to extend the shelf life of fruits and vegetables using natural methods, which could greatly reduce food waste.
2. [DeepBlue Greens](#): Provides indoor farming systems that enhance crop yields with their innovative high voltage crop growing systems.
3. [ECOLIFE Conservation](#): Promotes aquaponics, a sustainable and innovative method of farming that combines aquaculture with hydroponics in a symbiotic environment.
4. [Futura Gaia](#): Revolutionizing indoor vertical farming with an automated soil-based solution that supports the growth of a variety of plants.
5. [GroHo Garden](#): Supplies an aeroponic vertical garden system suitable for home use, enabling the cultivation of herbs, fruits, and vegetables.
6. [HRVSTS](#): Offers a platform that lets customers pre-purchase produce grown in indoor vertical farms, providing a tailored service from seed to delivery.
7. [Infarm](#): Expanding the network of urban farms, cultivating a variety of fresh produce locally and sustainably.
8. [Invaio Sciences](#): Addressing agricultural challenges by leveraging the interdependence of natural systems and advanced sciences.
9. [MycoTechnology](#): Utilizes the power of mushrooms to create food that's both healthy and enjoyable, aligning with sustainable agricultural practices
10. [TerraClear](#): Develops rock picking solutions that integrate AI and computer vision to streamline agricultural processes.
11. [vGreens](#): Manufactures fully automated vertical farms, especially for strawberry production, using advanced management software and robotics.
12. [YASAI](#): Builds and manages highly automated vertical farming solutions based on circular systems, aiming to transform food systems.

Crop Monitoring and AgTech Vendors

1. [Agristry](#): This Australian startup specializes in crop mapping with drone imagery and plant indices. They offer insightful data for crop health and stress detection, which assists in effective field management.
2. [Agrobit](#): Offers a mobile app for agricultural photogrammetry, allowing farmers to digitally model crops using smartphones. This technology provides detailed insights into crop health and development, enhancing precision agriculture practices.
3. [Airbots Aerospace](#): Indian startup building autonomous agri drones for enhanced crop spraying and monitoring. Their technology supports efficient pesticide and fertilizer application, and their drones can also gather valuable crop performance data.
4. [Algaenite](#): Specializing in biofertilizers derived from nitrogen-fixing microalgae, Algaenite aims to enhance agricultural productivity while maintaining soil health. Their innovative approach leverages the power of microalgae to naturally improve crop yields.

5. [BugMars](#): Optimizes insect farm management through artificial intelligence. BugMars' platform provides continuous surveillance and data-driven insights to increase productivity and reduce mortality in insect farming.
6. [CAPSERO](#): Provides innovative automated cultivation solutions that streamline the farming process, making it more efficient and sustainable.
7. [Cropler](#): A Polish startup offering AI-powered remote photo monitoring for enhanced field management. Cropler's technology allows for accurate crop health tracking and data-driven agricultural decisions.
8. [Ground Truth Agriculture](#): Focused on grain supply chain management, Ground Truth Agriculture integrates technology to streamline and optimize the journey from farm to table, ensuring quality and efficiency in the grain supply chain.
9. [Nanobubble Agritech](#): This company develops an advanced irrigation retrofit system. Their technology aims to increase the efficiency of water use in agriculture, crucial for sustainable farming practices in various climatic conditions.
10. [PlugZenGrow](#): Develops outdoor vertical micro-field systems, enabling efficient urban farming and decentralizing food production. Their systems are suitable for diverse environments, including rooftops and parking lots.
11. [RhizeBio](#): US-based company focusing on soil health management. They analyze soil microbiomes and provide in-depth soil health reports to inform farming practices and encourage regenerative agriculture.
12. [Ribes Technologies](#): A Polish startup enabling visual plant recognition and developing autonomous vehicles for constant crop monitoring, providing critical data for berry farmers to increase yields and reduce costs.
13. [RoboCare](#): Advances early disease detection in greenhouses using hyperspectral imaging and AI. Their solutions enable proactive responses to potential crop health issues.
14. [YieldX](#): YieldX specializes in providing real-time biosecurity insights for poultry farms using sensors, machine learning, and IoT. Their technology aims to proactively address poultry farming issues, enhancing productivity and health.

About TAG

TAG is a trusted next generation research and advisory company that utilizes an AI-powered SaaS platform to deliver on-demand insights, guidance, and recommendations in cybersecurity, artificial intelligence, and sustainability to enterprise teams, government agencies, and commercial vendors.

Copyright © 2024 TAG Infosphere, Inc. This report may not be reproduced, distributed, or shared without TAG Infosphere's written permission. The material in this report is comprised of the opinions of the TAG Infosphere analysts and is not to be interpreted as consisting of factual assertions. All warranties regarding the correctness, usefulness, accuracy, or completeness of this report are disclaimed herein.