

Soil Monitoring Market Forecasts to 2030 – Global Analysis By Component Type (Hardware, Software and Services), Connectivity, Offering, Application, End User and By Geography

<https://marketpublishers.com/r/S47784FADE53EN.html>

Date: April 2025

Pages: 150

Price: US\$ 4,150.00 (Single User License)

ID: S47784FADE53EN

Abstracts

According to Statistics MRC, the Global Soil Monitoring Market is accounted for \$749.11 million in 2024 and is expected to reach \$1882.5 million by 2030 growing at a CAGR of 16.6% during the forecast period. The practice of routinely measuring and evaluating soil characteristics to determine its fertility, health, and appropriateness for environmental management, building, or agriculture is known as soil monitoring. It entails employing sensors, lab testing, or remote sensing technologies to monitor variables including moisture, temperature, pH, nutrition, and pollutants. Efficient soil monitoring aids in pollution detection, crop yield enhancement, erosion prevention, and irrigation optimisation. In order to ensure soil protection and effective resource use for long-term agricultural and environmental advantages, it is essential to sustainable land management.

Market Dynamics:

Driver:

Advancements in IoT & remote sensing technologies

Modern IoT and remote sensing technologies improve precision farming by giving precise information about temperature, nutrient levels, and soil moisture. Farmers may improve crop yields and minimise resource waste by optimising irrigation and fertilisation with the help of IoT-connected sensors. Large-scale soil health monitoring is made possible by remote sensing using satellites and drones, which reduces expenses

and physical labour. Predictive analytics is made possible by integration with AI and cloud computing, which improves farming decision-making. As a result, the market is expanding due to the growing need for sophisticated soil monitoring systems.

Restraint:

High initial cost & maintenance

Cutting-edge technology like IoT and AI-powered monitoring further raise costs while restricting accessibility. Users find it challenging to maintain these systems due to the continuous expenditures associated with routine maintenance and calibration. Extreme weather can cause sensors to wear out and malfunction, raising the cost of replacement and repair. Due to lengthy payback times and an uncertain return on investment, farmers frequently hesitate to make investments. Consequently, market expansion is limited, particularly in emerging nations with tight budgets.

Opportunity:

Growing adoption of smart farming

Farmers are increasingly using IoT sensors, AI-driven analytics, and automated irrigation systems to optimize soil health. By offering real-time temperature, nutrient, and moisture data, these systems increase crop productivity and resource efficiency. The need for sophisticated soil monitoring systems is further increased by growing worries about climate change and water conservation. The market is growing as a result of government programs and subsidies encouraging the use of smart agriculture. As a result, the market for soil monitoring is growing quickly, and innovations are increasing the productivity and sustainability of farming.

Threat:

Fragmented market with low standardization

Integration is challenging since different manufacturers and geographical areas employ different technology. Device and software interoperability is made more difficult by the absence of consistent standards. Farmers and agronomists looking for dependable solutions incur more expenses as a result of this discrepancy. Additionally, if market adoption is slowed by disparate compliance requirements, regulatory issues emerge. As a result, despite rising demand, the soil monitoring industry's development is still limited.

Covid-19 Impact

The COVID-19 pandemic disrupted the soil monitoring market by causing supply chain delays and reduced manufacturing activities. Lockdowns and movement restrictions led to a decline in agricultural and construction activities, affecting the demand for soil monitoring technologies. However, the crisis highlighted the importance of precision agriculture, driving increased adoption of smart farming solutions post-pandemic. Government initiatives and stimulus packages supported the recovery of the market, particularly in regions emphasizing sustainable agriculture.

The software segment is expected to be the largest during the forecast period

The software segment is expected to account for the largest market share during the forecast period by enabling real-time data collection, analysis, and visualization for informed decision-making. Crop productivity, fertilisation, and irrigation are all optimised with the use of advanced analytics and AI-powered insights. Cloud-based technologies improve automation and remote monitoring, which lowers labour costs and boosts productivity. Predictive maintenance and precise soil health monitoring are ensured by integration with IoT sensors. All things considered, software solutions improve precision farming, increasing soil management sustainability and production.

The agricultural cooperatives segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the agricultural cooperatives segment is predicted to witness the highest growth rate by promoting advanced farming practices among their members. To increase production, they spend money on precision agricultural technology like data analytics and soil sensors. Small and medium-sized farms may now more easily afford soil monitoring technologies thanks to bulk purchases and pooled resources. In order to promote broad adoption, these cooperatives also help with government training initiatives and subsidies. They contribute to the optimisation of agricultural yields and sustainability by guaranteeing effective control of soil health, which drives market expansion.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share due to increasing agricultural activities and the rising adoption of precision

farming techniques. Governments in countries like China, India, and Australia are investing in smart farming technologies to enhance crop yield and address soil degradation issues. The demand for IoT-based soil sensors, remote sensing technologies, and data analytics solutions is surging, driven by the need for efficient water management and sustainable agricultural practices. Rapid urbanization and industrialization have also intensified soil contamination concerns, further fuelling the need for advanced soil monitoring systems.

Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR, owing to the increasing adoption of precision agriculture technologies. Farmers and agricultural enterprises are integrating advanced sensors, IoT-based monitoring systems, and AI-powered analytics to optimize soil health, water usage, and crop yields. The market is also benefiting from the rising interest in data-driven decision-making, enabling real-time tracking of soil parameters such as moisture, temperature, and nutrient levels. With continued technological advancements and expanding applications in agriculture, forestry, and land management, the North American soil monitoring market is poised for robust expansion in the coming years.

Key players in the market

Some of the key players profiled in the Soil Monitoring Market include Stevens Water Monitoring Systems, Inc., SGS Group, METER Group, Element Materials Technology Group Limited, The Toro Company, Campbell Scientific, Sentek Technologies, Spectrum Technologies, Inc., Irrrometer Company, Inc., CropX Technologies Ltd., AquaSpy, Decagon Devices, E.S.I. Environmental Sensors Inc., Delta-T Devices Ltd., Acclima Inc., Smartrek Technologies, Dynamax Inc., Vegetronix Inc., Edaphic Scientific and Onset Computer Corporation.

Key Developments:

In May 2024, Stevens acquired Dyacon, a company specializing in environmental data acquisition technologies and software platforms for water resources, soil sciences, and agronomy management. This acquisition aimed to enhance Stevens' offerings in meteorological applications, including research, agriculture, and fire weather monitoring.

In June 2023, SGS collaborated with AgriCircle, an agri-tech firm, to offer innovative solutions for soil health and regenerative agriculture. This collaboration aimed to provide

farmers and stakeholders with tools to understand soil health, implement regenerative practices, reduce greenhouse gas emissions, optimize fertilizer use, and enhance biodiversity.

Component Types Covered:

Hardware

Software

Services

Connectivities Covered:

Wired

Wireless

Offerings Covered:

By System Type

Sensing & Imagery

Ground-based Sensing

Robotic & Telematics

Other Offerings

Applications Covered:

Agricultural

Non-agricultural

End Users Covered:

Farmers & Agronomists

Research Institutions

Government & Regulatory Bodies

Commercial Enterprises

Agricultural Cooperatives

Other End Users

Regions Covered:

North America

US

Canada

Mexico

Europe

Germany

UK

Italy

France

Spain

Rest of Europe

Asia Pacific

Japan

China

India

Australia

New Zealand

South Korea

Rest of Asia Pacific

South America

Argentina

Brazil

Chile

Rest of South America

Middle East & Africa

Saudi Arabia

UAE

Qatar

South Africa

Rest of Middle East & Africa

What our report offers:

- Market share assessments for the regional and country-level segments
- Strategic recommendations for the new entrants
- Covers Market data for the years 2022, 2023, 2024, 2026, and 2030
- Market Trends (Drivers, Constraints, Opportunities, Threats, Challenges, Investment Opportunities, and recommendations)
- Strategic recommendations in key business segments based on the market estimations
- Competitive landscaping mapping the key common trends
- Company profiling with detailed strategies, financials, and recent developments
- Supply chain trends mapping the latest technological advancements

Free Customization Offerings:

All the customers of this report will be entitled to receive one of the following free customization options:

Company Profiling

Comprehensive profiling of additional market players (up to 3)

SWOT Analysis of key players (up to 3)

Regional Segmentation

Market estimations, Forecasts and CAGR of any prominent country as per the client's interest (Note: Depends on feasibility check)

Competitive Benchmarking

Benchmarking of key players based on product portfolio, geographical presence, and strategic alliances

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