

Precision Agriculture Market - A Global and Regional Analysis, 2023-2033

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Abstracts

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Global Precision Agriculture Market Overview

The precision agriculture market was valued at \$9,591.8 million in 2023, and it is expected to grow at a CAGR of 15.71% and reach \$41,265.0 million by 2033. The precision agriculture market anticipates growth fueled by a rising labor shortage in developed nations and a growing demand for input optimization. This trend reflects the industry's response to labor challenges and the heightened focus on efficient resource management.

Introduction of Precision Agriculture

Precision agriculture revolutionizes traditional farming practices by integrating advanced technologies such as GPS, drones, IoT devices, and AI. This approach enables data-driven decision-making, allowing for variable rate application of resources, precise field mapping, and real-time monitoring of crops and soil. Precision agriculture benefits include increased efficiency, higher yields, reduced costs, and environmental sustainability. However, challenges such as high initial costs, the need for technical expertise, data security concerns, and accessibility for small-scale farmers persist. Precision agriculture represents a significant advancement in farming, offering a more efficient, productive, and sustainable approach to agriculture in the modern era.

Market Introduction

The precision agriculture market, experiencing robust growth, is propelled by the

increasing demand for optimized farming solutions and sustainable practices. Key market drivers include technological advancements in IoT, AI, and remote sensing, coupled with a growing emphasis on resource efficiency and crop yield enhancement. Market penetration is accelerating, particularly in developed regions, with expanding adoption in emerging economies. The primary focus lies in integrating cutting-edge technologies to maximize farm productivity and sustainability. Challenges such as high costs and technological complexity hinder widespread adoption, particularly among smallholders. However, the market's potential is vast, with significant opportunities for innovation and expansion in the global agricultural landscape.

Market Segmentation:

Segmentation 1: by Application

Crop Monitoring

Precision Planting

Precision Spraying

Precision Fertilization

Precision Irrigation

Farm Management

Others

Precision Irrigation to Dominate the Global Precision Agriculture Market (by Application)

Precision irrigation is expected to dominate the precision agriculture market, followed by smart crop monitoring, over the forecast period. This trend is driven by the growing need for water conservation and enhanced crop yields. Precision irrigation systems, using sensors and IoT technology, enable efficient water usage and reduce waste and costs. Precision agriculture is vital in regions facing water scarcity and changing climate conditions. Smart crop monitoring, leveraging AI, drones, and remote sensing, provides real-time data on crop health, aiding in early problem detection and efficient resource allocation. These technologies are crucial for meeting the increasing global food

demand sustainably. However, precision agriculture adoption rates vary, influenced by factors such as cost, technological literacy, and regional agricultural practices. Overall, the market's growth is fueled by the urgent need for sustainable farming practices and the increasing availability of advanced and cost-effective technologies.

Segmentation 2: by Function

Farm Management

Fleet Management

Field Management

Field Management Function to Dominate the Precision Agriculture Market

In the precision agriculture market, field management is anticipated to dominate, owing to its crucial role in optimizing crop production and resource use. Meanwhile, demand for farm management is projected to grow at the highest CAGR, driven by the growing need for integrated farm operation solutions and data-driven decision-making in agriculture.

Segmentation 3: by Technology

Guidance Technology

Sensing Technology

Variable Rate Application

Data Analytics and Intelligence

Others

Guidance Technology to Dominate Global Precision Agriculture Market (by Technology)

Guidance technology is poised to maintain its dominance in precision agriculture. This technology, pivotal for precision farming, includes global positioning system (GPS) and

global navigation satellite system (GNSS) systems that enable farmers to navigate fields with exceptional accuracy. It is instrumental in optimizing field-level management by reducing overlaps in the application, saving time, and minimizing resource waste. The widespread adoption of guidance technology is driven by its direct impact on operational efficiency and cost-effectiveness. As precision agriculture evolves, this technology's role in enhancing sustainable farming practices and meeting the increasing demands for food production becomes increasingly vital, reinforcing its leading position in the market.

Segmentation 4: by Product Type

Hardware Systems

Software

Hardware Systems Segment to Dominate Global Precision Agriculture Market (by Product)

Hardware systems are expected to continue to dominate the precision agriculture market in terms of revenue generation. This includes advanced equipment such as sensors, GPS systems, drones, and IoT devices, which are fundamental in implementing precision farming techniques. The durability, robustness, and immediate impact of these hardware components on farming operations make them a significant investment for farmers, contributing to their dominant market share.

However, the demand for software in precision agriculture is projected to grow at the highest CAGR. This growth is fuelled by the increasing need for data analytics, decision support systems, and cloud-based services for efficient farm management. Software solutions offer scalability, continuous updates, and integration capabilities, enhancing the overall functionality of precision agriculture systems. They enable farmers to analyze large datasets, gain insights into crop health, soil conditions, and weather patterns, and make informed decisions.

While hardware lays the foundation for precision agriculture, the evolving role of software emphasizes a shift toward more integrated, data-driven farming solutions. This trend reflects the agriculture sector's growing reliance on technology for optimizing productivity and sustainability.

Segmentation 5: by Region

North America: U.S. and Canada

Europe: Germany, France, Netherlands, Italy, Spain, and Rest-of-Europe

Asia-Pacific: Japan, Australia, India, and Rest-of-Asia-Pacific

Middle East and Africa: Israel, Turkey, South Africa, and Rest-of-Middle East Africa

China

U.K.

North America, with its advanced technological infrastructure and strong adoption of modern agricultural practices, has been the largest revenue-generating region in the precision agriculture market and is expected to maintain this position throughout the forecast period. Factors contributing to this dominance include the widespread use of cutting-edge technologies such as IoT, drones, and AI in farming, coupled with substantial investments in R&D in the agricultural sector. Additionally, the presence of key players in the market and supportive government policies further fuel this growth. The region's focus on increasing productivity and sustainability in agriculture underpins its leading role in the global precision agriculture landscape.

Recent Developments in the Precision Agriculture Market

In April 2023, Bosch BASF Smart Farming and AGCO Corporation announced that they would integrate Smart Spraying technology into Fendt Rogator sprayers and jointly develop additional features.

In August 2022, as part of a strategic alliance, Trimble and CLAAS Group developed a next-generation precision farming system for CLAAS tractors, combines, and forage harvesters.

In May 2022, JCA Industries, a leader in developing autonomous software for agricultural machines, implementing controls, and electronic system components, was acquired by AGCO Corporation, a worldwide manufacturer

and distributor of farm machinery and precision agriculture technology.

Demand – Drivers, Limitations, and Opportunities

Market Demand Drivers: Need for Input Optimization in Agriculture

The need for input optimization is a key driver for the growth of the precision agriculture market. As global demand for food increases, farmers are under pressure to maximize yields while minimizing environmental impacts. Precision agriculture technologies enable efficient use of resources such as water, fertilizers, and pesticides. This not only enhances crop yields but also reduces costs and environmental harm. Technologies such as IoT, AI, and remote sensing provide detailed insights into crop health and soil conditions, allowing for precise application of inputs. This targeted approach is essential in an era of climate change and resource scarcity, making precision agriculture vital for sustainable and profitable farming. Adoption of these technologies can lead to significant improvements in resource management, driving the market's growth.

Market Challenges: Lack of Awareness and Infrastructure in Developing Countries

The growth of the precision agriculture market in developing countries is hindered by two primary factors, namely a lack of awareness and inadequate infrastructure. Many farmers in these regions are not fully aware of the benefits and applications of precision agriculture technologies. This gap in knowledge leads to lower adoption rates. Additionally, infrastructural challenges, such as limited access to reliable internet and advanced technology tools, are significant barriers. These issues are compounded by economic constraints, as many farmers operate on small scales and cannot afford the high costs associated with these technologies.

Furthermore, the effective use of precision agriculture technologies necessitates proper training and ongoing support, which are often lacking in developing countries. Without this training, the potential benefits of these technologies cannot be fully realized. The situation is further complicated by the lack of supportive policies and incentives from governments to encourage adoption.

Cultural factors also play a role. In many societies, traditional farming practices are deeply ingrained, and changing these practices requires not only resources but also a shift in mindset. Finally, there is a need for localized research and development to adapt these technologies to the specific conditions and needs of developing regions.

Governments, NGOs, and private entities must join forces to address these challenges by raising awareness, building infrastructure, providing training, and providing financial support. Tailoring technologies to local needs and ensuring they are accessible and affordable is essential for driving the growth of precision agriculture in these countries.

Market Opportunities: Increasing Adoption of Modern Technologies in Agriculture

The increasing adoption of modern technologies in agriculture presents significant opportunities for precision agriculture companies. As more farmers recognize the benefits of advanced technologies, such as improved crop yields, resource efficiency, and cost savings, the demand for precision agriculture solutions grows. This shift toward technology-driven farming practices opens new markets for companies specializing in precision agriculture. They can offer innovative products and services, including IoT devices, AI-powered analytics, and remote sensing tools, catering to the evolving needs of modern agriculture. These companies can also collaborate with farmers and agricultural organizations to develop customized solutions, further enhancing their market presence and driving the growth of precision agriculture.

How can this report add value to an organization?

Product/Innovation Strategy: Key players in the precision agriculture market focus on developing advanced, reliable technologies, such as AI, IoT, and remote sensing, to enhance farm productivity. The sector's growth is propelled by the increasing demand for food and sustainable agricultural practices. Market leaders continually innovate and expand their product offerings to meet these demands. However, emerging companies are also entering the market, intensifying competition. Collaborations and partnerships are crucial for companies to enhance their technological capabilities and solidify their market positions.

Growth/Marketing Strategy: The market is growing rapidly, offering opportunities for both established and new entrants. Key strategies include mergers, acquisitions, product launches, and expansions. Partnerships and collaborations are particularly important, helping companies to maintain and strengthen their market positions.

Competitive Strategy: The report profiles key market players, focusing on their development and marketing strategies. It also highlights the importance of strategic partnerships, agreements, and collaborations in understanding untapped market opportunities and in devising competitive strategies to capture significant market share.

Research Methodology

Factors for Data Prediction and Modeling

The scope of this report has been focused on the precision agriculture market.

Market shares for various precision agriculture technologies are calculated based on global sales and adoption rates.

Data on global agricultural production and technology adoption rates in different regions is used for market analysis.

The US\$ is the base currency for market analysis, with conversions from other currencies based on average annual exchange rates.

Historical exchange rates are sourced from reputable financial websites like Oanda.

Developments and advancements in precision agriculture from January 2020 to December 2023 are considered in the study.

The analysis includes stakeholders like technology developers, agricultural equipment manufacturers, farmers, and research institutions.

Primary interviews, surveys, and secondary research form the basis of the information presented in the report.

In cases of data unavailability, reasonable assumptions and estimations are used.

Future market forecasts do not account for unforeseen economic downturns.

Current technologies in precision agriculture are expected to remain predominant, with incremental advancements rather than disruptive breakthroughs.

Market Estimation and Forecast

The market size for the precision agriculture market has been calculated through a mix of secondary research and primary inputs. A top-bottom approach has been followed to derive the quantitative information. The steps involved in the bottom-up approach are as follows:

Agricultural production data by country, crop types, and farming practices are considered for market analysis.

Market shares for different precision agriculture technologies (such as guidance technology, sensing technology, VRA, and others.) are calculated for each crop type.

Product mapping for each company in the precision agriculture market is analyzed to estimate subsegment market shares, later validated by industry experts.

A supply-side approach calculates the market size in value, tracking the revenues of leading precision agriculture technology providers.

Segmental revenues are determined from annual reports, websites, and financial results of manufacturers.

CAGR calculations consider factors such as technology adoption rates, regulatory environments, and government incentives.

Market share calculations for technology types include the total number of devices and systems used across different types of farms.

A similar methodology is applied to product mapping, market size calculations, and validation by industry experts.

Market size estimations for 2023 and 2033 are based on country-specific data, including the type of technology and farming practices.

Primary Research

The primary sources involve industry experts from the precision agriculture market,

such as OEMs, sensor manufacturers, autonomous equipment providers, software providers, and component suppliers. Respondents such as CEOs, vice presidents, marketing directors, and technology and innovation directors have been interviewed to obtain and verify both qualitative and quantitative aspects of this research study.

The key data points taken from primary sources include:

- validation and triangulation of all the numbers and graphs

- validation of report segmentation and key qualitative findings

- understanding the competitive landscape

- validation of numbers of various markets based on product type, propulsion type, vehicle type, level of autonomy, and sensor type.

- percentage split of individual markets for regional analysis

Secondary Research

This research study involves the usage of extensive secondary research, directories, company websites, and annual reports. It also makes use of databases, such as Hoovers, Bloomberg, Businessweek, Factiva, and One-Source, to collect useful and effective information for an extensive, technical, market-oriented, and commercial study of the global market. In addition to the aforementioned data sources, the study has been undertaken with the help of other data sources and websites, such as www.weforum.org and www.trademap.org.

Secondary research was done in order to obtain crucial information about the industry's value chain, revenue models, the market's monetary chain, the total pool of key players, and the current and potential use cases and applications.

The key data points taken from secondary research include:

- segmentations, split-ups, and percentage shares

- data for market value

key industry trends of the top players of the market

qualitative insights into various aspects of the market, key trends, and emerging areas of innovation

quantitative data for mathematical and statistical calculations

Key Market Players and Competition Synopsis

The companies that are profiled have been selected based on inputs gathered from primary experts and analyzing company coverage, product portfolio, and market penetration.

Some of the prominent players in this market are:

Deere & Company

AGCO Corporation

CLAAS KGaA mbH

CNH Industrial N.V.

Hexagon Agriculture

Kubota Corporation

The Toro Company

Topcon Corporation

YANMAR HOLDINGS Co., Ltd.

AGRIVI

Climate LLC

Companies that are not a part of the pool have been well represented across different sections of the report (wherever applicable).

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