

# **Smart Agriculture Market - Global Industry Size, Share, Trends, Opportunity, and Forecast, 2019-2029 Segmented By Offering (Hardware, Software, Services), By Application (Precision Agriculture, Livestock Monitoring, Smart Greenhouses, Others), By Region and Competition**

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## **Abstracts**

Global Smart Agriculture Market was valued at USD 15.76 Billion in 2023 and is anticipated to project impressive growth in the forecast period with a CAGR of 8.65% through 2029. Smart agriculture, also known as precision agriculture, is an advanced and innovative approach that leverages cutting-edge technology to enhance the efficiency and productivity of agricultural practices. By integrating various digital tools such as sensors, drones, GPS, and data analytics, farmers can monitor and manage their crops, livestock, and land with unprecedented precision and accuracy. Through the use of these technologies, farmers are able to gather real-time data on crucial factors such as soil moisture levels, weather conditions, and crop health. This wealth of information empowers them to make informed decisions and take proactive measures to optimize irrigation, fertilization, and pest control strategies. As a result, resource wastage is dramatically reduced, leading to more sustainable farming practices.

Moreover, the implementation of smart agriculture techniques not only minimizes environmental impact but also has significant benefits for crop yields and quality. With precise monitoring and management of crops, farmers can identify and address issues in a timely manner, ensuring that the plants receive the optimal conditions they need to thrive. This results in higher yields and improved crop quality, benefiting both the farmers and consumers alike.

## Key Market Drivers

### Growing Government Initiatives for The Adoption of Latest & Advanced Technologies

Global demand for smart agriculture is predicted to rise significantly, largely propelled by growing government initiatives for the adoption of advanced technologies.

Governments worldwide are increasingly recognizing the role of modern technology in enhancing agricultural productivity and sustainability. This includes technologies such as Artificial Intelligence (AI), Machine Learning (ML), and Internet of Things (IoT) which are being integrated into farming practices to transform traditional agriculture into smart agriculture. Initiatives such as funding support for technology adoption, policy reforms favoring technological innovation in farming, and public-private partnerships for technology transfer are being undertaken. These government-led efforts aim to address the challenges faced by the agriculture sector, such as increasing food demand due to population growth and climate change impacts. By promoting technology integration in agriculture, governments are paving the way for smart farming techniques like precision farming, automated farming, and farm management systems. These advanced farming approaches not only enhance yield and productivity but also contribute to environmental sustainability. Therefore, the active role of government initiatives in promoting the adoption of advanced technologies in agriculture is a key factor driving the global demand for smart agriculture.

### Increasing Adoption of Smartphones

The surge in smartphone adoption worldwide is set to bolster the demand for smart agriculture, thereby revolutionizing the agricultural sector. State-of-the-art smartphones, equipped with advanced sensors and high-speed internet connectivity, facilitate the deployment of various smart farming technologies. They enable farmers to monitor crop health, track livestock movement, assess soil fertility, and perform many more tasks remotely and with greater precision. With timely and accurate data at their fingertips, farmers can make informed decisions, optimizing resource usage, boosting productivity, and enhancing sustainability. Furthermore, the advent of 5G technology is expected to augment this transition by offering ultra-fast, reliable, and low-latency communication, which is essential for real-time monitoring and control of agricultural operations. The accessibility and affordability of smartphones, even in rural and remote areas, make them an invaluable tool for disseminating information and services in agriculture. Consequently, the burgeoning smartphone penetration is poised to escalate the adoption of smart agriculture practices globally, ushering in a new era of agri-tech.

## Climatic Changes Affecting Agricultural Productivity

Climate change has a profound impact on agricultural productivity, leading to fluctuations in crop yields and triggering a significant surge in the demand for smart agriculture worldwide. Unpredictable weather patterns, rising temperatures, and increased instances of drought and flooding can severely hinder traditional farming methods. As the global population continues to rise, so too does the need for a more resilient agricultural sector, capable of withstanding these environmental challenges. Smart agriculture, leveraging cutting-edge technologies such as Internet of Things (IoT) sensors, artificial intelligence (AI), and big data analysis, is becoming an essential solution to these issues. These technologies offer farmers the ability to precisely monitor and manage their crops, optimizing water and fertilizer usage and effectively predicting disease outbreaks or pest invasions. As a result, they can maximize their yields while reducing their environmental footprint. Furthermore, the adoption of smart agriculture technologies is encouraged by government policies and initiatives aimed at sustainable farming and food security. Hence, the escalating impacts of climate change on agricultural productivity are expected to further propel the demand for smart agriculture on a global scale, as we strive to meet our growing food needs in a sustainable manner.

## Rising Adoption of Internet of Things (IoT) and Artificial Intelligence (AI) Technologies in Farming

The rising adoption of Internet of Things (IoT) and Artificial Intelligence (AI) technologies in farming is poised to significantly increase the demand for smart agriculture globally. IoT and AI have emerged as game-changing tools in the agricultural sector, enabling farmers to monitor crop conditions, optimize resource utilization, and make data-driven decisions in real-time. By embedding sensors in farming equipment and fields, IoT devices collect and transmit data about weather conditions, soil quality, crop health, among other vital factors. This data is then processed through AI algorithms that provide actionable insights to optimize crop yield and reduce resource waste. Furthermore, AI's predictive capabilities enable the forecasting of potential pest attacks or adverse weather conditions, allowing early interventions. Notably, the use of IoT and AI in agriculture also contributes to sustainable farming practices, addressing the urgent need for environmentally friendly farming to meet the surging global food demand. Therefore, as more farmers and agricultural businesses recognize these benefits, the demand for these technologies in smart agriculture is set to rise exponentially. This shift not only marks a significant evolution in farming practices but also promises a future where agriculture is smarter, more efficient, and sustainable.

## Key Market Challenges

### High Initial Investment

High initial investment is a significant barrier to the global adoption of smart agriculture, potentially decreasing its demand. The integration of advanced technologies like AI, IoT, and big data in farming requires substantial upfront capital. These smart farming tools offer numerous benefits, such as increased crop yield, efficient resource use, and improved decision-making through real-time data analysis. However, the high costs associated with acquiring and implementing these sophisticated technologies can be prohibitive, especially for small to medium-sized farmers who constitute a majority of the global farming community. The necessity for technical expertise and the cost of maintaining these systems add to the overall investment, further deterring potential adopters. While it is believed that these investments will pay off in the long run, the immediate financial burden can be daunting for many. As a result, the high initial investment required for smart agriculture could lead to a decrease in its global demand, despite the obvious long-term benefits. Policymakers need to address this issue by creating supportive financial schemes and subsidies that can make smart agriculture accessible to all farmers, irrespective of their economic status.

### Dependence on Internet Connectivity

The ever-increasing reliance on internet connectivity is anticipated to impact the global demand for smart agriculture adversely. Despite the potential capabilities of smart agriculture - such as improving productivity and efficiency through precision farming, automated irrigation systems, and real-time livestock monitoring - its dependence on stable internet connectivity poses significant challenges. This is particularly problematic in rural areas, where farming is most prevalent, yet the availability and reliability of internet services remains inconsistent. Furthermore, the complexity and cost of setting up advanced Internet of Things (IoT) devices and systems for smart agriculture could deter smallholder farmers, thus limiting the technology's reach and scalability. Cybersecurity risks also heighten with increased connectivity, escalating concerns about the theft or manipulation of sensitive farm data. Consequently, this increasing dependence on internet connectivity could reduce the demand for smart agriculture globally, particularly in regions with poor internet infrastructure and among farmers with limited resources.

## Key Market Trends

## Growing Advancements in Greenhouse & Precision Farming

The rapid advancements in Greenhouse and Precision Farming are expected to substantially increase global demand for Smart Agriculture. The integration of advanced technologies in farming practices has revolutionized agriculture, making it more sustainable and efficient. Greenhouse farming, characterized by controlled environmental conditions, enables year-round cultivation of crops, independent of external climatic conditions. The advent of precision farming, which utilizes GPS mapping and big data, assists in monitoring field variations, optimizing pesticide and fertilizer use, and increasing overall crop yield. These advancements are pivotal in addressing the escalating food demand of the growing world population. Furthermore, Smart Agriculture essentially reduces the environmental impact of farming practices, aligning with the global trend towards sustainability. It minimizes water and chemical usage, thus reducing soil degradation and pollution. The amalgamation of these factors substantiates the projection that the continual advancements in Greenhouse and Precision Farming will fuel the global surge in demand for Smart Agriculture.

## Adoption of Cloud Computing for Real-Time Farm Data Management

Adoption of Cloud Computing for real-time farm data management is set to significantly influence the global demand for Smart Agriculture. This cutting-edge technology streamlines farmers' access to crucial data, enabling quick and informed decision-making, thereby enhancing productivity and efficiency. Cloud computing provides centralized storage and seamless monitoring of weather conditions, soil quality, crop health, and pest infestation among others. It also supports the integration of IoT devices and remote sensing technologies, enabling real-time tracking and control of farm activities. The resultant precision farming minimizes wastage of resources and increases crop yield, contributing to sustainable farming practices. Furthermore, cloud-based solutions are scalable, accommodating the evolving needs of farmers and facilitating the adoption of advanced agricultural technologies. This trend is set to increase as more farmers globally are embracing smart agriculture in a bid to meet the growing food demand amidst climate change challenges and limited resources. The adoption of cloud computing in agriculture also opens opportunities for tech companies, spurring innovation and competition in the sector. Consequently, this is expected to stimulate the demand for Smart Agriculture worldwide, positioning it as a crucial component in the future of sustainable farming.

## Segmental Insights

## Offering Insights

Based on the Offering, in the rapidly evolving agricultural industry, the Software segment has emerged as the undisputed leader, driving the market's growth forward. With the rising emphasis on data-driven farming techniques, there is a surging demand for cutting-edge software solutions that enable monitoring, analysis, and prediction of diverse aspects of farming operations. This transformative trend has propelled the software segment to the forefront, surpassing the Hardware and Services segments in terms of industry influence and market significance. As farmers increasingly embrace innovative software tools, they are poised to unlock new levels of efficiency, productivity, and sustainability in their agricultural practices.

## Application Insights

Based on the Application, Precision Agriculture is revolutionizing the Global Smart Agriculture Market by harnessing cutting-edge technology such as Internet of Things (IoT) devices and Artificial Intelligence (AI). By leveraging these tools, Precision Agriculture empowers farmers to optimize their operations through data-driven decision-making, ultimately leading to increased yield and enhanced efficiency. This innovative farming approach has gained substantial traction in recent years, thanks to its immense potential in not only improving food security but also minimizing the environmental impact associated with traditional farming practices. With its ability to precisely monitor and manage crops, soil conditions, and resources, Precision Agriculture is paving the way for a more sustainable and productive future in agriculture.

## Regional Insights

North America is currently dominating the Global Smart Agriculture Market due to several key factors. The region boasts an advanced technological infrastructure that supports the seamless integration of smart farming technologies. This infrastructure enables the efficient collection and analysis of data, leading to improved agricultural practices and higher crop yields. Additionally, North America has made significant investments in research and development, driving continuous innovation in the field of smart agriculture. This commitment to R&D has resulted in the development of cutting-edge solutions and technologies that address the unique challenges faced by the agricultural industry.

Furthermore, the early adoption of smart farming technologies in North America has



given the region a competitive advantage. Farmers and agricultural enterprises in the region have embraced these technologies, recognizing their potential to optimize operations, increase productivity, and reduce resource wastage. The presence of major market players in North America further contributes to its market dominance. These industry leaders bring expertise, resources, and technological advancements that propel the growth of the smart agriculture sector in the region. North America's advanced technological infrastructure, significant investment in research and development, early adoption of smart farming technologies, and the presence of major market players have positioned it as the leading force in the Global Smart Agriculture Market.

### Key Market Players

AGCO Corporation

Ag Leader Technology, Inc.

BouMatic Robotic B.V.

GEA Group Aktiengesellschaft

Topcon Positioning Systems, Inc.

DeLaval Holding AB, Allflex USA, Inc.

Afimilk Agricultural Cooperative Ltd.

AKVA Group

Heliospectra AB

LumiGrow Inc.

### Report Scope:

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

### Smart Agriculture Market, By Offering:

Hardware

Software

Services

### Smart Agriculture Market, By Application:

Precision Agriculture

Livestock Monitoring

Smart Greenhouses

Others

### Smart Agriculture 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 Smart Agriculture Market.

## Available Customizations:

Global Smart Agriculture market report with the given market data, Tech Sci Research offers customizations according to a company's specific needs. The following

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customization options are available for the report:

#### Company Information

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

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