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Satellite Imaging for Agriculture Market - A Global and Regional Analysis: Focus on, Application, End User, Product, and Region - Analysis and Forecast, 2023-2028

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Abstracts

Introduction to Satellite Imaging for Agriculture

The global satellite imaging for agriculture market was valued at $516.1 million in 2022, and it is expected to grow with a CAGR of 7.50% during the forecast period 2023-2028 to reach $785.3 million by 2028. The growth in the global satellite imaging for agriculture technology market is expected to be driven by the increasing need for efficient and sustainable agriculture practices.

Market Introduction

Satellite-based agricultural imaging refers to the utilization of satellite-derived data for remote monitoring, management, and control of crop conditions, soil quality, and other agricultural parameters. Through the analysis of satellite imagery, farmers can assess soil characteristics, track crop health, and identify susceptibility to diseases, pests, and other risks. The integration of satellite imaging into precision agriculture practices has significantly enhanced sustainability and intelligence in the field. Recognizing the potential of satellite imaging in agriculture, the United Nations Food and Agriculture Organization (FAO) acknowledges the need for improved management of global agricultural resources, especially in developing nations.

Industrial Impact

In the agricultural domain, satellite imagery can be integrated with a range of

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complementary technologies to facilitate the monitoring and management of agricultural resources. The combination of global positioning system (GPS) technology and satellite image distribution enables researchers and farmers to effectively track and oversee agricultural activities. High-resolution satellite technologies provide crucial information for achieving profitability, efficiency, and sustainability in farming practices. Remote sensing using unmanned aerial vehicles (UAVs) for image capture, processing, and analysis has significantly impacted the agricultural sector. By combining these technologies with satellite imagery, farmers can enhance their overall agricultural operations.

The global market for satellite imaging technology in agriculture is set to benefit significantly from the advancement of small satellite constellations. These constellations consist of multiple compact satellites working collaboratively to provide high-resolution and high-frequency satellite services, delivering crucial information for achieving profitable, efficient, and sustainable agricultural practices. In comparison to traditional satellite systems, small satellite constellations offer notable advantages, including cost reduction, shorter revisit intervals, and enhanced image resolution. These factors have substantially improved farmers' accessibility to satellite imagery, enabling its integration into sustainable farming methods and precision agriculture.

In the global market for satellite imaging in agriculture, companies are proactively employing knowledge-driven strategies and technological innovations to establish themselves as market leaders. By adopting effective business or corporate strategies, these companies aim to maintain their relevance in the market and identify opportunities for growth. They strive to gain a competitive edge by implementing efficient business or corporate strategies that contribute to long-term profitability and ensure their future success.

Impact of the Russia-Ukraine Crisis

The conflict in Ukraine has heightened awareness regarding the use of satellite imagery to track crop losses and assess the impact of the war on food production. High-resolution satellite imagery has shed light on the attacks on Ukraine's agricultural sector, underscoring the importance of monitoring the effects of armed conflict on farming. NASA's Harvest program has leveraged satellite imagery to provide valuable insights into the wheat harvest in Ukraine, particularly in the season following Russia's invasion. The availability of commercial satellite data during conflicts proves instrumental in planning and mitigating food shortages, as demonstrated in the Ukraine crisis. Experts are increasingly recognizing the indispensable role of satellite imagery in

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tracking the influence of conflict on agriculture and ensuring effective response strategies.

Market Segmentation:

Segmentation 1: by Application

- Crop Health Monitoring
- Soil Mapping
- Forestry
- Others

Crop Health Monitoring to Continue its Dominance as the Leading Application Segment

The satellite imaging for agriculture market is led by the crop health monitoring segment, with a 41.1% share in 2022. Satellite imagery plays a pivotal role in the monitoring of crop health, enabling precise digital agriculture practices and large-scale pest detection. It empowers farmers and agronomists to monitor and optimize crop health and assess variations in yield on a seasonal basis.

By integrating satellite imagery with various datasets such as disease and pest models, yield maps, pest monitoring, and fertilization maps, a comprehensive crop monitoring system can be established. For example, in India, agri-traders have gained a competitive edge by estimating wheat yields at a state level 30 days prior to harvest, enabling informed decision-making regarding procurement and storage strategies.

By providing detailed imagery of remote areas, satellite imagery is providing researchers with the data they need to create accurate soil maps for areas that may otherwise have remained unmapped.

Satellite imagery is proving an effective tool that meets forestry management and research needs for cost-effective, up-to-date information on the status of forest resources. Scientists, governments, and non-governmental organizations have turned to satellite data to track deforestation, as well as to set targets for improvement. By providing a more comprehensive view of animal movements, this technology is allowing

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conservationists to better understand and protect migratory species.

Satellite imaging can be used to monitor carbon emissions, including those from forests and cities, in near-real-time through the integration of data from multiple satellites. Additionally, satellite imaging can be used to monitor weather patterns and changes, which can impact carbon sequestration and emissions.

Segmentation 2: by End User

- Agribusinesses
- Government and Non-Government Agencies
- Research Institutes
- Others

Agribusiness to Witness the Highest Growth between 2022 and 2028

The satellite imaging for agriculture market was dominated by the agribusiness segment in 2022 with a 66.6% share. Satellite image and remote sensing technology are improving every day, assisting farm managers and modern farmers in keeping track of conditions and monitoring growth, weather, and carbon. As the farms grow bigger in size, the satellite images give relevant data with newfound ease and surprising accuracy. They can help managers demonstrate their conservation and management efforts in an easily understandable and visually appealing way.

Governments and NGOs frequently use satellite images to analyze patterns of land use and plan for agricultural development, conservation, and other land use activities.

Crop models, which are mathematical representations of crop growth, yield, and response to environmental factors, can be developed and validated using satellite images. Researchers use these models to improve their understanding of crop biology and to create new crop varieties and management techniques.

More significant corporate players are searching for opportunities to buy and lease out various farming operations across the nation. Understanding historical management and conditions is crucial to these decisions, which has been made possible by satellite

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imagery and other remote sensing products. As a result, one can use the strength of time-series satellite imagery and remote sensing products to combine the expertise of farmers and farm managers with satellite data to tell a complete history of the farm and inspire confidence in the operation's capability in investors.

Segmentation 3: by Product

- Data Acquisition
- Processing
- Analytics
- Integrated Delivery Platform

Integrated Delivery Platform to Witness the Highest Growth between 2022 and 2028

The satellite imaging for agriculture market is estimated to be led by the integrated delivery platform, and it held a share of 45.2% in 2022. For further use in analytics, acquired raw data must be processed to remove distortions (such as geographic, radiometric, and radiometric). Additionally, predefined coordinates and sensor specifications are followed when acquiring data. In order to interpret and analyze the data, the sensors gather the radiance and further process it into raw images. The various algorithms used in the geospatial analytics process integrate the various data and provide useful insights.

A significant constraint is developing a platform that can streamline communications between these systems and exchange mission-critical data continuously by integrating data from all applications, databases, and users.

Segmentation 4: by Region

- North America - U.S., Canada, and Mexico
- Europe - Germany, France, Italy, Netherlands, Switzerland, Belgium, Spain, and Rest-of-Europe
- China

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U.K.

Asia-Pacific - Japan, India, South Korea, Australia and New Zealand, and Rest-of-Asia-Pacific

South America - Argentina, Brazil, and Rest-of-South America

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

North America, Europe, and the U.K. are the primary regions contributing to the global satellite imaging for agriculture market, and they collectively accounted for around 59% of the market share in 2022. The utilization of satellite imaging for precise crop health monitoring and pest detection is a key factor driving market growth in these regions. Asia-Pacific, including China, is gradually adopting satellite imaging for agriculture, supported by increasing research and development activities, experimental field studies, and government initiatives.

In the Middle East and Africa, the adoption of satellite imaging for agriculture is increasing due to technical training programs offered to farmers for adopting advanced precision agricultural technologies. In South America, the demand for food production with efficient input utilization and the emergence of start-ups are driving the adoption of satellite imaging for agriculture.

Recent Developments in the Satellite Imaging for Agriculture Market

On March 2023, Esri partnered with Pollen Systems Corporation. Growers can manage their operations and make data-driven decisions by integrating geospatial data from various sources and gaining insights into the environmental and social impacts of their operations owing to the integration of PrecisionView Mobile with Esri's ArcGIS platform.

On March 2023, Satellogic partnered with SKYFI. Further democratizing geospatial data, the integration would increase users' access to Satellogic's Earth observation data.

On March 2023, to broaden its data analysis platform and give its clients more insightful data, Planet Labs PBC acquired Sinergise.

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On March 2023, one of the first 30 cm HD global imagery base maps was produced by Maxar Technologies using more than 400,000 high-resolution satellite photos. It can be applied as a visually appealing contextual overlay as well as for extracting and recognizing features, making maps, producing 3D data for simulations, and more.

Demand – Drivers and Limitations

Market Demand Drivers:

Increasing Requirements from the Insurance Sector

In the realm of payment claims management, crop insurance companies are progressively incorporating satellite imagery as a valuable tool to assess the magnitude and extent of crop damage. An accurate and unbiased view of a crop's status and potential can be obtained from satellite imagery, which can assist insurers in making more informed choices regarding crop insurance claims.

Increasing Farm Consolidation

The proliferation of satellite imagery in agricultural applications is projected to surge in response to the growing trend of farm consolidation. As farms expand in size, the integration of remote sensing technology would enable managers to effectively monitor various aspects such as growth, weather conditions, and other relevant factors. Moreover, identifying underutilized or suboptimal areas would empower farmers to consolidate these areas and increase overall productivity and operational efficiency.

High Benefits over Other Remote Sensing Technology and Infield Monitoring Technology

By incorporating satellite data into sophisticated algorithms, it is also possible to measure a variety of characteristics, including yield and crop growth stage, using satellite imagery. Satellite imagery can also aid farmers in understanding a variety of farming-related issues, such as areas that require more or less irrigation, the areas where their livestock graze, where to apply fertilizer, and the effects of changing weather patterns.

Need for Sustainable Agriculture Practices

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In several ways, satellite imagery in agriculture supports the need for sustainable agricultural practices. First, crop health and growth rates can be tracked using satellite imagery, which can assist farmers in maximizing inputs and minimizing the use of pesticides and fertilizers. Second, land use and changes in vegetation cover can be tracked using satellite imagery, which can be used by farmers to identify underutilized or underused land. Deforestation and other types of land-use changes may not be as necessary as a result of more effective land use.

Market Challenges:

Technical Challenges in Obtaining and Analyzing Satellite Imagery

Even though satellite imagery has long been used in the agriculture industry, many developing nations still lack knowledge and understanding of the technology. This ignorance and lack of understanding may limit the use of satellite imagery in agriculture and prevent farmers from benefiting from its advantages. Although satellite imagery offers data for agricultural practices, crop types, and the corresponding outcome variables over lengthy time periods, farmers in developing nations might lack the technical know-how or expertise to effectively access and use the data.

Geopolitical Issues

High-resolution satellite imagery is restricted from being accessed for agricultural purposes due to national security, political, and privacy concerns, among other geopolitical issues. Additionally, some nations might not have the resources or infrastructure necessary to access and use satellite imagery efficiently, which can restrict the extent to which farmers in those nations can take advantage of satellite imagery's advantages in agriculture.

Limited Understanding and Awareness Across Developing Countries

Israel and the U.S. are two nations that limit access to high-resolution satellite imagery. While access to high-resolution satellite imagery in Israel has historically been constrained due to national security concerns, production of satellite imagery with a resolution finer than 0.31 m is prohibited in the U.S.

Market Opportunities:

Rising Threat of Climate Risk

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Satellite imagery is employed to tackle climate risks in agriculture. It aids in precision agriculture, enabling farmers to manage their environment sustainably. Remote sensing combines satellite data with field samples for a comprehensive agricultural landscape overview. Decision-makers can utilize satellite data for climate-sensitive matters like land use and water management.

Artificial Intelligence and Machine Learning in Action

By advancing crop production, raising agricultural efficiencies, enhancing crop yields, and cutting costs associated with food production, AI and ML are revolutionizing satellite imagery in agriculture. In order to predict crop yields, ML analyzes sensor data and historical trends, aiding farmers in the practice of precision farming. To help farmers monitor, manage, and protect crops from extreme weather conditions, diseases, pests, and other threats, satellite imagery can be combined with other cutting-edge solutions, such as the Internet of Things.

Tapping Small Holding Farmers with Affordable Solutions

The free use of satellite imagery on services such as Amazon Web Services (AWS) is one of the cost-effective solutions offered to smallholder farmers by satellite imaging. This can improve efficiency and help farmers conserve water and fertilizer. Additionally, utilizing satellite data and machine learning can promote smallholder farmers' financial inclusion. Farmers can inform their decision-making for improving crop production and revenue while reducing environmental impact by using precision agriculture, which is based on intensive data collection with local sensor-based technology and remotely sensed imagery. Smallholder farmers need an ecosystem of contextually relevant software applications, though, in order to truly benefit from these advancements.

How Can This Report Add Value to an Organization?

Product/Innovation Strategy: The product segment helps the reader understand the different technologies used for satellite imaging for agriculture and their potential globally. Moreover, the study gives the reader a detailed understanding of the different solutions provided by the satellite imaging technology providers, such as imaging, processing, and analyzing. Compared to conventional agricultural methods, satellite imaging technology enables more exact targeting of planting, soil mapping, and forestry, allowing farmers to save money by maximizing the use of their inputs.

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Growth/Marketing Strategy: The global satellite imaging for agriculture market has seen major development by key players operating in the market, such as business expansion, partnership, collaboration, and joint venture. The favored strategy for the companies has been partnerships, collaborations, and joint ventures to strengthen their position in the global satellite imaging for agriculture market. For instance, on March 2023, Satellogic partnered with SKYFI to further democratize geospatial data. The integration would increase users' access to Satellogic's Earth observation data.

Competitive Strategy: Key players in the global satellite imaging for agriculture market analyzed and profiled in the study involve satellite imaging technology-based product manufacturers, including market segments covered by distinct product kinds, applications served, and regional presence, as well as the influence of important market tactics employed. Moreover, a detailed competitive benchmarking of the players operating in the global satellite imaging for agriculture market has been done to help the reader understand how players stack against each other, presenting a clear market landscape. Additionally, comprehensive competitive strategies such as partnerships, agreements, and collaborations will aid the reader in understanding the untapped revenue pockets in the market.

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.

The top leading players include the public companies operating in the global satellite imaging for agriculture market, which had a market share of around 62% in 2021. The rest of the market share, 38%, was taken by the private and start-up companies.

Key Companies Profiled

Company Type 1: Public Companies

Airbus

Farmers Edge Inc

Planet Labs PBC

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Satellogic

Syngenta

Maxar Technologies

Company Type 2: Private Companies

Descartes Labs, Inc

EOS Data Analytics,Inc

Esri

European Space Imaging

Gamaya

ICEYE

NaraSpace Inc

Open Cosmos Ltd

Satellite Imaging Corporation

SkyWatch

SpaceKnow Inc.

EarthDaily Analytics

SatSure

SpaceSense

Synspective

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5 MARKET - COMPETITIVE BENCHMARKING AND COMPANY PROFILES

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