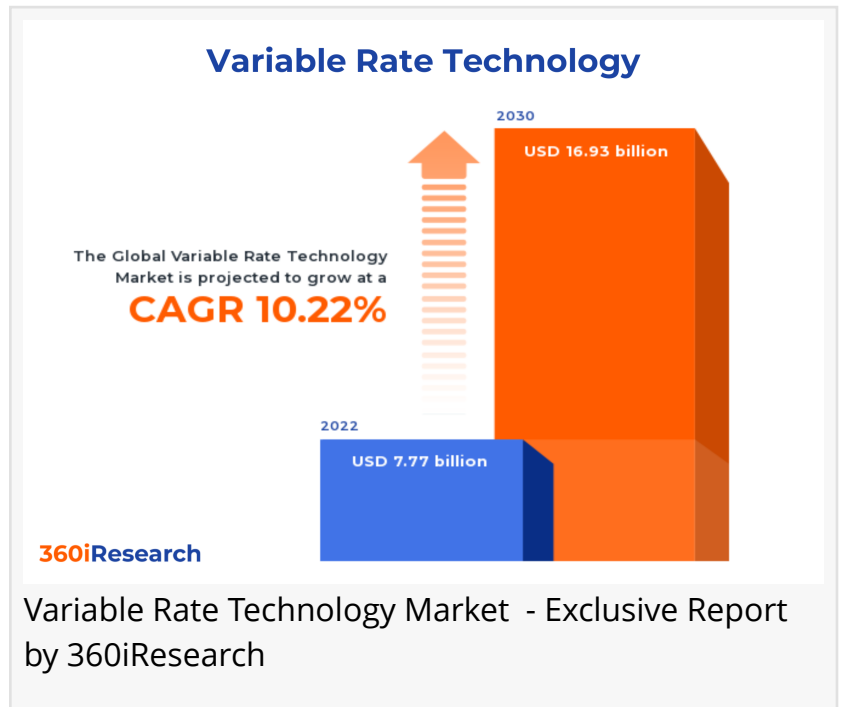


Variable Rate Technology Market worth \$16.93 billion by 2030 - Exclusive Report by 360iResearch

The Global Variable Rate Technology Market to grow from USD 7.77 billion in 2022 to USD 16.93 billion by 2030, at a CAGR of 10.22%.

PUNE, MAHARASHTRA, INDIA ,
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EINPresswire.com/ -- The "[Variable Rate Technology Market](#) by Component (Hardware, Services, Software), Technology (Map-based VRT, Sensor-based VRT), Crop Type, Application - Global Forecast 2023-2030" report has been added to 360iResearch.com's offering.



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The variable rate technology is an advanced method of agricultural management that leverages data-driven technologies to optimize the application of inputs such as fertilizers, seeds, and irrigation water. This approach enables farmers to apply various rates of these inputs across different areas of a field based on the specific requirements of each zone. The growing global food demands necessitate efficient farming practices, government incentives promoting precision agriculture, and heightened awareness about sustainable agriculture, significantly contributing to market growth. In addition, advancements in sensor technologies and improved connectivity solutions facilitate real-time decision-making, increasing the adoption of variable rate technology in agriculture. The high initial investment required for adopting VRT equipment and concerns about data privacy & security create hindrances in the market growth. Furthermore, continued technological advancements such as drone-based monitoring systems

providing highly accurate data on field conditions and artificial intelligence (AI) enabled predictive analytics tools enhancing decision-making capabilities create lucrative opportunities for market growth.

Application: Significant role of VRT in fertilizer for promoting sustainable farming practices
The use of VRT in applying crop protection chemicals ensures that pesticides and herbicides are applied at the appropriate rate and location based on plant needs. VRT in fungicide and bactericide applications ensures that these products are used optimally according to disease prevalence in different parts of the field. VRT allows farmers to target weed-infested areas more accurately and apply site-specific herbicide dosages, reducing overall chemical usage and environmental concerns associated with excessive applications. VRT enables farmers to identify insect hotspots within their fields using remote sensing technologies like drones or satellites and then apply insecticides selectively in these areas, decreasing the risk of unnecessary pesticide exposure for non-target organisms. With VRT, nematicide application can be optimized based on soil sample data and nematode distribution patterns within the field, ensuring effective treatment without over-application or unnecessary use. VRT enhances fertilizer application by adjusting rates according to soil nutrient levels and plant requirements. This need-based preference results in reduced input costs while also promoting sustainable farming practices by lessening nutrient runoff into nearby waterways. Irrigation management is another crucial aspect where VRT provides accurate water application based on soil moisture levels and crop needs. This promotes better water-use efficiency, reducing waste and cutting energy costs. VRT empowers farmers to understand their soil properties through soil sensing technologies such as electrical conductivity mapping and soil nutrient testing. Need-based preferences include gathering comprehensive data on the farm's variability to make informed decisions for site-specific nutrient management. The implementation of VRT in yield monitoring helps farmers track crop performance spatially and temporally throughout the growing season using sensors mounted on harvesting equipment. The need-based preference for this application is to improve decision-making regarding future crop management strategies.

Offering: Advancement in hardware components to meet the evolving needs of modern agriculture

Hardware components work together to enable precision agriculture practices such as variable rate seeding, fertilization, and irrigation. The need-based preference for hardware in VRT is guided by factors such as compatibility, ease of installation and maintenance, durability, and cost-effectiveness. Displays play a vital role in VRT for visualizing and processing critical information and are essential for farmers to monitor their equipment and make informed decisions. The flow and application control devices are essential for ensuring the proper distribution of inputs such as fertilizers, pesticides, and seeds. These devices help increase efficiency while reducing input costs and environmental impact. The use of GPS (Global Positioning System) or GNSS (Global Navigation Satellite System) receivers has revolutionized the precision agriculture industry by providing accurate positioning data that enables VRT implementation. Guidance and steering systems provide automated control over equipment movement, ensuring precise placement of inputs and maximizing efficiency in field

operations. In precision agriculture applications, including VRT, handheld computers offer mobile data collection capabilities for farmers, enabling real-time decision-making based on accurate information. The services comprise consulting services, data management services, and analytics solutions. These services are essential for supporting farmers with multiple operations, such as decision-making, input optimization, and yield maximization. Software is critical for successfully implementing variable rate technology as it processes field data collected by hardware components and generates application maps based on agronomic algorithms. Need-based preferences for software include ease of use, compatibility with various devices and platforms, the accuracy of data analysis, and the ability to integrate with other farm management systems. Hardware provides the necessary tools for data collection and application control, and services ensure farmers receive adequate support in decision-making and equipment usage. Software processes the collected data and generates actionable information for optimal VRT implementation.

Technology: Consumer preference for sensor-based VRT as it provides accurate data on crop health

Map-based VRT uses predetermined spatial data sets such as soil type maps, topography maps, and yield data to create maps for variable rate application of inputs such as fertilizers and pesticides. Sensor-based VRT collects real-time information about crop conditions using various sensors mounted on agricultural machinery. This technology enables on-the-go adjustments based on real-time data, which allows for a more efficient and practical application of inputs. AOS-VRT systems offer real-time data acquisition, enabling farmers to adjust their nutrient management strategy immediately. The drone-based VRT allows farmers to conduct targeted interventions such as spot-spraying pesticides or site-specific fertilization, reducing input costs and minimizing environmental impacts. Satellite-based VRT relies on remote sensing data from satellites to monitor crops at a large scale and provide actionable insights for precision agriculture applications. Map-based VRT is often considered a more cost-effective option due to its reliance on historical data. However, sensor-based VRT is more accurate and responsive than it is, which provides real-time information.

Crop Type: Growing need of VRT in cereals and grains to optimize nutrient and resource management

Cereals and grains, such as wheat, corn, and rice, are staple crops with a significant demand worldwide. Variable Rate Technology (VRT) is essential for these crops to optimize nutrient and resource management, maximize yield potential, and reduce environmental impact. Commercial crops such as cotton, sugarcane, tobacco, coffee, and tea require specific growing conditions and precise application of inputs for optimal results. The fruits and vegetables segment is characterized by high-value products requiring precise input management to ensure quality yields without compromising environmental sustainability. The oilseeds and pulses segment includes crops including soybean, sunflower, canola, lentils, chickpeas, etc., which are crucial for global food security due to their high protein content. Precision farming technologies such as VRT are vital in optimizing inputs while maintaining high yield standards. Cereals & grains require resource-efficient solutions to meet the global demand for staple foods, whereas commercial

crops need precision management systems to optimize profit margins. Fruits & vegetables demand precise input management for high-value yields, and oilseeds & pulses need innovative data-driven approaches for sustainable protein production.

Regional Insights:

In the Americas, the United States and Canada are leading adopters of Variable Rate Technology (VRT) in agriculture. VRT helps farmers optimize inputs, increase yields, and reduce environmental impact. The US has seen a significant increase in investment in precision agriculture technologies with agricultural technology companies. The European Union is prioritizing sustainable farming practices by investing heavily in VRT research and development. The European Commission launched various agricultural initiatives that aimed at accelerating advancements in smart farming technologies. This initiative has led to increased adoption of VRT in European agriculture markets as it helps reduce agrochemical utilization while maintaining yield levels. The Asia Pacific region is undergoing rapid growth in adopting VRT across China, Japan, and India due to increasing population demands for food production while facing limited arable land. The government across the APAC region has prioritized modernizing agriculture, leading to several large-scale VRT projects.

FPNV Positioning Matrix:

The FPNV Positioning Matrix is essential for assessing the Variable Rate Technology Market. It provides a comprehensive evaluation of vendors by examining key metrics within Business Strategy and Product Satisfaction, allowing users to make informed decisions based on their specific needs. This advanced analysis then organizes these vendors into four distinct quadrants, which represent varying levels of success: Forefront (F), Pathfinder (P), Niche (N), or Vital(V).

Market Share Analysis:

The Market Share Analysis offers an insightful look at the current state of vendors in the Variable Rate Technology Market. By comparing vendor contributions to overall revenue, customer base, and other key metrics, we can give companies a greater understanding of their performance and what they are up against when competing for market share. The analysis also sheds light on just how competitive any given sector is about accumulation, fragmentation dominance, and amalgamation traits over the base year period studied.

Key Company Profiles:

The report delves into recent significant developments in the Variable Rate Technology Market, highlighting leading vendors and their innovative profiles. These include 360 Yield Center, LLC, AG Leader Technology, AGCO Corporation, AquaSpy Inc., Bayer AG, Capstan AG Systems, Inc., CNH Industrial N.V., Crop Quest, Inc, CropX Technologies Ltd., Deere & Company, Farmers Edge Inc., Hexagon AB, Iteris, Inc., KUBOTA Corporation, Lindsay Corporation, Raven Industries, Inc., Sentra Inc., SZ DJI Technology Co., Ltd., Teejet Technologies, Topcon Corporation, Trimble, Inc.,

Valmont Industries, Inc., and Yara International ASA.

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Market Segmentation & Coverage:

This research report categorizes the Variable Rate Technology Market in order to forecast the revenues and analyze trends in each of following sub-markets:

Based on Component, market is studied across Hardware, Services, and Software. The Hardware is further studied across Displays, Flow and Application Control Devices, GPS or GNSS Receivers, Guidance and Steering Systems, and Handheld Computers. The Software is projected to witness significant market share during forecast period.

Based on Technology, market is studied across Map-based VRT and Sensor-based VRT. The Sensor-based VRT is further studied across Active Optical Sensor VRT, Drone-based VRT, and Satellite-based VRT. The Sensor-based VRT is projected to witness significant market share during forecast period.

Based on Crop Type, market is studied across Cereals & Grains, Commercial Crops, Fruits & Vegetables, and Oilseeds & Pulses. The Cereals & Grains is further studied across Corn and Wheat. The Oilseeds & Pulses is further studied across Cotton and Soybeans. The Commercial Crops is projected to witness significant market share during forecast period.

Based on Application, market is studied across Crop Protection Chemicals, Fertilizers, Irrigation, Soil Sensing, and Yield Monitoring. The Crop Protection Chemicals is further studied across Fungicides & Bactericides, Herbicides, Insecticides, and Nematicides. The Irrigation is projected to witness significant market share during forecast period.

Based on Region, market is studied across Americas, Asia-Pacific, and Europe, Middle East & Africa. The Americas is further studied across Argentina, Brazil, Canada, Mexico, and United States. The United States is further studied across California, Florida, Illinois, New York, Ohio, Pennsylvania, and Texas. The Asia-Pacific is further studied across Australia, China, India, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand, and Vietnam. The Europe, Middle East & Africa is further studied across Denmark, Egypt, Finland, France, Germany, Israel, Italy, Netherlands, Nigeria, Norway, Poland, Qatar, Russia, Saudi Arabia, South Africa, Spain, Sweden, Switzerland, Turkey, United Arab Emirates, and United Kingdom. The Americas commanded largest market share of 38.01% in 2022, followed by Europe, Middle East & Africa.

Key Topics Covered:

1. Preface
2. Research Methodology
3. Executive Summary
4. Market Overview
5. Market Insights
6. Variable Rate Technology Market, by Component
7. Variable Rate Technology Market, by Technology
8. Variable Rate Technology Market, by Crop Type
9. Variable Rate Technology Market, by Application
10. Americas Variable Rate Technology Market
11. Asia-Pacific Variable Rate Technology Market
12. Europe, Middle East & Africa Variable Rate Technology Market
13. Competitive Landscape
14. Competitive Portfolio
15. Appendix

The report provides insights on the following pointers:

1. Market Penetration: Provides comprehensive information on the market offered by the key players
2. Market Development: Provides in-depth information about lucrative emerging markets and analyzes penetration across mature segments of the markets
3. Market Diversification: Provides detailed information about new product launches, untapped geographies, recent developments, and investments
4. Competitive Assessment & Intelligence: Provides an exhaustive assessment of market shares, strategies, products, certification, regulatory approvals, patent landscape, and manufacturing capabilities of the leading players
5. Product Development & Innovation: Provides intelligent insights on future technologies, R&D activities, and breakthrough product developments

The report answers questions such as:

1. What is the market size and forecast of the Variable Rate Technology Market?
2. Which are the products/segments/applications/areas to invest in over the forecast period in the Variable Rate Technology Market?
3. What is the competitive strategic window for opportunities in the Variable Rate Technology Market?
4. What are the technology trends and regulatory frameworks in the Variable Rate Technology Market?
5. What is the market share of the leading vendors in the Variable Rate Technology Market?
6. What modes and strategic moves are considered suitable for entering the Variable Rate Technology Market?

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Mr. Ketan Rohom
360iResearch
+ 1 530-264-8485
ketan@360iresearch.com

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