

Agricultural Biotechnology Market Forecasts to 2032 – Global Analysis By Product Type (Transgenic Seeds, Crop Protection Products, Synthetic Biology-Enabled Products, Bio-fertilizers, Hybrid Seeds, Bio-stimulants, Nutritional Supplements, Animal Feed Additives and Other Product Types), Trait Type, Crop Type, Technology, Distribution Channel, End User and By Geography

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Abstracts

According to Statistics MRC, the Global Agricultural Biotechnology Market is accounted for \$137.3 billion in 2025 and is expected to reach \$247.8 billion by 2032 growing at a CAGR of 8.8% during the forecast period. Agricultural biotechnology involves the application of scientific techniques, including genetic engineering and molecular biology, to improve crops, livestock, and farming practices. It enables the development of genetically modified organisms (GMOs) with enhanced traits such as pest resistance, drought tolerance, and increased yield. This technology supports sustainable agriculture by reducing chemical inputs, improving food security, and promoting environmental conservation. Agricultural biotechnology plays a vital role in addressing global challenges related to food production, climate change, and resource efficiency.

According to the Indian Journal of Agricultural Sciences, the adoption of genetically modified (GM) crops in India has significantly impacted agricultural productivity. For instance, Bt cotton India's only commercially approved GM crop was cultivated on over 11.4 million hectares by 2022, accounting for over 90% of the country's total cotton area. Studies published in the journal report that Bt cotton has led to a 24% increase in yield and a 50% reduction in pesticide use, contributing to improved farmer income and

environmental outcomes.

Market Dynamics:

Driver:

Growing global population and food security concerns

Agricultural biotechnology is emerging as a pivotal solution, enabling the development of genetically modified crops that offer improved resistance to pests, diseases, and environmental stressors. These innovations are crucial for enhancing food availability and nutritional quality, especially in regions facing climate volatility. Technologies such as CRISPR and RNA interference are being leveraged to engineer crops with superior traits, helping address malnutrition and food scarcity. Governments and international bodies are increasingly supporting biotech research to ensure long-term food security and sustainable farming practices

Restraint:

Regulatory hurdles and lengthy approval processes

Approval processes for genetically modified organisms (GMOs) and bioengineered products often involve extensive safety evaluations, environmental impact assessments, and public consultations. These procedures, while essential for consumer protection, can be time-consuming and costly for developers. Variability in regulatory frameworks across countries further complicates global market entry, limiting the pace of innovation. Moreover, public skepticism and ethical debates surrounding GM crops contribute to policy inertia, hindering broader adoption

Opportunity:

Integration of agricultural biotechnology with digital technologies

Tools such as AI-driven bioinformatics remote sensing and genomic data analytics are enhancing the accuracy of trait selection and accelerating breeding cycles. This integration allows farmers to monitor crop health, predict yield outcomes, and apply inputs more efficiently. Digital platforms are also facilitating real-time decision-making and improving supply chain transparency. As smart farming gains traction, biotech firms are investing in digital infrastructure to deliver tailored solutions that boost productivity

and sustainability

Threat:

Socio-economic impacts on small farmers

High costs associated with biotech seeds, licensing fees, and proprietary technologies can limit accessibility for resource-constrained farmers. Additionally, dependence on patented traits may reduce seed sovereignty and increase financial vulnerability. The shift toward biotech-intensive farming could also disrupt traditional agricultural practices, leading to socio-economic displacement in rural communities. Addressing these concerns requires inclusive policies, capacity-building initiatives, and equitable access to biotech innovations

Covid-19 Impact:

The COVID-19 pandemic had a dual impact on the agricultural biotechnology market, disrupting supply chains while accelerating innovation. Lockdowns and labor shortages affected field trials, seed production, and distribution networks, causing delays in product launches. However, the crisis also underscored the need for resilient food systems, prompting increased investment in biotech solutions. Governments prioritized research on climate-resilient and disease-resistant crops to mitigate future disruptions.

The crop protection products segment is expected to be the largest during the forecast period

The crop protection products segment is expected to account for the largest market share during the forecast period due to their critical role in safeguarding yields against pests and diseases. Biotech-based pesticides, herbicides, and fungicides are increasingly preferred over chemical alternatives for their targeted action and environmental safety. Innovations in microbial biopesticides and RNAi-based pest control are gaining traction, offering sustainable solutions for integrated pest management.

The insect-resistant segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the insect-resistant segment is predicted to witness the highest growth rate driven by the need to reduce crop losses and minimize pesticide

usage. Genetic engineering techniques are being employed to develop crops that express insecticidal proteins, offering built-in protection against major pests. These traits not only enhance yield stability but also lower input costs for farmers. Advances in CRISPR and gene stacking are enabling the development of multi-resistant varieties, expanding the scope of insect-resistant biotech crops across diverse geographies.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share owing to its robust research infrastructure, favorable regulatory environment, and widespread adoption of GM crops. The region is home to several biotech giants and academic institutions driving innovation in genetic engineering and synthetic biology. Strong government support for biotech R&D and precision agriculture initiatives further bolsters market growth.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR fueled by rising food demand, climate challenges, and expanding agricultural investments. Countries like China, India, and Indonesia are embracing biotech innovations to enhance crop resilience and reduce dependency on imports. Government programs promoting GM crop trials, digital farming, and biotech education are accelerating regional adoption. The region's diverse agro-climatic zones also present opportunities for tailored biotech applications, making Asia Pacific a hotspot for future growth in agricultural biotechnology.

Key players in the market

Some of the key players in Agricultural Biotechnology Market include Bayer AG, Corteva Agriscience, Syngenta AG, BASF SE, FMC Corporation, Novozymes A/S, Valent BioSciences LLC, Certis USA LLC, Evogene Ltd., KWS SAAT SE, Indigo Agriculture, Inc., Bioceres Crop Solutions Corp., Ginkgo Bioworks Holdings Inc., UPL (Natural Plant Protection %-%NPP), RovensaNext, BioFirst and De Sangosse.

Key Developments:

In September 2025, BASF partnered with Arkema and AkzoNobel to reduce carbon footprint of Interpon powder coatings by up to 40%. It supplies bio-attributed neopentyl glycol (NPG ZeroPCF), enabling sustainable building materials.

In August 2025, Corteva and Insecticides India launched SPARCLE, a broad-spectrum insecticide targeting brown plant hopper in rice. The product combines Corteva's advanced chemistry with IIL's distribution network to improve crop yield and profitability.

In June 2025, Novonosis acquired DSM-Firmenich's share of the Feed Enzyme Alliance for €1.5 billion. This move strengthens Novonosis' position in animal biosolutions and expands its distribution.

Product Types Covered:

Transgenic Seeds

Crop Protection Products

Synthetic Biology-Enabled Products

Bio-fertilizers

Hybrid Seeds

Bio-stimulants

Nutritional Supplements

Animal Feed Additives

Other Product Types

Trait Types Covered:

Herbicide-Tolerant

Insect-Resistant

Stacked Traits

Virus-Resistant

Drought-Tolerant

Other Trait Types

Crop Types Covered:

Cereals & Grains

Oilseeds

Fruits & Vegetables

Pulses & Legumes

Specialty Crops

Forage & Turf

Other Crop Types

Technologies Covered:

Genetic Engineering

Gene Editing

RNA-Based Technologies

Microbiome Engineering & Synthetic Consortia

High-Throughput Phenotyping

Genotyping Platforms

Other Technologies

Distribution Channels Covered:

- Direct Sales
- Retail & Agri-Input Suppliers
- Online & Digital Marketplaces
- Other Distribution Channels

End Users Covered:

- Seed Companies
- Agrochemical Firms
- Research Institutes
- Farmers & 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 2024, 2025, 2026, 2028, and 2032
- 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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