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Plant Breeding and CRISPR Plants Market Forecasts to 2032 – Global Analysis By Trait (Herbicide Tolerance, Stress Tolerance, Disease Resistance, Drought Resistance, Yield Improvement, Nutritional Enhancement, Grain Size Enhancement, and Temperature Tolerance), Crop Type, Breeding Method, Technology, End User and By Geography

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Abstracts

According to Stratistics MRC, the Global Plant Breeding and CRISPR Plants Market is accounted for $18.76 billion in 2025 and is expected to reach $58.01 billion by 2032 growing at a CAGR of 17.5% during the forecast period. Plant breeding and CRISPR technology focus on enhancing crops with better yield, resilience, and adaptability to environmental conditions. Conventional breeding depends on selective crossing, whereas CRISPR-Cas9 offers accurate genetic editing by modifying chosen DNA regions. By combining these approaches, crop development becomes faster, reduces chemical inputs, and strengthens food security. This innovation fosters sustainable agriculture, helping meet growing nutritional needs while tackling challenges of pests, diseases, and climate change.

According to a NASA study published in Nature Food, maize production could decline by 24% as early as 2030 under high greenhouse gas emissions.

Market Dynamics:

Driver:

Rising global demand for high-yield and nutritious crops

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Global food systems are under mounting pressure as populations grow, prompting a surge in demand for crops that deliver both high productivity and improved nutrition. Agricultural stakeholders are increasingly turning to resilient crop varieties that can withstand environmental stressors and pests. Advanced breeding tools like CRISPR are accelerating the development of such traits, enabling more precise and efficient crop improvement. These technologies shorten breeding timelines and enhance genetic accuracy, making them attractive for large-scale deployment. Consumer interest in healthier food options is also fueling momentum for nutrient-rich crop varieties. As food security becomes a top priority, investment in next-gen plant genetics is gaining traction worldwide.

Restraint:

Limited awareness and adoption among small-scale farmers

Many farmers lack access to reliable information, training, and extension services that could demystify advanced genetic technologies. This knowledge gap is compounded by low digital literacy, language barriers, and scepticism toward biotech innovations. Additionally, the perceived complexity and cost of CRISPR-based solutions deter uptake, especially in regions where traditional farming practices dominate. Without targeted outreach, inclusive policy frameworks, and localized demonstration projects, the transformative potential of CRISPR in enhancing crop resilience and productivity remains underutilized.

Opportunity:

Rising demand for biofortified crops

Biofortified crops are gaining global attention as a strategic solution to combat micronutrient deficiencies and improve public health. CRISPR enables precise enhancement of nutritional content in staple foods, such as boosting iron, zinc, and vitamin levels. These innovations are being integrated into food aid programs, school meals, and health-focused agricultural policies. Advances in metabolic engineering are making it easier to enrich crops without compromising yield or taste. As awareness of “hidden hunger” grows, biofortification is emerging as a key pillar of sustainable nutrition strategies. The alignment of biotech innovation with health outcomes is opening new growth opportunities in this space.

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Threat:

Stringent global regulations and approval delays

The regulatory landscape for gene-edited crops remains fragmented, creating uncertainty for developers and slowing market entry. Approval processes are often lengthy and inconsistent, especially across international borders. Public concerns and ethical debates around genetic technologies continue to influence policy decisions. In many regions, the absence of harmonized standards complicates commercialization and trade. These regulatory bottlenecks increase costs and delay innovation, particularly for smaller biotech firms. Without clearer and more efficient approval pathways, the pace of global adoption may be significantly hindered.

Covid-19 Impact

The pandemic disrupted agricultural research and supply chains, delaying trials and regulatory reviews for CRISPR-based crops. Restrictions on movement and in-person training limited farmers' exposure to new technologies, especially in developing regions. At the same time, the crisis underscored the need for resilient crops that can stabilize food systems under stress. Remote collaboration tools and digital agronomy platforms helped sustain research and outreach efforts. Demand for nutrient-dense, shelf-stable crops rose as food insecurity became more widespread.

The herbicide tolerance segment is expected to be the largest during the forecast period

The herbicide tolerance segment is expected to account for the largest market share during the forecast period, due to their widespread use in commercial agriculture. These varieties simplify weed control, reduce labor demands, and enhance overall productivity. CRISPR is improving the precision of herbicide resistance traits, minimizing unintended effects and environmental risks. Farmers are increasingly adopting these crops to streamline operations and boost profitability. Innovations such as multi-resistance traits and integration with smart spraying systems are gaining traction. The economic and operational advantages of herbicide tolerance make it a leading trait in modern crop development.

The biotech firms segment is expected to have the highest CAGR during the forecast period

Over the forecast period, the biotech firms segment is predicted to witness the highest

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growth rate, driven by their ability to rapidly innovate and deploy advanced gene-editing solutions. These firms are at the forefront of developing complex traits through genome mapping and synthetic biology. Collaborations with academic institutions and agribusiness leaders are accelerating product development and market access. Strong investment flows and favourable intellectual property environments are supporting expansion. Biotech players are also leading efforts to engage regulators and educate the public on CRISPR safety. Their agility and technical expertise position them for sustained growth in a competitive landscape.

Region with largest share:

During the forecast period, the Asia Pacific region is expected to hold the largest market share fuelled by rising food demand and government support for agricultural biotechnology. Major economies like China and India are investing heavily in CRISPR research and crop modernization. The region’s diverse agricultural needs are driving adoption of gene-edited varieties across grains, vegetables, and pulses. Public-private partnerships and policy reforms are helping accelerate deployment. Localization of breeding programs and farmer outreach in native languages are improving engagement.

Region with highest CAGR:

Over the forecast period, the North America region is anticipated to exhibit the highest CAGR, owing to its strong research ecosystem and progressive regulatory stance. The region is home to leading biotech firms and universities driving agricultural innovation. CRISPR adoption is expanding across both commodity and specialty crops, supported by digital farming platforms. Trends like AI-powered trait selection and precision phenotyping are reshaping crop development. Partnerships with food companies and sports nutrition brands are boosting demand for enhanced varieties.

Key players in the market

Some of the key players profiled in the Plant Breeding and CRISPR Plants Market include Bayer CropScience, Tropic Biosciences, Corteva Agriscience, Pairwise, Syngenta Group, Inari Agriculture, BASF Agricultural Solutions, Benson Hill, KWS SAAT SE & Co. KGaA, Enko Chem, Limagrain, DLF Seeds, Rijk Zwaan, Takii & Co., Ltd., and Sakata Seed Corporation.

Key Developments:

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In February 2025, KWS SAAT SE & Co. KGaA (Germany) introduced new combination varieties that combined the CONVISO SMART system with high Cercospora protection (CR+), solidifying its market position in the sugarbeet seed industry. These varieties were introduced in several European

markets, with further expansion planned.

In January 2025, Syngenta Vegetable Seeds, part of Syngenta Group (Switzerland) signed a global licensing partnership deal with Apricus Seeds (US), that gives Syngenta exclusive access to Apricus' melon, squash, and watermelon germplasm. This partnership enhanced Syngenta’s cucurbits portfolio.

Traits Covered:

- Herbicide Tolerance
- Stress Tolerance
- Disease Resistance
- Drought Resistance
- Yield Improvement
- Nutritional Enhancement
- Grain Size Enhancement
- Temperature Tolerance

Crop Types Covered:

- Cereals & Grains
- Oilseeds & Pulses
- Fruits & Vegetables

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- Turf & Ornamentals
- Medicinal Crops
- Cash Crops
- Herbs & Microgreens

Breeding Methods Covered:

- Marker-Assisted Selection (MAS)
- Hybrid Breeding
- Genomic Selection
- Speed Breeding
- Molecular Breeding

Technologies Covered:

- Conventional Breeding
- Biotechnological Methods
- CRISPR-Cas Systems
- Genetic Engineering
- Other Technologies

End Users Covered:

- Commercial Agriculture

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- Biotech Firms
- Research Institutions
- Seed Companies
- Other End Users

Regions Covered:

- North America
  - US
  - Canada
  - Mexico
- Europe
  - Germany
  - UK
  - Italy
  - France
  - Spain
  - Rest of Europe
- Asia Pacific
  - Japan
  - China

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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

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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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Note: Tables for North America, Europe, APAC, South America, and Middle East & Africa Regions are also represented in the same manner as above.

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