

# **Genetic Engineering in Crops Market Forecasts to 2032 – Global Analysis By Trait (Herbicide Tolerance (HT), Insect Resistance (IR), Stacked Traits, Quality Improvement, Abiotic Stress Tolerance, and Disease Resistance), Crop Type (Cereals and Grains, Oilseeds and Pulses, Fruits and Vegetables, and Other Crops), Technology (Transgenic Technology, Genome Editing Technologies, Other Technologies), End User (Commercial Farmers & Growers, Seed Companies & OEMs, Food Processors & Ingredient Firms, Research Institutions & Contract R&D), and By Geography**

<https://marketpublishers.com/r/G4FAC7DC97EEEN.html>

Date: September 2025

Pages: 200

Price: US\$ 4,150.00 (Single User License)

ID: G4FAC7DC97EEEN

## **Abstracts**

According to Statistics MRC, the Global Genetic Engineering in Crops Market is accounted for \$1.24 billion in 2025 and is expected to reach \$2.32 billion by 2032 growing at a CAGR of 9.3% during the forecast period. Genetic engineering in crops focuses on developing genetically modified and engineered crops with enhanced traits such as higher yield, pest and disease resistance, drought tolerance, and improved nutritional quality. Driven by the need to ensure food security and sustainable agriculture, advancements in biotechnology and CRISPR-based techniques are enabling precision crop improvement. Increasing global population, evolving dietary preferences, and government initiatives supporting biotech adoption are propelling growth in this market, with stakeholders investing in research and development to meet future agricultural demands.

According to the Food and Agriculture Organization (FAO), genetically modified (GM)

crops were grown on over 190 million hectares globally in 2023.

#### Market Dynamics:

##### Driver:

#### Increasing Global Food Demand

The primary driver for this market is the pressing need to feed a growing global population, projected to near 10 billion by 2050. Conventional agriculture alone is struggling to expand output sufficiently due to limited arable land. Genetically engineered crops directly address this by being engineered for significantly higher yields and greater resistance to pests and diseases, which reduces pre-harvest losses. This enhanced productivity is crucial for ensuring food security. Furthermore, these crops can be developed with improved nutritional profiles, combating malnutrition and making them a vital tool for sustaining the global food supply chain under increasing pressure.

##### Restraint:

#### Regulatory Challenges and Approval Processes

A significant barrier to market growth is the complex, costly, and time-consuming regulatory approval processes for genetically modified organisms (GMOs). These frameworks vary drastically across different countries and regions, creating a fragmented and unpredictable landscape for developers. The high cost of compliance and the risk of a product being rejected after years of investment deter smaller companies and can delay the commercialization of beneficial innovations. This regulatory uncertainty acts as a major restraint, slowing down global market expansion and limiting the flow of new technologies to farmers in restrictive regions.

##### Opportunity:

#### Development of Climate-Resilient Crops

A major emerging opportunity lies in engineering crops to withstand the escalating challenges of climate change. This involves developing varieties tolerant to abiotic stresses such as drought, salinity, and extreme temperatures, which are becoming more frequent and severe. Such innovations can stabilize production in vulnerable regions, safeguarding farmers' livelihoods and ensuring consistent food supplies.

Moreover, this opens up new markets in developing countries where agriculture is heavily rain-fed and susceptible to climate shocks, positioning genetic engineering as a key solution for future-proofing global food systems against environmental volatility.

Threat:

#### Bioterrorism and Bioweapons Risks

Malicious actors could theoretically engineer pathogens targeting staple crops or develop herbicide-resistant "superweeds" to disrupt agriculture and cause widespread economic and social havoc. Such scenarios, even if hypothetical, fuel public apprehension and could lead to overly restrictive government regulations that stifle legitimate research. This perceived risk contributes to the "fear factor" surrounding GMOs, challenging the industry's efforts to gain public trust and maintain operational freedom.

Covid-19 Impact:

The Covid-19 pandemic initially disrupted the genetic engineering crops market through supply chain bottlenecks, delaying research activities and the distribution of seeds. However, it also underscored the critical importance of resilient and efficient food systems, accelerating the dialogue around agricultural biotechnology as a means to ensure food security amidst global crises. The focus on scientific solutions during the pandemic period had a dual effect, simultaneously hindering short-term operations while potentially fostering a more receptive long-term environment for biotech innovations in agriculture

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

The herbicide tolerance (HT) segment is expected to account for the largest market share during the forecast period due to its widespread adoption in major row crops like soybean, corn, and cotton. This technology offers simplified and more efficient weed control, allowing farmers to apply broad-spectrum herbicides without damaging their crops. This leads to significant cost savings on labor and fuel, making it an economically attractive solution for large-scale farming. Its established presence and proven economic benefits for growers cement its dominant position in the market landscape.

The fruits and vegetables segment is expected to have the highest CAGR during the

## forecast period

Over the forecast period, the fruits and vegetables segment is predicted to witness the highest growth rate. This is driven by strong consumer demand for produce with enhanced traits, such as improved flavor, extended shelf life, and visual appeal, which reduce food waste. Additionally, genetic engineering is being leveraged to develop varieties resistant to specific fungal and viral diseases that commonly affect high-value fruits and vegetables. This combination of consumer-centric benefits and tangible solutions for growers creates a powerful growth vector within the sector.

## Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share. This dominance is anchored by well-established regulatory frameworks, high adoption rates of GM crops in the U.S. and Canada, and strong presence of leading market players. Furthermore, large-scale farm operations in the region are highly receptive to technologies that boost efficiency and yield. The mature agricultural biotechnology infrastructure and consistent farmer acceptance solidify North America's position as the revenue leader in this market.

## Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR. This accelerated growth is fueled by increasing government support for agricultural biotechnology in key countries like China and India, which are grappling with the need to feed vast populations amidst shrinking arable land. Growing awareness among farmers about the benefits of GM crops, such as higher yields and reduced pesticide use, is also driving adoption. The region's vast agricultural base and pressing food security needs create a fertile ground for rapid market expansion.

## Key players in the market

Some of the key players in Genetic Engineering in Crops Market include Bayer AG, Corteva Agriscience, Inc., Syngenta AG, BASF SE, KWS SAAT SE & Co. KGaA, Limagrain, Calyxt, Inc., Pairwise Plants Technologies, Inc., Benson Hill, Inc., Arcadia Biosciences, Inc., Inari Agriculture, Inc., Yield10 Bioscience, Inc., Evogene Ltd., Bioceres Crop Solutions Corp., KeyGene N.V., and TraitGenetics GmbH.

## Key Developments:

In September 2025, Syngenta acquired Novartis' natural products and genetic strains collection, accelerating the development of biological and biotechnological crop solutions.

In August 2025, Together with Corteva and M.S. Technologies, BASF is bringing an industry-first biotech soybean with nematode resistance trait stacked with herbicide and insect resistance to Brazil by decade's end, aimed at yield protection and pest management.

In November 2024, Corteva announced a breakthrough hybrid wheat technology poised to increase wheat yields and genetic gains using proprietary methods that enable hybridization across 100% of wheat germplasm.

#### Traits Covered:

Herbicide Tolerance (HT)

Insect Resistance (IR)

Stacked Traits

Quality Improvement

Abiotic Stress Tolerance

Disease Resistance

#### Crop Types Covered:

Cereals and Grains

Oilseeds and Pulses

Fruits and Vegetables

Other Crops

**Technologies Covered:**

Transgenic Technology

Genome Editing Technologies

Other Technologies

**End Users Covered:**

Commercial Farmers & Growers

Seed Companies & OEMs

Food Processors & Ingredient Firms

Research Institutions & Contract R&D

**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

## Contents

### **1 EXECUTIVE SUMMARY**

### **2 PREFACE**

- 2.1 Abstract
- 2.2 Stake Holders
- 2.3 Research Scope
- 2.4 Research Methodology
  - 2.4.1 Data Mining
  - 2.4.2 Data Analysis
  - 2.4.3 Data Validation
  - 2.4.4 Research Approach
- 2.5 Research Sources
  - 2.5.1 Primary Research Sources
  - 2.5.2 Secondary Research Sources
  - 2.5.3 Assumptions

### **3 MARKET TREND ANALYSIS**

- 3.1 Introduction
- 3.2 Drivers
- 3.3 Restraints
- 3.4 Opportunities
- 3.5 Threats
- 3.6 Technology Analysis
- 3.7 End User Analysis
- 3.8 Emerging Markets
- 3.9 Impact of Covid-19

### **4 PORTERS FIVE FORCE ANALYSIS**

- 4.1 Bargaining power of suppliers
- 4.2 Bargaining power of buyers
- 4.3 Threat of substitutes
- 4.4 Threat of new entrants
- 4.5 Competitive rivalry

## **5 GLOBAL GENETIC ENGINEERING IN CROPS MARKET, BY TRAIT**

- 5.1 Introduction
- 5.2 Herbicide Tolerance (HT)
- 5.3 Insect Resistance (IR)
- 5.4 Stacked Traits
- 5.5 Quality Improvement
- 5.6 Abiotic Stress Tolerance
- 5.7 Disease Resistance

## **6 GLOBAL GENETIC ENGINEERING IN CROPS MARKET, BY CROP TYPE**

- 6.1 Introduction
- 6.2 Cereals and Grains
- 6.3 Oilseeds and Pulses
- 6.4 Fruits and Vegetables
- 6.5 Other Crops

## **7 GLOBAL GENETIC ENGINEERING IN CROPS MARKET, BY TECHNOLOGY**

- 7.1 Introduction
- 7.2 Transgenic Technology
  - 7.2.1 Agrobacterium-Mediated Gene Transfer
  - 7.2.2 Gene Gun/Biolistics
  - 7.2.3 Electroporation
- 7.3 Genome Editing Technologies
  - 7.3.1 CRISPR-Cas Systems
  - 7.3.2 TALENs
  - 7.3.3 ZFNs
- 7.4 Other Technologies

## **8 GLOBAL GENETIC ENGINEERING IN CROPS MARKET, BY END USER**

- 8.1 Introduction
- 8.2 Commercial Farmers & Growers
- 8.3 Seed Companies & OEMs
- 8.4 Food Processors & Ingredient Firms
- 8.5 Research Institutions & Contract R&D

## **9 GLOBAL GENETIC ENGINEERING IN CROPS MARKET, BY GEOGRAPHY**

### 9.1 Introduction

### 9.2 North America

#### 9.2.1 US

#### 9.2.2 Canada

#### 9.2.3 Mexico

### 9.3 Europe

#### 9.3.1 Germany

#### 9.3.2 UK

#### 9.3.3 Italy

#### 9.3.4 France

#### 9.3.5 Spain

#### 9.3.6 Rest of Europe

### 9.4 Asia Pacific

#### 9.4.1 Japan

#### 9.4.2 China

#### 9.4.3 India

#### 9.4.4 Australia

#### 9.4.5 New Zealand

#### 9.4.6 South Korea

#### 9.4.7 Rest of Asia Pacific

### 9.5 South America

#### 9.5.1 Argentina

#### 9.5.2 Brazil

#### 9.5.3 Chile

#### 9.5.4 Rest of South America

### 9.6 Middle East & Africa

#### 9.6.1 Saudi Arabia

#### 9.6.2 UAE

#### 9.6.3 Qatar

#### 9.6.4 South Africa

#### 9.6.5 Rest of Middle East & Africa

## **10 KEY DEVELOPMENTS**

### 10.1 Agreements, Partnerships, Collaborations and Joint Ventures

### 10.2 Acquisitions & Mergers

### 10.3 New Product Launch

10.4 Expansions

10.5 Other Key Strategies

## **11 COMPANY PROFILING**

11.1 Bayer AG

11.2 Corteva Agriscience, Inc.

11.3 Syngenta AG

11.4 BASF SE

11.5 KWS SAAT SE & Co. KGaA

11.6 Limagrain

11.7 Calyxt, Inc.

11.8 Pairwise Plants Technologies, Inc.

11.9 Benson Hill, Inc.

11.10 Arcadia Biosciences, Inc.

11.11 Inari Agriculture, Inc.

11.12 Yield10 Bioscience, Inc.

11.13 Evogene Ltd.

11.14 Bioceres Crop Solutions Corp.

11.15 KeyGene N.V.

11.16 TraitGenetics GmbH

## List Of Tables

### LIST OF TABLES

Table 1 Global Genetic Engineering in Crops Market Outlook, By Region (2024-2032) (\$MN)

Table 2 Global Genetic Engineering in Crops Market Outlook, By Trait (2024-2032) (\$MN)

Table 3 Global Genetic Engineering in Crops Market Outlook, By Herbicide Tolerance (HT) (2024-2032) (\$MN)

Table 4 Global Genetic Engineering in Crops Market Outlook, By Insect Resistance (IR) (2024-2032) (\$MN)

Table 5 Global Genetic Engineering in Crops Market Outlook, By Stacked Traits (2024-2032) (\$MN)

Table 6 Global Genetic Engineering in Crops Market Outlook, By Quality Improvement (2024-2032) (\$MN)

Table 7 Global Genetic Engineering in Crops Market Outlook, By Abiotic Stress Tolerance (2024-2032) (\$MN)

Table 8 Global Genetic Engineering in Crops Market Outlook, By Disease Resistance (2024-2032) (\$MN)

Table 9 Global Genetic Engineering in Crops Market Outlook, By Crop Type (2024-2032) (\$MN)

Table 10 Global Genetic Engineering in Crops Market Outlook, By Cereals and Grains (2024-2032) (\$MN)

Table 11 Global Genetic Engineering in Crops Market Outlook, By Oilseeds and Pulses (2024-2032) (\$MN)

Table 12 Global Genetic Engineering in Crops Market Outlook, By Fruits and Vegetables (2024-2032) (\$MN)

Table 13 Global Genetic Engineering in Crops Market Outlook, By Other Crops (2024-2032) (\$MN)

Table 14 Global Genetic Engineering in Crops Market Outlook, By Technology (2024-2032) (\$MN)

Table 15 Global Genetic Engineering in Crops Market Outlook, By Transgenic Technology (2024-2032) (\$MN)

Table 16 Global Genetic Engineering in Crops Market Outlook, By Agrobacterium-Mediated Gene Transfer (2024-2032) (\$MN)

Table 17 Global Genetic Engineering in Crops Market Outlook, By Gene Gun/Biolistics (2024-2032) (\$MN)

Table 18 Global Genetic Engineering in Crops Market Outlook, By Electroporation

(2024-2032) (\$MN)

Table 19 Global Genetic Engineering in Crops Market Outlook, By Genome Editing Technologies (2024-2032) (\$MN)

Table 20 Global Genetic Engineering in Crops Market Outlook, By CRISPR-Cas Systems (2024-2032) (\$MN)

Table 21 Global Genetic Engineering in Crops Market Outlook, By TALENs (2024-2032) (\$MN)

Table 22 Global Genetic Engineering in Crops Market Outlook, By ZFNs (2024-2032) (\$MN)

Table 23 Global Genetic Engineering in Crops Market Outlook, By Other Technologies (2024-2032) (\$MN)

Table 24 Global Genetic Engineering in Crops Market Outlook, By End User (2024-2032) (\$MN)

Table 25 Global Genetic Engineering in Crops Market Outlook, By Commercial Farmers & Growers (2024-2032) (\$MN)

Table 26 Global Genetic Engineering in Crops Market Outlook, By Seed Companies & OEMs (2024-2032) (\$MN)

Table 27 Global Genetic Engineering in Crops Market Outlook, By Food Processors & Ingredient Firms (2024-2032) (\$MN)

Table 28 Global Genetic Engineering in Crops Market Outlook, By Research Institutions & Contract R&D (2024-2032) (\$MN)

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

## I would like to order

Product name: Genetic Engineering in Crops Market Forecasts to 2032 – Global Analysis By Trait (Herbicide Tolerance (HT), Insect Resistance (IR), Stacked Traits, Quality Improvement, Abiotic Stress Tolerance, and Disease Resistance), Crop Type (Cereals and Grains, Oilseeds and Pulses, Fruits and Vegetables, and Other Crops), Technology (Transgenic Technology, Genome Editing Technologies, Other Technologies), End User (Commercial Farmers & Growers, Seed Companies & OEMs, Food Processors & Ingredient Firms, Research Institutions & Contract R&D), and By Geography

Product link: <https://marketpublishers.com/r/G4FAC7DC97EEEN.html>

Price: US\$ 4,150.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

[info@marketpublishers.com](mailto:info@marketpublishers.com)

## Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/G4FAC7DC97EEEN.html>