

AI-Powered Crop Disease Detection Market Forecasts to 2032 – Global Analysis By Component (Hardware, Software, and Services), Disease Type (Fungal, Bacterial, Viral, Pest Infestation, and Nutrient Deficiency), Crop Type, Technology, Application, End User, and By Geography

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Abstracts

According to Statistics MRC, the Global AI-Powered Crop Disease Detection Market is accounted for \$1.6 billion in 2025 and is expected to reach \$5.9 billion by 2032, growing at a CAGR of 19.5% during the forecast period. AI-powered crop disease detection combines computer vision, machine learning, and imagery from satellites, drones, and proximal sensors to identify early symptoms of disease, pest infestation, and nutrient stress. Automated diagnostics support targeted treatments, lower crop losses, and optimize chemical usage, enabling more sustainable interventions. Market adoption grows with improved models, sensor accessibility, and integration into farm-management platforms.

According to the International Journal of Research in Engineering and Technology (IRJET), AI-based crop disease detection using image processing and machine learning has demonstrated up to 92% accuracy in identifying leaf blight and rust in wheat and rice.

Market Dynamics:

Driver:

Need for Enhanced Food Security

Rising global population and climate pressures are intensifying demand for reliable crop yields, making AI-powered disease detection essential. Farmers, agribusinesses, and policymakers prioritise technologies that identify pathogens early to reduce losses and improve food availability. Moreover, early detection lowers chemical input use, supporting sustainable production and cost savings. Public and private investment in precision agriculture accelerates research, deployment, and scale-up. Consequently, adoption increases across commercial farms and cooperative models seeking resilient supply chains while improving farmer decision-making capabilities globally.

Restraint:

Limited Technical Awareness

Adoption of AI disease-detection tools is constrained by low technical literacy among many growers and inadequate extension support. Smallholders may lack smartphones, reliable connectivity, or confidence to act on automated recommendations, limiting real-world effectiveness. Vendors face higher costs to provide training, localized interfaces, and ongoing support. Additionally, skeptical stakeholders may resist data-driven changes to traditional practices. Addressing this restraint requires targeted capacity building, partnerships with local agricultural agencies, and user-centred design to ensure practical, sustained uptake accompanied by affordable connectivity solutions.

Opportunity:

Integration with Farm Management Software

Embedding AI disease-detection modules within farm management systems amplifies value by linking diagnostics to scheduling, inputs procurement, and record-keeping. Farmers gain context-aware recommendations that translate alerts into actionable tasks, such as targeted spraying or altered irrigation. This integration streamlines workflows, improves traceability for buyers, and supports certification schemes. Additionally, combined platforms enable richer datasets for model refinement, creating feedback loops that enhance accuracy. For vendors, integrations open subscription revenue, cross-selling and deeper enterprise partnerships with agribusinesses and cooperatives globally.

Threat:

Data Privacy & Security Concerns

Harvesting field images, sensor streams, and management records creates sensitive datasets that, if mishandled, can undermine trust in AI crop-monitoring services. Farmers worry about unauthorized access, commercial exploitation of yield intelligence, and unclear ownership of derived models. Regulatory fragmentation across jurisdictions increases compliance burdens for vendors operating internationally. Moreover, cyber risks such as data leaks or model poisoning can disrupt operations.

Covid-19 Impact:

The pandemic highlighted the value of remote, automated crop monitoring as travel limits and labor shortages constrained field operations. Short-term deployment delays occurred, but sustained investment shifted toward AI tools that reduce visits and enable continuous surveillance. Supply-chain stress increased demand for early detection to protect yields, while public funding and research partnerships supported pilots. Overall, Covid-19 accelerated adoption and demonstrated digital agriculture's role in building resilience for small and large farms.

The fungal diseases segment is expected to be the largest during the forecast period

The fungal diseases segment is expected to account for the largest market share during the forecast period. Farmers confront significant yield losses from rusts, mildews, and blights across cereals, fruits, and vegetables, creating steady demand for reliable diagnostics. AI solutions that detect early symptomology reduce reactive chemical use and improve harvest quality, which buyers reward with premium pricing. Integration with spraying platforms and advisory services further enhances ROI. As datasets expand across geographies, model accuracy improves, reinforcing preference for fungal-focused detection offerings from suppliers globally.

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

Over the forecast period, the software segment is predicted to witness the highest growth rate. Scalability, rapid deployment, and continuous learning cycles make software attractive for diverse farm scales and geographies. SaaS pricing and cloud-native architectures reduce upfront capital, encouraging trials and pilot-to-scale transitions. Interoperability with sensors and drones increases utility, while regular model retraining with new field data improves detection under local conditions. As agritech investors favour asset-light platforms, capital flows and partnerships will fuel

product enhancement, market reach, adoption velocity for software-led solutions.

Region with largest share:

During the forecast period, the North America region is expected to hold the largest market share. Well-developed agricultural technology ecosystems, widespread connectivity, and high mechanization support rapid deployment of AI detection platforms. Large commercial farms and precision agriculture service providers invest in advanced sensing, analytics, and decision-support tools, generating significant market demand. Additionally, strong private investment, research institutions, and favourable procurement budgets among agribusinesses and commodity buyers drive vendor innovation. Regulatory clarity and data infrastructure further enable scalable rollouts and commercial partnerships across the region.

Region with highest CAGR:

Over the forecast period, the Asia Pacific region is anticipated to exhibit the highest CAGR. Rapid digitalisation of agriculture, rising smartphone penetration, and government programs supporting precision farming create fertile conditions for AI disease detection uptake. Large populations of smallholder farmers present scalability opportunities for low-cost, mobile-first solutions, while local startups adapt models to regional crops and languages. Foreign vendors form partnerships with distributors and research institutes to localise offerings. As infrastructure improves and agtech investments increase, adoption rates are poised to accelerate across region.

Key players in the market

Some of the key players in AI-Powered Crop Disease Detection Market include PEAT GmbH, Taranis, Prospera Technologies, Aerobotics, Sentera, AgroScout Ltd, Cropin Technology Solutions Pvt. Ltd., IUNU Inc., Fasal, Trace Genomics, Inc., Gamaya SA, Picterra, HSAT, Agremo d.o.o., Stenon GmbH, SkySquirrel Technologies Inc., and PlantVillage.

Key Developments:

In August 2025, Launched Ag Assistant™, a generative AI agronomy engine that analyzes leaf-level imagery, weather, and machinery data to detect crop diseases and provide field-specific recommendations.

In May 2025, Picterra announced availability on Google Cloud Marketplace and its platform (GeoAI) supports automated detection/monitoring workflows used for plot monitoring and disease/pest detection; Picterra's news page lists the May 2025 item.

Components Covered:

Hardware

Software

Services

Disease Types Covered:

Fungal Diseases

Bacterial Diseases

Viral Diseases

Pest Infestation

Nutrient Deficiency

Crop Types Covered:

Cereals & Grains

Fruits & Vegetables

Oilseeds & Pulses

Cash Crops

Other Crops

Technologies Covered:

Machine Learning/Deep Learning

Computer Vision

Predictive Analytics

Natural Language Processing

Applications Covered:

Field Monitoring & Scouting

Quality Assessment & Yield Monitoring

Farm-level Advisory & Treatment Recommendations

Research & Development

End Users Covered:

Individual Farmers/Smallholders

Large-scale Corporate Farms & Agribusinesses

Government & Research Institutions

Agricultural Cooperatives

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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