FIJISHI

Optimizing Sustainable Crop Development.

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Case Study: Optimizing Sustainable Crop Development

Type of Organization: Agricultural Research Institute

Industry: Agriculture / Biotechnology

The Challenge: Developing new crop varieties that are more resilient to climate change (e.g., drought resistance, heat tolerance) and naturally resistant to common pests, while minimizing the use of chemical inputs. Manual breeding and traditional field trials are time-consuming and resource-intensive.

The ScieFI Solution: The institute leveraged **ScieFI's Adaptive Knowledge Graph (AKG)** to integrate vast datasets of plant genomics, environmental conditions, soil microbiome data, and historical yield data. The AKG's **contextualized information** processing allowed it to identify complex gene-environment interactions influencing crop performance. The **AI Co-Scientist Module (ACS)**, using this integrated knowledge, proposed novel gene edits and specific gene combinations predicted to enhance resilience and pest resistance. Its **Automated Experimental Design & Optimization** feature then designed optimal greenhouse and controlled environment experiments to validate these genetic modifications, suggesting precise growing conditions and measurement protocols. Furthermore, **Predictive Toxicology & Environmental Impact Integration** assessed the potential ecological impact of the modified crops on surrounding biodiversity.

Impact & Benefits: The development cycle for new, resilient crop varieties was cut by 40%. The institute rapidly identified candidate genetic modifications that demonstrated significantly improved drought tolerance and natural pest deterrence in early-stage trials, leading to a substantial reduction in the need for irrigation and pesticides. This contributes to more sustainable and food-secure agricultural practices.

Key Features Highlighted:

- Adaptive Knowledge Graph (AKG)
- Contextualized information
- AI Co-Scientist Module (ACS)
- Automated Experimental Design & Optimization
- Predictive Toxicology & Environmental Impact Integration
