NAPPO
North American Plant Protection Organization
Organización Norteamericana de Protección a las Plantas
MEXICO - USA - CANADA

2025 NAPPO Annual Meeting Symposium Questions Summary

Artificial Intelligence (AI) and Plant Health

October 23, 2025, Ottawa, Canada

During the NAPPO Annual meeting held in Ottawa, a symposium was held on the use of Artificial Intelligence in plant health. The symposium on Artificial Intelligence brought together government leaders, industry experts, and professionals to explore the transformative role of artificial intelligence in developing and protecting plant resources, while facilitating safe trade. The event began by examining the definition and other foundational concepts of AI to ensure a shared understanding among participants. Member countries presented on their overarching guidance as well as concerns for using AI in regulatory decision-making. The symposium also featured breakout sessions to discuss how AI could be used to address challenges and next steps for NAPPO stakeholders. Below is a summary of the feedback from the discussion questions.

1. **Key challenges in plant health.**
   What are the key challenges your organization currently faces in maintaining or improving plant health?

   Summary:

   National Plant Protection Organizations and industry stakeholders identified that they are navigating a complex landscape in protecting plant health. They are constrained by limited resources and have competing priorities between trade facilitation and biosecurity. External pressures such as climate change, evolving global trade, and regulatory restrictions are intensifying the challenge. Other issues—including lack of coherent direction, information overload, and concerns around the consequences of pest detections—further complicate operations. Critical gaps in expertise, diagnostic capacity, taxonomy, and early pest detection hinder preparedness, and retention of specialized knowledge remains a pressing concern. At the same time, balancing operational realities with innovation requires careful integration of new technologies, particularly artificial intelligence, alongside legislative adaptation and workforce training.

2. **AI as a solution.**
   Can AI address any of the challenges you've identified? If so, which ones, and what kind of AI solutions might be effective?

   Summary:

Artificial intelligence offers great potential to improve plant health management by boosting efficiency, enhancing detection, and aiding decision-making. While AI may not solve the challenge of balancing competing priorities, it can enable operational improvements across various areas. Some of the areas where participants suggested that AI could be used include:

Streamlining of administrative tasks, freeing up specialized staff for more complex tasks.

Automation of the verification of compliance documentation

Enabling targeted resource allocation - advanced models and simulations can optimize trade-offs, prioritize risks, and accelerate the analysis of large datasets, enhancing the accuracy and efficiency of decision-making.

Improved surveillance with the use of AI-driven tools (artificial nose detectors, CO_2 sensors, visual detectors, drones, and remote vehicles) could improve surveillance at ports, in transportation, and in the field.

Initial pest identification and taxonomic screening (confirmed by experts) could expand diagnostic capacity and reduce delays.

Speeding up pest detection, trace-back analysis, and climate/host-based targeting could allow quicker containment and mitigation.

3. **Enabling effective use of AI.**
   What key considerations and potential concerns should be considered when developing and implementing AI technologies in plant health, particularly in terms of scientific integrity, transparency, equity, and international trust?

Summary:

Integrity and reliability – Central to the responsible use of AI in plant health, they require careful attention to how AI tools are designed, validated, monitored, and used. Managing and understanding the uncertainty of AI tool results is critical. Output from AI tools should be rigorously tested to avoid eroding public trust, and reproducibility is essential to ensure that results remain consistent and verifiable across contexts. High-quality datasets and robust models form the foundation for reducing errors and uncertainty, but they should also be complemented by strong human oversight, with experts validating AI-generated findings. In addition, safeguards and backup systems are essential to detect failures and prevent excessive reliance on AI, ensuring resilience and reliability in plant health applications.

Transparency – Transparency regarding when AI is used and where it is appropriate is crucial at the global level, necessitating clear communication and adherence to international standards and guidelines. Accreditation and approval of AI tools and their outputs from

recognized international bodies could provide legitimacy and demonstrate compliance with established AI standards. Additionally, stakeholder acceptance is crucial, which can be achieved through active engagement, consultation, and collaboration. Together, these elements could help create a foundation of openness and accountability that would strengthen international cooperation and support sustainable plant health management.

Equity and accessibility - AI tools should be designed with a clear focus on core plant health challenges and tailored to the needs of end users, providing meaningful and actionable support. Equitable access to AI tools is particularly important for smaller organizations and resource-limited groups, which often face barriers to adopting advanced technologies. It is also important to ensure that AI complements rather than replaces human expertise. This approach ensures that AI strengthens plant health programs without creating new vulnerabilities or inequities.

Privacy, data protection, and international trust - Robust privacy safeguards should be implemented to protect sensitive data and ensure compliance with international privacy standards and regulations. This includes secure data storage, encryption, and controlled access protocols to prevent unauthorized use. At the same time, openness and transparency in how AI is used (and how AI makes decisions) should be balanced with the protection of proprietary and personal information. Establishing clear governance frameworks for use will help maintain trust among stakeholders while enabling innovation and global cooperation.

Robust backup systems and contingency plans - Participants indicated that AI systems should be designed with robust backup systems and contingency plans to detect and mitigate potential failures. In addition, AI models should be continuously refined through iterative improvements and feedback loops, enhancing accuracy and adaptability over time.

Global Standards - Participants indicated that ensuring an AI system meets recognized global standards or certifications (such as ISO standards or OECD AI principles) before deployment or use would promote consistency and credibility across borders.

4. **Responsible use of AI.**
   What are the key factors for ensuring responsible and successful use of AI in plant health, including human oversight, ethics, governance, access to tools, and training?

Summary:

Participants indicated that ensuring the responsible and successful use of AI in plant health requires a comprehensive approach that integrates human oversight, ethical considerations, and robust governance. Transparency in how AI is used for decision-making is critical to building trust, along with clear explanations of how outputs are generated and acknowledgment of limitations and unknowns.

Continuous training of AI models and iterative improvements to AI systems are essential to maintain accuracy and relevance, supported by standard operational procedures that are regularly reviewed and updated. Human validation and intervention remain vital to mitigate risks associated with automated decision-making, complemented by thorough risk assessments and mechanisms to correct inaccurate data.

Participants also indicated that legal frameworks for the use of AI in plant protection/plant health should address ethics, governance and oversight, cybersecurity, and copyright training.

5. **NAPPO's role in guidance and collaboration.**
   What types of guidance or collaborative initiatives should NAPPO consider supporting to advance the responsible development and use of AI in plant health?

Summary:

To support the responsible development and use of AI in plant health, NAPPO should consider initiating a project(s) that fosters collaboration, transparency, and consistency among member countries. Key actions could include:

Developing a guidance document that includes best practices or principles for AI use aligned with IPPC standards.

Developing a discussion document to better inform stakeholders on AI.

Developing a standard for data sources and authoritative standards.

A project to harmonize data as well as looking at data integrity.

Consider whether established dispute resolution processes are adequate to address differences in AI-driven decisions between countries, promoting trust and fairness.

Facilitating information sharing through annual meeting presentations, discussion papers, and collaborative platforms to help stakeholders stay informed and engaged.

Producing educational/promotional materials and e-learning to build capacity and understanding among stakeholders.

Collaboration among the National Plant Protection Organizations and stakeholders from the NAPPO member countries in these areas could help guide ethical and effective AI adoption in plant health in the NAPPO region.

6. Optional, additional questions.

What does success look like for AI in plant health in 5 years?
What role should public-private partnerships play in AI development for plant health?

Not much information was provided by participants.