Canadian Food Inspection Agency | Agence canadienne d'inspection des aliments

Considerations for Using AI in Regulatory Decision-Making

Cheryl Corbett, National Manager Plant Health Risk Assessment

Angela Murray, National Manager Plant Data, Analytics and Modelling Unit

NAPPO Ottawa ON, October 23, 2025

Canada

Overview

- Highlight the international science-based framework for pest risk assessment (WTO and IPPC)
- Provide examples of how we are currently using AI in Pest Risk Analysis
- Identify the limitations we see currently with using AI

What is AI? “Information technology that performs tasks that would ordinarily require biological brainpower to accomplish, such as making sense of spoken language, learning behaviours or solving problems.” (Treasury Board Secretariat, 2023)

“… draw from fields like statistics, linguistics and computer science, and use techniques such as rules-based systems, regression, predictive analytics, machine learning, deep learning, and neural networks.” (Treasury Board Secretariat, 2025)

WTO SPS Agreement

Members shall:

- ensure that any sanitary or phytosanitary measure is applied only to the extent necessary to protect human, animal or plant life or health, is based on scientific principles and is not maintained without sufficient scientific evidence…
- ensure that their sanitary and phytosanitary measures do not arbitrarily or unjustifiably discriminate between Members where identical or similar conditions prevail.
- base their sanitary or phytosanitary measures on international standards, guidelines or recommendations, where they exist, except as otherwise provided for in this Agreement…

International Plant Protection Convention

Phytosanitary principles embodied in the International Plant Protection Convention and elaborated in ISPMs stipulate that measures:

> "should be **technically justified, transparent** and should not be applied in such a way as to constitute either a means of arbitrary or unjustified discrimination or a disguised restriction, particularly on international trade"

WTO Report on AI – Trading with intelligence

Artificial Intelligence is a trade issue due to its

> "…inherent complexity and opacity, as well as its potential failures and biases, raise significant concerns related to matters such as how to understand the reasons for and basis of AI decisions and recommendations, or regarding ethics and broader societal implications."

In addition:

> " …the large datasets required by AI models raise significant privacy concerns. Therefore, a reasonable trade-off between accessing large amounts of data to train AI models and protecting individual privacy must be found."

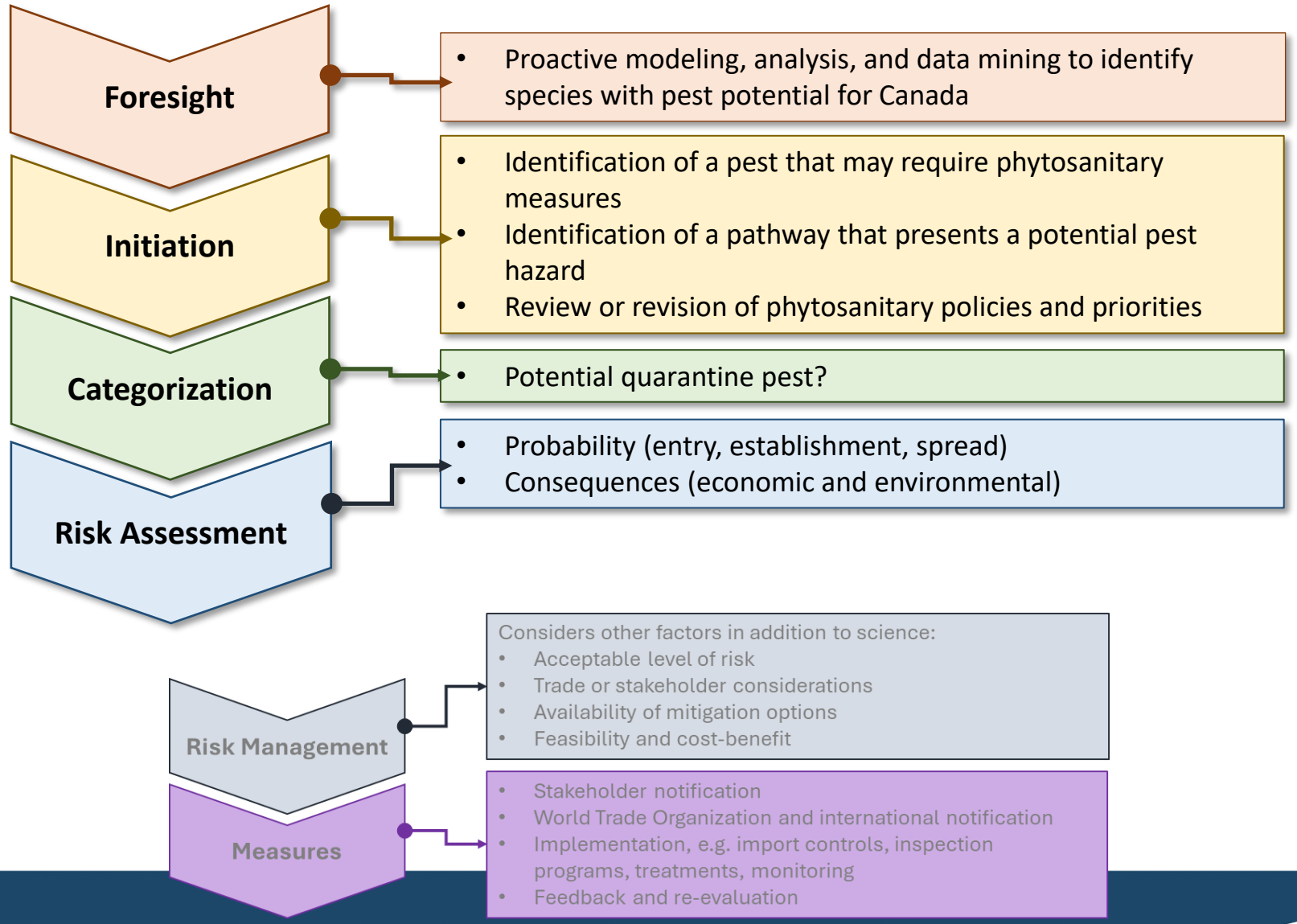
Source: https://doi.org/10.30875/9789287076601

Considerations in AI Use Cases for Pest Risk Analysis at CFIA

1. Is there already a valid, effective, and deterministic scientific approach to solving the issue?
2. Is the AI method *explainable* to stakeholders and *legally defensible* within Canadian law?
3. Does the AI method provide *consistent* and *reproducible* results when solving the issue?
4. Does the AI method substantially augment our ability to protect plant health in Canada?

CLEAR guidelines: Consistency, Legality, Explainability, Augmentation, Reproducibility

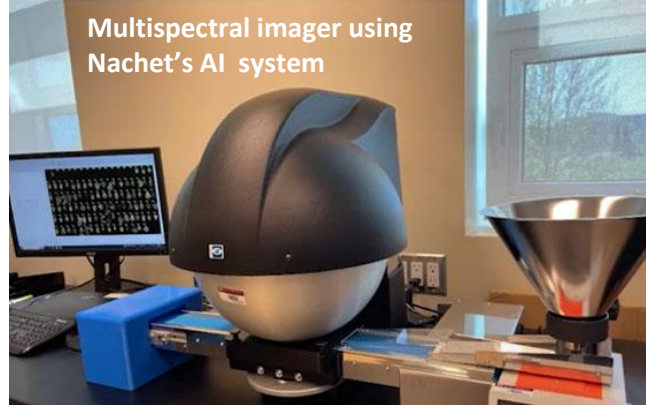
Pest Risk Analysis at CFIA

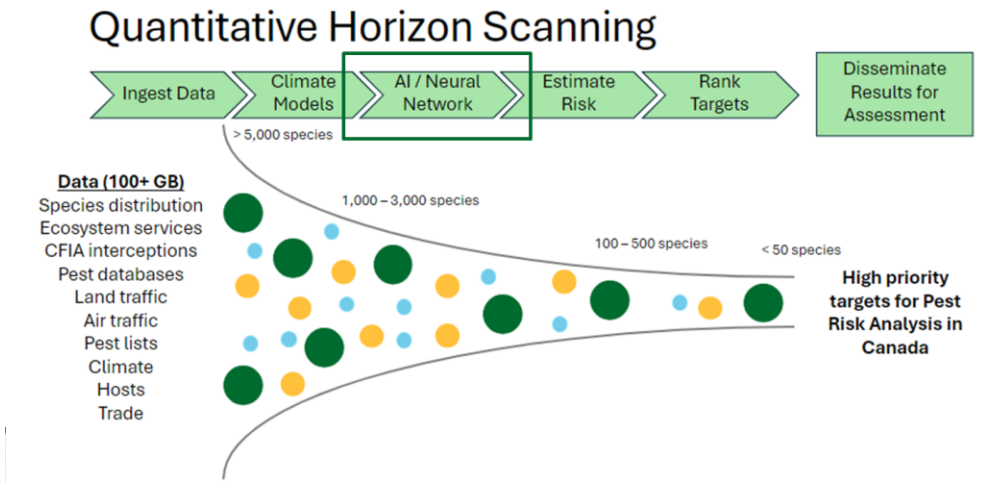


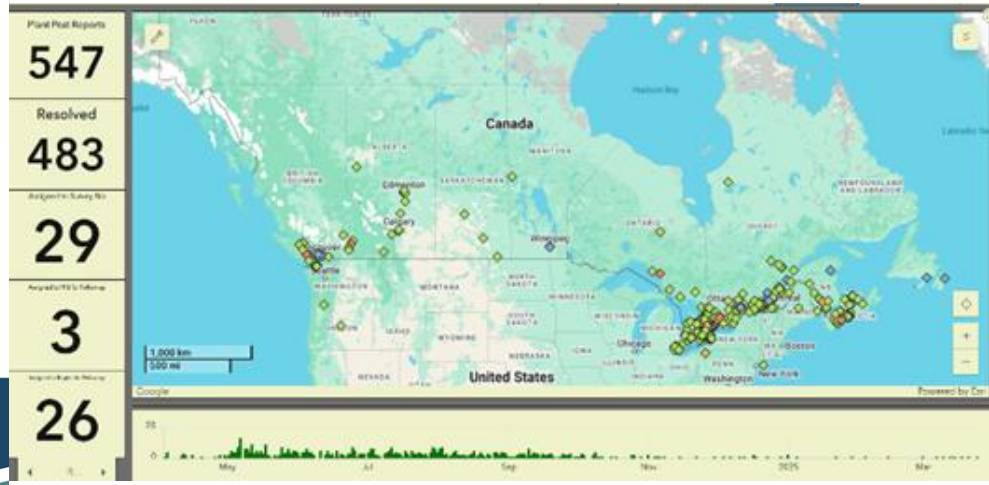
- Focusing on where we are using AI in the identification and assessment of risks
- Multiple units and divisions contribute to the Pest Risk Analysis continuum

Examples of non-generative AI

- **Foresight** - Self-organizing maps to identify potential pests with suitability in Canada
  - Neural network that groups areas based on assembly and co-occurrence with other species
  - One subcomponent of our horizon scanning process
- **Initiation** – Computer vision for weed seed identification (e.g., CFIA's Nachet Tool) and automated web-scraping of iNaturalist data and information
  - Consistent performance
  - Repetitive manual work reduced for expert who can do more complex work or further enhance the AI performance







Plant pest reporting dashboard includes data mined from iNaturalist

Limitations of Generative AI* in Risk Analysis

- Unable to replicate the deep expertise held by trained SMEs
- Lacks situational context and critical thinking

	Subject Matter Expert	Generative AI
Problem formulation	Considers whether the right question is being asked	Answers only the question that has been asked
Information sources	Educational background, peer-reviewed scientific publications, experts and expert working knowledge	Trained on the whole of the internet or a specific subset of information, can include factually incorrect sources
Evaluation of information	Weight of evidence approach, discussion of uncertainty, situational context awareness	Accepts information without scrutiny; does not have the ability to consider situational context
Transparency and reproducibility of results	SME bias can be minimized by peer review, reasoning logic provided and transparent, results of analysis are reproducible	Transparency is improving, but generative AI regularly fails to provide appropriate references with statements. Results are inherently variable.

*MS Copilot September 2025

Our Approach

- We are cautiously optimistic with the benefits and use cases of AI and automated decision making in our day-to-day work
  - AI tools rely on models that can pose challenges, such as limited transparency and explainability
  - They can also rely on training data that is difficult to access and assess
  - Need to ensure transparency when it is being used
- Opportunity to enhance productivity by increasing efficiency and quality of outputs in some analytical and writing tasks not only in pest risk analysis but in other areas of regulatory science
- Generative AI tools are valuable but require trained SMEs to apply their deeper knowledge