

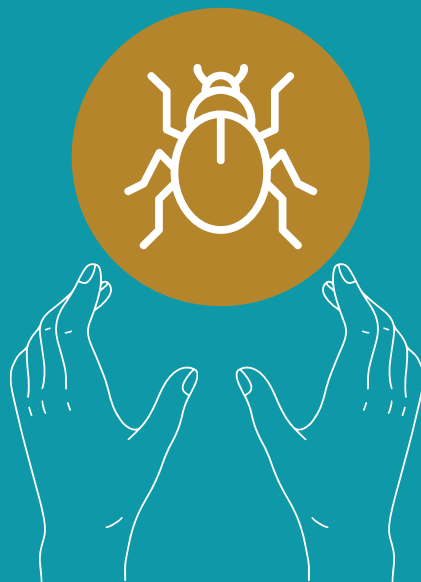
Framing Challenges and Opportunities for Canada



Gene-editing technologies offer promising approaches to addressing pest problems. They also carry environmental, socioeconomic, and cultural risks. *Framing Challenges and Opportunities for Canada* examines the scientific, bioethical, and regulatory challenges posed by genetic pest-control tools.

EVOLVING PEST PROBLEMS

Pests continually adapt to the tools used to manage them, and **the efficacy of some conventional pest-control approaches is waning.** At the same time, human activities have contributed to changes in climate and land-use, **altering the geographic ranges of pests** and the risks they pose.



WHAT IS GENETIC PEST CONTROL?

Gene-editing technologies allow for the **alteration of genomes in pest organisms**, to suppress populations or to modify their traits. A pest can be edited to contain a **gene drive**, which passes traits through a population at greater rates than conventional inheritance.

POTENTIAL AND RISK

The novelty of genetic pest-control tools, combined with uncertainty about their implementation and the diversity of target organisms, creates a variety of potential risks.

Environmental

Negative impacts on biodiversity, native ecosystems, and human health



Economic

Ineffective suppression of pests, and trade-related complications



Cultural

Threats to valued species and marginalization in decision-making



Social

Loss of public trust in science and technology



In Canada, research and development capacity for genetic pest control is low, posing challenges for risk management and governance.

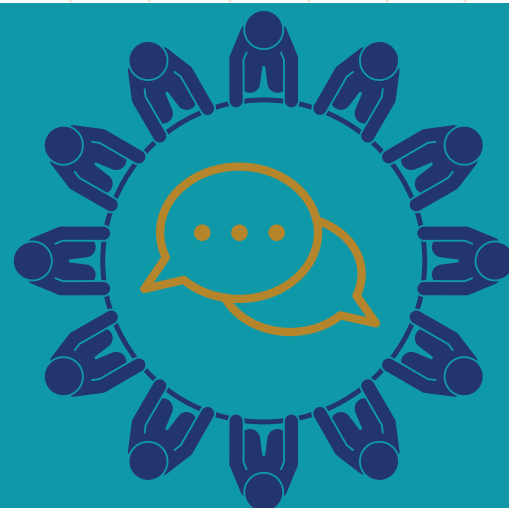
MANAGING RISK

Risk assessment is central to effective governance, and critical to building trust. Genetic pest-control tools are novel, and may be designed to spread geographically – potentially across jurisdictional borders – **posing challenges to existing risk assessment processes.**

Adaptive and iterative processes can aid in managing risks posed by new technologies. **Better engagement with stakeholders and Rights holders** can also inform these processes.

EMPOWERING ENGAGEMENT

Canada includes rural and urban areas, Indigenous and non-Indigenous people, and immigrant communities. Engagement is necessary to tailor pest-control tools to specific contexts—by addressing public concerns, improving program design, and mitigating risk. Empowering public engagement looks beyond communication toward collaboration and power-sharing at each step of the pest-management process.



ADAPTING GOVERNANCE

Today, Canada regulates pest-control tools on a case-by-case basis, with responsibilities falling to various departments. Genetic pest control may soon test the limits of this approach.

Effective governance of genetic pest-control technologies will require:



Scientific capacity



Jurisdictional cooperation



Adaptive risk assessment



Meaningful public engagement

Building solid foundations in governance will enable Canada to effectively use and oversee future pest-control tools, and to serve as a model for others who hope to do the same.