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Reorienting federal regulation of pesticides to reduce risk: A health and environmental imperative

Environmental, health and food safety groups call on the Government of Canada to reorient federal regulation of pesticides to centre on risk reduction in alignment with Target 7 of the Kunming-Montreal Global Biodiversity Framework. Target 7 requires signatories, including Canada, to reduce the overall risk from pesticides by at least half by 2030. Achieving this goal will require a suite of new measures with a focus on reducing pesticide use and exposure.

Over-reliance on pesticides is associated with significant environmental concerns (including biodiversity loss, reduced water quality and greenhouse gas emissions) and health concerns (such as cancer, reproductive harm, developmental effects and neurological conditions).

Although Health Canada's Pest Management Regulatory Agency evaluates risks of individual pesticides,[1] the Agency does not systematically manage overall risks from the ever-growing number of pest-control products approved for use in Canada. More than 132 million kilograms of pesticide active ingredients were sold in Canada in 2021, a 5.1 per cent increase over the previous year, and a 47 per cent overall increase since 2011.[2] **The current trajectory is incompatible with risk reduction.**

The area of agricultural land treated with pesticides has dramatically increased over recent decades.[3] In addition to agriculture, pesticides are also widely used in Canadian forestry and landscaping, among other applications.

Large quantities of pesticides are used where no significant pest threat has been demonstrated (e.g., prophylactic use of treated seeds and forestry herbicides, use of pesticides to dry field crops) and where benefits are negligible (e.g., cosmetic use on lawns and gardens). This needlessly increases exposures for people and the environment.

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[1] Significant potential harm to health and the environment from individual pesticides is not routinely assessed and remains unknown, as a result of gaps in PMRA assessment methodologies and available data.
[2] PMRA, Pest Control Products Sales Reports for 2021 and 2011.
[3] Spatio-Temporal Patterns of Crops and Agrochemicals in Canada Over 35 Years https://www.frontiersin.org/articles/10.3389/fenvs.2020.556452/full

Canada's commitment to reduce overall pesticide risk must inform implementation of the federal Pest Control Products Act, the primary objective of which is "to prevent unacceptable risks to individuals and the environment from the use of pest control products." It is also important to align the forthcoming Sustainable Agriculture Strategy and other related federal policy frameworks with Canada's 2030 pesticide risk reduction target.

If designed and implemented well, measures to reduce pesticide risk can support more resilient food systems in the face of climate change[4] and help to achieve the goals of Canada's forthcoming Sustainable Agriculture Strategy, as well as the National Biodiversity Strategy. The priorities outlined below will need to be bolstered by complementary measures and resources to support pesticide use reduction, reduce delays in decision-making, increase use of independent data and science as well as Indigenous consultation, and improve transparency and enforce label conditions, including worker-protection provisions.

Priorities for strengthening federal regulation of pesticides:

1. **Incorporate pesticide use reduction strategies and indicators in Canada's 2030 National Biodiversity Strategy.**

   Overall pesticide risk is determined by the hazard characteristics of pesticide products (i.e., their potential to cause harm) and exposure to the products. Exposure is a function of the quantities used, types of uses and conditions of use. Therefore, restricting availability of more hazardous pesticides and reducing total quantities of pesticides used are key strategies to reduce overall pesticide risk**.**

   Actions outlined below will help to achieve Target 7. In particular, the Biodiversity Strategy and Canada's implementation plan for Target 7 must include actions to:

   - Phase out more hazardous active ingredients and support safer substitution.
   - Eliminate or restrict categories of uses, starting with non-pest control applications, prophylactic uses like treated seeds, routine spraying of forestry pesticides and cosmetic uses.
   - Support farmers and other user groups to transition away from chemical pesticides and toward sustainable pest-management strategies that support biodiversity.

   It will be important to establish specific targets for reducing use of (a) more hazardous pesticides and (b) all chemical pesticides, taking into account differences in potency. This will help orient implementation planning towards reversing the current trends, which are incompatible with risk reduction.

[4] Rising temperatures will influence pest populations and pesticide efficacy. For example, pests may reproduce more prolifically and appear earlier at warmer temperatures, while greater pesticide volatilization, drift and degradation may affect efficacy. More severe rain events could increase pesticide contamination of waterways. Pesticides and systems dependent on pesticides reduce agricultural system resilience to climate change by harming beneficial species such as insect-eating birds and pollinators and by reducing soil microbial biodiversity and harming earthworms.

Changing conditions of use to limit exposure can also reduce pesticide risk (for example, application requirements that aim to reduce exposure to non-target species). However, this strategy alone is insufficient and less likely to deliver verifiable results, as implementation is often difficult to monitor and enforce**.**

2. **Protect vulnerable people.**

Health Canada defines vulnerable populations as "a group of individuals within the general Canadian population who, due to either greater susceptibility and/or greater exposure, may be at greater risk than the general population of experiencing adverse health effects from exposure to chemicals." Despite requirements in the PCPA to protect vulnerable populations such as women and children, current safety factors do not take account of the significant uncertainties about harm and exposure to women, children, Indigenous harvesters and heavily exposed populations such as migrant workers. Pesticide evaluations should be strengthened to identify relevant vulnerable populations and explicitly consider effects and potential uncertainties, and reduce the potential for harm. Clear worker protection standards and protection for Indigenous rights need to be incorporated into pesticide decision-making.

3. **Expand pesticide risk assessments to consider and reduce cumulative risks to the environment (including wildlife), and strengthen assessment of pesticide formulants, mixtures and transformation products and contaminants.**

The Pest Control Products Act requires assessment of cumulative effects of pest control products with a common mechanism of toxicity but only in relation to human health. Cumulative risks to the environment should be assessed in parallel. In addition, a broader ecological perspective is needed to assess cumulative effects. The current approach, which is limited to consideration of active ingredients with a common mechanism of toxicity, is no longer sufficient in light of research on the often unpredictable effects on humans, individual species and ecosystem function when common pesticides combine, transform in the environment and interact in real-world scenarios.[5]

Furthermore, entire pest control products (including formulants, transformation products and contaminants) should be assessed and subject to transparent regulatory requirements, not just the active ingredients. Some of these can be more harmful than the active ingredients and/or render the entire product significantly more harmful than the active ingredients alone.

[5] In the health context, multiple pesticides may target the same human biological systems. In ecosystems, multiple pesticides may change ecological structures and relationships and create multiple stressors.

4. Strengthen protections for endangered and threatened wildlife, and other species in decline.

Pesticide regulation needs to be brought into alignment with the goals of Canada's Species at Risk Act: preventing the extinction of endangered or threatened wildlife, helping these species recover and preventing other species from becoming at risk. This requires:

- Explicit assessment of risks to species at risk and in decline in pesticide evaluations, including indirect risks (e.g., effects on food sources of vulnerable groups of species such as bats, swallows and other aerial insectivores).
- Application of more protective risk-acceptability thresholds for species at risk, including more use of uncertainty factors.
- An ecological evidence-based approach that avoids incremental harm and multiple stressors to vulnerable species and ecosystems.

In addition, when there is evidence that pesticides may contribute to the decline of threatened or endangered wildlife (such as for the monarch butterfly and rusty patched bumblebee, among others), or where pesticide use may impede recovery, action plans required under SARA should include reducing pesticide exposure. This could include banning or restricting use of registered pesticides in areas identified as habitat for these species.

5. Phase out more hazardous active ingredients, using comparative assessments to support safer substitution.

Canada should match European Union requirements for comparative assessments to support a shift away from active ingredients that demonstrate characteristics of particular concern to human health and/or the environment, and informed substitution.[6] The EU maintains a list of "Candidates for Substitution" — currently 77 active ingredients are listed — and requires comparative assessments of products containing these ingredients to determine whether alternatives that promote sustainability are available. Also, approval periods for candidates for substitutions are limited to a maximum of seven years.

At a minimum, pesticides that are persistent, bioaccumulative, highly toxic to non-target organisms, carcinogenic, mutagenic, neurotoxic or toxic to reproduction and development should be considered highly hazardous and be identified as priorities for substitution in Canada. Comparative assessments should consider not only alternative pest control products but also alternative practices that could avoid or reduce the use of pesticides altogether.

[6] Informed substitution, replacing hazardous substances with safer alternatives, is the goal of a solutions-oriented approach to chemical management. It involves identifying alternatives and evaluating their health and safety hazards, potential tradeoffs, and technical and economic feasibility. https://www.osha.gov/safer-chemicals

6. **Prohibit the sale and use of chemical pesticides for cosmetic purposes.**

   The use of pesticides for cosmetic purposes poses unnecessary risks to human health (especially children) and the environment. Several provinces and dozens of municipalities restrict the use of lawn and garden pesticides, and the federal government has ended the cosmetic use of pesticides on federal land. More comprehensive federal restrictions would reinforce local action, facilitate enforcement and raise the bar across the country.

7. **Enhance access to "safer substitutes," without compromising on risk assessment and robust regulatory processes; support farmers to transition to more sustainable practices.**

   Initiatives to enhance access to alternative pest control methods should centre on organic-approved pest management strategies with well-established health and environmental risk profiles, and maintain robust risk assessment and transparent regulatory processes with opportunities for robust public participation and review.

   Support for farmers could include training and funds to implement integrated pest management, organic, regenerative and agroecological principles, improving access to safer strategies for pest management including non-chemical strategies research and development and compensation.

8. **Strengthen regulation of treated seeds under the PCPA and restrict their use.**

   Some pesticides, such as systemic neonicotinoid insecticides and various fungicides, are commonly applied as seed coatings. The plant incorporates the pesticide into its tissue (including pollen and nectar) as it grows. Treated seeds are routinely used even when no relevant pest threat has been identified. This contributes to overall pesticide risks, as well as pest resistance, with little or no benefit to crop yields. In particular, neonicotinoid seed coats are linked to bird deaths.[7] Workers handling treated seeds may also be significantly exposed.[8]

   Currently, seed treatments are regulated as a use of a registered pesticide under the PCPA. These uses should be cancelled or subject to enforceable restrictions. If approved for use, treated seeds should be transparently regulated as pest control products under the PCPA, including requirements for public consultation, reporting seed treatment–specific sales data and monitoring.

[7] https://www.nature.com/articles/s41598-017-15446-x.epdf and https://abcbirds.org/neonics

[8] https://iro.uiowa.edu/esploro/outputs/graduate/Exploration-of-potential-exposure-to-neonicotinoids/9983777168002771

9. **Establish Canadian maximum residue limits (MRLs) to reflect regulatory restrictions on the use of these pesticides in Canada.**

   International reference levels for pesticide MRLs on agricultural commodities often exceed those that would be expected from approved uses of the same pesticide in Canada, because the international standards do not take into account environmental risks or Canadian growing conditions. They also do not account for the cumulative effects of exposure to multiple pesticide residues in multiple products. These inflated international MRLs cannot be relied on to monitor compliance with Canadian label restrictions on the use of pesticides, or "acceptable risks" of exposures to multiple pesticides via multiple routes.

   Canada should establish MRLs for pesticides on domestic agricultural commodities that reflect regulatory restrictions on the use of the pesticide, taking into account potential increased health and environmental risks from over-use (i.e., MRL exceedances). These should be determined as part of the pesticide registration and post-market review process, based on verified field trials in Canada. Industry requests to increase MRLs for domestic products outside of a comprehensive health and environmental risk assessment for changes to Canadian use patterns should not be permitted.

10. **Expand and extend national systems for reporting pesticide use and environmental monitoring.**

    The PMRA lacks robust data on environmental monitoring and use patterns for the pesticides it is responsible for evaluating and regulating. Highly hazardous pesticides, for which there are no monitoring data available, continue to be used in large quantities. This is an unacceptable gap. The recent pilot projects to gather water-monitoring and pesticide-use data should be improved, expanded and extended, taking into account lessons learned in the pilot phase. Other relevant routes of exposure should also be monitored, such as ambient air, food, drinking water and house dust. In addition, biomonitoring should be expanded to measure a broader suite of pesticides in humans and non-human species, with longitudinal data and linkages to health data. Existing requirements to report pesticide sales should be extended to include pesticide-treated and genetically modified seeds, and improved to enable regional and product-based analysis. Use and monitoring data need to be made available to the public in a disaggregated and accessible format.

11. **Recognize the human right to a healthy environment**

    Recent amendments to the Canadian Environmental Protection Act recognize the right to a healthy environment and the principle of environmental justice for the first time in Canadian law, setting a new standard for the assessment and regulation of toxic substances under CEPA. In 2022, Canada also supported a United Nations resolution recognizing more broadly the right to a healthy environment. This right should be recognized under the PCPA as well. In addition to a climate lens, the PMRA should integrate a human rights lens in its approach to pesticide regulation and enforcement.