Review of the Environmental and Health Impacts of Chemicals in Australia

Written by Nujhat Mubarrat - HOPE researcher Vic

Recent studies reveal that Australia continues to use nearly 60 percent of pesticides banned in the European Union. High pesticide use in Australia indicates loopholes in pesticide approval policies that are increasing environmental and health hazards [1]. Pesticides pose environmental hazards because they don't degrade easily and accumulate in living organisms for longer periods, leading to various diseases [2]. Paraquat, atrazine, chlorpyrifos, fipronil, diquat and neonicotinoids are among the most commonly cited pesticides banned in the EU/UK but routinely permitted and used in Australia and are associated with everything from Parkinson's disease and endocrine disruption to bee colony collapse [3], [4].

Regulatory gaps and policy misalignment

As of December 2024, Australia has banned just 24 dangerous pesticides, compared with 225 in the EU and UK. On the one hand, the Australian Pesticides and Veterinary Medicines Authority (APVMA) takes a risk-based approach to assessment, where chemicals may receive a lower risk ranking based on application methods and other related criteria. By contrast, the EU uses a hazard-based approach that is more effective at controlling pesticide use. In a risk-based system, chemicals can remain available for use indefinitely until a review is initiated. Some reviews have taken decades; for example, paraquat has been under review by the APVMA since the 1990s and is still available for use in Australia, despite being banned in over 70 countries. Australia is the only OECD nation whose pesticide regulator is majority-funded by the chemicals industry (87% in 2023–24), leading to accusations that there is a structural incentive for the regulator to be pesticide-permissive [5], [6].

Health impacts

Australia’s heavy reliance on herbicides, especially glyphosate, for weed control is alarming. Glyphosate is classified as a probable carcinogen (IARC 2A) and has been associated with non-Hodgkin lymphoma in some epidemiological studies [7]. Another herbicide used in broadacre systems such as maize, sorghum, and sugarcane, atrazine (a triazine), is linked to endocrine disruption concerns, with associations with menstrual irregularities and adverse pregnancy outcomes in some studies of long-term exposure. Paraquat (and diquat) shows evidence of a potential association with Parkinson’s disease [8]. PFAA concentrations in Australian reticulated drinking water are generally low, with reported maximum concentrations of 9.7 ng/L (PFOA), 16.4 ng/L (PFOS), 19.1 ng/L (PFHxS), and 2.2 ng/L (PFBS) [9]. However, much higher concentrations have been reported in groundwater near contaminated sites. Human exposure to PFAS has been linked to small increases in cholesterol, changes in kidney function, and hormone levels [10].

Environmental and food-system risks

Chemical pollution is intertwined with climate change and biodiversity loss, creating compounding, hard-to-reverse risks for ecosystems and human health. Fluorinated pesticides can behave similarly to PFAS in the environment, with persistent by-products such as trifluoroacetic acid (TFA) remaining in water for extended periods. They resist degradation and metabolism, allowing them to persist and accumulate in environmental systems [11]. Wetlands in the Great Barrier Reef catchment face year-round risks from pesticide mixtures, driven mainly by PSII herbicides such as diuron [12].

Trade and economic implications

Australia is still using pesticides that many of our trading partners have outlawed, which puts us out of step with modern chemical safety standards and could make selling our produce overseas harder [13]. Exporters will face stricter maximum residue limits (MRLs) at destination. This increases the risk of non-compliance, shipment holds or rejections, and withdrawal from retailers with zero-tolerance lists [14].

Practical risk-reduction moves

Practical risk reduction in Australia requires comprehensive monitoring of pesticides and other chemicals across water, soil, air, food, and biota, alongside source-control measures such as integrated pest management (IPM), substitution with safer chemicals, and responsible application practices [15]. Australia can reduce chemical and pesticide risks by improving wastewater treatment, expanding residue monitoring, updating APVMA chemical reviews, and protecting vulnerable ecosystems, including the Great Barrier Reef [16].

References:

[1] C. Rosengreen, “Majority of Australia’s high-use pesticides banned overseas,” Griffith News. Accessed: Jul. 11, 2026. [Online]. Available: https://news.griffith.edu.au/2026/03/26/majority-of-australias-high-use-pesticides-banned-overseas/

[2] W. Zhou, M. Li, and V. Achal, “A comprehensive review on environmental and human health impacts of chemical pesticide usage,” *Emerging Contaminants*, vol. 11, no. 1, p. 100410, Mar. 2025, doi: 10.1016/j.emcon.2024.100410.

[3] P. R. Whitehorn, S. O’Connor, F. L. Wackers, and D. Goulson, “Neonicotinoid Pesticide Reduces Bumble Bee Colony Growth and Queen Production,” *Science*, vol. 336, no. 6079, pp. 351–352, Apr. 2012, doi: 10.1126/science.1215025.

[4] L. Utyasheva, P. Amarasinghe, and M. Eddleston, “Paraquat at 63—the story of a controversial herbicide and its regulations: It is time to put people and public health first when regulating paraquat,” *BMC Public Health*, vol. 25, p. 3089, Sep. 2025, doi: 10.1186/s12889-025-23830-w.

[5] “Impact of Pesticides,” Pesticide Action Australia. Accessed: Jul. 19, 2026. [Online]. Available: https://pesticideaction.org.au/impact/

[6] “Australian food is grown with dangerous chemicals banned in other countries | Food safety | The Guardian.” Accessed: Jul. 19, 2026. [Online]. Available: https://www.theguardian.com/australia-news/2022/sep/27/australian-food-is-grown-with-dangerous-chemicals-banned-in-other-countries

[7] L. Zhang, I. Rana, R. M. Shaffer, E. Taioli, and L. Sheppard, “Exposure to glyphosate-based herbicides and risk for non-Hodgkin lymphoma: A meta-analysis and supporting evidence,” *Mutat Res Rev Mutat Res*, vol. 781, pp. 186–206, 2019, doi: 10.1016/j.mrrev.2019.02.001.

[8] W. Tangamornsuksan *et al.*, “Paraquat exposure and Parkinson’s disease: A systematic review and meta-analysis,” *Archives of Environmental & Occupational Health*, vol. 74, no. 5, pp. 225–238, Sep. 2019, doi: 10.1080/19338244.2018.1492894.

[9] “Per- and poly-fluoroalkyl substances (PFAS) | Australian Drinking Water Guidelines.” Accessed: Jul. 21, 2026. [Online]. Available: https://guidelines.nhmrc.gov.au/australian-drinking-water-guidelines/part-5/physical-chemical-characteristics/cas-numbers-1763-23-1-pfos-335-67-1-pfoa-355-46-4-pfhxs

[10] “NHMRC Review of PFAS in Australian drinking water | NHMRC.” Accessed: Jul. 21, 2026.

[11] M. K. Alam *et al.*, “Fluorinated pesticides are a growing source of PFAS contamination in the environment: An Australian perspective on use, fate and ecotoxicity,” *Ecotoxicology and Environmental Safety*, vol. 314, p. 120038, Apr. 2026, doi: 10.1016/j.ecoenv.2026.120038.

[12] C. Beggs, C. Neelamraju, S. L. Kaserzon, and M. L. VanderGragt, “Exposure and combined risk of pesticide mixtures in tropical wetland waters, Australia,” *Science of The Total Environment*, vol. 979, p. 179454, Jun. 2025, doi: 10.1016/j.scitotenv.2025.179454.

[13] S. M. Bengtson Nash and G. L. Burns, “Australia’s Blind Eye: Exploring the Nation’s Permissive Stance on Harmful Pesticides,” *Environ. Sci. Technol.*, vol. 60, no. 13, pp. 9823–9830, Apr. 2026, doi: 10.1021/acs.est.5c15716.

[14] Y. Jafari and D. G. Tarr, “Estimates of Ad Valorem Equivalents of Barriers Against Foreign Suppliers of Services in Eleven Services Sectors and 103 Countries,” *The World Economy*, vol. 40, no. 3, pp. 544–573, Mar. 2017, doi: 10.1111/twec.12329.

[15] “Chemical review | Australian Pesticides and Veterinary Medicines Authority.” Accessed: Jul. 21, 2026. [Online]. Available: https://www.apvma.gov.au/regulation/chemical-review

[16] S. E. Lewis *et al.*, “Herbicides: A new threat to the Great Barrier Reef,” *Environmental Pollution*, vol. 157, no. 8, pp. 2470–2484, Aug. 2009, doi: 10.1016/j.envpol.2009.03.006.