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MNZH MAKE NEW ZEALAND HEALTHY

Require the NZ EPA to use the Best Available Science.

THE PROBLEM: The new Environmental Protection Authority (NZ EPA) CEO will take control mid-2026. They will inherit a hazardous-substances system that is, frequently, better at processing applications than at stewardship. A 'fit for business' - but not for *stewardship* operation.

But the NZ EPA is here to protect farmers, growers, the general public and the environment. It is not here to protect the chemical industry applicant and the chemical industry. But if the NZ EPA is to act to protect New Zealand, staff have to sound, up-to-date information to provide them with confidence in their decision-making. This currently does not appear to be the case.

The Hazardous Substances and New Organisms Act 1996 (HSNO) is protective and preventive, and explicitly requires precaution under scientific/technical uncertainty.

The evidence suggests that the new CEO is 'walking into' not one single failure but a mesh of scientifically-relevant blind spots: mixture reality, weak feedback loops from monitoring to controls, and decision pathways that treat uncertainty as a reason to withhold conclusions rather than a trigger to escalate scrutiny.

- There is no publicly documented decision pathway guiding staff on when to escalate from modified reassessment to full risk assessment, and no evidence of an internal framework that fills this gap.
- Modified risk assessments appear to be the default mechanism; comprehensive, NZ-specific risk assessments are rare and not systematically triggered by emerging science or exposure concerns.
- New Zealand lacks comprehensive pesticide use data. There is no reliable national reporting on quantities, geography, and co-application patterns.
- No contemporary understanding of chemical mixtures and 'cocktail effects', particularly synergistic and cumulative interactions across products, sectors, and landscapes.
- Class-based *assessments* of a single class of chemical with the same mode of action are undertaken, but the toxic risk of cumulative loading over time (the tau problem), from single chemical classes, including accumulation in groundwater, soils, and sediments is ignored.
- There may be no structured internal policy guiding the identification and regulation of endocrine disruptors, cited references suggest limited understanding and discretion.
- Staff are not routinely resourced or required to conduct systematic reviews of emerging literature to determine whether mechanistic, epidemiological, or environmental data warrant full reassessment. The *Methodology (2022)* suggests this form of inquiry is 'discretionary' rather than standard practice.
- Institutional support for decision-making under uncertainty appears limited. Precaution is required by statute, yet there is no clearly operationalised framework for acting where plausible evidence of risk exists.

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MNZH POLICY RECOMMENDATIONS:

THE SOLUTION: A public-good, transparent and integrated approach to monitoring, analysing and making judgements to protect human and environmental health.

A reform agenda for the NZ EPA and the new CEO – to support staff to make decisions that are protective and preventative (See below for full discussion).

Such information provides not only a pathway for internal staff, but an evidentiary pathway for the independent scientific community and the public so that they can be assured of the competency of the Authority and hence trust the decisions of the NZ EPA.

The protective architecture of the Hazardous Substances and New Organisms Act 1996 is not self-executing – it does not work without adequate guidance for officials, and MNZH show that much of this information is lacking. It is no wonder that public trust in the NZ EPA has been declining.

The HSNO Act's purpose: to safeguard the environment and human health. Its precautionary obligation cannot operate by aspiration alone. Institutional capacity and dedicated, long-term resourcing is required to achieve this purpose over time. This includes:

- ✓ Skilled, multidisciplinary personnel with expertise spanning toxicology, epidemiology, exposure science, environmental chemistry, and regulatory law, and - importantly - are proficient in deploying modern analytical tools, including AI-assisted evidence synthesis, data mining, and advanced monitoring analytics, to interrogate and integrate complex scientific datasets.
- ✓ Reliable (human and environmental) exposure data that is updated over time,
- ✓ Transparent decision pathways that explain how uncertainty is to be confronted and precaution addressed,
- ✓ Systematic evidence synthesis and the capacity to research new mechanistic pathways, cohort data, developmental windows of vulnerability, or low-dose and endocrine-system effects.
- ✓ Capacity to review monitoring feedback loops to ensure evidence inflows and informational outflows to New Zealand industries and regions.

The NZ EPA does not appear to have these capabilities, and current approaches suggests that precaution has devolved into a narrow reliance on conservative modelling assumptions. In the current NZ EPA environment, precaution cannot function as the dynamic, inquiry-driven stewardship that Parliament had intended, many decades ago.

MNZH have a reform agenda for the NZ EPA and the new CEO – to support staff to make decisions that are protective and preventative.

1. **Build a funded *stewardship intelligence* function:** Establish a permanently funded internal unit responsible for continuous horizon scanning, systematic evidence review, uncertainty characterisation, and maintenance of transparent evidence registers. This function should not be reactive to applications. It should proactively identify emerging risks, international shifts in science, and local exposure concerns. Crucially, it should

incorporate a national pesticide use intelligence stream, including the capacity to aggregate, analyse, and publish pesticide usage data, so the agency is not constrained by applicant dossiers.

2. **Appoint a Senior Integrated Pest Management and Resistance Ecology Adviser at a principal scientist level** with deep expertise in IPM, weed/insect ecology, and resistance evolution. This adviser should work alongside toxicologists and exposure scientists to ensure that chemical approvals and reassessments are evaluated in the context of viable non-chemical or diversified management strategies. This strengthens benefit–risk analysis and reduces structural reliance on chemical solutions, particularly where pesticide resistance is accelerating.

3. **Hard-wire mixtures and cumulative exposure into routine practice:** Move beyond single-substance assessment as the default. Embed class-based grouping, mixture prioritisation, and cumulative loading analysis into standard operating procedure. Introduce formal triggers for cumulative reassessment where real-world use (e.g., tank mixes, sequential applications, co-formulants) makes single-chemical evaluation scientifically unrepresentative.

4. **Create an operational precaution framework under HSNO:** Publish a clear internal decision pathway specifying how precaution is to be applied when uncertainty is material. This should define escalation points, additional controls, targeted data requirements, conditional approvals, enhanced monitoring, rather than allowing uncertainty to default to ' no conclusion or regulatory change'. Precaution must be proceduralised, not rhetorical.

5. **Build monitoring-to-regulation feedback loops:** Create formal pipelines linking groundwater, soil, surface-water, and residue monitoring to regulatory action. Where pesticides are detected persistently or cumulatively, this should automatically feed into exposure reassessment and control review. Monitoring data must become a decision trigger, not a passive archive.

6. **Require comprehensive pesticide use reporting and exposure-relevant data collection.** Responding directly to the documented scarcity of pesticide usage data in New Zealand, establish a national pesticide reporting and analysis system. Regulators cannot assess risk without knowing quantities, frequency, geography, and co-application patterns. Data infrastructure should underpin exposure modelling, mixture prioritisation, and resistance management. (Without it, risk assessment remains assumption-based rather than evidence-based.)

7. **Enable routine scoping of global scientific literature.** Provide staff with resources, training, and digital tools (including AI-assisted evidence synthesis) to systematically review peer-reviewed literature on persistence, bioaccumulation, mechanistic toxicity, endocrine effects, and long-term environmental fate. This ensures regulatory science is not confined to industry-submitted dossiers or overseas regulator summaries.

8. **Modernise endocrine disruption governance.** Develop policy direction that extends beyond traditional EATS pathways and integrates developmental windows, neurodevelopmental vulnerability, non-monotonic dose considerations, and new approach methodologies (NAMs). The agency should articulate how it will act under uncertainty in

this domain, drawing on evolving OECD work and broader international debates while retaining NZ-specific discretion.

9. **Re-orient 'reassessment' toward New Zealand exposure reality**: ensure reassessments are not primarily constrained by the overseas position plus the industry claim, but are reconciled with NZ use patterns, local receiving environments, and (where absent) targeted monitoring/biomonitoring that makes risk characterisation real. Glyphosate is the obvious test case for this shift.

NB. MNZH emphasise: *years of agency under-resourcing can prevent this work being undertaken*.

BACKGROUND TO THIS POLICY

[1] PROBLEM(S) DEFINITION

The Hazardous Substances and New Organisms Act 1996 (HSNO) is protective and preventive, and explicitly requires precaution under scientific/technical uncertainty, yet New Zealand's Environmental Protection Authority (the NZ EPA) – it's actions and operational machinery - has trended toward administrative defensibility, reliance on applicant dossiers, and overseas defaults rather than a sustained, NZ-specific, learning system.

The term 'pesticides' is a broad umbrella covering a wide spectrum of plant and biocidal substances designed to control unwanted organisms. It includes herbicides (weeds), insecticides (insects), fungicides (fungal pathogens), rodenticides, nematicides, molluscicides, and bactericides, as well as seed treatments, desiccants, and growth regulators. Some are synthetic chemicals; others are biologically derived or microbial agents. What unites 'pesticides' or 'biocides' is not their chemistry but their purpose: to suppress or eliminate organisms that interfere with crop production, forestry, amenity use, or public health.

From a stewardship perspective, this diversity matters because each class carries distinct ecological, toxicological, persistence, and resistance dynamics, yet all fall under the single regulatory label of 'pesticides'.

Hazardous substances behave differently depending on formulation, geography, cumulative exposure history, and biological vulnerability, yet these contextual factors are not consistently integrated into assessment practice.

Risk assessment is important as it shows not only the hazard but the risk of a chemical.

The main regulatory 'instruction manual' is an industry-applicant *facing Risk Assessment Methodology for Hazardous Substances (December 2022)* (Methodology 2022) paper. It was drafted in the months following an extensive glyphosate consultation, where many of the submitter's drew attention to persistent challenges with legacy regulatory approaches.

GOOD REGULATION: EVALUATING BOTH HAZARD *AND* RISK.

In simple terms, a **hazard** is the inherent ability of a substance to cause harm, for example, whether a chemical can cause cancer, disrupt hormones, or damage ecosystems. A **risk** is the likelihood that harm will actually occur in real life, which depends on how much of the substance people or the environment are exposed to, how often, and under what conditions. This requires local monitoring to understand local conditions and influences.

A chemical can be hazardous but pose low risk if exposure is tightly controlled; equally, even a moderate hazard can become a serious risk if exposure is widespread or poorly managed. Good stewardship requires understanding both. Focusing only on hazard ignores real-world exposure patterns; focusing only on risk without properly identifying hazards may miss long-term or cumulative harms. Assessing both together ensures that decisions are grounded in how substances behave biologically and how they are actually used, supporting public health, environmental protection, and the wider public interest.

The *Methodology* (2022) relies on standardised soils metrics, default exposure scenarios, and internationally derived guidance values without also requiring that NZ EPA staff source local data. It looks like it was written by an industry toxicologist. Many concepts were out-dated at the time of publication, suggesting an under-resourced agency that struggles to comprehensively evaluate and update information.

The Methodology doesn't sufficiently integrate a pathway that ensures officials will evaluate both hazard *and* risk, particularly, and this is key. There is no feedback loop from the agriculture or industry sector, from the science community, to update and keep the NZ EPA abreast of New Zealand conditions (including soil type, temperature, rainfall) and use (for example in a tank mix with other formulations, or quantity and repetitiveness of use) and the actions of pesticides, including all formulations applied over a growing season. There's no evidence of officials investigating whether the default exposure scenarios, for example reflect real world conditions in across New Zealand, in the varying regions where pesticides are sprayed.

The NZ EPA has largely stepped away from undertaking comprehensive risk assessment, including the evaluation of both hazards and risks, and including reviews of the scientific literature to identify new knowledge, including at low-dose endocrinologically relevant levels, including to deepen staff knowledge of the mechanistic knowledge of how a hazardous substance may impact cellular function, from water and soil microbiota up through the food chain, to human effects.

But when the NZ EPA defaults to offshore decisions when making a modified reassessment (which is frequently reflective of an industry-science box ticking exercise, as no broader literature search tends to be undertaken), it does not necessarily *also* tighten controls like that jurisdiction does. It shows, we have many pesticides in our environment that are banned or more tightly regulated than Europe, for example (Hageman et al 2019).

The glyphosate story is useful here not because it is unique, but because it is a clean case study of how these system features play out over the longer term: high use, occupational exposure plausibility, strong public contestation after 2015, no formal (comprehensive) risk assessment;

and yet persistent difficulty translating contestation and new science into an up-to-date comprehensive, locally grounded risk assessment and updated controls.

Glyphosate may be one of the most commonly used pesticides in New Zealand, but it has never undergone a full risk assessment, in the 50 years it has been used here. What is often not publicly acknowledged, but is important example of 'lost in translation' effects, is that Europe's glyphosate's controls are much tighter than New Zealand. Frequency of sprays are limited, and spraying in public areas, including road sides, is not approved.

Hence, simply drawing on Europe's 'information' to prove 'the science' is settled and that there is no 'new knowledge' is one thing, but then following European steps to more tightly regulate the substance to keep farmers, growers, soils, groundwater, bystanders safe is another matter.

Modified reassessments should not be the 'go-to' when modern analytical tools including AI, data management and mining systems, including advanced monitoring analytics can be integrated into day-to-day operations. Modified reassessments tend to be industry friendly, because they are ignoring key processes to do with assessing risk:

- Industry data is the key information used. Staff do not routinely scope the literature to see what is 'missing' i.e. what new evidence of hazard and risk is emerging.
- NZ EPA staff are not integrating monitoring data from New Zealand but depending on offshore frameworks and assumptions that might not reflect New Zealand conditions.
- The EPA may cite the science but might not adopt the tighter regulatory stance that was then enacted by an overseas jurisdiction, following a their formal risk reassessment.

With nearly $60 billion in agricultural exports, the chemical industry financially benefits as an input supplier for farmers and growers, and therefore has a strong footing in New Zealand.

The pesticides industry utilises a broad variety of political practices to secure preferential treatment or that prevent, shape, circumvent, or undermine public policies (or a combination of the above) in ways that further corporate interests' (Gilmore et al 2023; Schölin et al 2025).

The NZ EPA should not exclusively be funded from chemical industry fees for its scientific work. The difficulty arises when the same industry that is subject to regulation is also the primary funder of the regulator's scientific and technical capacity.

Over time, fee-for-service funding can subtly reorient an agency's posture. Daily correspondence, data updates, modified reassessments, and application processing become the routine centre of gravity. Officials interact repeatedly with the same applicants and technical consultants. Relationships become collegial and efficient, which is not inherently improper. However, repeated cooperative engagement can normalise an 'application servicing' mindset rather than a 'public-interest stewardship' mindset.

In effect, the institution becomes aligned with industry applicant 'needs'. When core scientific capability depends largely on industry-derived revenue, incentives can drift toward prioritising timely processing of applications; limiting discretionary investigations that would exceed the budget generated by fees; avoiding expansive reassessments that disrupt regulated sectors;

limiting regulatory questions to within existing rules and norms that will not be contested by industry applicants; and cease requiring comprehensive pesticide use reporting.

A recent study Scarcity of pesticide data in New Zealand with a focus on neonicotinoids (Tai et al. 2025) highlights this fundamental weakness in New Zealand's understanding of pesticides: the absence of comprehensive, publicly accessible pesticide usage and exposure data. The authors make clear that there is no centralised system tracking how much and where pesticides, including neonicotinoids, are used in New Zealand, leaving regulators and scientists without a clear picture of real-world application patterns or trends.

This lack of basic usage data means that even simple exposure questions, what quantities are applied, how often, in which landscapes, and in combination with what other products, remain unanswered. Without that foundation, neither hazard nor risk can be reliably assessed. Instead, regulation tends to focus narrowly on specific application routes (e.g., foliar spray risk to honey bees) while overlooking broader exposure pathways (e.g., soil persistence, residues taken up by underground native bees, or movement through water and non-target systems).

The study also shows that New Zealand's patterns of use differ markedly from those in Europe and North America, yet regulatory approaches remain heavily influenced by overseas assumptions rather than NZ-specific evidence. The implication is stark: without local data, regulators are largely managing assumptions, not measured realities. This undercuts the ability to prioritise surveillance, to model cumulative or mixture exposures, and to anticipate resistance dynamics or neurological/ecotoxicological outcomes in a nuanced way.

The absence of systematic pesticide data undermines the very basis for risk assessment. It exemplifies the broader theme of weak scientific infrastructure and regulatory reliance on international defaults, which compromises both precaution and the capacity to evaluate real-world human and environmental exposures.

[2] CHEMICAL MIXTURES: ADDITIVE & SYNERGISTIC RISKS

The first problem is mixture reality: additive and synergistic risks, class effects, and long-tail loading. The European Environment Agency's *Late lessons from Early Warnings* (2013) publication is now over a decade old. It is a long, sober record of regulators learning late, often after widespread exposure, because early warnings were discounted, uncertainty was treated as a reason to delay, and complex exposures were simplified.

The *Risk Assessment Methodology for Hazardous Substances (December 2022)* is heavily model-centred. It draws on non-local exposure modelling parameters, default assumptions, and quantitative risk tools, applicants are expected to provide the data and justification, with EPA supplementing 'where needed'. The use of standardised soils, exposure scenarios, and foreign guidance values is emphasised and the document views the industry applicant as the primary source of risk and benefit information for its own hazardous substances that it is seeking approval and reauthorisation for. There is no instruction for officials to conduct a literature review to identify the latest scientific evidence that might highlight new mechanistic pathways, cohort signals, developmental windows of vulnerability, or low-dose and endocrine-system effects from the active ingredient and chemical formulation that is under discussion or review.

In 2026, New Zealand regulators have failed to scientifically address the concerns of this paper in relation to New Zealand risk. Mixture rules tend to cover additivity, but they do not reliably capture synergy, potentiation, or class-based cumulative burdens, and the architecture remains substance-by-substance. By contrast, Europe has implemented cumulative risk assessment (CRA) methodologies for pesticide residues using cumulative assessment groups and monitoring data, including for maximum residue levels of pesticides.

Europe revised its bee guidance in 2023, expanding exposure pathways and tiering approaches and moving towards a broader approach that encompasses chronic exposures, sublethal effects, and landscape-scale exposure. Europe also replaced its earlier birds-and-mammals guidance, including a revised framework in 2023 which now includes diverse feeding behaviours, landscape exposure, and indirect pathways. Europe also improved its human exposure assessment in 2022 to include not just operators and workers, but residents and bystanders, with updated assumptions and exposure pathways.

Glyphosate illustrates the mechanism: real agronomy increasingly involves tank mixes to manage resistance, so 'single active' evaluation becomes less representative of real exposure conditions. The NZ EPA has not addressed the cumulative toxicological issue that includes risk to farmers and growers, and risks from roadside applications. When the evidence of risk from human exposures and potential bioaccumulation (including from its breakdown products, including heavy metals in the full formulation) as the active ingredient and its formulation co-ingredients persist, the lack of movement by Authority scientists to address the environmental and human health risks is concerning.

Stewardship must ask about loading trajectories over time, not just compliance with single-chemical thresholds in abstract model worlds.

[3] PRECAUTION: NO POLICY SUMMARIES TO SUPPORT DECISION-MAKING

The second problem concerns *precaution* which is embedded in law, but which has not been systematically deepened into documentary form as a working decision system. The HSNO Act requires that officials take a Precautionary approach (S.7):

> *All persons exercising functions, powers, and duties under this Act … shall take into account the need for caution in managing adverse effects where there is scientific and technical uncertainty about those effects.*

Decision-makers 'are required to take a cautious approach' where scientific or technical uncertainty exists, with an overall statutory logic of prevention of harm and protection of life-supporting systems.

Yet the literature to support officials when dealing with uncertainty is negligible.

The strength of precaution lies not in invoking caution, but in equipping decision-makers to act responsibly when knowledge is incomplete. Ensuring that capability exists is central to maintaining public confidence, environmental stewardship, and the integrity of statutory decision-making under HSNO.

The *Methodology* (2022) document does not provide such a pathway. It explains the different types of uncertainty, and notes various types of uncertainties which relate to various models, but it does not provide any direction for officials when dealing with uncertainty where there are threats of serious or irreversible damage, i.e. where harm from an activity could plausibly occur.

> *Lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation*.

There is no pathway for decision-makers to operationalise when there is scientifically plausible but uncertain. Judgements of plausibility can be grounded in scientific analysis.

Academic analyses of precaution in New Zealand environmental law have emphasised that precaution must be operationalised through structured decision tools to avoid inconsistent or ad hoc application. The current framework appears to provide discretion rather than a systematic architecture for precautionary reasoning.

Various documents have been used or have been referred to these analyses in the past, yet precaution, in the decades since the HSNO Act was established, has not been operationalised in policy (Voigt 2002; Scott 2016; Iorns & Scott 2017; Iorns Magallanes 2018; Iorns Magallanes & Scott 2020).

Policy and guidance documents which provide scientifically robust, investigative steps could include: commissioning independent evidence synthesis from subject matter experts, conducting literature reviews to improve the understanding of the behaviour dynamics of the substance; screening offshore jurisdictions for newer guideline material on dealing with precaution and uncertainty, integrating monitoring, or setting triggers that require escalation when uncertainty is material. These documents would then be updated to include case studies of recent decisions where officials considered that the evidence was uncertain but that there was plausible evidence of harm should the activity continue.

Precaution in complex regulatory environments requires more than acknowledging uncertainty; it requires institutional practices that encourage exploration of unknowns, iterative reassessment, and transparency about evidentiary gaps. The available materials do not clearly demonstrate a structured methodology for characterising uncertainty, weighting emerging evidence streams, or triggering precautionary reassessment where scientific understanding evolves.

[4] PESTICIDES: SHIFTING FROM RESISTANCE MANAGEMENT TO AN IPM APPROACH

A crucial context that is often downplayed, is the historic and continued problem of pesticide resistance (See Heap for herbicides resistance). Over time, weeds, insects and organisms adapt to repeated chemical use and evolve resistance, so the product that once worked no longer does. This cycle, often called the ‘pesticide treadmill’, drives the use of higher doses, more frequent applications, or combinations of products.

One common response is the use of tank mixes: multiple chemicals with different modes of action applied together to delay resistance. Yet the environmental persistence, bioaccumulation, and combined toxicity of these multi-chemical formulations, used routinely by farmers and applicators, are rarely assessed in a cumulative or systems-based way. In practice, the real-world mixture becomes normalised, while hazard and risk evaluation remains largely single-substance focused.

Looking ahead, biotechnology is increasingly presented as the next solution. For example, gene-edited organisms designed to act *in situ* in crops or ecosystems. But evolutionary pressure does not disappear; resistance can emerge to biological tools as well. That means the treadmill dynamic may simply shift form. Unlike conventional chemicals, however, genetically modified or gene-edited organisms introduce additional layers of complexity: they can replicate, spread, and potentially transfer heritable traits.

For GMOs including gene edited organisms, questions of persistence and bioaccumulation are replaced by questions of ecological interaction, gene flow, and long-term evolutionary consequences. These are qualitatively different risks - not necessarily greater, but more complex and potentially enduring, and they require a regulatory framework capable of anticipating system-level effects, not just immediate efficacy.

For pesticide regulators, understanding Integrated Pest Management (IPM) is not an optional agricultural add-on; it is foundational to responsible chemical stewardship. When regulators grasp the power of IPM, risk assessment becomes more balanced. The 'benefit' side of the equation is no longer defined narrowly as chemical efficacy, but as long-term system stability. That understanding supports precaution, reduces dependency cycles, and aligns chemical regulation with sustainable land stewardship.

IPM recognises and situates pest control as a systems problem rather than a product problem. Instead of asking 'Which product works best?', it asks 'How does this whole system function, and how do we manage it intelligently over time?'

IPM brings together ecology, soil health, crop rotation, biological controls, habitat design, monitoring, thresholds, and, only when necessary, targeted chemical use. It is formidable not because it is complicated for its own sake, but because it requires understanding living systems rather than simply applying inputs.

It integrates biological controls, crop rotation, soil management, habitat diversification, mechanical control, resistant cultivars, monitoring, and threshold-based decision-making before resorting to chemicals.

For regulators, that depth matters. IPM demonstrates that chemical control is rarely the only tool available and often not the most durable one. By diversifying control strategies, IPM reduces resistance pressure, lowers cumulative chemical loading, and builds resilience into agricultural systems. In other words, it strengthens both productivity and environmental protection.

This matters for three interlocking reasons.

a. First, persistence, bioaccumulation, and toxicity cannot be ethically evaluated in a vacuum. If safer or lower-impact management strategies exist, even if they require knowledge transfer, system redesign, or staged transition, regulators must understand them to properly weigh risk–benefit decisions.

   Without IPM literacy, the 'benefit' side of the equation can become narrowly defined as yield protection via chemical application, rather than resilience-based control through diversified

systems. A regulator unfamiliar with IPM may inadvertently treat chemical reliance as inevitable, when in fact it is often contingent.

b. Second, pesticide resistance underscores why chemical defaulting is unsuitable, if public short and long-term human and environmental health are taken into account. The 'pesticide treadmill' is well documented: repeated chemical exposure selects for resistant weeds and insects, leading to higher doses, tank mixes, or new active ingredients. This creates escalating chemical complexity and potentially greater cumulative exposure and mixture effects.

   IPM is explicitly designed to slow resistance evolution by diversifying selection pressures. If regulators do not integrate resistance ecology and IPM strategies into their assessment frameworks, they risk approving or maintaining chemicals in ways that accelerate resistance, thereby increasing long-term environmental loading and hazard exposure.

c. Third, IPM knowledge sharpens precaution. A regulator charged with protecting environmental and human health must understand when chemical control is genuinely necessary and when it is substitutable. Precaution is not prohibition; it is proportionality under uncertainty. IPM provides the technical basis for proportionality because it expands the range of practicable alternatives.

Without that knowledge, regulators may feel compelled to accept higher chemical risks on the assumption that there are no workable alternatives, an assumption that is often incorrect.

Where regulators lack deep familiarity with IPM, regulatory assessments can drift toward evaluating chemical efficacy and toxicity in isolation, rather than situating pesticides within the broader spectrum of viable management tools.

Weaving IPM knowledge into the regulatory framework would elevate decision-making in several ways:

- ✓ It would inform benefit–risk assessments with realistic non-chemical or reduced-chemical comparators.
- ✓ It would strengthen conditions of approval (e.g., requiring resistance management plans consistent with IPM principles).
- ✓ It would allow regulators to assess cumulative and mixture exposures in light of actual field practices.
- ✓ It would align chemical regulation with long-term soil health, biodiversity, and water quality objectives.
- ✓ It would create a coherent bridge between environmental protection and sustainable agriculture policy.

NZ EPA PRINCIPAL SCIENTIST – IPM & RESISTANCE ECOLOGY ADVISOR

MNZH recommend that the new CEO appoints (or recruits) a Senior Integrated Pest Management and Resistance Ecology Adviser at a principal scientist level. This individual should:

- Have deep expertise in weed/insect ecology, resistance evolution, and systems-based pest management.
- Be conversant in agronomic realities (forestry, horticulture, arable, pastoral systems).

- Work alongside toxicologists and exposure scientists to ensure chemical decisions are contextualised within integrated management options.
- Liaise formally with agricultural research institutes, universities, and extension bodies.
- Contribute to risk assessment by providing an integrative, evidence-based analysis of feasible IPM alternatives and resistance implications.

The principal scientist role would be supported by dedicated budgetary resourcing and commissioning authority to identify and address strategic knowledge gaps across agricultural, forestry, and conservation systems, including the power to commission and advance independent research, pilot programmes, field trials, and evidence syntheses that advance the integration of IPM across the New Zealand landscape.

This resourcing should enable proactive system mapping, resistance monitoring, cross-sector collaboration, and translation of science into regulatory and operational guidance, rather than leaving the role dependent on ad hoc funding or reactive analysis.

Institutionally, this role would support regulatory functions by:

- Improving the quality of benefit–risk evaluations.
- Reducing over-reliance on chemical efficacy claims.
- Informing precautionary conditions and adaptive controls.
- Anticipating resistance-driven escalation before it becomes entrenched.

At a systems level, it would also facilitate integration across environmental and agricultural agencies. Instead of siloed regulation (inside the NZ EPA) and production advice (agriculture agencies), there would be a shared technical language around resilience, reduced chemical dependence, and long-term stewardship. That integration would strengthen national environmental objectives while maintaining agricultural productivity, aligning regulatory practice with both HSNO's protective mandate and sustainable land-use strategy.

[5] ENDOCRINE DISRUPTION: NO POLICY SUMMARIES TO SUPPORT DECISION-MAKING

The NZ EPA has not published documentation that demonstrates that the Authority has a fit-for purpose system to identify endocrine disruption that is a tool for Authority officials. The NZ EPA Risk Assessment Methodology for Hazardous Substances (2022) does not include specific information to support officials on the regulation and stewardship of endocrine disrupting compounds.

The Cawthron (2022) report Overview of Endocrine Disruption – An Aotearoa New Zealand Perspective, provides a competent descriptive overview of endocrine disruption science and recognises that uncertainty and evidentiary gaps justify a precautionary approach in chemical registration. It clearly explains the biological mechanisms of endocrine activity, the limits of current testing methods, and the challenges of detecting adverse outcomes at whole-organism or population levels. the report is primarily explanatory rather than reform-oriented

Advances in European Union pesticide risk-assessment practice by 2022, could have provided content which could have been included in the *Methodology* (2022) document or utilised and developed as a policy discussion document to by officials, yet this does not appear to be the case.

Endocrine disruption is a formal legal decision criterion (Commission Regulation (EU) 2018/605). Endocrine effects are not a discretionary considerations but a statutory decision trigger.

Instead, NZ EPA staff lean heavily on OECD GD150 / the OECD Conceptual Framework and the WHO/IPCS definition, and endocrine disruption-related conclusions are often definition-driven and threshold-based.

> The rationale for grouping effects is based on the 'Guidance Document on standardised test guidelines for evaluating chemicals for endocrine disruption. Series on Testing and Assessment No. 150' provided by the Organisation for Economic Co-operation and Development (OECD, 2018b) for their interpretation with regard to estrogenic, androgenic, thyroidal and steroidogenic (EATS) modalities and adapting the Joint Research Centre's (JRC) screening methodology to identify potential endocrine disruptors.' (EFSA 2018)

Non-EATS mechanisms (e.g. metabolic disruption) are treated as emerging areas that require regulatory discussion, debate and evaluation. Standard guideline tests may miss sensitive developmental windows and delayed life-course effects, limiting detection of early-life programming and long-term outcomes (Grignard et al., 2022). The framework also does not distinguish endocrine 'activity' from adverse endocrine-mediated effects. This leaves key determinations dependent on weight-of-evidence judgement (European Commission, 2020).

While this may be efficient for officials, if data are incomplete, the regulators can default to a 'no formal conclusion' finding, rather than increasing controls, requesting more data or conducting further enquiry, to ensure that precaution favours protection rather than inaction.

Recent papers have called to integrate new approach methodologies (NAMs), adverse outcome pathways (AOPs), and integrated testing strategies (e.g. Barton-Maclaren et al., 2022).

This matters because the international 'state of the science' conversation has moved on. OECD's December 2025 report explicitly canvasses EATS and non-EATS endocrine disrupters and signals diversity of expert views. This is useful, but it is also an indicator of contested science. The OECD GD150/CF provides a structured basis for assessment, yet to ensure that regulators can protect the environment, test methods have to evolve in line with current science, scientists have to have the flexibility to integrate evidence which may arise from different disciplinary perspectives, and must be able to take a precautionary approach in favour of restricting applications where scientific coverage remains incomplete but there is evidence for plausible harm.

When the science is not settled, a precautionary regulator must have a clear internal decision pathway. For example, the paper by regulatory scientists (Holmer et al., 2025) reveals that even in the European Union (EU), where endocrine criteria are more formally embedded, implementation debates persist, especially around New Approach Methodologies (NAMs) and linking mechanistic signals to adversity.

The NZ EPA must be concerned with governance. Officials require a locally-owned, published 'how we decide under uncertainty' pathway for EDCs, rather than episodic, submission-triggered analysis that lacks scientifically relevant expertise, and is at risk of being undermined by narrow evidentiary conventions that do not step into broader inquiry.

[6] SILENCE: AGRICULTURAL POLLUTION.

With nearly $60 billion in agricultural exports there is no integrated, regionally appropriate strategy to monitor and assess risk from agricultural pollution in soil, water and air. Without such information HSNO decision-making cannot be comprehensive.

As a case study, the ESR national groundwater pesticide survey is a rare long-run dataset (repeated sampling since 1990), yet its apparent regulatory use is narrow, supporting product-specific leaching warnings and label controls rather than cumulative loading analysis, class-based tracking, or mixture burden governance.

In Europe, groundwater policy treats pesticide mixtures as intrinsically relevant to public protection: the regulatory benchmark is 0.1 µg/L for any individual pesticide and 0.5 µg/L for the total of pesticides in a sample. Regional regulations to limit use and prevent further accumulation can then be enacted to limit further groundwater contamination and protect drinking water. No such aggregate approach exists in New Zealand. Similarly, while the NZ EPA will approve class-based reassessments, they are yet to recognise that the bioaccumulation of a single class of pesticides in soil or water constitutes the same risk as if a single active ingredient of that class had exceeded the threshold. This is an example of the Authority failing to step into a stronger stewardship position and protect the health of local communities.

Monitoring without translation cannot protect the environment. However, there does not appear to be a funded institutional bridge that can review the ESR data, and then convert these detection patterns into precautionary triggers, reassessments, or strengthened controls.

The CEO will also inherit a stark regional reality: regional variations in agricultural use: forestry, horticulture, arable, dry stock and dairy use, the different soils, different receiving environments and climatic effects result in radically different use profiles and exposure patterns.

The stewardship task is therefore not merely ‘national standards’, but a scientifically-relevant, interdisciplinary approach that has the rigor and intelligence to shift beyond a single chemical focus and consider the wider receiving-environment: including NZ geography, soils, rainfall, aquifers, and climate.

This has never been done. Instead, the *Methodology* (2022) presumes that overseas defaults are adequate proxies. The heavy reliance on standardised parameters and offshore defaults might be administratively defensible, but it is scientifically incomplete for HSNO’s place-based protective purpose - if it is not reconciled with NZ exposure realities.

[7] SILENCE: URBAN WASTE STREAMS

The governance gap is not merely ‘the EPA doesn’t regulate everything’, but that New Zealand lacks an integrated programme that treats synthetic chemicals in wastewater and biosolids as a stewardship problem requiring cross-agency science leadership, technology development, and adaptive control over time.

Urban waste-water treatment plants do a lot of work to ensure that waste-water that is released into our rivers and sea is not microbiologically active and nutrient heavy. But the loading of man-

made chemical mixtures and that risk into receiving environments is a quiet and largely unaddressed problem.

The NZ literature on pharmaceuticals and personal care products (PPCPs) in wastewater shows these residues are routinely detectable in influent, and removal is incomplete/variable depending on compounds and treatment processes, i.e., a classic case of continuous low-dose emissions that accumulate into ecological and public-health questions (Kumar et al 2019; Kumar et al 2019).

This is precisely the kind of domain where modern digital tools (systematic evidence mapping, screening-level mixture prioritisation, automated horizon scanning) can help NZ move from 'we don't know' to 'here are the highest-risk chemicals and pathways that warrant monitoring and controls'.

But the NZ EPA has not acted on the 2019 data, and historically has not stepped in to demand the funding and capacity to routinely monitor across a significant spectrum of chemical classes and synthesise the information and evidence for chemical emissions in waste streams, or demand that resourcing for this work is undertaken, and that reports are then generated and forwarded to the NZ EPA.

[8] ABSENCE OF FORMAL NZ-SPECIFIC RISK ASSESSMENT CAPACITY

The NZ EPA demonstrates a consistent inability to characterise real-world exposure, not just hazards. New Zealand's use of pesticides that are suspected carcinogens is high (t'Mannetje 2020). Here glyphosate is again an instructive case, but it is not the exception.

The absence of formal risk assessment and relative lack of any focus on real world exposures in New Zealand is a big black spot in regulatory oversight. The NZ EPA does not have systems for requiring the monitoring and testing of farmers, growers and applicators in industrial, sporting and urban environments, to understand occupational exposure risk and the importance of mixture/tank-mix reality for applicators. The above sections showed how no work is being undertaken to understand regional agricultural use and to understand chemicals being released in urban waste water. These are large, problematic gaps in the Authority's capacity to protect human and environmental health and to inform risk assessment.

If exposure is not being measured and model assumptions are not being tested against NZ biomonitoring/environmental monitoring, 'risk assessment' is superficial and cannot address New Zealand scenarios and fulfil the overarching obligations of the HSNO Act.

[9] OVER-RELIANCE ON MODIFIED REASSESSMENTS.

Modified reassessments appear to have replaced risk assessment. Modified reassessments lean heavily on industry-supplied data and overseas regulator positions, with limited systematic review of the open scientific literature. The studies supplied by industry applicants are often not published, and the data that provides the rationale for industry claims is not shown.

With the modified reassessment process, applicants control the initial flow of data; guideline/GLP studies are privileged via reliability scoring. However, reliability scoring does not address whether the study is appropriate for hazard and risk evaluation in 2026.

In contrast, the requirement that officials review the peer-reviewed literature and mechanistic science are discretionary and therefore vulnerable to under-weighting; and co-

formulants/formulations and mixture effects can be left under-characterised. In practice, officials do not conduct literature reviews where they use a declared method to systematically evaluate the science on the different risk pathways of a pesticide.

NZ EPA officials have also ignored the policy significance of court-disclosed evidence (e.g., for example in the Pilliod glyphosate trial where dermal exposure dynamics can be longer-lived than assumed).

The ignorance of information uncovered in the discovery process, that meaningfully add to real world evidence, in combination with the capacity of an integrated literature review to shed light on the mechanistic effects that increase the evidence for the plausibility of outcomes identified in the case, cohort and epidemiological literature, suggests that NZ EPA officials lack capacity, the institutional culture or the managerial approval to look further. Epidemiologist Professor Dave McLean discussed the absence of the use of epidemiological data by the NZ EPA in his book Pesticides and Health: How New Zealand Fails in Environmental Protection.

[10] CASE STUDY OF WIDER SYSTEM FAILURE: GLYPHOSATE

Glyphosate's regulatory footing in New Zealand is historically thin. It sits on a 50-year old transfer into HSNO (a grandfathering mechanism) and later administrative reissuing to align classifications with updated GHS rules, rather than a contemporary, NZ-specific reappraisal of hazards, exposures, and risk management under present-day use. That distinction matters because 'lawful approval' can be the product of legacy continuity, not of modern, scientifically-relevant scrutiny.

The International Agency for Research on Cancer (IARC) (2015) finding that glyphosate was 'probably carcinogenic to humans', was a global signal that the scientific conversation had shifted. It did not compel a legal outcome in New Zealand, but it did sharpen the public-law question: when a credible international hazard authority changes the framing, does a protective statute like HSNO expect the regulator to revisit the substance in NZ conditions, or can the system continue to rely on inherited approvals unless a very high threshold is met?

EPA's post-2015 posture, as perceived by critics, illustrates a recurring pattern in chemical governance: the agency commissions or cites reviews that are explicitly not reassessments, then treats the resulting position as effectively dispositive unless new evidence crosses a demanding gateway. The Temple Cancer review (2016) which was published to rebut the IARC finding, is a case in point. It was not a reassessment. The subsequent critique by senior public health scientists and epidemiologists (Douwes et al. 2018) critiqued the reliance by the Temple on an earlier European Food Safety Authority (EFSA) report, which was markedly flawed as it had heavily relied on industry-funded and industry-manipulated reviews. The Temple paper additionally lacked discussion of NZ exposures which are relevant to judging risk and hazard.

The critique by *Douwes et al* was not a rhetorical objection; it was a technical complaint by scientists with expertise in public health: over-reliance on overseas regulator conclusions, constrained engagement with contested bodies of evidence, and lack of NZ exposure analysis that could allow hazard signals to be translated into risk and controls.

The NZ EPA's 2021 Call for Information on glyphosate (CFI) looked, on the surface, like a democratic corrective, a channel for practical proposals and local knowledge. As a consequence,

submitters to the Call asked for measures that would materially change exposure: restricting retail availability, requiring trained use, limiting application in public spaces, controlling co-formulants like surfactants, tightening signage/notification, and constraining use on food crops.

Yet the CFI was framed as voluntary, and EPA stated it did not verify submitter claims. The deeper critique is that the exercise produced no visible regulatory reform: there is no public evidence of binding HSNO control amendments being enacted following the process to implement submitter proposals, and no transparent scientific evaluation showing which proposals were tested, rejected, or prioritised and why. This was consultation without evaluative follow-through, perhaps viewed internally as a process to ensure reputational management, following the Douwes criticisms.

Requests for formal risk assessment of glyphosate have repeatedly stalled at the 'grounds' stage, - the NZ EPA appear operationally closed to new information unless evidence is presented in a regulator-preferred format.

The Douwes et al paper which called for risk assessment was ignored by the NZ EPA, member of Parliament Steffan Browning called for formal risk assessment. The Associate Minister for the Environment also requested that the EPA consider reassessing glyphosate, and the NZ EPA refused.

Then, in February 2023 the Environmental Law Initiative applied to the NZ EPA to determine if there was grounds for a formal risk assessment. The NZ EPA rejected their application (July 2024). In September 2024 ELI made an application for Judicial Review of that July decision. In October 2025, the High Court upheld the Environment Protection Authority's (EPA) decision not to reassess glyphosate.

ELI's move into formal process is best understood as an attempt to force the system to do what the CFI did not: confront the statutory question of reassessment. ELI sought to open the gateway under HSNO s 62 on the basis of significant new information. That strategy implicitly recognises a hard reality: under HSNO, the regulator is not obliged to reassess simply because controversy exists; it is obliged only when the legal threshold is met.

EPA's rejection of ELI's application turns on 'significance', and on the mechanics by which significance is judged. 'New' information can be acknowledged and still deemed insufficient if it does not dislodge EPA's existing risk view, especially when overseas regulators have maintained their conclusions and when reliability scoring diminishes the weight of contested literature.

This is where the critics' complaint' about 'modified risk assessment' bites: if the agency's frame effectively requires evidence to look like an industry dossier or an overseas regulator's endpoint, then the gateway may filter out precisely the sort of public-interest evidence that signals uncertainty, cumulative exposure, vulnerable subgroups, or formulation-based toxicity.

ELI consequently lodged an appeal against the ruling, claiming that the High Court erred in finding the EPA's decision was lawful, including by (See Appeal Grounds on the ELI website):

- *Misinterpreting the scope of section 62 of the Hazardous Substances and New Organisms Act (HSNO): The Court accepted that the EPA could apply a high threshold for what counts as "significant new information" because the power under s 62 is "highly discretionary and*

administrative." ELI contends this undermines s 62's critical gatekeeping function into reassessments.

- *The Court did not engage with the question of when significant new information should be assessed for glyphosate, where the EPA acknowledged there is no record of any prior risk assessment in Aotearoa.*
- *Endorsing the EPA's "weight of evidence" approach: The Court found it was not an error for the EPA to weigh ELI's evidence against existing evidence (principally European Union regulatory assessment material) to determine significance. ELI argues this approach is inconsistent with HSNO's precautionary intent.*
- *Misapplying HSNO's purposes and principles: The Court held that the EPA sufficiently considered Part 2 of HSNO because it referenced these principles in its decision. ELI argues that a comprehensive application was required, including express consideration of the precautionary approach and Te Tiriti o Waitangi responsibilities.*
- *Overlooking glyphosate-containing substances: The Court erred in finding that the EPA adequately considered glyphosate-containing substances.*

Courts do not decide whether glyphosate is safe; they decide whether the NZ EPA acted unlawfully. Judicial review is typically deferential where Parliament has entrusted decisions to expert regulators and where statutory tests involve judgment and weighting.

If the Court characterised s 62 as 'highly discretionary and administrative', and therefore accepted a high threshold for 'significant new information', that raises a constitutional question:

- Is s 62 meant to be protective and precautionary?
- Or is it meant to shield prior approvals unless overwhelming evidence emerges?

Under a public-interest reading of HSNO, s 62 functions as a safety valve. It is the mechanism by which emerging hazard evidence, cumulative exposure knowledge, endocrine disruption findings, or international regulatory shifts can trigger reconsideration. If the threshold is set too high, the gate effectively closes, not because no new science exists, but because the bar is calibrated to preferentially to preserve the status quo (and regulatory stability) rather than to test risk afresh.

ELI's point about the absence of any documented prior NZ risk assessment is legally important. If glyphosate has never undergone a full, contemporary, New Zealand-specific reassessment under current knowledge frameworks (mixtures, cumulative exposure, endocrine pathways, ecological systems impacts), then:

- What baseline is s 62 operating against?
- Significant compared to what?

A public law concern arises if 'significance' is judged relative to foreign regulatory material rather than to a domestic evidentiary baseline. HSNO is territorially grounded legislation. It requires consideration of New Zealand's environment, exposure patterns, Māori interests, and ecological context.

The Court accepted the EPA's weighing of ELI's material against existing EU regulatory assessments. Weight-of-evidence models are standard in toxicology but establishing weight of

evidence before progressing to risk assessment is arguably misleading. Under HSNO officials operate within a statute that explicitly requires that official act to:

- ✓ Protect human and environmental health.
- ✓ safeguarding life-supporting capacity of environmental systems.
- ✓ consider uncertainty and operate with precaution (s 7).

Precaution does not displace the weighing of evidence; it reframes it. It requires officials to ask whether credible scientific uncertainty about potentially serious harm warrants further inquiry, rather than being resolved at the threshold stage.

In circa 2023-2026 circumstances where there is no routine environmental or biomonitoring data in New Zealand, no documented contemporary NZ-specific risk assessment, and where European Union recommendations and controls, including formulation strengths, public-use restrictions, and application rules on water surfaces differ materially from domestic settings, the evidential context is not equivalent.

A weight-of-evidence approach applied without this contextual overlay can operate less as evaluation and more as a barrier to regulatory inquiry, effectively raising the gate that s 62 was designed to open.

The case of glyphosate and the calls for a formal risk assessment therefore represent something more fundamental than disagreement about carcinogenicity. They are a request that HSNO's protective architecture be used as designed: not merely to catalogue hazards, but to assess risk in real-world NZ contexts, including vulnerable populations, cumulative/aggregate exposures, and formulation-level effects.

A central feature of this legacy approach is the evidentiary hierarchy. The NZ EPA's approach, observed in the Methodology (2022) privileges GLP/test-guideline studies and uses reliability scoring that tends to down-weight epidemiology (as Professor Dave McLean has described), systematic reviews, and independent synthesis, especially where causal inference is complex or mechanisms are contested.

However, studies can get 'locked in' and form the basis of acceptable exposure levels for decades. Old unpublished Monsanto studies (Bio/Dynamics 1981; Atkinson 1993) form the basis for evidence for safe levels of glyphosate in drinking water in 2026.

The position of current NZ EPA management may be defensible as one method of managing uncertainty, but it also entrenches a predictable asymmetry: industry-commissioned dossiers and regulator-to-regulator review loops become the 'gold standard', while independent science is treated as suggestive but rarely decisive. In practice, has enabled the claim of 'alignment with overseas regulators' to substitute for an any domestic evaluation of New Zealand exposures and any discussion of alternatives that could be safer. This is not protective of farmers and growers and their families, but protective of the chemical industry.

ELI's appeal matters because it is not merely another scientific disagreement recast as litigation. It is an argument about statutory interpretation and governance design: whether a protective statute that embeds precaution can be administered through a gateway so strict that precaution is functionally postponed until evidence becomes both overwhelming and regulator-conforming. In

other words, the question is whether precaution is an operative decision principle or a recital that has little traction until the door to reassessment is already open.

HSNO's protective framework requires attention to both hazard and risk and instructs caution where uncertainty exists. The governance tension is that 'hazard' can be acknowledged yet neutralised by insisting that risk has not been shown to change, without doing the exposure work that would actually reveal whether risk has shifted under NZ use patterns. If NZ exposure data are thin, that does not necessarily justify regulatory confidence; it may justify a precautionary programme of measurement, monitoring, and targeted control. A regime that treats data absence as reason to maintain status quo, rather than reason to investigate, can drift away from HSNO's protective logic.

It's interesting to observe that the NZ EPA have been happy to spend budgetary resources on the Call for Information (which involved analysing 465 responses and editing and publishing a 129-page Summary Report), on the 26-page rebuttal to ELI and to ongoing court litigation – but not on formal risk assessment of a pesticide that has never been formally risk assessed in 50 years.

Taken together, the post-2015 story reads less like a science dispute and more like a stewardship deficit. The system appears capable of processing paperwork, aligning classifications, and restating alignment with overseas regulators, yet reluctant to undertake a transparent, NZ-specific risk assessment that integrates modern evidence, exposure realities, formulation effects, and uncertainty. The ethical critique is that where a substance is ubiquitous and exposures are widespread, 'procedurally correct' governance is not necessarily 'substantively responsible' governance.

[11] GATEKEEPING IN FAVOUR OF BIG PESTICIDE - OR SO MUCH MORE?

Regulatory guidelines can become a gatekeeping technology, useful for consistency, but also capable of excluding mechanistic, epidemiological, and real-world field evidence that signals harms outside standard endpoints.

As this briefing paper has discussed, the dominant public-facing paper, a *Methodology* (2022) is essentially an applicant-facing, model-centric, often out-dated construction, and does not embed circa 2026 evidence-based pathways for independent evidence synthesis, monitoring integration, or operational precaution.

Without published decision pathways, officials predictably default to what they can defend procedurally (models, defaults, dossiers), rather than a stronger and scientifically robust evidence base, which is what HSNO requires substantively. This includes knowledge of hazard and risk under New Zealand conditions, with precaution where uncertainty is material.

This reflects the concept of regulatory capture.

Appropriate HSNO Act stewardship can only work if officials have the resourcing and capacity to broaden their scope to include new information and new evidence of risk.

When credible signals exist, for example, including mechanistic plausibility, cohort signals, developmental windows, class-based effects, non-EATS endocrine pathways, the agency must be

required, by internal policy, to conduct or commission systematic reviews and integrate monitoring evidence, rather than leaving it to chance or submissions.

Modern AI and machine learning tools support regulatory monitoring, research synthesis and data analysis.

They can reduce the marginal cost of horizon scanning, evidence mapping, adverse outcome pathway (AOP) synthesis, and cross-linking monitoring detections to plausible mechanistic harms, which can then support scientific and official judgement.

CONCLUSION

The NZ EPA has a missing white paper problem and a formal risk-assessment avoidance problem. As this brief paper outlines, there is a lack of evidentiary documentation to demonstrate that NZ EPA officials are supported in their scientific analysis and decision-making processes, which ensure there is transparency in the use of science to justify the regulation of hazardous substances and the quality of the scientific understanding that is relied upon.

The absence of a consolidated, HSNO-facing decision framework that explains how officials should do risk assessment and precaution in 2026 reality, mixtures, long latency, endocrine modalities, NZ exposure heterogeneity, and incomplete monitoring.

If the new CEO continues on the path that the current CEO has followed, the NZ EPA will be faced with an accelerated decline in trust, simply because new technologies have transformatively enhanced the capacity for both scientists and lay communities to build a deeper understanding of hazards and risks from hazardous substances, and communicate this information in a public-good capacity.

The above discussion provides a credible case for an independent inquiry into the ability of the EPA to safely steward hazardous substances, however, with a new CEO starting mid-year, there is a huge opportunity for reform that can be led within the agency itself.

The next five years will demonstrate whether the new CEO has the fortitude to undertake this work.

Kiwis will keep a keen eye on the unfolding operations and the work of members of Parliament, Treasury and related health, environment and agricultural ministers in ensuring that the NZ EPA has adequate long-term resourcing, and is not a timid lap-dog of the chemical industry, but a globally relevant regulator which has the capacity to undertake it’s work to a level of quality that ensures that it can fulfill the purpose of the HSNO Act.

In the meantime, many of the reasons why an inquiry is presently needed, are listed above.

All Kiwis can start asking questions that could be answered by future investigators. Is the NZ EPA sufficiently resourced enough to:

- Independently review contemporary scientific literature to understand new knowledge around the mechanism and action, the risk of bioaccumulation, and the problem of persistence (including chronic exposures) in human biology and the environment.
- Demand and then evaluate and incorporate New Zealand-specific environmental monitoring and exposure data in its considerations. This includes urban, worker, bystander and neighbouring property exposure, including from formulation and mixture effects.

- Assess persistence, bioaccumulation, and long-term environmental loading;
- Evaluate formulation toxicity and mixture effects; and
- Manage uncertainty in a manner consistent with HSNO's precautionary intent.

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